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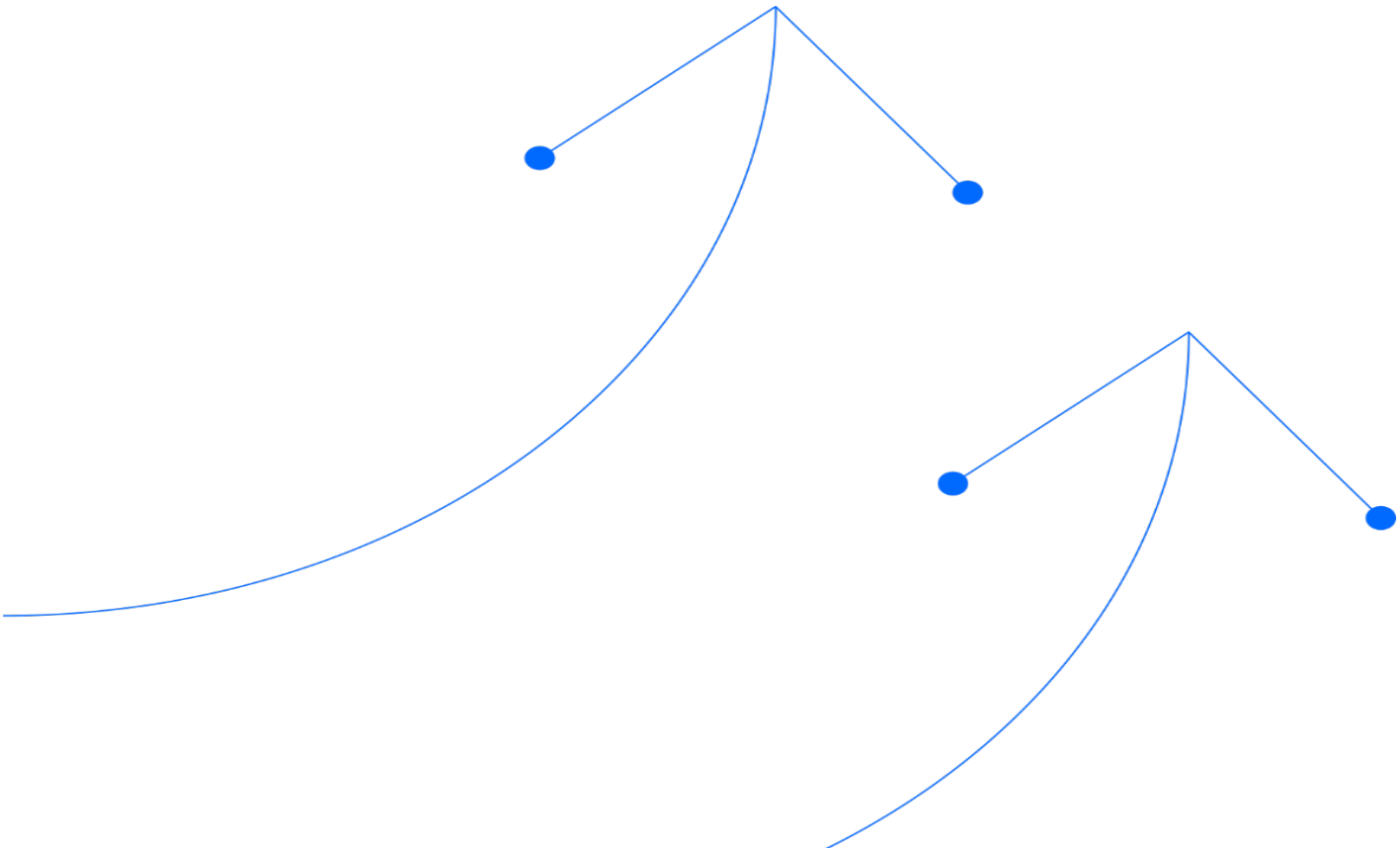
Van Gogh Coniston Novara VGA-4H GI ST1 Well Decommissioning Environment Plan

February 2026



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Van Gogh Coniston Novara VGA-4H GI ST1 Well

Decommissioning Environment Plan

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Terms

Term	Definition
ABARES	Australian Bureau of Agricultural and Resource Economics and Sciences
ACHIS	Aboriginal Cultural Heritage Inquiry System
ACN	Australian company number
ACT	Australian Capital Territory
AEP	Australian Energy Producers
AFMA	Australian Fisheries Management Authority
AFZ	Australian Fishing Zone
AHO	Australian Hydrographic Office
AIO	auditory injury onset
ALARP	as low as reasonably practicable
AMPs	Australian Marine Parks
AMSA	Australian Maritime Safety Authority
ANZG	Australian and New Zealand Water Guidelines
API	American Petroleum Institute
BIA	biologically important area
BOP	blowout preventer
CEWAFs	chemically enhanced water-accommodated fractions
CHARM	chemical hazard and risk management
CH_4	methane
CM	control measure
CO_2	carbon dioxide
COLREGS	Convention on the International Regulations for Preventing Collisions at Sea
CSIRO	Commonwealth Scientific and Industrial Research Organisation
DAFF	Department of Agriculture, Fisheries and Forestry (Commonwealth)
DAH	dissolved aromatic hydrocarbon
DAWE	Department of Agriculture, Water and Environment, now Department of Climate Change, Energy, the Environment and Water
dB	decibel
DBCA	Department of Biodiversity, Conservation and Attractions (Western Australia)
DCCEEW	Department of Climate Change, Energy, the Environment and Water
DEWHA	Department of the Environment, Water, Heritage, and the Arts, now Department of Climate Change, Energy, the Environment and Water
DMPE	Department of Mines, Petroleum and Exploration
DNP	Director of National Parks
DoD	Department of Defence
DoE	Department of the Environment, now
DoEE	Department of the Environment, Water, Heritage, and the Arts, now Department of Climate Change, Energy, the Environment and Water
DTM	disconnectable turret mooring
DTMI	Department of Transport and Major Infrastructure
DP	dynamic positioning

Term	Definition
DPIRD	Department of Primary Industries and Regional Development
DSEWPaC	Department of Sustainability, Environment, Water, Population and Communities, now Department of Climate Change, Energy, the Environment and Water
ESD	ecologically sustainable development
EMBA	environment that may be affected
ENVID	environmental hazard identification workshop
EP	Environment Plan
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
EPO	environment performance outcome
EPS	environmental performance standard
EVA	environmental economic value
FAR	floating asset removal
FCA	Federal Court of Australia
FCAFC	Federal Court of Australia – Full Court
FPSO	floating production, storage and offloading
GHG	greenhouse gas
HEV	high environmental value
hi-vis	high viscosity
HOCNF	harmonised offshore chemical notification format
HSE	health, safety, and environment
IBC	intermediate bulk container
ILUA	Indigenous Land Use Agreement
IMO	International Maritime Organization
IMS	invasive marine species
IMSMP	Invasive Marine Species Management Plan
ISO	International Standards Organization
ITC	internal tree cap
ITOPF	International Tankers Owners Pollution Federation
IUCN	International Union for Conservation of Nature
JRCC	Joint Rescue Coordination Centre
KEF	key ecological feature
LWIV	light well intervention vessel
LOWC	loss of well control
MARPOL	International Convention for the Prevention of Pollution from Ships
MBES	multibeam echo sounder
MC	measurement criteria
MDO	marine diesel oil
MMO	Marine Mammal Observer
MNES	matter of national environment significance
MoC	management of change
MODU	mobile offshore drilling unit
MoU	Memorandum of Understanding

Term	Definition
MPNMP	Marine Parks Network Management Plan
N_2O	nitrous oxide
NEBA	net environmental benefit analysis
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NOPSEMA	National Offshore Petroleum Safety and Environmental Management Authority
NORM	naturally occurring radioactive material
NO_X	nitrogen oxides
NRC	National Research Council
NW	North West
NWS	North West Shelf
OCNS	Offshore Chemical Notification Scheme
ODS	ozone depleting substances
OECD	Organisation for Economic Co-operation and Development
OPGGS(E)R	Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2023
OPGGS Act	*Offshore Petroleum and Greenhouse Gas Storage Act 2006*
OPEP	Oil Pollution Emergency Plan
OSPAR	Oslo and Paris Convention for the Protection of the Marine Environment of the Northeast Atlantic
OVID	Offshore Vessel Inspection Database
PAHs	polycyclic aromatic hydrocarbons
PBC	Prescribed Body Corporate
PLONOR	pose little or no risk (to the environment)
PMS	planned maintenance system
PMST	protected matters search tool
PSZ	petroleum safety zone
PTS	permanent threshold shift
Q#	quarter
ROV	remotely operated vehicle
SAR	subsea asset removal
SBES	single beam echo sounder
SDS	safety datasheet
SEL	sound exposure level
SEL_{24h}	weighted cumulative sound exposure level over a 24-hour period
SELcum	sound exposure level (accumulated)
SFRT	subsea first response toolkit
SIMAP	Spill Impact Mapping and Analysis Program
SMPEP	Shipboard Marine Pollution Emergency Plan
SOLAS	International Convention on the Safety of Life at Sea 1974
SOPEP	Shipboard Oil Pollution Emergency Plan
SO_X	sulphur oxides
SPL	sound pressure level

Term	Definition
SSS	side-scan sonar
THC	total hydrocarbon content
TSSC	Threatened Species Scientific Committee
TTS	temporary threshold shift
UK	United Kingdom
US	United States
VGCN	Van Gogh Coniston Novara
WA	Western Australia
WAF	water accommodated fraction
WAFIC	Western Australian Fishing Industry Council
WBM	water based mud
WDCS	Whale and Dolphin Conservation Society
WOCS	workover and control system
WOMP	Well Operations Management Plan
XT	xmas tree

Units of measure

Unit	Description
%	percent
°C	degrees centigrade
cP	centipoise
dB	decibels
dB(A)	decibels A-weighting
EC_{50}	effective concentration 50%
ErC_{50}	effect reduction concentration 50%
g/m^2	grams per square metre
HP	horsepower
hrs	hours
Hz	hertz
kHz	kilohertz
km	kilometre (1,000 metres)
km^2	square kilometres
kW	kilowatt
L	litre (1,000 ml)
LC_{50}	lethal concentration 50%
m	metre (100 cm)
m^2	square metre
m^3	cubic metre
mg/kg	milligrams per kilogram
mg/L	milligrams per litre
ml	millilitre
mm	millimetre
nm	nautical mile (1.856 km)
Pa	Pascal (unit of pressure)
PK	peak sound pressure level
ppb	parts per billion
ppm	parts per million
rms	root mean square
s	second (time)
t	tonne (1,000 kg)
µg/L	micrograms per Litre
µPa	micropascal
μPa^2	micropascal squared

1. Introduction

1.1 Environment Plan summary

Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2023 (OPGGS(E)R 2023) Requirements
Section 35(6)
Within 10 days after receiving notice that NOPSEMA [National Offshore Petroleum Safety and Environmental Management Authority] has accepted an environment plan (whether in full, in part or subject to limitations or conditions), the titleholder must submit a summary of the accepted plan to the NOPSEMA for public disclosure.
Section 35(7)
The summary: • must include the following material from the environment plan for the activity: (i) the location of the activity (ii) a description of the receiving environment (iii) a description of the activity (iv) details of environmental impacts and risks of the activity (v) a summary of the control measures for the activity (vi) a summary of the arrangements for ongoing monitoring of the titleholder's environmental performance (vii) a summary of the response arrangements in the oil pollution emergency plan (viii) details of consultation already undertaken, and plans for ongoing consultation (ix) details of the titleholder's nominated liaison person for the activity, and • must be to the satisfaction of NOPSEMA.

This Van Gogh Coniston Novara VGA-4H GI ST1 Well Decommissioning Environment Plan (EP) Summary has been prepared from material provided in the EP. The summary consists of the following as required by section 35(7) of the OPGGS(E)R:

EP Summary Material Requirement	Relevant Section of EP Containing Summary Material
The location of the activity	2.1.1
A description of the receiving environment	3, Appendix C, Appendix D
A description of the activity	2
Details of the environmental impacts and risks	6 and 7
The control measures for the activity	8.4.1
The arrangements for ongoing monitoring of the titleholder's environmental performance	8
Response arrangements in the oil pollution emergency plan (OPEP)	6.8, 7.5, 7.6, 7.7, 8.7 See Van Gogh Coniston Novara VGA-4H GI ST1 Well Decommissioning OPEP (7745-236-EMP-0002)
Consultation already undertaken and plans for ongoing consultation	4
Details of the titleholders nominated liaison person for the activity	1.5

1.2 Activity overview

Santos WA PVG Pty Ltd (Santos) is preparing to temporarily suspend or decommission the VGA-4H GI ST1 well within the Van Gogh Coniston Novara (VGCN) fields (production licence WA-35-L). The titleholders are Santos WA PVG Pty Ltd (52.501% ownership) and INPEX Alpha Ltd (47.499% ownership). The well is located in Commonwealth waters approximately 285 km west-southwest of Dampier and 60 km north of Exmouth, Western Australia (Figure 1-1). The water depths in the field range from approximately 360 m to 380 m.

The VGCN fields ceased production in 2025. Santos plans to complete decommissioning in three stages:

- floating asset removal (FAR)
- well decommissioning
- subsea asset removal (SAR).

The FAR campaign (covered in the Ningaloo Vision Cessation of Production and Floating Asset Removal EP (7750-650-EIS-0007) accepted by NOPSEMA in December 2024) covers the removal of floating assets (disconnectable turret mooring (DTM) risers and wet parking or removal of the DTM mooring lines) in the vicinity of the former floating production, storage and offloading (FPSO) location, recovery of a section of damaged production flowline B, FPSO disconnect and permanent FPSO sail away.

Santos plans to undertake well intervention to suspend the single barrier VGA-4H GI ST1 well, or, alternatively, the well may be decommissioned.

Well suspension will be carried out using a light well intervention vessel (LWIV), or alternatively, well decommissioning activities will be carried out using a mobile offshore drilling unit (MODU). Both the LWIV and MODU will require support vessels and helicopters. Both activities may also include use of a remotely operated vehicle (ROV).

The well decommissioning activity will place permanent barriers in the well. To do so, some components of well infrastructure will be removed (e.g. crown plugs, completion tubing). Additionally, some subsea infrastructure may also be removed (e.g. electrical flying lead, hydraulic flying lead) between the xmas tree (XT) and the subsea manifold to facilitate the safe and effective removal of the XT, if it is removed during the well decommissioning activity.

The activity is planned to commence between approximately Quarter (Q)3 2026 and Q4 2027 with an expected duration of approximately 10 to 40 days.

Both the commencement date and duration may vary depending on approvals, MODU/LWIV availability, operational efficiencies and weather conditions This EP has evaluated impacts and risks of the activity for any time of the year to allow for operational flexibility.

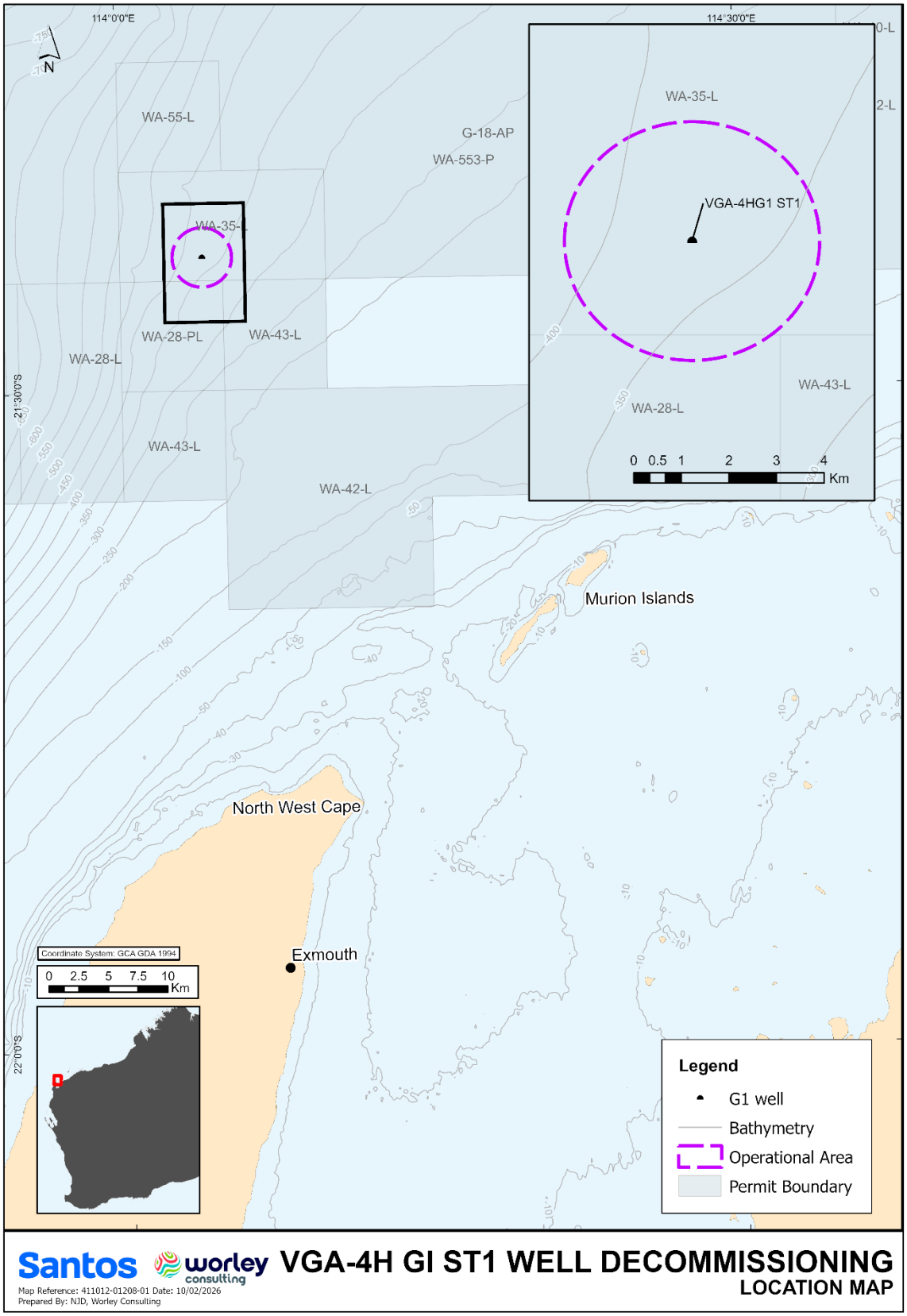

Figure 1-1: Location map

1.3 Purpose of this Environment Plan

This EP has been prepared to address the environmental requirements of activities undertaken in accordance with Commonwealth OPGGS(E)R, for acceptance by NOPSEMA.

In accordance with the OPGGS(E)R, this EP details the environmental impacts and risks associated with the activity and demonstrates how these will be reduced to as low as reasonably practicable (ALARP) and to an acceptable level. The EP provides an implementation strategy that will be used to measure and report on environmental performance during planned activities and unplanned events to ensure impacts and risks are continuously reduced to ALARP and are at an acceptable level. The environmental management of the activity described in the EP complies with the Santos Environment Policy (Appendix A) and with all relevant legislation (Appendix B). This EP documents and considers all relevant stakeholder consultation performed during the development of the EP.

This EP represents the next step in Santos' approval pathway to decommissioning the VGCN field. Santos' decommissioning approvals pathway for decommissioning the VGCN field is detailed in Section 1.5 of the Ningaloo Vision Cessation of Production and Floating Asset Removal EP (7750-650-EIS-0007).

1.4 Environment Plan validity

This EP remains valid from NOPSEMA acceptance for a period of five years, or until NOPSEMA has accepted an end-of-activity notification under section 46, or until Santos revises this EP in the event a significant change to the activity or level of impact or risk occurs as required under subsections 39(1) and 39(2). This period provides an appropriate window for safely and effectively executing the activities.

Santos may revise the EP, using the Management of Change (MoC) process described in Section 8.10. Any changes made under this process will not affect the validity of this EP.

1.5 Operator and titleholder details

OPGGS(E)R 2023 Requirements
Section 23. Details of titleholder and nominated liaison
23(1) The environment plan must include the following details for the titleholder: (a) name (b) business address (c) telephone number (if any) (d) fax number (if any) (e) email address (if any) (f) if the titleholder is a body corporate that has an Australian Company Number (within the meaning of the *Corporations Act 2001*) – ACN. 23(2) The environment plan must also include the following details for the titleholder's nominated liaison person: (i) name (ii) business address (iii) telephone number (if any) (iv) fax number (if any) (v) email address (if any).

1.5.1 Details of titleholder

Santos WA PVG Pty Ltd is the nominated titleholder for the petroleum activity covered under this EP within WA-35-L.

In accordance with section 23(1) of the OPGGS(E)R, the titleholder details are as follows:

Name:	Santos WA PVG Pty Ltd
Business address:	100 St Georges Terrace, Perth, WA 6000
Telephone number:	(08) 6218 7100
Email address:	WA.NT.Regulatory@santos.com
ACN:	129 604 860

1.5.2 Details of nominated liaison person

Details for Santos' nominated liaison person for the activity are as follows:

Name:	Dawn MacInnes (Manager, Environment Approvals (WANATL)
Business address:	Level 7, 100 St Georges Terrace, Perth, WA 6000
Telephone number:	(08) 6218 7100
Email address:	WA.NT.Regulatory@santos.com

1.5.3 Notification procedure in the event of changed details

If there is a change in the titleholder, the titleholder's nominated liaison person, or a change in the contact details for the titleholder or liaison person, Santos will notify NOPSEMA in writing and provide the updated details.

1.6 Environmental management framework

OPGGS(E)R 2023 Requirements
Section 24(a). Other information in environment plan
The environment plan must contain the following: (i) a statement of the titleholder's corporate environmental policy

1.6.1 Environmental Policy

The activities will be conducted in accordance with the Santos Environment Policy (Appendix A) and relevant legislative requirements presented within Appendix B, inclusive of the relevant EP sections where the legislation may prescribe or control how an activity is undertaken.

Sections 6 and 7 reflect the Santos Environment Policy, detailing and evaluating impacts and risks from planned and unplanned events, providing control measures with set performance outcomes, standards, and measurement criteria to ensure environmental performance is achieved.

1.7 Legislative requirements

OPGGS(E)R 2023 Requirements
Section 21. Environmental assessment
Description of the activity 21(4) The environment plan must: (a) describe the requirements, including legislative requirements, that apply to the activity and are relevant to the environmental management of the activity, and (b) demonstrate how those requirements will be met.

1.7.1 Commonwealth and State legislation

All activities will comply with legislative requirements established under relevant Commonwealth and State legislation. These are further detailed in Appendix B.

1.7.2 Offshore Petroleum and Greenhouse Gas Storage Act 2006

The *Offshore Petroleum and Greenhouse Gas Storage Act 2006* (OPGGS Act) is the principal legislation managing petroleum activities in Australian Commonwealth waters.

The OPGGS Act and supporting sections address all licencing, health, safety environmental and royalty issues for offshore petroleum and gas exploration and production operations in Commonwealth waters. Specifically, the OPGGS(E)R prescribe the requirements for management of environmental impacts associated with petroleum activities and require proponents to submit an EP to the regulatory authority for approval prior to the commencement of activities. As part of these documents, the proponent is required to assess the risks associated with the activities and demonstrate that the proposed mitigation measures reduce these risks to ALARP and acceptable levels.

Obligations in relation to the maintenance and removal of equipment and property brought onto title are provided under subsection 572(3) of the OPGGS Act. Under subsection 572(3) of the OPGGS Act, a titleholder must remove

from the title area all structures that are in, and all equipment and other property that is neither used nor to be used in connection with the operations. Under subsection 572(7), property removal requirements are subject to any other provision of the OPGGS Act, the regulations, directions given by NOPSEMA or the responsible Commonwealth Minister, and any other law. Section 572(3) requires the removal of property when it is no longer used, unless NOPSEMA has accepted alternative arrangements where justification is appropriate and with regard to the Guideline: Offshore Petroleum Decommissioning (Department of Industry, Science and Resources, 2022).

Appendix B includes the pertinent sections of the OPGGS(E)R 2023 and details the sections of the EP that ensure compliance with the requirements.

1.7.3 Environment Protection and Biodiversity Conservation Act 1999

The Van Gogh Development was referred under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) to the Commonwealth Department of Environment, Water, Heritage, and the Arts (DEWHA; now Department of Climate Change, Energy, the Environment and Water (DCCEEW)) on 3 January 2007 (Ref. EPBC 2007/3213). The DEWHA determined that the development was a “controlled action” requiring approval under Part 3, Division 1 of the EPBC Act. The Van Gogh Development referral covered the installation of subsea equipment to control and direct reservoir production fluids to an FPSO vessel, to recover, process and export oil from the Van Gogh field.

1.7.4 International legislation

Australia is signatory to numerous international conventions and agreements that obligate the Commonwealth Government to prevent pollution and protect specified habitats, flora, and fauna. Those that are relevant to the activities are detailed in Appendix B.

2. Activity description

OPGGS(E)R 2023 Requirements
Section 21. Environmental assessment
Description of the activity 21(1) The environment plan must contain a comprehensive description of the activity including the following: (a) the location or locations of the activity (b) general details of the construction and layout of any facility that is used in undertaking the activity (c) an outline of the operational details of the activity (for example, seismic surveys, exploration drilling or production) and proposed timetables for undertaking the activity, and (d) any additional information relevant to consideration of environmental impacts and risks of the activity. Note: An environment plan will not be capable of being accepted by the regulator if an activity or part of the activity, other than arrangements for environmental monitoring or for responding to an emergency, will be undertaken in any part of a declared World Heritage property – see Section 3.

2.1 Activity overview

The VGA-4H GI ST1 well will either be suspended using a dynamically positioned (DP) LWIV or decommissioned using a MODU (moored or DP). In either case, the objective is to return the VGA-4H GI ST1 well to a two-barrier status. If suspension using a LWIV is undertaken, the well will need to be decommissioned, which would occur at a later date as part of the VGCN overall field well decommissioning campaign, which is subject to separate regulatory approvals.

A summary of key activities under this EP is provided in Table 2-1.

Table 2-1 Summary of key activities

General Details	
Operational Area	The Operational Area is defined as a 2,500 m radius surrounding the VGA-4H GI ST1 well in the VGCN field, with water depths of approximately 360 to 380 m
Operational activities	
MODU type	MODU (DP or moored) or LWIV (DP)
In-field MODU or LWIV no.	One MODU or LWIV will be involved with the well suspension or well decommissioning activities covered by this EP
Support vessel type	Up to three supply vessels, which could be anchor handling supply vessels (AHSVs), platform supply vessels (PSVs) or a combination of the two.
In-field vessel no. (including MODU)	1 to 4
Remotely operated vehicles	Yes
Helicopters	Yes
Well suspension/well decommissioning activities	
No. of wells	1
Estimated activity durations	10–40 days, depending on the required activities
Well decommissioning	VGA-4H GI ST1 well will be either suspended or decommissioned in accordance with the NOPSEMA accepted Well Operations Management Plan (WOMP).

2.1.1 Location and Operational Area

The VGCN fields are located approximately 285 km west-southwest of Dampier and 60 km north of Exmouth in production licence WA-35-L, with the Operational Area extending into WA-28-PL, as shown in Figure 1-1. Water depths in the VGCN fields range from 360 m to 380 m. The activities covered by this EP will occur in an Operational Area, which is defined as within a 2,500 m radius of the VGA-4H GI ST1 subsea well, which is located in 367 m of water at latitude 21° 23' 52.186" south, longitude 114° 04' 04.147" east. The Operational Area is shown on Figure 1-1.

2.1.2 Timing and duration

Activities are expected to commence between Q3 2026 and Q4 2027 with an estimated duration of approximately 10 to 40 days. The permanent decommissioning of a well typically takes 20 to 40 days, depending on the complexity of preparing the well for placement of those barriers. Suspension of a well typically takes 10 to 30 days, depending on the complexity of gaining access to the well for placement of those barriers.

The exact timing and duration of this activity is subject to MODU/LWIV availability, MODU/LWIV capability and metocean conditions (particularly cyclonic activity). Once started, operations will be 24 hours per day, seven days per week. This EP assumes the activity may be undertaken at any time of year over the validity period of this EP.

2.2 Activities before mobile offshore drilling unit (MODU)/light well intervention vessel (LWIV) mobilisation

Prior to well suspension or well decommissioning by a LWIV or MODU, preparatory activities may occur using a support vessel with a winch or davit-deployed ROV and potentially a subsea winch. Additional equipment may be added to expand the ROV capabilities. The class and size of the ROV and equipment used will be dependent on the survey or preparatory work requirements. A subsea winch may also be available on the vessel to assist in removal and/or replacement of well infrastructure.

Preparatory activities may include the following:

- Install and calibrate the long baseline array system.
- Perform an as-found well system survey and VGA-4H GI ST1 GVI and/or close visual inspection.
- Verify the vertical flow line jumper gooseneck height (if rigid jumper has not yet been removed).
- Remove corrosion cap.
- Clean the internal tree cap (ITC), crown plug and H4 profile, install refurbed corrosion cap and inject inhibitor.
- Disconnect or park the production hydraulic flying lead, if not already done during rigid jumper removal campaign.
- Clean the XT fixed production stab plate.
- Install ROV workover and control system (WOCS) plate onto XT fixed production stab plate.
- Clean the XT connector actuation rods.
- Clean the ROV manual valve mechanisms.
- Remove marine growth covers.
- Dose ROV buckets interfaces with acid.
- Fit new marine growth covers.
- Clean UH-550 gas-lift connector ROV bucket.
- Remove production electrical flying lead.
- Install XT wet park mud mat.
- Carry out tree connector lock hydraulic verification on one of the adjacent Baker Hughes XTs.
- Deploy met-ocean monitoring equipment.
- Deploy pre-set anchors (if required).

2.3 Survey activities

A number of surveys may be required prior to MODU arrival within the Operational Area. These surveys are undertaken using a survey vessel and provide information to allow the safe placement of the MODU. The suite of surveys will typically occur within a duration of one to two weeks within the Operational Area.

2.3.1 Side scan sonar

A side-scan sonar (SSS) identifies any sea floor debris that may cause damage to equipment. SSS involves towing a set of transducers mounted on either side of a 'tow fish' approximately 10 to 20 m above the seabed, producing pulses at high frequencies.

2.3.2 Multibeam echo sounder

Multibeam echo sounder (MBES) use enables the collection of bathymetry data and the correlation of depth information. This instrumentation uses a sonar system to transmit short pulses of sound energy, analysing the return signal from the seafloor or other objects.

2.3.3 Single beam echo sounder

A single beam echo sounder (SBES) provides water depths by measuring the two-way travel time of a high frequency pulse emitted by a transducer. The systems are calibrated to allow for errors introduced by temperature and salinity and other factors that affect sound velocity. The choice of echosounder depends on many factors including accuracy requirements, depth of water and resolution.

2.4 MODU well decommissioning activities

Well decommissioning activities will involve the use of a MODU which may be moored or DP. The permanent well decommissioning activities for the VGA-4H GI ST1 well, including the installation of permanent well barriers, will be completed in accordance with the NOPSEMA accepted WOMP, as required under the OPGGS(E)R.

This section describes the well decommissioning activities as would be typically performed by a MODU.

In general, a MODU based well decommissioning program may consist of:

- Mobilise and position equipment:
  - Move the MODU onto location.
  - Run and test the anchors (eight to 12 anchors) with the aid of anchor handling supply vessel (moored MODU only).
  - Undertake DP testing (DP MODU only).
  - Perform intra field skidding of the MODU on its anchor chains (moored MODU only).
  - Perform intra field moving of the MODU by its DP system (DP MODU only).
- Establish and test connection with the well:
  - Remove corrosion cap (if not completed during a pre-MODU campaign).
  - Clean and inspect XT and ITC profile.
  - Run, latch, pressure and function test the blowout preventer (BOP).
  - Install BOP tether (if required).
  - Recover ITC and upper crown plug, clean the tubing hanger.
  - Run, latch, pressure and function test landing string.
  - Run, install, pressure and function test the WOCS (either intervention WOCS or ROV WOCS).
  - Rig up and test the well bleed-off package.
- Displace hydrocarbons from well:
  - Recover lower crown plug.
  - Open well and observe for pressure/flow.

  - Perform well kill (if required).
  - Rig up wireline (e-line slickline and/or braided line).
  - Set a hold open sleeve in the surface-controlled subsurface safety valve (if required).
  - Drift tubing with a suitable drift (if required).
  - Set a mechanical bridge plug in the well (if required).
  - Cut/punch production packer/tubing.
  - Recover/dispose of well fluids.
- Install permanent isolation barriers to the reservoir:
  - Recover upper completion.
  - Log annular cement isolation (if required).
  - Remediate annular cement (if required).
  - Install and test permanent isolation barriers.
- Remove subsea tree from the wellhead.
- Install permanent isolation barrier to non-hydrocarbon zones (if required):
  - Regain access to surface casing.
  - Recover/dispose of well fluids.
  - Install and test permanent isolation barrier.
- Recover riser and BOP.
- Recover subsea well infrastructure:
  - Cut and recover wellhead and guide base.
- Demobilise MODU:
  - Recover anchors (moored MODU only).
  - Perform seabed clearance survey.

2.4.1 MODU mobilisation and positioning

The MODU may mobilise, from prior commitments on the North West Shelf (NWS), from elsewhere within Australian waters or from an overseas location. The MODU will adhere to Australian biofouling management requirements before moving to the well location site.

A DP MODU will move to the operating area and position on location using in-built propulsion and positioning systems. These same systems are used to keep the MODU in position during the execution of well decommissioning activities.

A moored MODU will be towed to the operating area by at least one vessel. Once the MODU is in the general vicinity of the well location (usually within 200 m), the anchor handling support vessel(s) will receive an anchor from the MODU and the anchor will be placed into the desired position on the seabed. This continues until all anchors have been deployed and proof-load tested by a method of cross tensioning opposing anchors. The mooring plan will take into account the risks presented by any infrastructure, seabed hazards or sensitive environmental features.

Once anchored in position, a moored MODU is able to make relatively small positional changes by kedging on its anchor lines. This enables the MODU to conduct critical operations (such as riser and BOP handling) off well location and place well infrastructure (such as the XT) on the seabed. If a required move is outside the MODU's kedging capability, the anchors will have to be recovered and the MODU towed to its new location.

In certain circumstances, MODU lines may not be able to be run conventionally without breaching recommended safety margins and increasing the risk of contact between the anchor chain and subsea infrastructure. In these instances, a pre-laid anchor would likely be run in a pre-MODU campaign (Section 2.2) and recovered during a post-MODU campaign (Section 2.4.11).

Note that the subsea system for the well will have been flushed to trace amounts of hydrocarbon prior to MODU/LWIV arrival. This is covered in a Management of Change (MoC) to the Ningaloo Vision Operations EP (TV-00-RI-00003.01) accepted by NOPSEMA in February 2021.

2.4.2 Establishing and testing of well barriers

Once anchored on location the process of establishing and testing well barriers, such that the well decommissioning activity can be undertaken, commences. This includes running the BOP and riser system and latching it to the XT, thereby creating a conduit between the well and the MODU.

During well decommissioning activity, the minimum number of well barriers, per the NOPSEMA accepted Well Operations Management Plan (WOMP), will be in place. Well barrier elements that may be used throughout well decommissioning activities include, but are not limited to:

- monitored fluid column
- BOP
- subsea landing string
- surface flow tree
- well bleed off package
- wireline pressure control equipment
- existing well infrastructure, including but not limited to:
  - XT
  - wellhead
  - casing/tubulars
  - packers
  - annular cement.

Furthermore, the process to establish and test the well barriers required throughout well decommissioning activities will be described in the decommissioning programs.

2.4.3 Blowout preventer tethering

Once the BOP and riser system are in place, they are exposed to loads from the water column and surface movement (winds, wave, current, tide, etc.), which impart cyclical loads on the well structure. In certain circumstances, the accumulation of this load can lead to fatigue failure of the existing wellhead structure. Where a high degree of fatigue has already occurred and there is concern that inadequate fatigue life remains to complete the well decommissioning activities in the well, a combination of axial monitoring and tethering may be installed. Axial load monitoring involves the installation of strain gauges or accelerometers to the BOP frame to measure the actual cyclic loads on the wellhead. This improves the accuracy of fatigue accumulation over more conservative simulation methods. In extreme cases, a tether may be installed onto the BOP frame to act as a shock absorber and thereby lessen, or in some cases eliminate, the transfer of cyclic loads to the wellhead. Where tethers are required, typically four clump weights will be deployed to the seabed during a pre-MODU campaign (Section 2.2) and recovered with the MODU on location or during a post-MODU campaign (Section 2.4.11).

2.4.4 Rigging up and testing the well bleed-off package

The well bleed-off package is a temporary process and handling facility installed on the MODU and facilitates bleeding off and disposing of well fluids/pressure. Any fluids returned from the well must be handled appropriately to prevent the potential for accumulation of explosive vapours on the MODU and minimise the risk of loss of containment to the environment.

If required, the reservoir fluids (hydrocarbons and formation water) may be vented or circulated back to the MODU via a temporary process and handling facility installed on the MODU.

The primary method for disposing of residual reservoir fluids is flaring via the bleed-off package. Limited venting of hydrocarbons may occur as dead spaces or inaccessible areas of the well infrastructure are recovered and where any hydrocarbons cannot be directed to the bleed-off package. Flaring is expected to occur for six to 12 hours over two to three days of the activity. Marine discharges of treated formation water and brine, and cooling (deluge) water

may also occur. Any fluids discharged will be first verified as having an oil in water content equal to or less than 1% by volume prior to discharge.

Chemicals required for bleed-off activities include brines, acids, enzymes, pH controllers, chelating agents, hydrate inhibitors (such as MEG or methanol), defoamers and emulsion breakers.

2.4.5 Displacement of hydrocarbons from well

Displacement of hydrocarbons from the well may require the injection (bull-heading) of a weighted fluid (usually brine) into the well to push any hydrocarbons back into the reservoir. Alternatively, hydrocarbons may be displaced from the well via circulating the weighted fluid into the bottom of the well whilst taking the reservoir fluids back to the bleed-off package described in Section 2.4.2.

After displacing hydrocarbons from the well, a mechanical barrier may be placed in the well to isolate the reservoir. This is usually a mechanical bridge plug run on wireline and may be installed in the top of the lower completion or in the base of the upper completion.

The upper completion packer/tubing may be punched and/or cut and the well may be bull-headed or circulated via the bleed-off package (if required) to ensure all hydrocarbons are fully displaced out of the production tubing and annulus. Following this, the upper completion can be recovered to the surface.

2.4.6 Establishing a permanent isolation of the reservoir

The reservoir will be abandoned in accordance with the NOPSEMA accepted WOMP.

In order for the reservoir to be isolated, installed barrier(s) should extend across the full cross section of the well, including all annuli, adjacent to the cap rock. The placement of a barrier is typically achieved by displacing cement through the drill pipe to a pre-determined well depth.

To facilitate the installation of the permanent well barriers, some, all or a combination of the following steps may be required:

- wireline, tractor, coiled tubing or pipe conveyed logging, including, but not limited to, annular cement verification and calliper
- wireline, tractor or drill pipe conveyed installation of equipment including, but not limited to, plugs, retainers, punches, mechanical cutters, abrasive cutters, mills, packers, perforating guns, and hold open sleeves
- section milling of casing with swarf returned and collected on the MODU
- collected swarf will be returned to shore for disposal in an acceptable manner
- annular cement remediation, which may involve the use of downhole perforating guns and charges, and placement of cement through drill pipe
- placement and testing of cement plugs through drill pipe
- pressure testing of temporary or permanent barriers using brines or water-based drilling fluids.

The actual techniques and steps to establish and test the permanent well barriers are assessed considering equipment suitability, capability, availability, MODU capability and any impact on the environment.

All recovered infrastructure shall be secured and returned to shore for disposal in an acceptable manner. Naturally occurring radioactive material (NORM) is not anticipated; however, a NORM contingency plan shall be prepared and any affected material returned to shore will be stored and/or disposed in accordance with applicable authorisations.

2.4.7 Installation of permanent isolation barrier to non-hydrocarbon zones

Non-hydrocarbon zones will be abandoned in accordance with the NOPSEMA accepted WOMP.

In order for non-hydrocarbon zones to be isolated, if required, an installed barrier should extend across the full cross section of the well, including all annuli, adjacent to the cap rock/sealing formation. To facilitate the installation of such a barrier, some, all or a combination of the following steps are typically required:

- removal of casing string(s)
- wireline, tractor, coiled tubing or pipe conveyed logging, including, but not limited to, annular cement verification, calliper

- wireline, tractor or drill pipe conveyed installation of equipment including, but not limited to, plugs, retainers, punches, mechanical cutters, abrasive cutters, mills, packers, perforating guns, hold open sleeves
- section milling of casing with swarf returned and collected on the MODU
- collected swarf will be returned to shore for disposal in an acceptable manner
- annular cement remediation, which may involve the use of downhole perforating guns and charges, and placement of cement through drill pipe
- placement and testing of cement plugs and/or bismuth plugs through drill pipe
- pressure testing of temporary or permanent barriers using brines or water-based drilling fluids
- injection of fluids (reservoir fluid, recovered water based mud (WBM) or base fluids, brines, water-based drilling fluids, etc) into overburden formations for in-well disposal or bleeding-off of fluids to the bleed-off package.

The actual techniques and steps to establish and test the permanent well barrier are assessed considering equipment suitability, capability, availability, MODU capability and any impact on the environment.

All recovered infrastructure shall be secured and returned to shore for disposal in an acceptable manner.

Table 2-2: Summary of approximate discharge volumes associated with well decommissioning

Discharge Material	Purpose	Reason for Discharge	Maximum Potential Discharge Per Well
Existing wellbore fluid			
Packer fluid	Packer fluid currently in well	Unable to be reused	250 m^3
WBM/cuttings	Casing annulus fluid currently in well	Unable to be reused	300 m^3
Drilling fluids and additives			
Brine/seawater/freshwater (possibly inhibited)	Kill and circulating system	Cement contamination and excess to requirements	500 m^3
Water based drilling/milling fluids	Kill and circulating system	Cement contamination and excess to requirements	500 m^3
Hi-vis pills	Used for numerous purposes including setting cement plugs on, preventing losses and hole cleaning	Unable to be reused and excess to requirements	200 m^3
Other additives (i.e. density increasing additives, viscosity additives, alkalinity and hardness control additives, lost-circulation material and tracer dyes)	Used to prevent downhole losses	Unable to be reused and excess to requirements	50 m^3
Tank cleaning wash water	Residue from mud pits (i.e. tanks used to mix and hold brine, sweeps or WBM), cement mixing/holding tanks and bulk storage tanks	Unable to be reused and impractical to return to shore for disposal	500 m^3
Drilling cements and additives			
Cement cuttings	Solids generated while drilling through cement plug	Unable to be reused	100 m^3
MODU wet cement discharges	Wet or set cement discharges to sea (i.e. cement spacer, flushing tanks and lines)	Unable to be reused and impractical to return to shore for disposal	<15 m^3

Discharge Material	Purpose	Reason for Discharge	Maximum Potential Discharge Per Well
Off specification cement	100 m³ of cement (wet) discharged at sea surface or 250 m³ at the seabed in the event of a cement job not meeting technical and safety standards	Unable to be reused and impractical to return to shore for disposal	100–250 m^3
Mixed cement and/or cement additives	Mixed for use but not subsequently required due to unplanned interruptions	Unable to be reused and impractical to return to shore for disposal	100 m^3
Cement system flushing wash water	Residue from when the cement system is flushed to prevent curing inside the cement unit and pipework after each cement job is completed	Unable to be reused and impractical to return to shore for disposal	100 m^3
Well bleed-off			
Treated oil in water	Recovered formation water that has been treated to remove oil prior to discharged to the marine environment	Treated to <1% by volume oil in water for acceptable discharge	200 m^3
End-of-campaign discharges			
Cement/bentonite/barite/brine	Discharged as slurry at the end of well in the event stocks cannot be reused/sold	Excess to requirements	70 m^3
Dry cement or bentonite	Discharged in the event dead space volumes in silos cannot be mixed into a slurry	Excess to requirements	10–15 t

2.4.8 Recovery of the blowout preventer

Once the well has been permanently decommissioned with the required barriers in place, the BOP and riser system can be recovered to surface.

2.4.9 Recovery of subsea well infrastructure

During the well decommissioning activity, the XT may be:

- removed and recovered to the MODU, or
- left on the wellhead for recovery during the field wide decommissioning campaign, or
- removed and wet parked for recovery during the field wide decommissioning campaign.

In either case, disconnection of the subsea flying leads, flowline jumpers and well services lines may be required. For the lines that require severance, severance will likely occur using an ROV mounted cutting tool such as diamond wire saw or similar.

If wet-parked, the XT will be located within 100 m of the well location on the pre-installed XT wet parking mud mat. A wet-parking positioning survey will confirm the wet-parked location of the XT and it will be left in this position until it is recovered , using a vessel with a suitable heave-compensated crane.

2.4.10 Demobilisation of MODU

Upon completion of the well decommissioning scope, the MODU will be demobilised from location. A DP MODU will depart using in-built propulsion and positioning systems. A moored MODU can only depart once anchors have been recovered from the seabed. Anchor recovery considers the risk of collision with any subsea infrastructure remaining. Pre-laid anchors may have been placed on the seabed prior to rig arrival and where these have been used, they will be released and recovered during a post-MODU campaign (Section 2.4.11).

Prior to MODU departure a survey of the seabed in the vicinity of the well will be completed by ROV. The survey will document the seabed condition at departure and any equipment identified would either be recovered by ROV (if within the ROV capabilities) or marked for recovery during a future campaign.

2.4.11 Post MODU activities

After departure of the MODU, any final tasks will be completed by a support vessel with an ROV. These tasks may include:

- recovery of any pre laid anchors suspended during the MODU demobilisation
- recovery of any clump weights deployed to the seabed as part of the fatigue management system
- recovery of any survey or monitoring equipment from the seabed
- recovery of any material not recovered by the MODU (excluding wet parked items for recovery during the field wide decommissioning campaign)
- general visual inspection of the seabed and remaining subsea equipment.

2.5 LWIV well suspension activities

An alternative option to permanently abandoning the well is to suspend the well by setting a mechanical barrier (plug) in the well using an LWIV. If suspension using an LWIV is undertaken the well will need to be decommissioned at a later date as part of the VGCN field well decommissioning campaign. The use of a LWIV to intervene on a subsea well is a well recognised and accepted industry practice. Key aspects of well intervention on a subsea well using a LWIV are as follows:

- LWIV is dynamically positioned and therefore does not require the placement of anchors on the seabed.
- The LWIV does not remain on location during a cyclone, instead it is able to relocate under its own propulsion to a safe zone.
- There is no BOP or landing string deployed, instead a subsea intervention lubricator/device is used for operations on live wells. The subsea intervention lubricator/device is similar to a wireline or coiled tubing BOP adapted for subsea use.
- The subsea intervention lubricator/device has its own WOCS.
- LWIV has limited circulation capability and therefore cannot perform complex operations that require extensive pumping or rotating of downhole tools.

In general, an LWIV based well suspension activity may consist of the following:

- Move the LWIV onto location.
- Remove the corrosion cap, clean and inspect the XT and ITC profiles.
- Deploy the subsea intervention lubricator/device and WOCS.
- Recover upper crown plug and lower crown plug.
- Set a hold open sleeve in the surface-controlled subsurface safety valve (if required).
- Drift the tubing with a suitable drift (if required).
- Run, set and test a mechanical bridge plug in the well.
- Run, set and test the lower crown plug and upper crown plug (if required).
- Recover the subsea intervention lubricator/device and WOCS.
- Reinstall the corrosion cap.
- Move the LWIV off location.

The well intervention equipment required for the activities may include:

- ROV, including tooling to wash, jet, clean and manipulate equipment and tools
- drifting and wellbore cleaning tools
- electric-line

- slickline
- umbilicals and reelers
- mechanical plugs, isolation plugs and/or packers

2.6 Support vessels and helicopters

In general, up to three support vessels will be used for the duration of the well decommissioning activity using a MODU. These vessels may be anchor handling supply vessels, platform supply vessels or a combination of the two. A single support vessel is likely to be required to support an LWIV during well suspension activities. Vessels will be used to tow the MODU to location (if a moored MODU) and act as a support to the MODU/LWIV by conducting safety lookouts for helicopter transfers and generally monitoring the 500 m exclusion zone that will be maintained around the MODU/LWIV to prevent vessel collisions. All support vessels may be present simultaneously in the field.

Supply vessels will operate between the MODU/LWIV and the nearest suitable port (normally Dampier) and provide the continuous supply and back-loading of materials and other supplies during operations. Such materials include fresh water, food, fuel, bulk dry chemicals and equipment to be used during the activities. Wastes will be transported back to shore to either the supplier or an approved waste facility.

The MODU/LWIV and vessel crews will be accommodated aboard the MODU/LWIV (approximately 150 people) and the respective support vessels (likely capacity per support vessel is up to 40 people). Crew changes for personnel onboard the MODU/LWIV require transfer by helicopter between MODU/LWIV and the nearest airport, usually Karratha. These flights will take place several times a week dependent on location and contract. Support vessel crew changes will generally take place in Dampier Port. Due to the short distances between Santos' acreage and the designated airports, helicopter refueling on the MODU/LWIV or vessel refueling in the field will not be required, however bunkering between the MODU/LWIV and support vessel will occur.

All vessels will be verified and inspected by Santos to ensure they are appropriate for the support activities required. Vessel types that will be typically used during activities are outlined in Table 2-3.

Table 2-3: Offshore vessel types typically utilised by Santos

Vessel Type	Vessel Capability
Anchor handling supply (AHS) vessel	Service Supply Anchor handling Towing Standby
Platform supply vessel	Service Supply

2.7 Cyclone preparedness

In the event of a tropical cyclone while performing operations, the well will be suspended with two barriers in accordance with the NOPSEMA accepted WOMP. The location and movement of tropical cyclones will be monitored and tracked against the time required to safely suspend the well and down-crew the rig.

2.8 Chemicals

Chemicals may be discharged overboard during the activity if they are unable to be reused. The majority of the discharges are similar in nature to those discharged during the drilling of a conventional well. These discharges include:

- brines
- seawater
- water based drilling/milling fluid
- lost circulation materials
- hi-vis pills

- cement (set or unset)
- inorganic or organic acid washes for marine growth removal and subsea infrastructure cleaning, if required
- other chemicals and additives (e.g. tracer dyes and cement spacer)
- residual fluids in the existing well bore (e.g. synthetic based muds).

2.8.1 Well kill, milling and abrasive cutting fluids

When abandoning wells, well kill, milling and abrasive cutting fluids with various additives may be required for specific well activities to control wellbore pressure and facilitate the well decommissioning program.

The carrying medium of a kill fluid is either fresh water (drill water), seawater or a brine. The selection of the carrying medium depends on what is available on the MODU/LWIV. A combination of all may be used during any well decommissioning program. Brines are used to achieve the required density parameters of the kill fluid and may contain sodium chloride, potassium chloride or calcium chloride added to fresh water.

Setting cement plugs may require weighed high viscosity (hi-vis) fluid pills to prevent the cement plug from slumping down hole, to aid in achieving the correct depth requirements of the specific well. They may also be used in the lifting of solids to the surface while pumping. A hi-vis pill is either a combination of drill water, gel and barite, or seawater or brine with a polymer and barite. Some of the additives commonly used with a kill fluid are:

- Density-increasing or weighting additives: materials are added to the kill fluid (drill water, seawater, or brine) to increase its weight to the desired density. Barite is normally used as the proprietary weighting material.
- Viscosity additives: selected materials may be added to the hi-vis fluid to increase the viscosity if addition of barite does not meet the desired viscosity parameters. Materials such as bentonite (gel), xanthan gum and other proprietary mixtures can be used to increase viscosity.
- Alkalinity and hardness control: selected materials may be added to the hi-vis fluid to control the alkalinity properties. Materials such as sodium hydroxide or magnesium hydroxide are used to control alkalinity and sodium carbonate for hardness control.
- Lost circulation material: selected materials are added to the kill fluid to reduce the loss of fluid to the formation. Materials such as walnut shells, wood fibre, cellulose fibre, calcium carbonate and other proprietary mixtures are used to reduce the loss of circulation.

Abrasive cutting fluids use a naturally occurring material (usually sand, garnet or similar) to abrade steel and cement for the purposes of severing well infrastructure. Abrasion based cutters are able to complete cuts where mechanical cutters may not be able to fit or extend adequately to complete the severance. Mechanical and abrasive cutters are preferred over explosive cutters for near seabed severances.

2.8.2 Cementing fluids

When using cement for cementing or plugging a well, various additives are blended into the cement for specific purposes, based on the requirements of the specific well to be decommissioned. Some of the additives commonly used in cement pills are:

- Retarder: a retarder is added to slow down the setting time to allow for longer pump times and/or the removal of the tubing used to place the cement.
- Accelerator: accelerators are used to shorten the setting time. These are used in wells to allow the cement to set faster to prevent gas or fluid channeling, to prevent backflow in the tubing and when plugging the additive can shorten the wait time between plugs.
- Light-weight additives: these materials are added to cement to reduce the cement density and thereby lessen the chances of losing cement to high-permeability or low fracture-gradient formations.
- Water-loss additives: water-loss additives are combined with the cement mixture to reduce the rate of water loss from the cement mixture. By reducing water loss prior to setting, the cement can harden properly and avoid premature drying, which can reduce the strength of the cement.
- Gas migration additives: gas migration additives are combined with cement mix to reduce or prevent the migration and expansion of any gas entering the wellbore during the cement transition phase. By eliminating gas migration, the competency of the placed cement is increased in scenarios where gas may be present, particularly isolations in or across a known hydrocarbon bearing zone.

2.8.3 Treated seawater and brine

During well suspension and/or well decommissioning activities, seawater or brine may be pumped down a well as a well kill fluid to displace a minimum of one tubing/open hole volume into the reservoir. Additives are used with these fluids (e.g. biocide or corrosion inhibitor) to prevent bacterial growth in the well that may impact steel well casings. General kill fluid dosing concentrations are 300 mg/L for biocide and 700 mg/L for corrosion inhibitor.

2.8.4 Recovered fluids from the existing well bore

There may be discharges of recovered fluids from the existing well bore, including WBM and other standard additives such as brine, emulsifiers, loss circulation materials, and barium.

2.8.5 Chemicals for marine growth removal

Marine growth removal will be undertaken using an ROV. Chemical washes may be used for marine growth removal or subsea infrastructure cleaning – prior to well decommissioning or suspension activities to ensure access to infrastructure. Any chemicals used in the wash or soak will be subject to the Santos Operations Chemical Selection, Evaluation and Approval Procedure (EA-91-II-10001).

2.9 Chemical assessment

A risk-based approach to select chemical products ranked under the Offshore Chemical Notification Scheme (OCNS) is applied for those chemicals used and discharged to the marine environment. This scheme lists and ranks all chemicals used in the exploration, exploitation and associated offshore processing of petroleum on the UK Continental Shelf.

Chemicals are ranked according to their calculated hazard quotients by the chemical hazard assessment and risk management (CHARM) mathematical model, which uses aquatic toxicity, biodegradation and bioaccumulation data. The hazard quotient is converted to a colour banding with Gold and Silver colour bands representing the least environmentally hazardous chemicals. Chemicals not amenable to the CHARM model (i.e. inorganic substances, hydraulic fluids or chemicals used only in pipelines) are assigned an OCNS grouping based on the worst-case ecotoxicity data with Group E and D representing the least hazard potential.

The Santos Operations Chemical Selection, Evaluation and Approval Procedure (EA-91-II-10001) and Drilling Fluid and Chemical Selection in Drilling Activities Procedure (EA-91-II-00007) accept CHARM ranked Gold/Silver, or non-CHARM ranked E/D chemicals, for use and discharge without a detailed environmental risk assessment. The same applies to chemicals that are on the OSPAR Pose Little or No Risk to the Environment (PLONOR) List. The PLONOR List, agreed upon by the OSPAR Convention (Oslo and Paris Convention for the Protection of the Marine Environment of the North-East Atlantic), contains a list of substances that will pose little or no risk to the environment in offshore waters. If chemicals are ranked lower than Gold, Silver, E or D (i.e. CHARM ranked purple, orange, blue or white, or non-CHARM A, B or C ranked chemicals) and no alternatives are available, a risk assessment is conducted providing technical justification for their use and showing that their use and associated risk is acceptable and ALARP.

As described above, investigation of potential alternative chemicals is completed when chemicals are ranked lower than CHARM Gold, Silver, E or D (in other words, CHARM ranked purple, orange, blue or white, or non-CHARM A, B or C ranked chemicals). There is a preference for chemical options that are CHARM ranked Gold/Silver, or non-CHARM ranked E/D chemicals and/or chemical that have a low aquatic toxicity, are readily biodegradable and do not bioaccumulate (discussed below).

Any chemicals that may be discharged to the marine environment and are not OCNS CHARM or non-CHARM ranked, are risk assessed using the OCNS CHARM or non-CHARM models. The chemical is assigned a pseudo-ranking based on the available aquatic toxicity, biodegradation and bioaccumulation data (discussed below) and assessed for environmental acceptability for discharge to the marine environment.

2.9.1 Ecotoxicity assessment

Table 2-4 and Table 2-5 act as guidance in assessing the ecotoxicity of chemicals during the investigation of potential alternatives. Table 2-4 is used by Cefas to group a chemical based on ecotoxicity results, ‘A’ representing highest toxicity/risk to environment and ‘E’ lowest. Table 2-5 shows classifications/categories of toxicity against aquatic toxicity results.

Table 2-4: Initial Offshore Chemical Notification Scheme ranking

Initial Grouping	A	B	C	D	E
Result for aquatic-toxicity data (ppm)	<1	≥1–10	>10–100	>100–1,000	>1,000
Result for sediment-toxicity data (ppm)	<10	≥10–100	>100–1,000	>1,000–10,000	>10,000

Note: Aquatic toxicity refers to the Skeletonema costatum *EC_{50},* Acartia tonsa *LC_{50}, and* Scophthalmus maximus *(juvenile turbot) LC_{50} toxicity tests. Sediment toxicity refers to the* Corophium volutator *LC_{50} test.*

Source: Cefas Standard Procedure 2019, OCNS 011 NL Protocol PART 1: Core Elements.

Table 2-5: Aquatic species toxicity grouping

Category	Species	LC_{50} and EC_{50} criteria
Category Acute 1 – Hazard statement – Very toxic to aquatic life	Fish	LC_{50} (96 hr) of ≤1 mg/L
	Crustacea	EC_{50} (48 hr) of ≤1 mg/L
	Algae/other aquatic plant species	ErC_{50} (72 or 96 hr) of ≤1 mg/L
Category Acute 2 – Hazard statement – Toxic to aquatic life	Fish	LC_{50} (96 hr) of >1 mg/L to ≤10 mg/L
	Crustacea	EC_{50} (48 hr) of >1 mg/L to ≤10 mg/L
	Algae/other aquatic plant species	ErC_{50} (72 or 96 hr) of >1 mg/L to ≤10 mg/L
Category Acute 3 – Hazard statement – Harmful to aquatic life	Fish	LC_{50} (96 hr) of >10 mg/L to ≤100 mg/L
	Crustacea	EC_{50} (48 hr) of >10 mg/L to ≤100 mg/L
	Algae/other aquatic plant species	ErC_{50} (72 or 96 hr) of >10 mg/L to ≤100 mg/L

2.9.2 Biodegradation assessment

The biodegradation of chemicals is assessed using the Cefas biodegradation criteria, which aligns with the categorisation outlined in the United Nations GHS Annex 9 Guidance on Hazards to the Aquatic Environment (2019). The below is used as a guide during the investigation of potential chemical alternatives. The preference is to select readily biodegradable chemicals.

Cefas categorises biodegradation into the following groups:

- readily biodegradable: results of >X% biodegradation in 28 days to an OSPAR harmonised offshore chemical notification format (HOCNF) accepted ready biodegradation protocol
- moderately biodegradable: results >20% and <X% to an OSPAR HOCNF accepted ready biodegradation protocol
- poorly biodegradable: results from OSPAR HOCNF accepted ready biodegradation protocol.

Where X is equal to:

- 60% in 28 days in OECD 306, Marine BODIS or any other acceptable marine protocols, or in the absence of valid results for such tests
- 60% in 28 days (OECD 301B, 301C, 301D, 301F, Freshwater BODIS) or
- 70% in 28 days (OECD 301A, 301E).

2.9.3 Bioaccumulation assessment

The bioaccumulation of chemicals is assessed using the Cefas bioaccumulation criteria, which aligns with the categorisation outlined in the United Nations GHS Annex 9 Guidance on Hazards to the Aquatic Environment (2019). Preference is to select non bioaccumulative chemicals.

The following guidance is used by Cefas:

- Non-bioaccumulative/non-bioaccumulating: Log Pow <3, or results from a bioaccumulation test (preferably using Mytilus edulis) demonstrates a satisfactory rate of uptake and depuration, and the molecular mass is ≥700.
- Bioaccumulative/bioaccumulates: Log Pow ≥3, or results from a bioaccumulation test (preferably using *Mytilus edulis*) demonstrates an unsatisfactory rate of uptake and depuration, and the molecular mass is <700.

3. Existing environment

OPGGS(E)R 2023 Requirements
Section 21. Environmental assessment.
Description of the environment 21(2) The environment plan must: (a) describe the existing environment that may be affected by the activity, and (b) include details of the particular relevant values and sensitivities (if any) of that environment. Note: The definition of environment in section 5 includes its social, economic and cultural features. 21(3) Without limiting paragraph (2)(b), relevant values and sensitivities may include any of the following: (a) the world heritage values of a declared World Heritage property within the meaning of the *Environment Protection and Biodiversity Conservation Act 1999* (b) the national heritage values of a National Heritage place within the meaning of that Act (c) the ecological character of a declared Ramsar wetland within the meaning of that Act (d) the presence of a listed threatened species or listed threatened ecological community within the meaning of that Act (e) the presence of a listed migratory species within the meaning of that Act (f) any values and sensitivities that exist in, or in relation to, part or all of: (i) a Commonwealth marine area within the meaning of that Act, or (ii) Commonwealth land within the meaning of that Act.

3.1 Environment that may be affected

This section describes the key physical, biological, socio-economic and cultural characteristics of the environment that may be affected by the activity (Section 2). The EMBA is the largest spatial extent where the worst case unplanned event could have a potential environmental consequence.

The description of the environment describes two areas:

- the Operational Area (the area within which the planned activities will occur)
- the environment that may be affected (EMBA).

These are shown in Figure 3-1.

A detailed and comprehensive description of the environment (required by OPGGS(E)R, section 21(2)(3)) in the Operational Area and the EMBA is provided within Section 3 and Appendix C.

3.1.1 Determining the environment that may be affected

In order to determine the EMBA, stochastic hydrocarbon dispersion and fate modelling is undertaken on the worst-case unplanned hydrocarbon release (which for this EP is from a loss of well control event as described in Section 7.5), to identify the potential spatial extent of environment consequence from hydrocarbons at different exposure values (Table 3-1). Each stochastic model is created by overlaying 300 individual hypothetical oil spill simulations from an oil spill into a single map, with each simulation subject to a different set of metocean conditions drawn from historical records.

The oil spill modelling exposure values applied, results in the creation of two EMBAs, defined as the:

- socio-economic EMBA
- ecological EMBA.

Both the socio-economic EMBA and ecological EMBA in Figure 3-1 are driven primarily by the exposure value thresholds for surface hydrocarbons. Figure 3-1 also contains an example of a single spill scenario (deterministic run). This provides an example of the potential extent of a single spill event based on certain wind and weather conditions. This deterministic run uses the same hydrocarbon exposure values as for the socio-economic EMBA.

Socio economic EMBA

The socio-economic EMBA is:

- defined as the potential spatial extent at which socio-economic impacts may occur; and
- has been used to inform stakeholder consultation (Section 4) – note this has formed part of the identification of relevant persons; however, as described in Section 4 is not the only method used to identify relevant persons

The description of the existing environment in Section 3 is based on the largest potential spatial spill extent, the socio-economic EMBA (defined as the EMBA). The socio-economic EMBA is the most conservative of the two EMBAs, references to "the EMBA" throughout this document relate to the socio-economic EMBA.

Ecological EMBA

The ecological EMBA is defined as the area at which ecological and biological impacts to the marine environment may occur in the event of an unplanned hydrocarbon release (Section 7.5 to 7.8).

Table 3-1 describes the exposure values used for determining both EMBAs and further detail is provided in Section 7.5.4.

Table 3-1: Hydrocarbon exposure values of the environment that may be affected

	Socio-economic EMBA	Ecological EMBA
Surface hydrocarbons (Oil that is predicted to be floating on the surface of the water at the time it is mapped. Floating oil may later entrain into the water or go ashore).	1 g/m² Approximates the range of socio-economic effects NOPSEMA Information Paper, *Application of oil spill modelling in Environment Plans* (NOPSEMA, 2025a) This represents a wider area where a visible sheen may be present on the surface and, therefore, the concentration at which socio-cultural impacts to the visual amenity of the marine environment may occur.	10 g/m² Approximates the lower limit for harmful exposures to birds and marine mammals (NOPSEMA,2025a).
Dissolved hydrocarbons (The portion of oil that is predicted to have dissolved into seawater. Compounds in oil capable of dissolving are soluble and semi-soluble.)	10 ppb 10 ppb dissolved represents a lower concentration for identifying social, economic and cultural features of the environment that may be affected by dissolved oil and for assessing the potential consequences on these features. Acute toxicity studies (French-McCay, 2025; Negri et al., 2021; Bejarano et al., 2017) demonstrate that, the 10 ppb dissolved exposure value is protective of >95% of species for acute exposures. 10 ppb dissolved also represents a conservatively low concentration that can cause toxic effects to sensitive species (French-McCay, 2025; Bejarano et al., 2014; McGrath et al., 2018). On the basis that 10 ppb dissolved exposure value can cause potential toxic effects to sensitive species, which can then potentially impact socio-economic values (e.g. impact on fisheries, tourism operations or cultural features), 10 ppb dissolved is considered an appropriate dissolved hydrocarbon exposure value to determine the socio-economic EMBA.	10 ppb 10 ppb dissolved exposure value represents a lower concentration for identifying ecological features of the environment that may be affected by dissolved oil and for assessing the potential consequences on these features. Acute toxicity studies (French-McCay, 2025; Negri et al., 2021; Bejarano et al., 2017) demonstrate the 10 ppb dissolved exposure value is protective of >95% of species for acute exposures. 10 ppb dissolved also represents a lower concentration that can cause toxic effects to sensitive species (French-McCay, 2025; Bejarano et al., 2014; McGrath et al., 2018). 10 ppb dissolved therefore represents a conservatively low dissolved hydrocarbon exposure value to determine the ecological EMBA.

	Socio-economic EMBA	Ecological EMBA
Entrained hydrocarbons	1,000 ppb There is a direct scientific relationship between the entrained and dissolved hydrocarbons. The dissolved concentrations derived from oil compounds typically represent about 1% of the oil when fresh, and oil loses the soluble components rapidly as it weathers, therefore the entrained oil threshold should be at least 100 times that for dissolved concentrations (French McCay et al., 2018). Therefore, given toxic effects on sensitive species are established at 10ppb dissolved, and there is a direct correlation between the dissolved component and entrained components within oil, the entrained oil exposure value should be at least 100 times that for dissolved concentrations (i.e. 1,000 ppb) (French McCay et al., 2018). 1,000 ppb entrained represents a lower concentration for identifying social, economic and cultural features of the environment that may be affected by entrained oil and for assessing the potential consequences on these features. Dissolved components are more bioavailable, hence evaporate and dissolve, leaving residual (entrained) hydrocarbons with lower potential to cause toxic effects (French-McCay, 2023). Potential for long term exposure to entrained hydrocarbons is low because aquatic organisms' exposures to entrained oil and dissolved components in the water column is limited to typically brief encounters (French-McCay, 2025). While entrained in the water column, the entrained components do not physically concentrate further, rather, entrained hydrocarbons will surface as floating oil and accumulate on the shorelines. Low exposure values for floating oil (1 g/m²) and shoreline accumulation (10 g/m²) have already been applied in the EMBA development.	1,000 ppb There is a direct scientific relationship between the entrained and dissolved hydrocarbons. The dissolved concentrations derived from oil compounds typically represent about 1% of the oil when fresh, and oil loses the soluble components rapidly as it weathers. Therefore given toxic effects on sensitive species are established at 10 ppb dissolved, and there is a direct correlation between the dissolved component and entrained components within oil, the entrained oil exposure value should be at least 100 times that for dissolved concentrations (i.e. 1,000 ppb) (French McCay et al., 2018). 1,000 ppb entrained represents a lower concentration for identifying ecological features of the environment that may be affected by entrained oil and for assessing the potential consequences on these features. Therefore, 1,000 ppb is appropriate for identifying where potential impacts to key sensitive species could occur based on its scientific relationship with dissolved hydrocarbon concentrations.
Shoreline accumulation (oil that is predicted to have reached the coastline, including beaches, rocky shores and mangroves)	10 g/m² Predicts the potential for potential socio-economic impact. 10 g/m² shoreline represents a lower concentration for identifying social, economic and cultural features of the environment that may be affected by shoreline oil, and for assessing the potential consequences on these features.	100 g/m² Loading predicts area likely to require clean-up response effort (refer to Section 7.5.4).

3.1.2 Planning area for scientific monitoring

The planning area for scientific monitoring is the area in which scientific monitoring may be required in the event of a spill and is described further in Section 17 of the OPEP. This scientific monitoring planning area has been set using the planning area for scientific monitoring values outlined in Table 3-2.These are low exposure values as per the NOPSEMA *Application of Oil Spill Modelling in Environment Plans-Information Paper* (NOPSEMA, 2025a)

An operational and scientific monitoring program would be activated in the event of any release with the potential to contact sensitive environmental receptors. This is described in further detail in the OPEP (7745-236-EMP-0002) and associated Operational and Scientific Monitoring Bridging Implementation Plan.

Table 3-2: Hydrocarbon exposure values for the planning area for scientific monitoring

Hydrocarbon Fate	Planning Area for Scientific Monitoring
Surface hydrocarbons 1 g/m²	It represents a lower concentration for defining the planning area for operational and scientific monitoring, within which further analysis can be undertaken to inform monitoring priorities.
Dissolved hydrocarbons 10 ppb	
Entrained hydrocarbons 10 ppb	
Shoreline accumulation 10 g/m²	

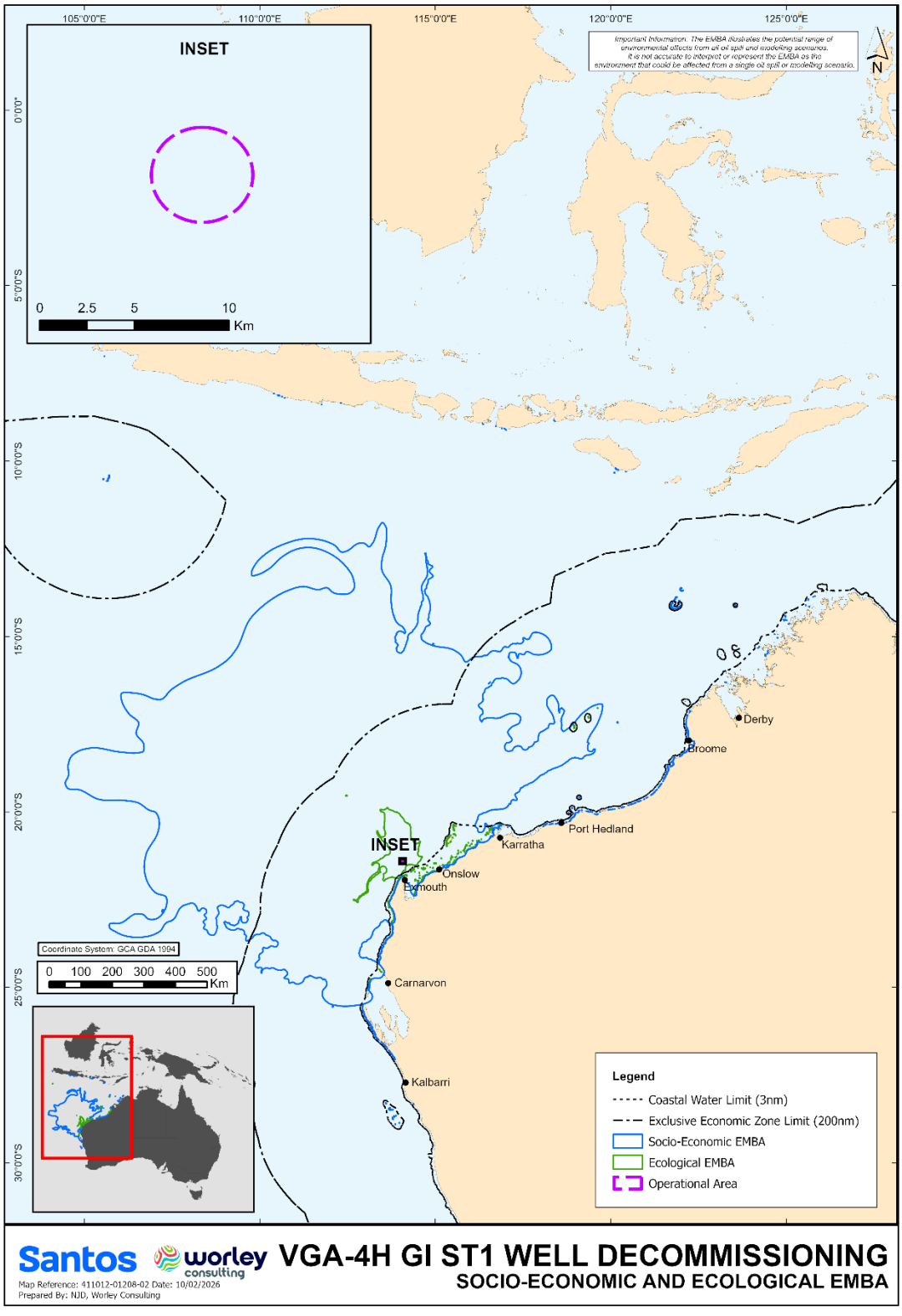

Figure 3-1: The environment that may be affected

3.2 Environmental values and sensitivities

This section summarises environmental values and sensitivities, including physical, biological, socio-economic, and cultural features in the marine and coastal environment that are relevant to the Operational Area and the EMBA.

A comprehensive description of the environmental values and sensitivities of the existing environment within the Operational Area and the EMBA is provided in Appendix C, which provides a compilation of environmental values and sensitivities including physical, biological, social, economic and cultural features within the marine and coastal environment that are relevant to this EP.

3.2.1 Protected Matters Search Tool reports

Database searches of the Operational Area, ecological EMBA and socio-economic EMBA were undertaken using the Protected Matters Search Tool (PMST) in June 2025. The EMBA encompasses the full range of environmental receptors that might be contacted by surface and subsurface hydrocarbons at the low exposure level, in the highly unlikely event of a worst-case oil spill. The PMST reports were used to inform the protected and significant areas, as well as the threatened and migratory fauna discussed in this section. The output reports from these searches are provided in Appendix D.

3.2.2 Physical environment

3.2.2.1 Oceanography

Ocean currents on the NWS are dominated by the southward-flowing warm surface Indonesian Throughflow, which flows from the tropics to the waters of southwest Western Australia (CSIRO, 2007), with the Leeuwin Current a distinct current south of North West Cape, near Exmouth (Department of Sustainability, Environment, Water, Population and Communities (DSEWPaC), 2007).

Ocean currents are semi-diurnal, flowing across the local bathymetry in a south-east/north-west direction. Tropical cyclone storm currents seldom penetrate below 100 m water depth; therefore, near-seabed extremes are caused by turn of tide, internal waves and baroclinic currents. Internal waves and baroclinic currents are caused by summertime water stratification and density differences between water bodies.

Swells are predominately from the south-west to west, but wind generated waves can develop from any direction, reflecting the region at the time. Sea surface currents over the NWS are generated by several components, including tidal-forcing, local wind-forcing and residual drift. Tidal and wind-forcing are the dominant contributions to local sea surface currents. The orientation and degree of drop off of the continental shelf slope influences the oceanography of the area.

3.2.2.2 Tides

The tides of the NWS have a strong semi-diurnal signal with four tide changes per day (Holloway & Nye, 1985). Peak tidal flows are from the north-northwest on the ebb, and to the south-southeast on the flood (Holloway & Nye, 1985; SSE, 1993). Measurements of tidal currents mid shelf are predicted to attain average speeds of approximately 0.25 knots during neap tides and up to 0.5 knots during spring tides (NSR, 1995; WNI, 1995).

3.2.2.3 Waves

The wave climate in the northwest is composed of locally generated wind waves (seas) and swells that are propagated from distant areas (WNI, 1995). In summer the seas typically approach from the west and southwest, while in winter the seas typically approach from the south and east. Mean sea wave heights are typically less than 1 m and peak heights of less than 2 m are experienced in all months of the year (WNI, 1995).

Indonesian waters, especially the eastern part of the archipelago, play an important role in the global water mass transport system, in which warm water at the surface conveys heat to the deeper cold water in what is known as the great ocean conveyor belt. The eastern archipelago is the only place in the Pacific Ocean that connects with the Indian Ocean at lower latitudes. The water mass transport from the Pacific to the Indian Ocean through various channels in Indonesia is called Arlindo (Arus Lintas Indonesia), also known as the Indonesian Throughflow (Zhang et.al., 2018). Surface currents in Indonesian waters are more strongly influenced by circulation from the Pacific Ocean than from the Indian Ocean. The currents are also greatly influenced by the winds of the prevailing monsoon.

Average swell heights are low, around 0.4 to 0.6 m in all months. The greatest exposure to swells is from the west (SSE, 1993). Tropical cyclones have generated significant swell heights of up to 5 m in this area, although the predicted frequency of swells exceeding 2 m is less than 5% (WNI, 1996). In the open ocean, sustained winds result in wind-forced currents of approximately 3% of the wind speed (Holloway & Nye, 1985).

3.2.2.4 Water and sediment quality

The following description is based on data obtained from the environmental baseline monitoring program undertaken in May 2021 for the operational area surrounding Ningaloo Vision operations (Figure 1-1).

Water quality profiles from the monitoring program included temperature, salinity, dissolved oxygen, and turbidity. These profiles showed a warm, low salinity and low turbidity surface layer, with no evidence of thermoclines or upwelling/downwelling within the top 35 m of water. Surface water temperatures surrounding Ningaloo Vision FPSO were similar to temperatures recorded along the Ningaloo Reef (Hanson et al., 2005; Hanson et al., 2007).

Concentrations of petroleum hydrocarbons and trace metals in surface water samples were all below Australian and New Zealand Water Guidelines (ANZG) (2018) 99% species protection guidelines. Nutrients and radium in surface waters were all below limits of reporting (LoR).

The sediment surrounding the Ningaloo Vision FPSO is predominantly comprised of silt and fine sands with a sparse benthic infauna community, dominated by polychaetes and crustaceans. Hydrocarbon and metal concentrations in marine sediment samples were also below the limits of reporting at all sites and met the applicable ANZG (2018) 99% species protection guidelines.

Previous seabed surveys of VGCN field identified a similar infauna community to the Ningaloo Vision FPSO, dominated by polychaetes and crustaceans (RPS, 2011; referenced in Santos, 2020). Ningaloo Vision – Environmental Baseline Monitoring Program did not find any benthic infauna of regional significance, and no benthic primary producers were observed in any sample, which is to be expected given the depth (>360 m).

There were no discernible differences in water or sediment characteristics with respect to direction or distance from the Ningaloo Vision FPSO, which reflects the homogeneity of the region.

Sediment and water quality results from the most recent survey were free from chemical contaminants, which is typical of the region, and similar to other studies in the Pilbara region. The total organic carbon (TOC) content of all samples was very low and it can be concluded that there has been no enrichment of organic matter in these sediments resulting from previous activities in the area.

3.2.3 Bioregions

Based on the Integrated Marine and Coastal Regionalisation of Australia, Version 4.0 (CoA, 2006), the regional descriptions relevant to the Operational Area, the socio-economic EMBA and the ecological EMBA are provided in Table 3-3, shown in Figure 3-2 and further discussed in Appendix C.

Table 3-3: Integrated Marine and Coastal Regionalisation of Australia 4.0 provincial bioregions relevant to the activity

Bioregion	Operational Area	Ecological EMBA	Socio-economic EMBA
North West Marine Region			
Central Western Shelf Province	×	✓	✓
Central Western Shelf Transition	×	✓	✓
Central Western Transition	×	✓	✓
Christmas Island Province	×	✓	✓
Northwest Province	✓	✓	✓
Northwest Shelf Province	×	✓	✓
Northwest Shelf Transition	×	×	✓
Northwest Transition	×	✓	✓
Southwest Shelf Transition	×	×	✓
Timor Province	×	✓	✓

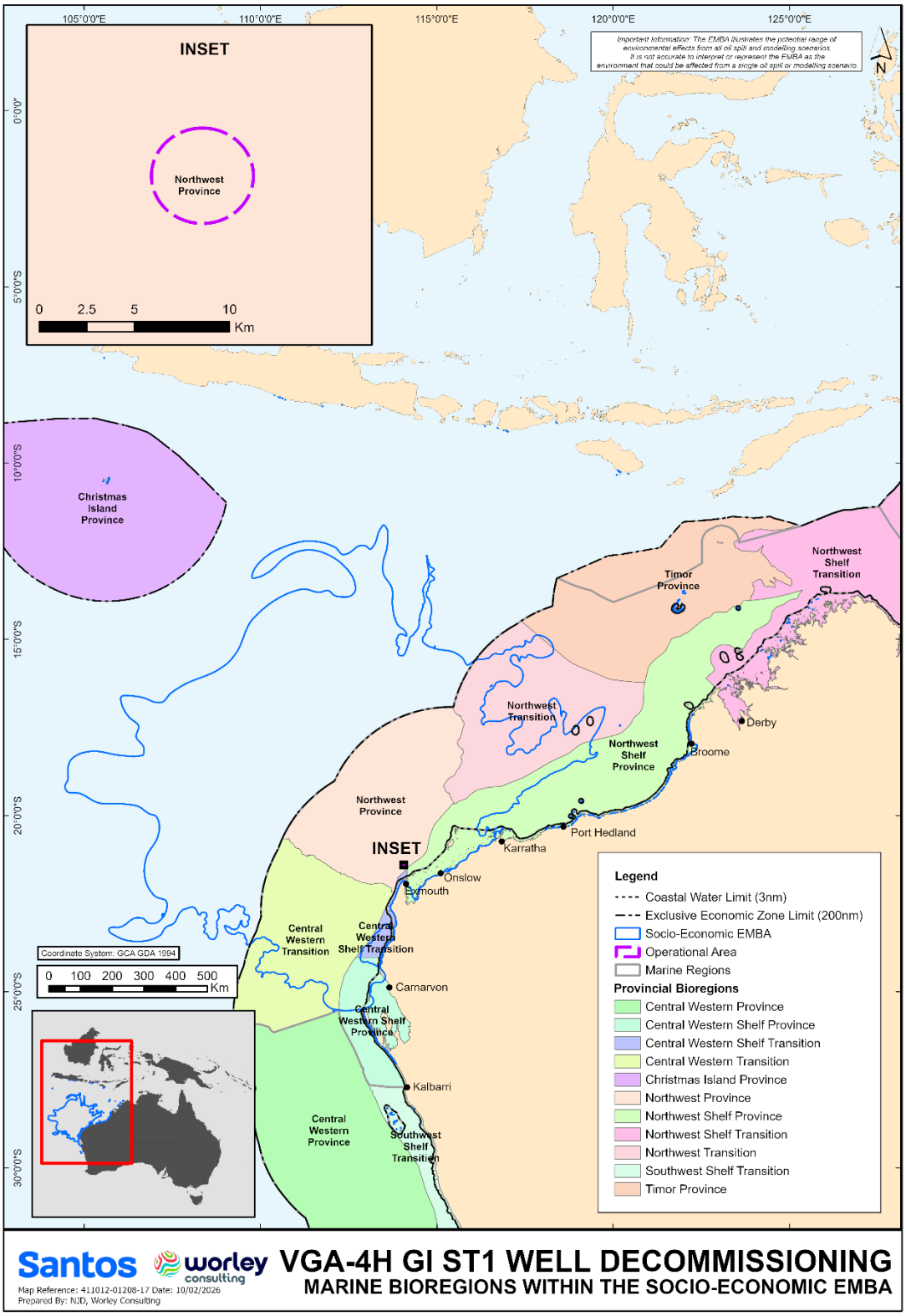

Figure 3-2: Integrated Marine and Coastal Regionalisation of Australia 4.0 provincial bioregions within the environment that may be affected

3.2.4 Benthic habitats

The Operational Area does not contain any shoreline habitat. The Operational Area is approximately 41 km north-northwest off the Cape Range Peninsula in Western Australia.

The benthic habitats in the Operational Area lie in water depths ranging from 360 m to 400 m. The Operational Area consists of soft sediment seabeds as the dominant habitat. A survey of seabed habitat has previously been conducted at the Coniston/Novara fields located approximately 5 to 6 km north (RPS, 2011) and at the VGCN Field (Apache, 2009). The seabed survey at the Coniston/Novara fields, along the flowlines and production manifold locations, has revealed a flat soft sediment habitat comprising sand, silt and mud with a sparse epibenthic fauna (including anemones, sea stars, soft corals, crabs, shrimp and sea urchins) and an infaunal community dominated by polychaetes and crustaceans. This survey found no unique communities or communities of regional significance (RPS, 2011). Similarly, a seabed survey at the VGCN field has revealed a flat substrate comprising mud and silts sediments with sparse epifauna (including sponges, echinoderms and crustaceans) and an infaunal community comprising mainly polychaetes and crustaceans (Apache, 2009).

The depth of the Operational Area (>300 m) precludes the existence of benthic primary producers (i.e. photosynthetic organisms including hard corals, seagrasses and macroalgae), which are typical of shallower coastal areas, as seabed light availability at these depths is insufficient to support photosynthesis (Gattuso et al., 2006).

There are no known offshore reefs or islands within or in close proximity (less than 20 km) to the Operational Area. However, there are a number of emergent oceanic reefs and islands in the EMBA, including Ningaloo Reef, Muiron Islands, Barrow Island, Montebello Islands and Lowendal Islands. Benthic habitats identified from the EMBA (include benthic primary producers (coral reefs, macroalgae, seagrasses and mangroves), soft sediments, rocky substrates, intertidal mud/sandflats, rocky shorelines and sandy beaches.

Within the EMBA, habitat diversity is highest in shallower waters (<30 m) associated with the mainland and offshore islands/shoals where light availability promotes the occurrence of benthic primary producers, and in areas where hard substrate provides attachment points for a greater diversity of habitat forming organisms. Within the EMBA benthic habitat diversity is therefore highest within waters along the Ningaloo coastline, shallow waters around offshore islands extending from Northwest Cape to Onslow (e.g. Muiron Islands) and the Montebello/Barrow/Lowendal Islands.

A description of the values and sensitivities associated with these reefs and islands within the EMBA is provided in Appendix C. The presence of marine and coastal habitats within the Operational Area and EMBA is summarised in Table 3-4.

Table 3-4: Benthic habitats within the Operational Area and environment that may be affected

Category	Receptor	Operational Area Presence	EMBA Presence										Relevant Events That May Impact on The Receptors
			Central Western Shelf Province	Central Western Shelf Transition	Central Western Transition	Christmas Island Province	Northwest Province	Northwest Shelf Province	Northwest Shelf Transition	Northwest Transition	Southwest Shelf Transition	Timor Province	
Benthic habitats	Coral reefs	×	✓	✓	×	✓	×	✓	✓	✓	✓	✓	<u>Unplanned</u> Hydrocarbon release due to loss of well control Diesel release from vessel collision
	Seagrass	×	✓	✓	×	✓	×	✓	✓	✓	✓	✓	
	Macroalgae	×	✓	✓	×	✓	×	✓	✓	✓	✓	✓	
	Non-coral benthic invertebrates	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	<u>Planned</u> Seabed disturbance Planned operational discharges Drilling and cement discharges <u>Unplanned</u> Hydrocarbon release due to loss of well control Unplanned release of solid objects
Shoreline habitats	Mangroves	×	✓	✓	×	×	×	✓	✓	×	×	✓	<u>Unplanned</u> Hydrocarbon release due to loss of well control Diesel release from vessel collision
	Intertidal platforms	×	✓	✓	×	✓	×	✓	✓	✓	✓	×	
	Sandy beaches	×	✓	×	×	✓	×	✓	✓	×	✓	✓	
	Rocky shorelines	×	✓	✓	×	✓	✓	✓	✓	✓	✓	×	

3.2.5 Protected and significant areas

3.2.5.1 Australian Marine Parks and state marine parks, management areas and reserves

The Operational Area does not intercept any Australian Marine Parks (AMPs) or state marine parks, management areas or reserves. The closest AMPs to the Operational Area are the Ningaloo AMP (International Union for Conservation of Nature (IUCN) IV) and the Gascoyne AMP (IUCN VI), located approximately 28 km south of the Operational Area. The closest state marine park is the Muiron Islands Marine Management Area, located approximately 33 km southeast of the Operational Area. Further details are provided in Table 3-5, Figure 3-3 and Figure 3-4.

The EMBA overlaps a number of AMPs and state marine parks, management areas and nature reserves. Further details are outlined in Table 3-5 and shown in Figure 3-3 and Figure 3-4.

AMPs are recognised under the EPBC Act for protecting and maintaining biological diversity and contributing to a national representative network of marine protected areas. Management plans for AMPs have been developed and came into force on 1 July 2018. Under these plans, AMPs are allocated conservation objectives based on the Australian IUCN reserve management principles in Schedule 8 of the EPBC Regulations 2000. These principles determine what activities are acceptable within a protected area under the EPBC Act. The marine park management zones that are relevant to the AMPs and state marine parks within the EMBA are listed in Table 3-6. Section 3.2.7.1 includes additional details regarding cultural heritage and marine parks.

Oil and gas operations and associated oil spill response may be conducted in a Multiple Use Zone (IUCN VI) subject to the class approval and prescriptions in the North-west Marine Parks Network Management Plan (North-west MPNMP) (Director of National Parks (DNP), 2018). The Class Approval – Mining Operations and Greenhouse Gas Activities for the North-west MPNMP, which is applicable to petroleum-related activities, came into effect on 1 July 2018. Prescriptions/conditions of the North-west MPNMP and Class Approval for the North-west MPNMP that are considered relevant to the scope of this EP are provided in Table 3-7.

Appendix B further discusses the adjacent marine parks, management areas and reserves.

3.2.5.2 Key ecological features

Key ecological features (KEFs), which are components of the marine ecosystem that are considered to be important for biodiversity or ecosystem function and integrity of the Commonwealth Marine Area, are also identified in the EPBC Act PMST results (Appendix D).

The Continental Slope Demersal Fish Communities KEF intersects the Operational Area. There are 13 KEFs within the EMBA (Figure 3-5).

3.2.5.3 Heritage areas

Australia's heritage is managed by various levels of government and peak bodies that identify and list places for their heritage values. Significant heritage places are identified and grouped (by type) into lists that guide the protection and management of heritage values. Of relevance are the Commonwealth Heritage List, World Heritage List and National Heritage List.

There are no Commonwealth, National or World Heritage areas located within the Operational Area. However, the EMBA overlaps three World Heritage areas, two Commonwealth Heritage areas, and three National Heritage areas. These areas are shown in Table 3-5 and Figure 3-6.

Further details are provided in Section 3.2.7.2 and Appendix C.

3.2.5.4 Wetlands of international or national importance

Wetlands are a critical part of our natural environment. They protect our shores from wave action, reduce the impacts of floods, absorb pollutants, and improve water quality. They provide habitat for animals and plants, and many contain a wide diversity of life, supporting plants and animals that are found nowhere else.

The Operational Area does not intersect any internationally (Ramsar) or nationally important wetlands. However, the EMBA intersects with four Ramsar wetlands and 14 wetlands of national importance (Figure 3-7). The closest Ramsar Wetland to the Operational Area is Eighty Mile Beach, located over 530 km from the Operational Area.

Table 3-5: Distance from respective Operational Area boundaries to protected areas within the environment that may be affected

Name	Status, Zone or IUCN Classification	Presence in Operational Area	Presence in Ecological EMBA	Presence in Socio-economic EMBA	Distance to Operational Area
Australian Marine Parks					
North West Marine Region					
Argo-Rowley Terrace AMP	Multiple Use Zone (IUCN VI)	×	×	✓	469.65 km
	National Park Zone (IUCN II)	×	×	✓	764.72 km
Carnarvon Canyon AMP	Habitat Protection Zone (IUCN IV)	×	×	✓	345.58 km
Eighty Mile Beach AMP	Multiple Use Zone (IUCN VI)	×	×	✓	535.19 km
Gascoyne AMP	Multiple Use Zone (IUCN VI)	×	✓	✓	27.97 km
	Habitat Protection Zone (IUCN IV)	×	✓	✓	128.12 km
	National Park Zone (IUCN II)	×	×	✓	221.18 km
Mermaid Reef AMP	National Park Zone (IUCN II)	×	✓	✓	734.95 km
Montebello AMP	Multiple Use Zone (IUCN VI)	×	✓	✓	135.33 km
Ningaloo AMP	Recreational Use Zone (IUCN IV)	×	✓	✓	27.17 km
	National Park Zone (IUCN II)	×	✓	✓	147.24 km
Shark Bay AMP	Multiple Use Zone (IUCN VI)	×	×	✓	334.09 km
Dampier AMP	National Park Zone (IUCN II)	×	✓	✓	326.08 km
	Habitat Protection Zone (IUCN IV)	×	✓	✓	333.64 km
Roebuck AMP	Multiple Use Zone (IUCN VI)	×	×	✓	899.105 km
Kimberley AMP	Multiple Use Zone (IUCN VI)	×	×	✓	874.02 km
South West Marine Region					
Abrolhos AMP	Habitat Protection Zone (IUCN IV)	×	×	✓	493.78 km
Indian Ocean Territories Marine Region					
Christmas Island AMP	Habitat Protection Zone (IUCN IV)	×	×	✓	1,471.66 km

Name	Status, Zone or IUCN Classification	Presence in Operational Area	Presence in Ecological EMBA	Presence in Socio-economic EMBA	Distance to Operational Area
State marine parks and management areas					
Bardi Jawi Gaarra Marine Park	Marine Park (IUCN VI)	×	×	✓	1,038.50 km
Barrow Island Marine Management Area	Unzoned (with exception of Bandicoot Bay Conservation Area)	×	✓	✓	132.62 km
Barrow Island Marine Park	Multiple Use Zone (IUCN VI)	×	✓	✓	132.62 km
	Sanctuary Zone (IUCN Ia)	×	✓	✓	138.79 km
Eighty Mile Beach Marine Park	Marine Park (IUCN VI)	×	×	✓	580.42 km
Lalang-gaddam Marine Park	Marine Park (IUCN VI)	×	×	✓	1,106.88 km
Mayala Marine Park	Marine Park (IUCN VI)	×	×	✓	1,096.73 km
Montebello Islands Marine Park	General Use Zone (IUCN II)	×	✓	✓	170.60 km
	Sanctuary Zone (IUCN Ia)	×	✓	✓	167.66 km
Muiron Islands Marine Management Area	Marine Management Area (IUCN VI)	×	✓	✓	32.59 km
Ningaloo Marine Park	General Use Zone (IUCN II)	×	✓	✓	33.60 km
	Sanctuary Zone (IUCN Ia)	×	✓	✓	39.95 km
North Kimberley	Marine Park (IUCN VI)	×	×	✓	1,303.76 km
Rowley Shoals	Habitat Protection Area (IUCN IV)	×	✓	✓	665.68 km
	General Use Zone (IUCN II)	×	×	✓	647.94 km
	Sanctuary Zone (IUCN Ia)	×	✓	✓	652.57 km
Shark Bay	General Use Zone (IUCN II)	×	×	✓	439.95 km
	Sanctuary Zone (IUCN Ia)	×	×	✓	446.30 km
Yawuru Nagulagun/Roebuck Bay	Marine Park (IUCN VI)	×	✓	✓	894.40 km

Name	Status, Zone or IUCN Classification	Presence in Operational Area	Presence in Ecological EMBA	Presence in Socio-economic EMBA	Distance to Operational Area
Wetlands of national importance					
Cape Range Subterranean Waterways	-	×	✓	✓	41.66 km
Hosine's Spring, Christmas Island	-	×	×	✓	1,513.22 km
Bundera Sinkhole	-	×	×	×	114.50 km
Exmouth Gulf East	-	×	✓	✓	76.36 km
Mermaid Reef	-	×	✓	✓	747.48 km
Roebuck Bay	-	×	✓	✓	912.29 km
Shark Bay East	-	×	×	✓	391.48 km
Lake MacLeod	-	×	×	✓	242.83 km
Eighty Mile Beach System	-	×	×	✓	582.16 km
Willie Creek Wetlands	-	×	×	✓	941.08 km
Leslie (Port Hedland) Saltfields System	-	×	×	✓	496.53 km
Learmonth Air Weapons Range – Saline Coastal Flats	-	×	✓	✓	112.99 km
"The Dales", Christmas Island	-	×	✓	✓	1,521.57 km
Bunda-Bunda Mound Springs	-	×	✓	✓	983.65 km
Wetlands of international importance (Ramsar)					
Eighty-Mile Beach	-	×	✓	✓	609.96 km
Roebuck Bay	-	×	✓	✓	908.50 km
The Dales	-	×	✓	✓	1,519.89 km
Hosine's Spring	-	×	✓	✓	1,512.71 km

Name	Status, Zone or IUCN Classification	Presence in Operational Area	Presence in Ecological EMBA	Presence in Socio-economic EMBA	Distance to Operational Area
Key ecological features					
Commonwealth marine environment surrounding the Houtman Abrolhos Islands	-	×	×	✓	738.38 km
Western demersal slope and associated fish communities	-	×	✓	✓	489.35 km
Commonwealth waters adjacent to Ningaloo Reef	-	×	✓	✓	27.18 km
Western rock lobster	-	×	×	✓	697.13 km
Ancient coastline at 125 m depth contour	-	×	✓	✓	22.91 km
Exmouth Plateau	-	×	✓	✓	70.20 km
Canyons linking the Cuvier Abyssal Plain and the Cape Range Peninsula	-	×	✓	✓	4.79 km
Wallaby Saddle	-	×	×	✓	508.00 km
Commonwealth marine environment within and adjacent to the west coast inshore lagoons	-	×	×	✓	736.92 km
Continental slope demersal fish communities	-	✓	✓	✓	0 km
Mermaid Reef and Commonwealth waters surrounding Rowley Shoals	-	×	×	✓	638.93 km
Seringapatam Reef and Commonwealth waters in the Scott Reef Complex	-	×	×	✓	1,131.92 km
Glomar Shoals	-	×	×	✓	319.95 km

Name	Status, Zone or IUCN Classification	Presence in Operational Area	Presence in Ecological EMBA	Presence in Socio-economic EMBA	Distance to Operational Area
Indigenous Protected Areas					
Yawuru	Sea Country Indigenous Protected Areas (IUCN IV)	×	✓	✓	894.40 km
Nyangumarta Warrarn	Sea Country Indigenous Protected Areas (IUCN IV)	×	×	✓	642.94 km
World Heritage property					
Murujuga Cultural Landscape	Declared Property	×	✓	✓	261.02 km
The Ningaloo Coast	Declared Property	×	✓	✓	27.18 km
Shark Bay, Western Australia	Declared Property	×	✓	✓	374.67 km
Commonwealth Heritage Listed places					
Ningaloo Marine Area	Listed Place	×	✓	✓	27.17 km
Learmonth Air Weapons Range Facility	Listed Place	×	✓	✓	108.21 km
National Heritage places					
Batavia Shipwreck Site and Survivor Camps Area 1629 – Houtman Abrolhos	Historic	×	×	✓	779.25 km
Dampier Archipelago (including Burrup Peninsula)	Indigenous	×	✓	✓	261.02 km
The Ningaloo Coast	Natural	×	✓	✓	27.17 km
The West Kimberley	Natural	×	×	✓	855.97 km
Shark Bay, Western Australia	Natural	×	✓	✓	374.68 km

Table 3-6: Australian and state marine management zones

Management Zones	Objective
Australian Marine Parks	
Multiple Use (IUCN VI)	The objective is to provide for ecologically sustainable use and the conservation of ecosystems, habitats, and native species.
Recreational Use (IUCN IV)	The objective is to provide for the conservation of ecosystems, habitats, and native species in as natural a state as possible, while providing for recreational use.
Habitat Protection Zone (IUCN IV)	The objective is to provide for the conservation of ecosystems, habitats, and native species in as natural a state as possible, while allowing activities that do not harm or cause destruction to seafloor habitats.
National Park Zone (IUCN II)	The objective is to protect natural biodiversity with its underlying ecological structure and supporting environmental processes, and to promote education and recreation.
Special Purpose Zone	The objective is to protect natural ecosystems and use natural resources sustainably, when conservation and sustainable use can be mutually beneficial.
State marine parks	
Sanctuary Zones	The primary purpose of sanctuary zones is for the protection and conservation of marine biodiversity. Sanctuary zones are 'no-take' areas managed solely for nature conservation and low-impact recreation and tourism.
Special Purpose Zones	*Special purpose (benthic protection) zone*: This zone has the priority purpose of conservation of benthic habitat. *Special purpose (shore-based activities) zone:* Special purpose zones in marine parks are managed for a priority purpose or use, such as a seasonal event (e.g. wildlife breeding, whale watching) or a commercial activity (e.g. pearling).
Recreation Zones	Recreation zones have the primary purpose of providing opportunities for recreational activities, including fishing, for visitors and for commercial tourism operators, where these activities are compatible with the maintenance of the values of the zone.
General Use Zones	Conservation of natural values is still the priority of general use zones, but activities such as sustainable commercial and recreational fishing, aquaculture, pearling and petroleum exploration and production may be permitted provided they do not compromise the ecological values of the marine park.

Table 3-7: Prescriptions/conditions from the North-west Marine Parks Network Management Plan 2018 relevant to the activities in this Environment Plan

Prescription/ Condition Number	Prescription/Condition	Relevant Section of EP
North-west MPNMP (DNP, 2018a)		
4.2.9.8	Notwithstanding Section 4.2.9.1 (of the North-west MPNMP), actions required to respond to oil pollution incidents, including environmental monitoring and remediation, in connection with mining operations authorised under the OPGGS Act, may be conducted in all zones without an authorisation issued by the Director, provided that the actions are taken in accordance with: • an environment plan that has been accepted by NOPSEMA • the Director is notified in the event of oil pollution within a marine park, or where an oil spill response action must be taken within a marine park, so far as reasonably practicable, prior to response action being taken.	This EP (Section 4) (stakeholder consultation), reporting under Section 7 of the OPEP
Class approval – mining operations and greenhouse gas activities – for North-west MPNMP (DNP, 2018)		
1	Approved action must be conducted in accordance with: (a) an Environment Plan accepted under the Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations (2023)	This EP and OPEP (some proposed response activities in the event of an oil pollution incident may be undertaken within the North-west Marine Parks Network)
	(b) the EPBC Act	Appendix B (legislation)
	(c) the EPBC Regulations	This EP
	(d) the North-west Network Management Plan	This table
	(e) any prohibitions, restrictions or determinations made under the EPBC Regulations by the Director of National Parks	Not applicable
	(f) all other applicable Commonwealth and state and territory laws (to the extent those laws are capable of operating concurrently with the laws and instruments described in paragraphs a to e).	Appendix B (legislation), and the OPEP
2	If requested by the Director of National Parks, an Approved Person must notify the Director prior to conducting Approved Actions within Approved Zones. Note: the timeframe for prior notice will be agreed to by the Director of National Parks and the Approved Person.	Section 8 (reporting) and Section 7 of the OPEP
3	If requested by the Director of National Parks, an Approved Person must provide the Director with information relating to undertaking the Approved Actions (or gathered while undertaking the Approved Actions), that is relevant to the Director's management of the Approved Zones. Note: the information required, and timeframe within which it is required, will be agreed to by the Director of National Parks and the Approved Person.	Not applicable

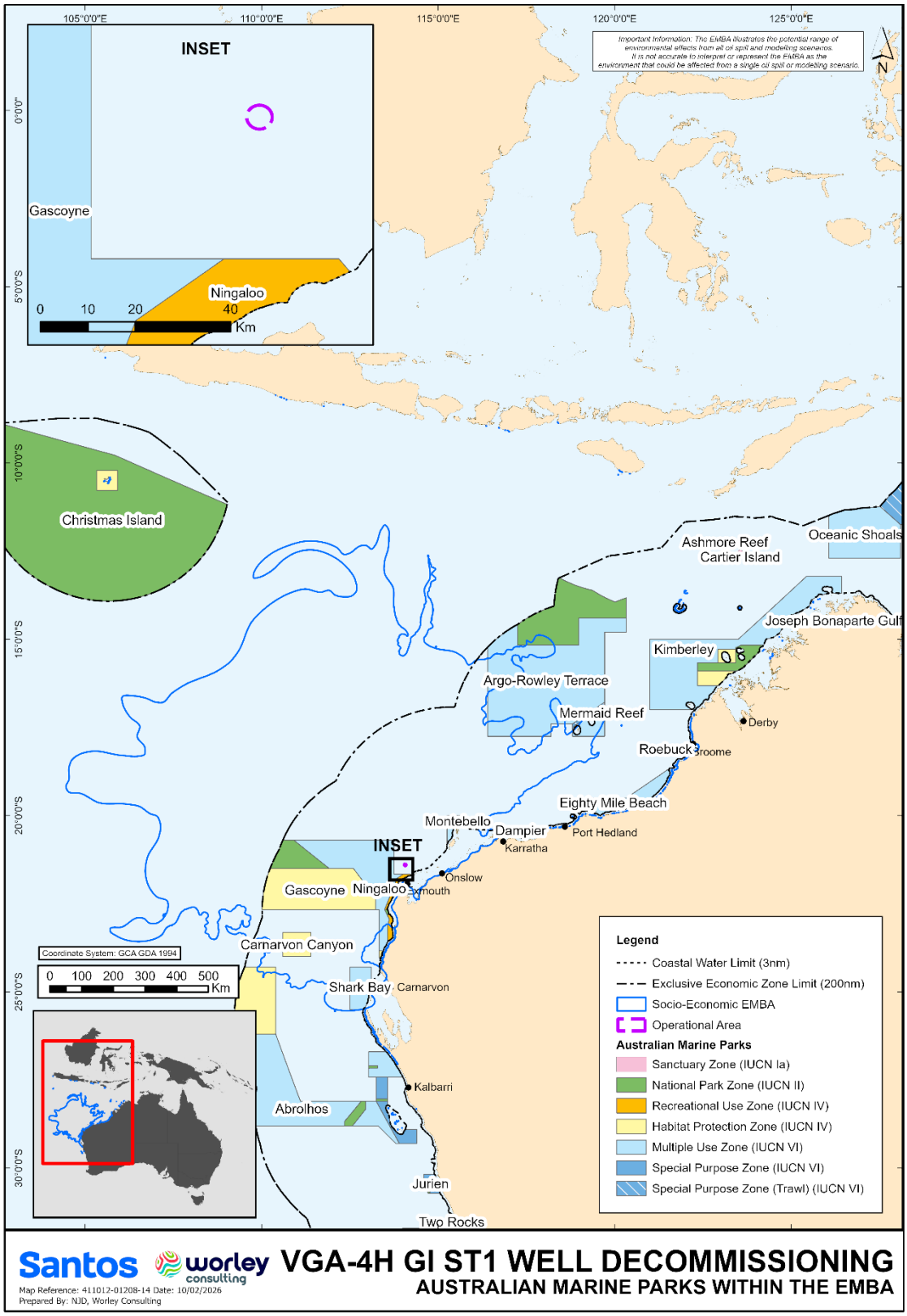

Figure 3-3: Australian marine parks within the environment that may be affected

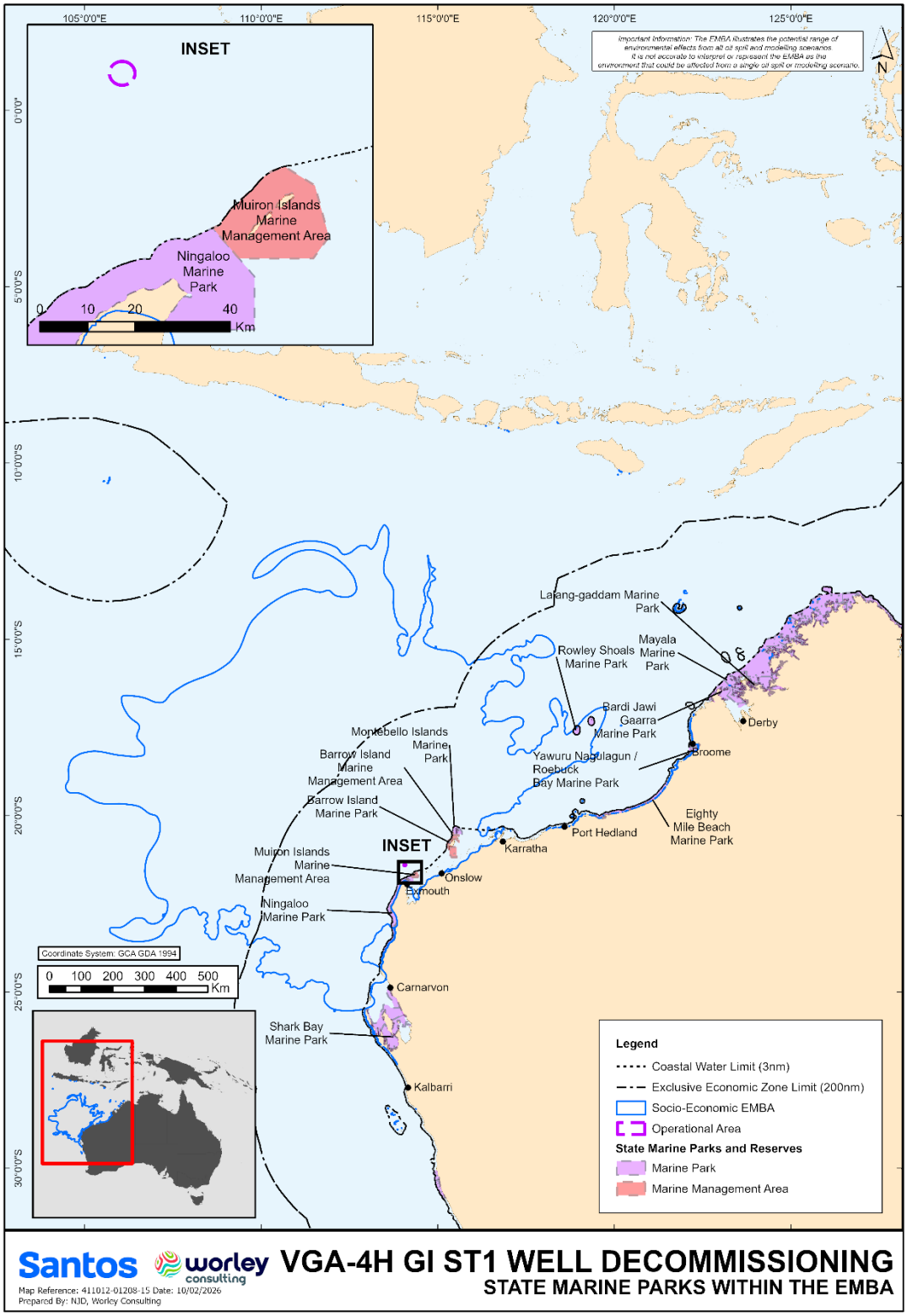

Figure 3-4: State marine protected areas within the environment that may be affected

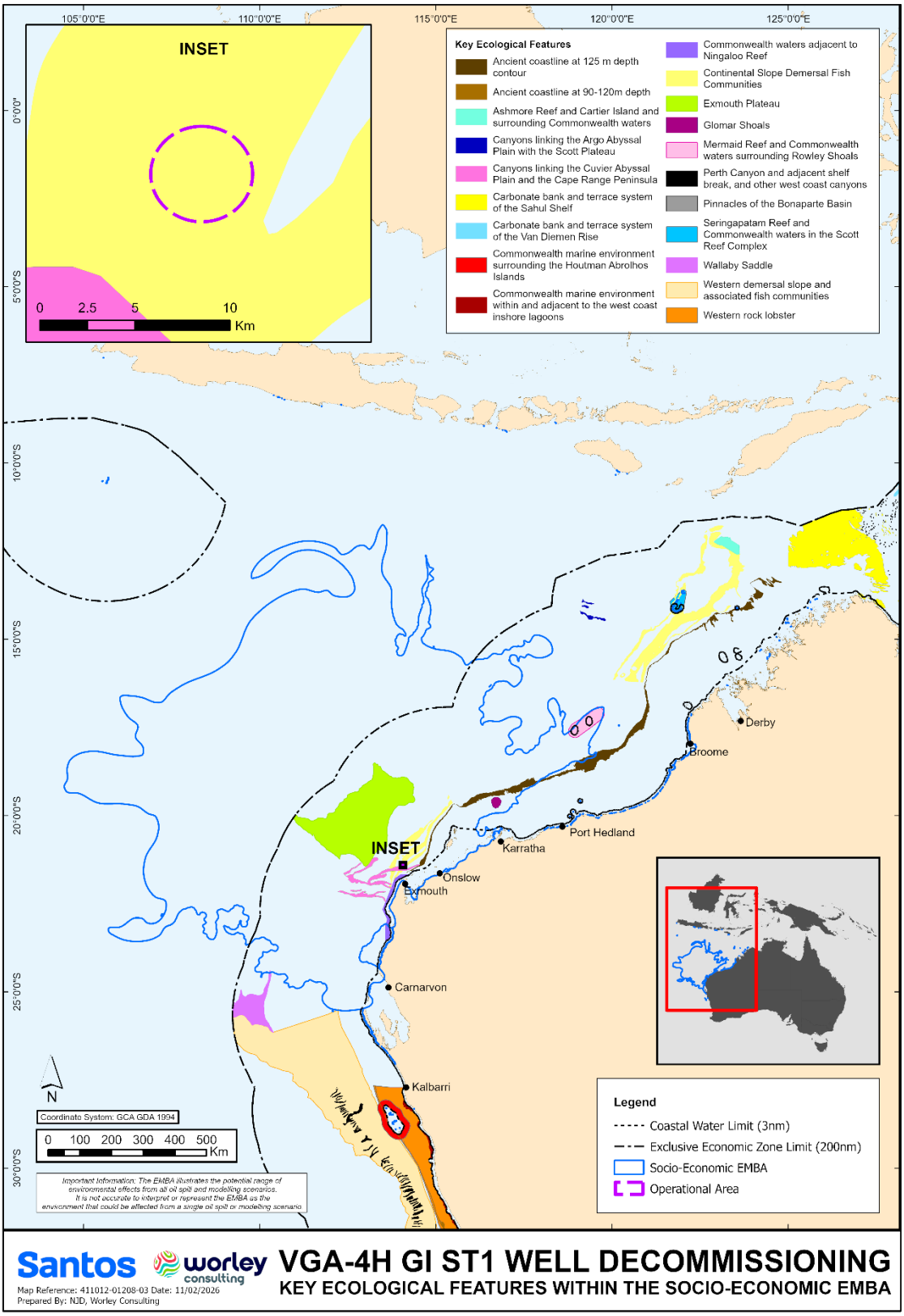

Figure 3-5: Key ecological features within and near the environment that may be affected

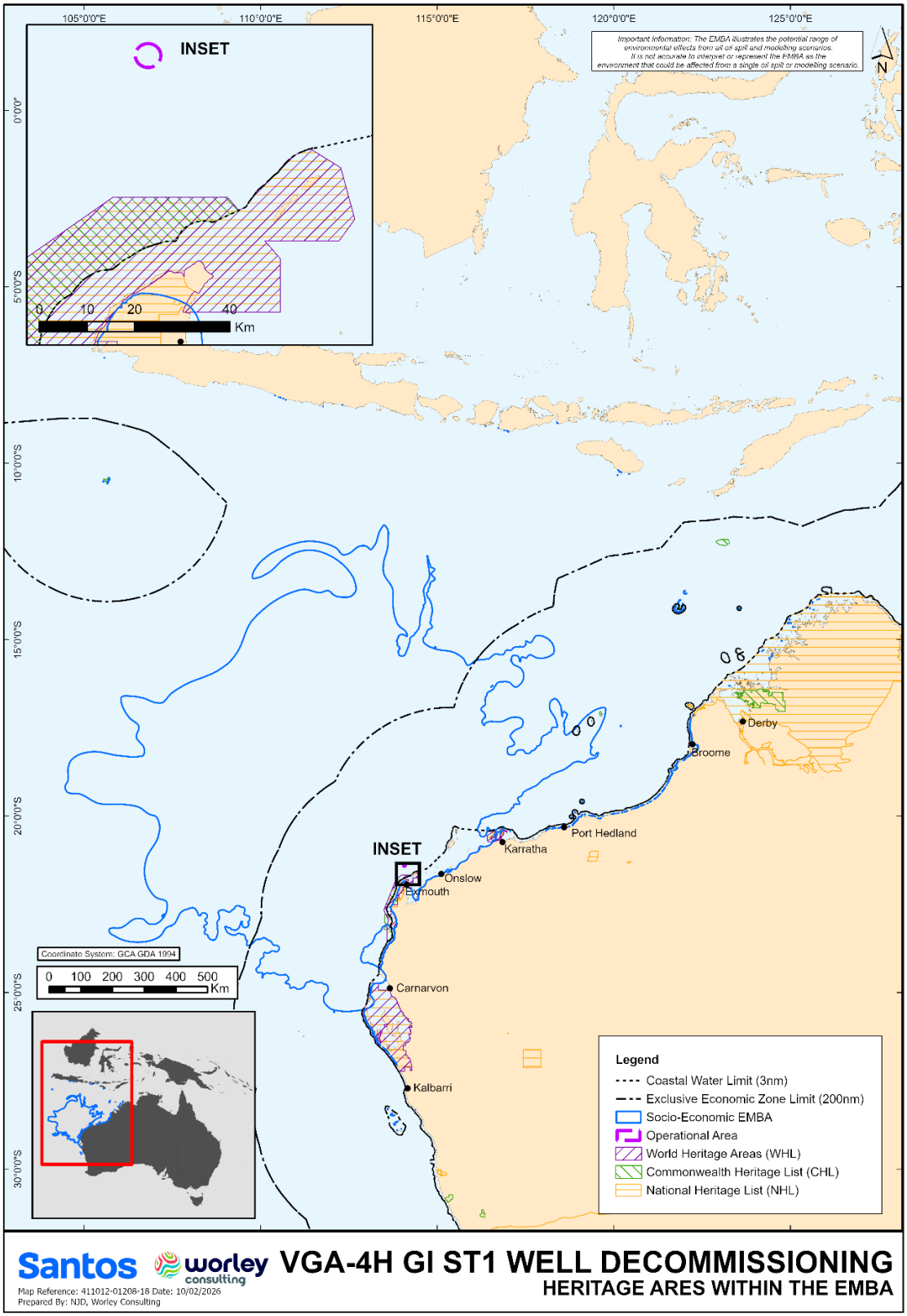

Figure 3-6: Heritage areas within the environment that may be affected

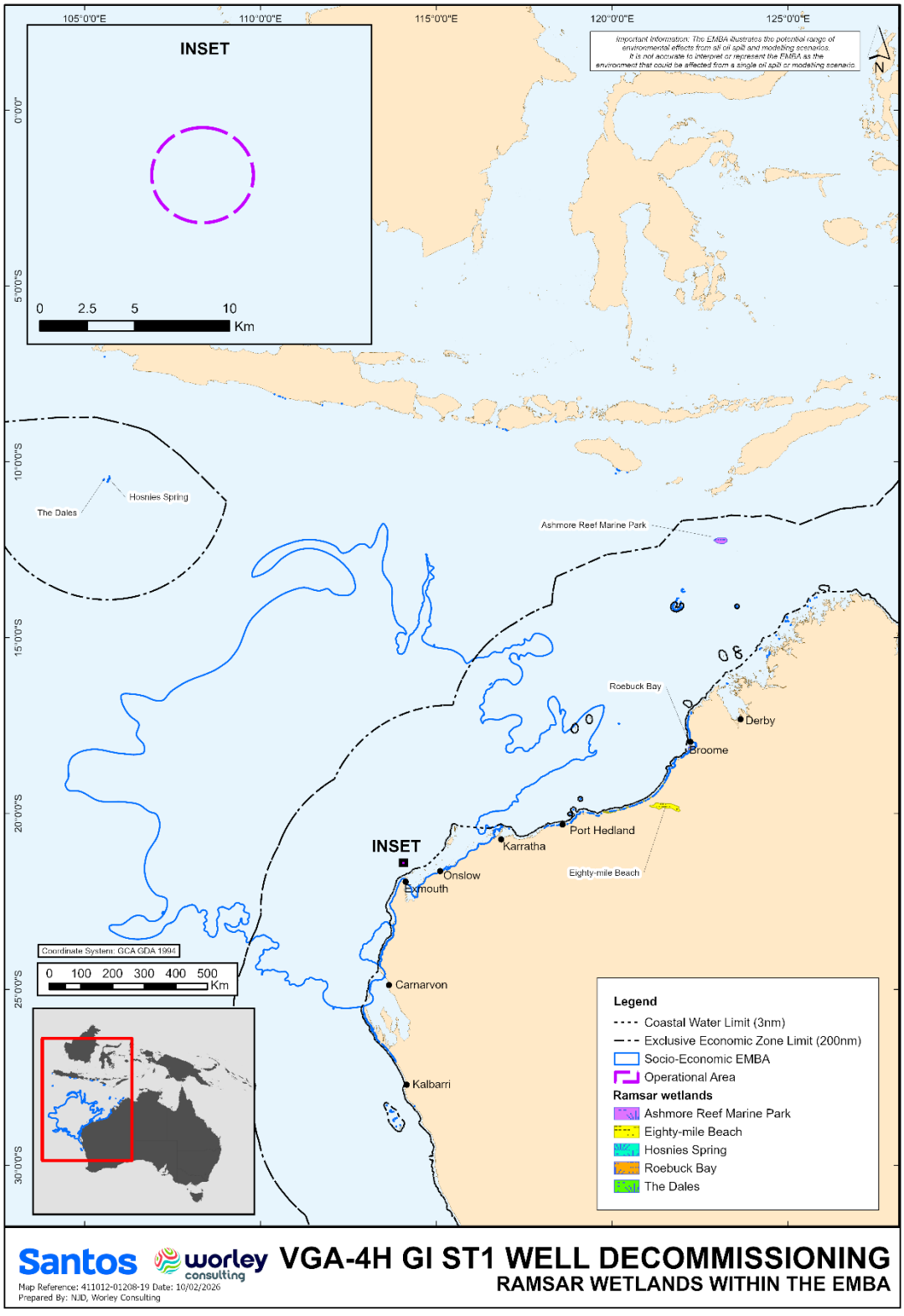

Figure 3-7: Wetlands of international importance within the environment that may be affected

3.2.6 Threatened and migratory fauna

Table 3-8 presents the Threatened (Conservation Dependent, Vulnerable, Endangered, Critically Endangered) and Migratory species identified as potentially occurring within the Operational Area, the socio-economic EMBA and the

ecological EMBA. These include all relevant matter of national environment significance (MNES) protected under the EPBC Act as identified in the PMST report for the Operational Area and EMBAs (Appendix D). For each species identified, their status under the Western Australia *Biodiversity Conservation Act 2016* is also provided as well as the extent of likely presence, including any overlap with designated biologically important areas (BIAs). Planned and unplanned events associated with the activities outlined in Section 2 that may have an impact on the relevant MNES are also included in Sections 6 and 7.

Terrestrial species considered MNES appearing in the PMST reports that are not considered to interact with the marine environment, based on the species profiles published on the DCCEEW Species Profile and Threats database, were not considered relevant to the activity impacts and therefore have been excluded from Table 3-8 and are not discussed further. Marine species that were not classed as Threatened or Migratory were not considered MNES under the EPBC Act and were also excluded from Table 3-8 and are not discussed further.

The PMST report for the Operational Area identified a total of 25 marine fauna species listed as Threatened, and one additional marine fauna species listed as Migratory under the EPBC Act. Of these 26 species, six were fish or sharks, five were marine mammals, five were marine reptiles and 10 were marine birds.

The PMST report for the ecological EMBA identified a total of 54 marine fauna species listed as Threatened under the EPBC Act. An additional 53 migratory species were also identified. Of these 107 species, 14 were sharks or fish, 14 were marine mammals, 10 were marine reptiles, and 69 were marine birds.

There were 60 listed Threatened species, and an additional 59 migratory species were identified as potentially occurring in marine or shoreline habitats within the EMBA. Of these 119 species, 16 were fish or sharks, 15 were marine mammals, 10 were marine reptiles and 78 were marine birds.

Further details of these species are provided in Appendix C.

Table 3-8: Environmental values and sensitivities within the environment that may be affected and Operational Area – threatened and migratory marine fauna

Value/Sensitivity		Conservation Status			Operational Area		Ecological EMBA		Socio-economic EMBA		Relevant Events
Common Name	Scientific Name	Migratory Status	EPBC Act Status	BC Act Status	Presence	Type of Presence	Presence	Type of Presence	Presence	Type of Presence	
Fish and sharks											
Dwarf sawfish, Queensland sawfish	*Pristis clavata*	Migratory	Vulnerable	P1 Migratory	✓	Species or species habitat known to occur within area	✓	Breeding known to occur within area	✓	Species or species habitat known to occur within area	<u>Planned</u> Noise emissions Light emissions Seabed and benthic habitat disturbance Operational discharges Drilling and cement discharges <u>Unplanned</u> Release of solid objects Introduction of invasive marine species Marine fauna interaction Minor hydrocarbon and chemical spills Hydrocarbon spill – loss of well control (LOWC) Hydrocarbon spills – marine diesel oil (MDO) Spill response operations
Freshwater sawfish	*Pristis pristis*	Migratory	Vulnerable	P3 Migratory	×	-	✓	Species or species habitat known to occur within area	✓	Species or species habitat known to occur within area	
Giant manta ray	*Mobula birostris*	Migratory	-	Migratory	×	-	✓	Species or species habitat known to occur within area	✓	Species or species habitat known to occur within area	
Green sawfish, dindagubba, narrowsnout sawfish	*Pristis zijsron*	Migratory	Vulnerable	Vulnerable	✓	Species or species habitat known to occur within area	✓	Breeding known to occur within area	✓	Species or species habitat known to occur within area	
Grey nurse shark (west coast population)	*Carcharias taurus (west coast population)*	-	Vulnerable	-	✓	Species or species habitat may occur within area	✓	Congregation or aggregation known to occur within area	✓	Congregation or aggregation known to occur within area	
Little gulper shark	*Centrophorus uyato*	-	Conservation Dependent	-	×	-	×	-	✓	Species or species habitat likely to occur within area	
Longfin mako	*Isurus paucus*	Migratory	-	Migratory	×	-	×	-	✓	Species or species habitat likely to occur within area	
Narrow sawfish, knifetooth sawfish	*Anoxypristis cuspidata*	Migratory	-	Migratory	×	-	✓	Species or species habitat likely to occur within area	✓	Species or species habitat likely to occur within area	
Northern river shark, New Guinea river shark	*Glyphis garricki*	-	Endangered	P1	×	-	✓	Species or species habitat may occur within area	✓	Species or species habitat may occur within area	
Oceanic whitetip shark	*Carcharhinus longimanus*	Migratory	-	-	×	-	✓	Species or species habitat likely to occur within area	✓	Species or species habitat likely to occur within area	
Porbeagle, mackerel shark	*Lamna nasus*	Migratory	-	Migratory	×	-	✓	Species or species habitat may occur within area	✓	Species or species habitat may occur within area	
Reef manta ray, coastal manta ray	*Mobula alfredi*	Migratory	-	Migratory	×	-	✓	Species or species habitat known to occur within area	✓	Species or species habitat known to occur within area	
Scalloped hammerhead	*Sphyrna lewini*	-	Conservation Dependent	-	✓	Species or species habitat may occur within area	✓	Species or species habitat known to occur within area	✓	Species or species habitat known to occur within area	
Shortfin mako, mako shark	*Isurus oxyrinchus*	Migratory	-	Migratory	×	-	✓	Species or species habitat likely to occur within area	✓	Species or species habitat likely to occur within area	
Whale shark	*Rhincodon typus*	Migratory	Vulnerable	Migratory	✓	Foraging, feeding or related behaviour known to occur within area	✓	Foraging, feeding or related behaviour known to occur within area	✓	Foraging, feeding or related behaviour known to occur within area	
White shark, great white shark	*Carcharodon carcharias*	Migratory	Vulnerable	Vulnerable	✓	Species or species habitat may occur within area	✓	Species or species habitat known to occur within area	✓	Foraging, feeding or related behaviour known to occur within area	

Value/Sensitivity		Conservation Status			Operational Area		Ecological EMBA		Socio-economic EMBA		Relevant Events
Common Name	**Scientific Name**	**Migratory Status**	**EPBC Act Status**	**BC Act Status**	**Presence**	**Type of Presence**	**Presence**	**Type of Presence**	**Presence**	**Type of Presence**	
Marine mammals											
Antarctic minke whale, dark-shoulder minke whale	*Balaenoptera bonaerensis*	Migratory	-	Migratory	×	-	✓	Species or species habitat likely to occur within area	✓	Species or species habitat likely to occur within area	<u>Planned</u> Noise emissions Operational discharges Drilling and cement discharges <u>Unplanned</u> Release of solid objects Introduction of invasive marine species Marine fauna interaction Minor hydrocarbon and chemical spills Hydrocarbon spill – LOWC Hydrocarbon spills – MDO Spill response operations
Australian humpback dolphin	*Sousa sahulensis*	Migratory	Vulnerable	P4 Migratory	✓	Species or species habitat may occur within area	✓	Breeding known to occur within area	✓	Breeding known to occur within area	
Australian sea-lion, Australian sea lion	*Neophoca cinerea*	-	Endangered	Endangered	×	-	×	-	✓	Breeding known to occur within area	
Australian snubfin dolphin	*Orcaella heinsohni*	Migratory	Vulnerable	P4 Migratory	✓	Species or species habitat may occur within area	✓	Breeding known to occur within area	✓	Species or species habitat known to occur within area	
Blue whale	*Balaenoptera musculus*	Migratory	Endangered	Endangered	×	-	✓	Migration route known to occur within area	✓	Migration route known to occur within area	
Bryde's whale	*Balaenoptera edeni*	Migratory	-	Migratory	×	-	✓	Species or species habitat likely to occur within area	✓	Species or species habitat likely to occur within area	
Dugong	*Dugong dugong*	Migratory	-	Migratory	×	-	✓	Breeding known to occur within area	✓	Breeding known to occur within area	
Fin whale	*Balaenoptera physalus*	Migratory	Vulnerable	Endangered	Species or species habitat may occur within area	Species or species habitat likely to occur within area	✓	Foraging, feeding or related behaviour likely to occur within area	✓	Foraging, feeding or related behaviour likely to occur within area	
Humpback whale	*Megaptera novaeangliae*	Migratory	-	Special conservation interest Migratory	×	-	✓	Breeding known to occur within area	✓	Breeding known to occur within area	
Killer whale, orca	*Orcinus orca*	Migratory	-	Migratory	×	-	✓	Species or species habitat may occur within area	✓	Species or species habitat may occur within area	
Omura's whale	*Balaenoptera omurai*	Migratory	-	-	✓	Species or species habitat likely to occur within area	✓	Species or species habitat likely to occur within area	✓	Species or species habitat likely to occur within area	
Sei whale	*Balaenoptera borealis*	Migratory	Vulnerable	Endangered	✓	Species or species habitat likely to occur within area	✓	Foraging, feeding or related behaviour likely to occur within area	✓	Foraging, feeding or related behaviour likely to occur within area	
Southern right whale	*Eubalaena australis*	Migratory	Endangered	Vulnerable	✓	Species or species habitat likely to occur within area	✓	Species or species habitat likely to occur within area	✓	Species or species habitat likely to occur within area	
Sperm whale	*Physeter macrocephalus*	Migratory	-	Vulnerable	×	-	✓	Species or species habitat may occur within area	✓	Species or species habitat may occur within area	
Spotted bottlenose dolphin (Arafura/Timor Sea populations)	*Tursiops aduncus* (Arafura/Timor Sea populations)	Migratory	-	Migratory	×	-	✓	Species or species habitat known to occur within area	✓	Species or species habitat known to occur within area	

Value/Sensitivity		Conservation Status			Operational Area		Ecological EMBA		Socio-economic EMBA		Relevant Events
Common Name	**Scientific Name**	**Migratory Status**	**EPBC Act Status**	**BC Act Status**	**Presence**	**Type of Presence**	**Presence**	**Type of Presence**	**Presence**	**Type of Presence**	
Marine reptiles											
Dusky sea snake	*Aipysurus fuscus*	-	Endangered	P4	×	-	✓	Species or species habitat known to occur within area	✓	Species or species habitat known to occur within area	<u>Planned</u> Noise emissions Operational discharges Drilling and cement discharges <u>Unplanned</u> Introduction of invasive marine species Hydrocarbon spill – LOWC Hydrocarbon spills – MDO Spill response operations
Flatback turtle	*Natator depressus*	Migratory	Vulnerable	Vulnerable	✓	Congregation or aggregation known to occur within area	✓	Breeding known to occur within area	✓	Breeding known to occur within area	
Green turtle	*Chelonia mydas*	Migratory	Vulnerable	Vulnerable	✓	Congregation or aggregation known to occur within area	✓	Breeding known to occur within area	✓	Breeding known to occur within area	
Hawksbill turtle	*Eretmochelys imbricata*	Migratory	Vulnerable	Vulnerable	✓	Congregation or aggregation known to occur within area	✓	Breeding known to occur within area	✓	Breeding known to occur within area	
Leaf-scaled sea snake, leaf-scaled seasnake	*Aipysurus foliosquama*	-	Critically Endangered	Critically Endangered	×	-	✓	Species or species habitat known to occur within area	✓	Species or species habitat known to occur within area	
Leatherback turtle	*Dermochelys coriacea*	Migratory	Endangered	Vulnerable	✓	Species or species habitat known to occur within area	✓	Foraging, feeding or related behaviour known to occur within area	✓	Foraging, feeding or related behaviour known to occur within area	
Loggerhead turtle	*Caretta caretta*	Migratory	Endangered	Endangered	✓	Congregation or aggregation known to occur within area	✓	Breeding known to occur within area	✓	Breeding known to occur within area	
Olive ridley turtle	*Lepidochelys olivacea*	Migratory	Endangered	Endangered	×	-	✓	Foraging, feeding or related behaviour likely to occur within area	✓	Breeding likely to occur within area	
Salt-water crocodile, estuarine crocodile	*Crocodylus porosus*	Migratory	-	Migratory	✓	Species or species habitat may occur within area	✓	Species or species habitat likely to occur within area	✓	Species or species habitat may occur within area	
Short-nosed sea snake, short-nosed seasnake	*Aipysurus apraefrontalis*	-	Critically Endangered	Critically Endangered	×	-	✓	Species or species habitat may occur within area	✓	Species or species habitat known to occur within area	
Marine birds											
Abbott's booby	*Papasula abbotti*	-	Endangered	-	×	-	✓	Species or species habitat known to occur within area	✓	Species or species habitat known to occur within area	<u>Planned</u> Noise emissions Light emissions Seabed and benthic habitat disturbance Operational discharges Drilling and cement discharges <u>Unplanned</u> Release of solid objects Introduction of invasive marine species
Amsterdam albatross	*Diomedea amsterdamensis*	Migratory	Endangered	Critically Endangered	×	-			✓	Species or species habitat may occur within area	
Asian dowitcher	*Limnodromus semipalmatus*	Migratory	Vulnerable	Migratory	×	-	✓	Species or species habitat known to occur within area	✓	Species or species habitat known to occur within area	
Australian fairy tern	*Sternula nereis nereis*	-	Vulnerable	Vulnerable	✓	Foraging, feeding or related behaviour likely to occur within area	✓	Breeding known to occur within area	✓	Breeding known to occur within area	
Australian lesser noddy	*Anous tenuirostris melanops*	-	Vulnerable	Endangered	×	-	✓	Species or species habitat may occur within area	✓	Breeding known to occur within area	
Australian painted snipe	*Rostratula australis*	-	Endangered	Endangered	×	-	✓	Species or species habitat known to occur within area	✓	Species or species habitat likely to occur within area	

Value/Sensitivity		Conservation Status			Operational Area		Ecological EMBA		Socio-economic EMBA		Relevant Events
Common Name	Scientific Name	Migratory Status	EPBC Act Status	BC Act Status	Presence	Type of Presence	Presence	Type of Presence	Presence	Type of Presence	
Barn swallow	*Hirundo rustica*	Migratory	-	Migratory	×	-	✓	Species or species habitat known to occur within area	✓	Species or species habitat known to occur within area	Marine fauna interaction Minor hydrocarbon and chemical spills Hydrocarbon spill – LOWC Hydrocarbon spills – MDO Spill response operations
Bar-tailed godwit	*Limosa lapponica*	Migratory	-	Migratory	×	-	✓	Species or species habitat known to occur within area	✓	Species or species habitat known to occur within area	
Black-browed albatross	*Thalassarche melanophris*	Migratory	Vulnerable	Endangered	×	-	✓	Species or species habitat may occur within area	✓	Species or species habitat may occur within area	
Black-tailed godwit	*Limosa limosa*	Migratory	Endangered	Migratory	×	-	✓	Roosting known to occur within area	✓	Species or species habitat known to occur within area	
Bridled tern	*Onychoprion anaethetus*	Migratory	-	Migratory	×	-	✓	Breeding known to occur within area	✓	Breeding known to occur within area	
Broad-billed sandpiper	*Limicola falcinellus*	Migratory	-	-	×	-	✓	Roosting known to occur within area	✓	Species or species habitat known to occur within area	
Brown booby	*Sula leucogaster*	Migratory	-	Migratory	×	-	✓	Breeding known to occur within area	✓	Breeding known to occur within area	
Campbell albatross, Campbell black-browed albatross	*Thalassarche impavida*	Migratory	Vulnerable	Vulnerable	×	-	✓	Species or species habitat may occur within area	✓	Species or species habitat may occur within area	
Caspian tern	*Hydroprogne caspia*	Migratory	-	Migratory	×	-	✓	Breeding known to occur within area	✓	Breeding known to occur within area	
Christmas Island frigatebird, Andrew's frigatebird	*Fregata andrewsi*	Migratory	Endangered	Migratory	×	-	✓	Foraging, feeding or related behaviour known to occur within area	✓	Breeding known to occur within area	
Christmas Island white-tailed tropicbird, golden bosunbird	*Phaethon lepturus fulvus*	-	Endangered	-	✓	Species or species habitat may occur within area	✓	Breeding known to occur within area	✓	Species or species habitat may occur within area	
Common greenshank, greenshank	*Tringa nebularia*	Migratory	Endangered	Migratory	×	-	✓	Species or species habitat known to occur within area	✓	Species or species habitat known to occur within area	
Common noddy	*Anous stolidus*	Migratory	-	Migratory	×	-	✓	Species or species habitat likely to occur within area	✓	Species or species habitat likely to occur within area	
Common redshank, redshank	*Tringa totanus*	Migratory	-	Migratory	×	-	✓	Roosting known to occur within area	✓	Species or species habitat known to occur within area	
Common sandpiper	*Actitis hypoleucos*	Migratory	-	Migratory	×	-	✓	Species or species habitat known to occur within area	✓	Species or species habitat known to occur within area	
Curlew sandpiper	*Calidris ferruginea*	Migratory	Critically Endangered	Critically Endangered	✓	Species or species habitat may occur within area	✓	Species or species habitat known to occur within area	✓	Species or species habitat known to occur within area	
Double-banded plover	*Charadrius bicinctus*	Migratory	-	Migratory	×	-	✓	Roosting known to occur within area	✓	Roosting known to occur within area	
Eastern curlew, far eastern curlew	*Numenius madagascariensis*	Migratory	Critically Endangered	Critically Endangered	✓	Species or species habitat may occur within area	✓	Species or species habitat known to occur within area	✓	Species or species habitat known to occur within area	

Value/Sensitivity		Conservation Status			Operational Area		Ecological EMBA		Socio-economic EMBA		Relevant Events
Common Name	Scientific Name	Migratory Status	EPBC Act Status	BC Act Status	Presence	Type of Presence	Presence	Type of Presence	Presence	Type of Presence	
Flesh-footed shearwater, fleshy-footed shearwater	*Ardenna carneipes*	Migratory	-	Vulnerable	×	-	✓	Species or species habitat likely to occur within area	✓	Foraging, feeding or related behaviour likely to occur within area	
Fork-tailed swift	*Apus pacificus*	Migratory	-	Migratory	×	-	✓	Species or species habitat likely to occur within area	✓	Species or species habitat likely to occur within area	
Great frigatebird, greater frigatebird	*Fregata minor*	Migratory	-	Migratory	×	-	✓	Breeding known to occur within area	✓	Breeding known to occur within area	
Great knot	*Calidris tenuirostris*	Migratory	Vulnerable	Critically Endangered	×	-	✓	Roosting known to occur within area	✓	Species or species habitat known to occur within area	
Greater crested tern	*Thalasseus bergii*	Migratory	-	Migratory	×	-	✓	Breeding known to occur within area	✓	Breeding known to occur within area	
Greater sand plover, large sand plover	*Charadrius leschenaultii*	Migratory	Vulnerable	Vulnerable	×	-	✓	Species or species habitat known to occur within area	✓	Species or species habitat known to occur within area	
Grey falcon	*Falco hypoleucos*	-	Vulnerable	Vulnerable	×	-	✓	Species or species habitat known to occur within area	✓	Species or species habitat known to occur within area	
Grey plover	*Pluvialis squatarola*	Migratory	Vulnerable	Migratory	×	-	✓	Roosting known to occur within area	✓	Species or species habitat known to occur within area	
Grey wagtail	*Motacilla cinerea*	Migratory	-	Migratory	×	-	✓	Species or species habitat known to occur within area	✓	Species or species habitat may occur within area	
Grey-tailed tattler	*Tringa brevipes*	Migratory	-	P4 Migratory	×	-	✓	Roosting known to occur within area	✓	Species or species habitat known to occur within area	
Indian yellow-nosed albatross	*Thalassarche carteri*	Migratory	Vulnerable	Endangered	✓	Species or species habitat may occur within area	✓	Species or species habitat may occur within area	✓	Species or species habitat may occur within area	
Lesser frigatebird, least frigatebird	*Fregata ariel*	Migratory	-	Migratory	×	-	✓	Species or species habitat likely to occur within area	✓	Species or species habitat known to occur within area	
Lesser sand plover, Mongolian plover	*Charadrius mongolus*	Migratory	Endangered	Endangered	×	-	✓	Roosting known to occur within area	✓	Species or species habitat known to occur within area	
Little curlew, little whimbrel	*Numenius minutus*	Migratory	-	Migratory	×	-	✓	Roosting known to occur within area	✓	Roosting known to occur within area	
Little tern	*Sternula albifrons*	Migratory	Vulnerable	Migratory	×	-	✓	Breeding known to occur within area	✓	Breeding known to occur within area	
Long-toed stint	*Calidris subminuta*	Migratory	-	Migratory	×	-			✓	Species or species habitat known to occur within area	
Marsh sandpiper, little greenshank	*Tringa stagnatilis*	Migratory	-	Migratory	×	-	✓	Roosting known to occur within area	✓	Species or species habitat known to occur within area	
Masked booby	*Sula dactylatra*	Migratory	-	Migratory	×	-	×	-	✓	Breeding known to occur within area	
Northern giant petrel	*Macronectes halli*	Migratory	Vulnerable	Migratory	×	-	✓	Species or species habitat may occur within area	✓	Species or species habitat may occur within area	

Value/Sensitivity		Conservation Status			Operational Area		Ecological EMBA		Socio-economic EMBA		Relevant Events
Common Name	Scientific Name	Migratory Status	EPBC Act Status	BC Act Status	Presence	Type of Presence	Presence	Type of Presence	Presence	Type of Presence	
Northern Siberian bar-tailed godwit, Russkoye bar-tailed godwit	*Limosa lapponica menzbieri*	-	Endangered	Critically Endangered	×	-	✓	Species or species habitat known to occur within area	✓	Species or species habitat known to occur within area	
Oriental plover, oriental dotterel	*Charadrius veredus*	Migratory	-	Migratory	×	-	✓	Roosting known to occur within area	✓	Species or species habitat known to occur within area	
Oriental pratincole	*Glareola maldivarum*	Migratory	-	Migratory	×	-	✓	Roosting known to occur within area	✓	Species or species habitat known to occur within area	
Oriental reed-warbler	*Acrocephalus orientalis*	Migratory	-	Migratory	×	-	×	-	✓	Species or species habitat known to occur within area	
Osprey	*Pandion haliaetus*	Migratory	-	Migratory	✓	Species or habitat may occur within area	✓	Species or habitat may occur within area	✓	Breeding known to occur within area	
Pacific golden plover	*Pluvialis fulva*	Migratory	-	Migratory	×	-	✓	Roosting known to occur within area	✓	Species or species habitat known to occur within area	
Pectoral sandpiper	*Calidris melanotos*	Migratory	-	Migratory	×	-	✓	Species or species habitat known to occur within area	✓	Species or species habitat known to occur within area	
Pin-tailed snipe	*Gallinago stenura*	Migratory	-	Migratory	×	-	✓	Roosting likely to occur within area	✓	Roosting likely to occur within area	
Red goshawk	*Erythrotriorchis radiatus*	-	Endangered	Vulnerable	×	-			✓	Species or species habitat may occur within area	
Red knot, knot	*Calidris canutus*	Migratory	Vulnerable	Endangered	✓	Species or species habitat may occur within area	✓	Species or species habitat known to occur within area	✓	Species or species habitat known to occur within area	
Red-footed booby	*Sula sula*	Migratory	-	Migratory	×	-	✓	Breeding known to occur within area	✓	Breeding known to occur within area	
Red-necked phalarope	*Phalaropus lobatus*	Migratory	-	Migratory	×	-	×	-	✓	Species or species habitat known to occur within area	
Red-necked stint	*Calidris ruficollis*	Migratory	-	Migratory	×	-	✓	Roosting known to occur within area	✓	Species or species habitat known to occur within area	
Red-rumped swallow	*Cecropis daurica*	Migratory	-	Migratory	×	-	✓	Species or species habitat known to occur within area	✓	Species or species habitat known to occur within area	
Red-tailed tropicbird	*Phaethon rubricauda*	Migratory	-	P4 Migratory	✓	Species or species habitat may occur within area	✓	Breeding known to occur within area	✓	Species or species habitat known to occur within area	
Red-tailed tropicbird (Indian Ocean), Indian Ocean red-tailed tropicbird	*Phaethon rubricauda westralis*	-	Endangered	-	✓	Species or species habitat may occur within area	✓	Breeding known to occur within area	✓	Species or species habitat known to occur within area	
Roseate tern	*Sterna dougallii*	Migratory	-	Migratory	×	-	✓	Breeding known to occur within area	✓	Breeding known to occur within area	
Ruddy turnstone	*Arenaria interpres*	Migratory	Vulnerable	Migratory	×	-	✓	Roosting known to occur within area	✓	Species or species habitat known to occur within area	
Ruff	*Calidris pugnax*	Migratory	-	Migratory	×	-	×	-	✓	Roosting known to occur within area	

Value/Sensitivity		Conservation Status			Operational Area		Ecological EMBA		Socio-economic EMBA		Relevant Events
Common Name	Scientific Name	Migratory Status	EPBC Act Status	BC Act Status	Presence	Type of Presence	Presence	Type of Presence	Presence	Type of Presence	
Sanderling	*Calidris alba*	Migratory	-	Migratory	×	-	✓	Roosting known to occur within area	✓	Species or species habitat known to occur within area	
Sharp-tailed sandpiper	*Calidris acuminata*	Migratory	Vulnerable	Migratory	✓	Species or species habitat may occur within area	✓	Roosting known to occur within area	✓	Species or species habitat known to occur within area	
Shy albatross	*Thalassarche cauta*	Migratory	Endangered	Vulnerable	×	-	✓	Species or species habitat may occur within area	✓	Species or species habitat may occur within area	
Soft-plumaged petrel	*Pterodroma mollis*	-	Vulnerable	-	✓	Species or species habitat may occur within area	✓	Foraging, feeding or related behaviour likely to occur within area	✓	Foraging, feeding or related behaviour likely to occur within area	
Southern giant-petrel, southern giant petrel	*Macronectes giganteus*	Migratory	Endangered	Migratory	✓	Species or species habitat may occur within area	✓	Species or species habitat may occur within area	✓	Species or species habitat may occur within area	
Southern royal albatross	*Diomedea epomophora*	Migratory	Vulnerable	Vulnerable	×	-			✓	Species or species habitat may occur within area	
Streaked shearwater	*Calonectris leucomelas*	Migratory	-	Migratory	×	-	✓	Species or species habitat known to occur within area	✓	Species or species habitat likely to occur within area	
Swinhoe's snipe	*Gallinago megala*	Migratory	-	Migratory	×	-	✓	Roosting likely to occur within area	✓	Roosting likely to occur within area	
Terek sandpiper	*Xenus cinereus*	Migratory	Vulnerable	Migratory	×	-	✓	Roosting known to occur within area	✓	Species or species habitat known to occur within area	
Wandering albatross	*Diomedea exulans*	Migratory	Vulnerable	Vulnerable	×	-			✓	Species or species habitat may occur within area	
Wedge-tailed shearwater	*Ardenna pacifica*	Migratory	-	Migratory	×	-	✓	Breeding known to occur within area	✓	Breeding known to occur within area	
Whimbrel	*Numenius phaeopus*	Migratory	-	Migratory	×	-	✓	Roosting known to occur within area	✓	Species or species habitat known to occur within area	
White-capped albatross	*Thalassarche steadi*	Migratory	Vulnerable	-	×	-	✓	Species or species habitat may occur within area	✓	Species or species habitat may occur within area	
White-tailed tropicbird	*Phaethon lepturus*	Migratory	-	Migratory	×	-	✓	Breeding known to occur within area	✓	Species or species habitat known to occur within area	
Wood sandpiper	*Tringa glareola*	Migratory	-	Migratory	×	-	✓	Roosting known to occur within area	✓	Species or species habitat known to occur within area	
Yellow wagtail	*Motacilla flava*	Migratory	-	Migratory	×	-	✓	Species or species habitat known to occur within area	✓	Species or species habitat may occur within area	

3.2.6.1 Biologically important areas

BIAs are areas that have been identified where threated or migratory species protected under the EPBC Act carry out critical lifecycle activities.

The following BIAs are present in the Operational Area:

- pygmy blue whale (migration)
- humpback whale (migration – north and south)
- wedge-tailed shearwater (breeding).

The following BIAs are located within a 20 km buffer surrounding the Operational Area:

- flatback turtle (reproduction)
- green turtle (reproduction)
- hawksbill turtle (reproduction)
- loggerhead turtle (reproduction)
- whale shark (foraging).

BIAs for aggregation, breeding, resting, nesting, or feeding area, or known migratory routes and areas deemed habitat critical for the survival of a species within the Operational Area and EMBA, are listed in Table 3-9, shown in Figure 3-8 to Figure 3-17 and described further in Appendix C.

3.2.6.2 Habitat critical to the survival of a species

Habitat critical to the survival of species is defined by the EPBC Act Significant Impact Guidelines 1.1 Matters of National Environmental Significance as areas necessary:

- for activities such as foraging, breeding or dispersal
- for the long-term maintenance of the species (including the maintenance of species essential to the survival of the species)
- to maintain genetic diversity and long-term evolutionary development
- for the reintroduction of populations or recovery of the species.

The Recovery Plan for Marine Turtles in Australia 2017–2027 (CoA, 2017) identifies draft habitat critical to the survival of a species for marine turtles as:

- nesting habitat critical to the survival of green, loggerhead, flatback and hawksbill turtles includes at least 70% of nesting for the stock
- nesting habitat critical to the survival of olive ridley turtles includes all documented nesting areas in Queensland and Western Australia, and beaches where nesting has been recorded with greater than ten nesting females in the Northern Territory (noting inter-annual fluctuations)
- nesting habitat critical to the survival of leatherback turtles includes all areas where nesting has occurred in Australia since 1996
- nesting habitat critical to survival of marine turtles is of a geographically relevant scale; for example, green turtles are known to move between islands of the Capricorn Bunker Group within a nesting season, while leatherback turtles may move up to 400 km within a season
- where relevant, nesting habitat determined to be critical to the survival of marine turtles includes areas that are: geographically dispersed; major and minor rookeries; mainland and island beaches; and winter or summer nesting
- to ensure the validity of long-term monitoring programs for assessing trends in nesting turtle abundance, all index beaches are considered habitat critical to survival of marine turtles
- internesting habitat critical to the survival of marine turtles is located immediately seaward of designated nesting habitat critical to the survival of marine turtles; the internesting habitat critical buffer for green, loggerhead, hawksbill, olive ridley and leatherback turtles is 20 km and 60 km for flatback turtles.

There is one habitat critical to the survival of marine turtles within the Operational Area, and an additional three within a 20 km buffer zone surrounding the Operational Area, as listed below:

- flatback turtle (nesting, in Operational Area)
- loggerhead turtle (nesting, in 20 km buffer only)
- green turtle (nesting, in 20 km buffer only)
- hawksbill turtle (nesting, in 20 km buffer only).

Habitat critical to the survival of marine turtles within the Operational Area and EMBA are described in Table 3-9 and shown in Figure 3-13 to Figure 3-16.

3.2.6.3 Recovery plans, conservation advice and species management plans

To support the protection of threatened and migratory species, a series of recovery plans, conservation advice and species management plans have been developed by the Commonwealth of Australia (CoA). These documents identify threats to the specific species they are associated with and, in some cases, recommend conservation actions that should be undertaken to protect that species.

Table 3-10 summarises the recovery plans, conservation advice and species management plans relevant to the threatened and migratory species that have been identified as potentially occurring within the Operational Area, ecological EMBA and socio-economic EMBA. Table 3-10 also identifies the actions within these documents that are relevant to the petroleum activity.

Table 3-9: Biologically important areas and critical habitat within the environment that may be affected

Fauna Group	Species	BIA Type	Presence in Operational Area	Presence in Ecological EMBA	Presence in Socio-economic EMBA	Habitat Critical in Socio-economic EMBA
Sharks and rays	Dwarf sawfish	Foraging	×	✓	✓	N/A
		Nursing	×	✓	✓	
		Pupping	×	✓	✓	
	Green sawfish	Foraging	×	✓	✓	
		Nursing	×	✓	✓	
		Pupping	×	✓	✓	
	Freshwater sawfish	Foraging	×	✓	✓	
		Juvenile	×	✓	✓	
		Pupping	×	✓	✓	
	Whale shark	Foraging	✓	✓	✓	
		Foraging – high density	×	✓	✓	
Marine mammals	Australian snubfin dolphin	Breeding	×	✓	✓	N/A
		Calving	×	✓	✓	
		Foraging (high density prey)	×	✓	✓	
		Foraging likely	×	✓	✓	
	Dugong	Reproduction	×	✓	✓	
		Foraging	×	✓	✓	
	Humpback whale	Migration	✓	✓	✓	
		Resting	×	✓	✓	
		Calving	×	✓	✓	
		Nursing	×	✓	✓	
		Breeding	×	✓	✓	

Fauna Group	Species	BIA Type	Presence in Operational Area	Presence in Ecological EMBA	Presence in Socio-economic EMBA	Habitat Critical in Socio-economic EMBA
	Indo-Pacific humpback dolphin	Calving	×	✓	✓	
		Foraging	×	✓	✓	
		Foraging (high density prey)	×	✓	✓	
	Pygmy blue whale	Migration	✓	✓	✓	
		Foraging	×	✓	✓	
	Spotted bottlenose dolphin	Breeding	×	✓	✓	
		Calving	×	✓	✓	
		Foraging	×	✓	✓	
	Southern right whale	Reproduction	×	✓	✓	
		Migration	×	✓	✓	
Marine reptiles	Flatback turtle	Foraging	×	✓	✓	• Eighty Mile Beach • Eco Beach • Montebello Islands • Mundabullangana Beach • Barrow Island • Cemetery Beach • Dampier Archipelago (including Delambre Island and Huay Island) • Coastal islands from Cape Preston to Locker Island
		Reproduction	×	✓	✓	
		Migration	×	✓	✓	
		Aggregation	×	×	✓	
	Green turtle	Foraging	×	✓	✓	• Maret Island • Cassini Island • Lacepede Islands • Barrow Island • Montebello Islands • Serrurier Island • Dampier Archipelago • Thevenard Island • Northwest Cape • Ningaloo coast • Scott Reef (Sandy Islet) • Browse Island
		Nesting	×	✓	✓	
		Resting	×	✓	✓	
		Reproduction	×	✓	✓	
		Migration	×	✓	✓	
	Hawksbill turtle	Foraging	×	✓	✓	• Dampier Archipelago • Montebello Islands • Lowendal Islands • Sholl Island
		Nesting	×	✓	✓	
		Reproduction	×	✓	✓	
		Migration	×	✓	✓	
	Loggerhead turtle	Nesting	×	✓	✓	• Dirk Hartog Island • Muiron Islands • Gnaraloo Bay • Ningaloo coast
		Foraging	×	✓	✓	
		Reproduction	×	✓	✓	

Fauna Group	Species	BIA Type	Presence in Operational Area	Presence in Ecological EMBA	Presence in Socio-economic EMBA	Habitat Critical in Socio-economic EMBA
Marine birds	Australian lesser noddy	Foraging	×	×	✓	N/A
	Bridled tern	Foraging	×	×	✓	
	Brown booby	Reproduction	×	×	✓	
	Caspian tern	Foraging	×	×	✓	
	Common noddy	Foraging	×	×	✓	
	Fairy tern	Reproduction	×	✓	✓	
		Foraging	×	×	✓	
	Greater frigatebird	Reproduction	×	×	✓	
	Lesser crested tern	Reproduction	×	✓	✓	
	Lesser frigatebird	Reproduction	×	✓	✓	
	Little shearwater	Foraging	×	×	✓	
	Little tern	Reproduction	×	✓	✓	
		Resting	×	✓	✓	
	Pacific gull	Foraging	×	×	✓	
	Red-footed booby	Reproduction	×	×	✓	
	Roseate tern	Reproduction	×	✓	✓	
		Foraging	×	✓	✓	
		Resting	×	×	✓	
	Sooty tern	Foraging	×	×	✓	
	Wedge-tailed shearwater	Reproduction	×	✓	✓	
		Foraging	×	×	✓	
	White-faced storm-petrel	Foraging	×	×	✓	
	White-tailed tropicbird	Reproduction	×	×	✓	

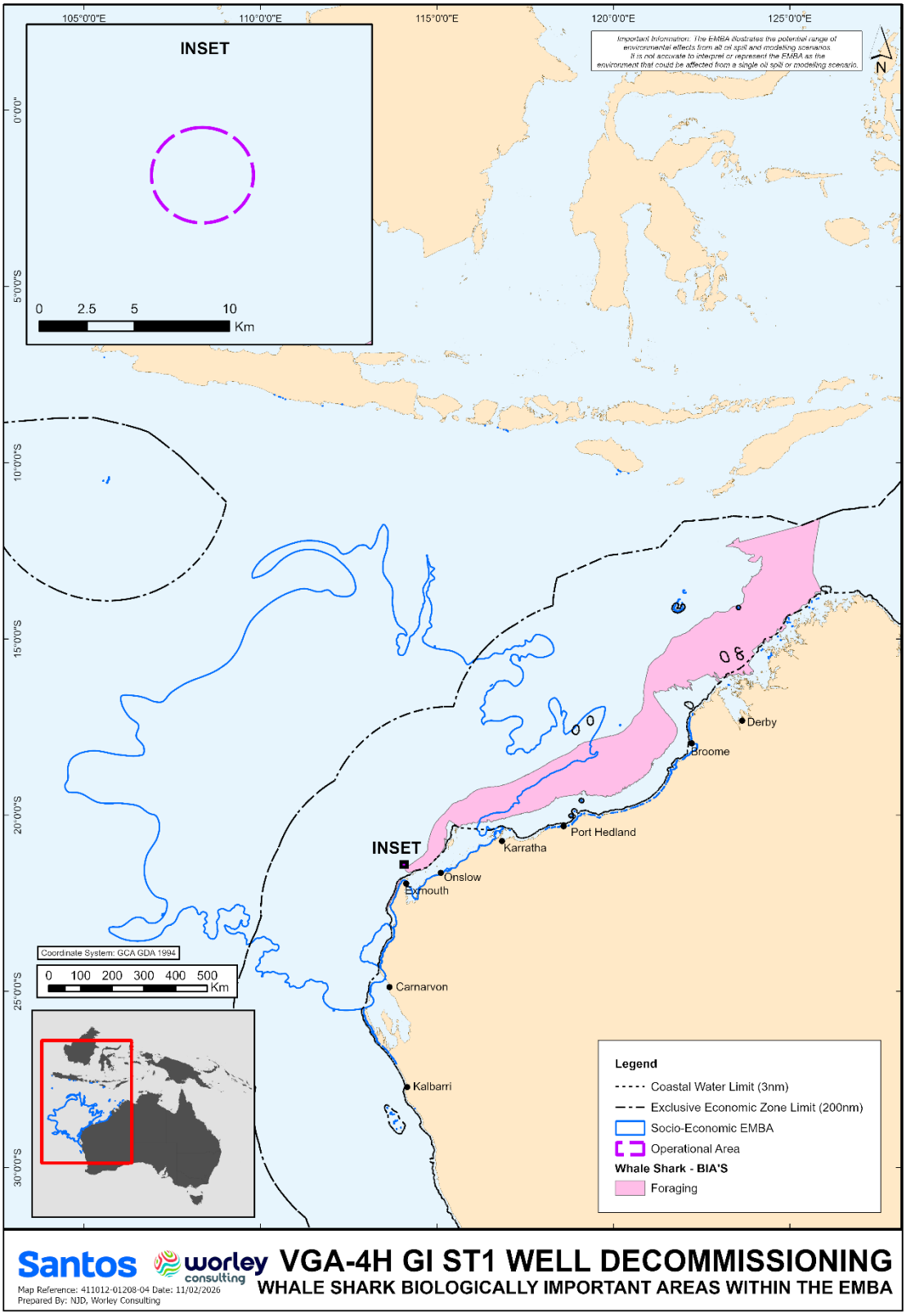

Figure 3-8: Biologically important areas for protected whale sharks within the environment that may be affected

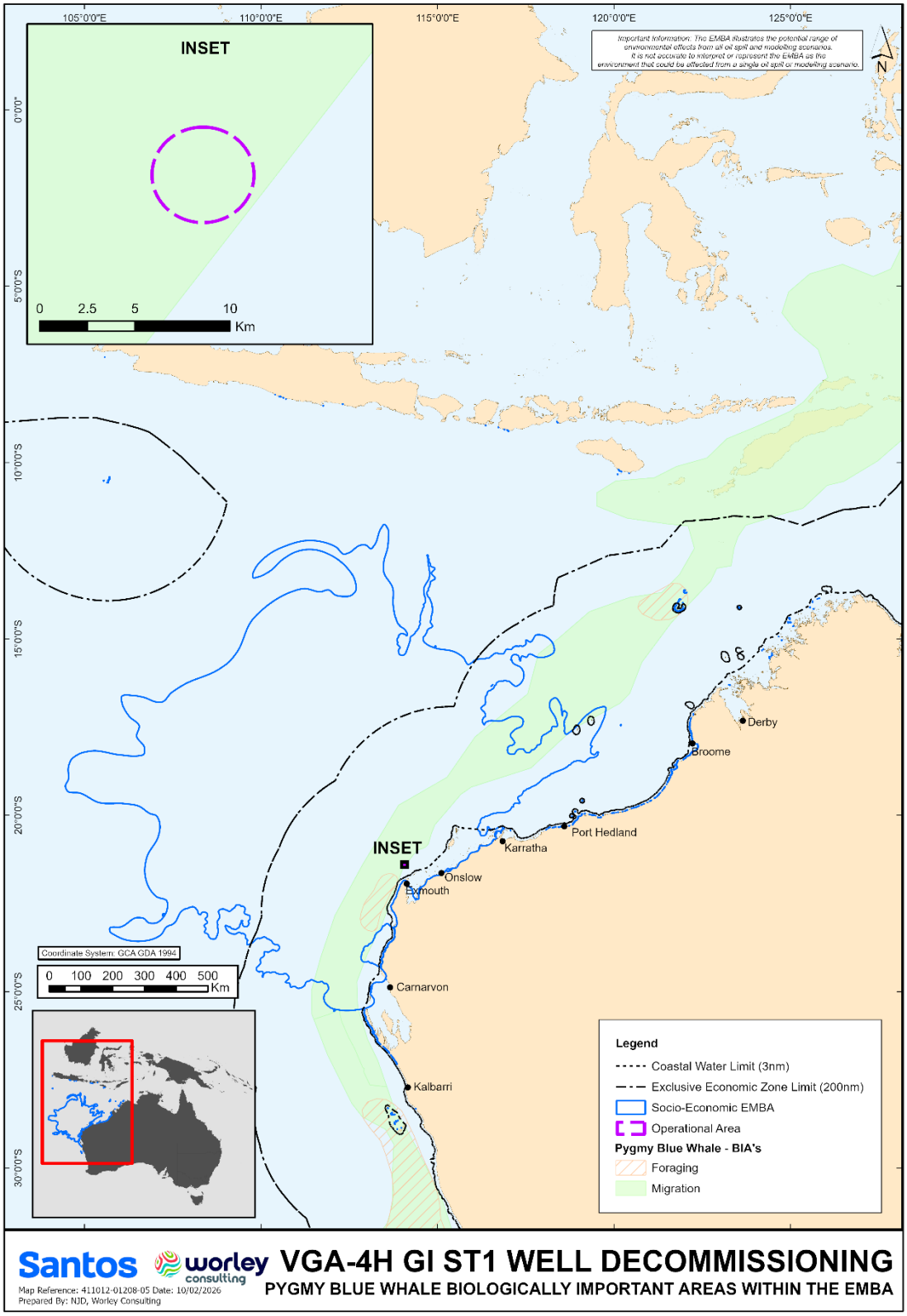

Figure 3-9: Biologically important areas for protected pygmy blue whale within the environment that may be affected

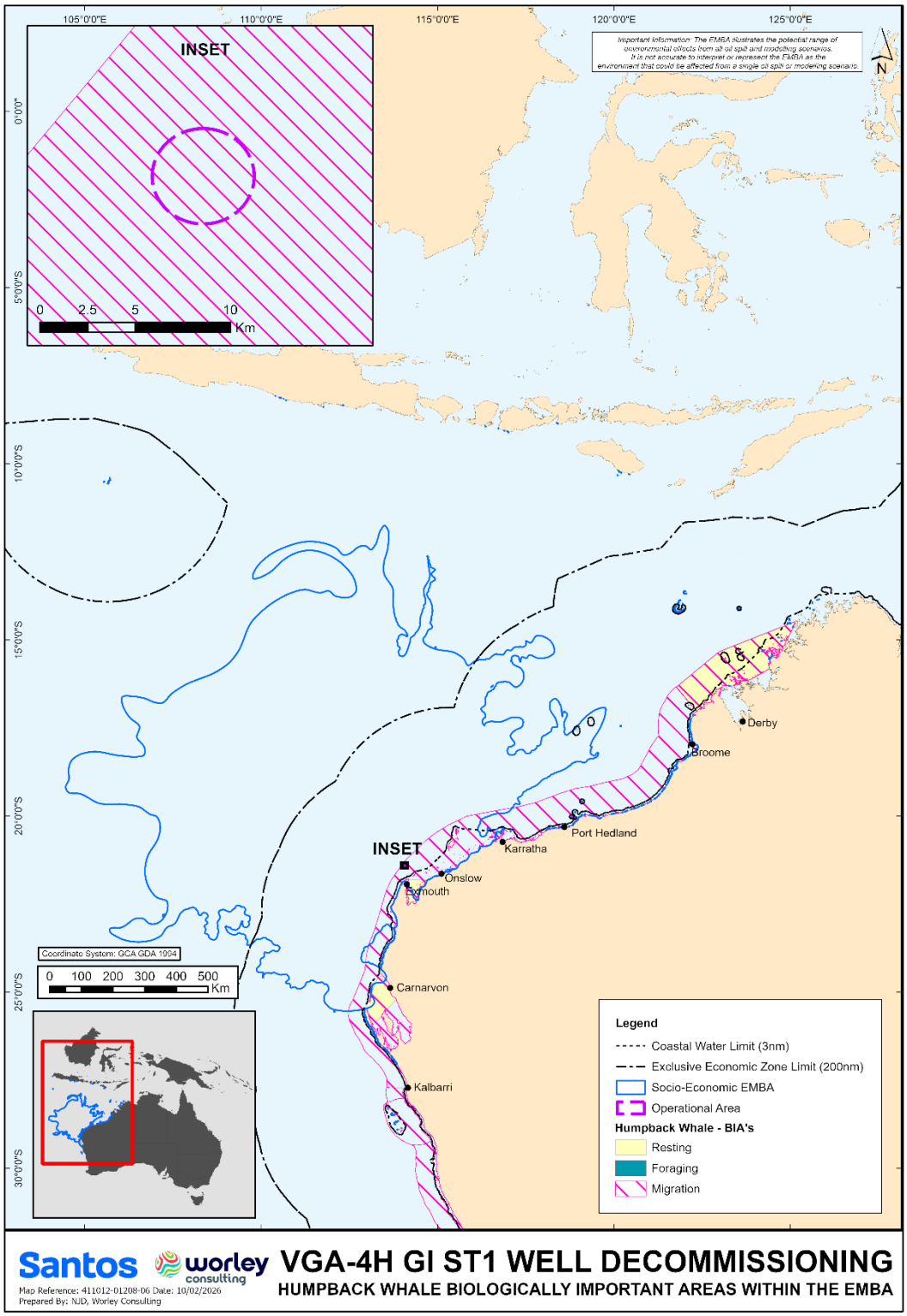

Figure 3-10: Biologically important areas for humpback whale within the environment that may be affected

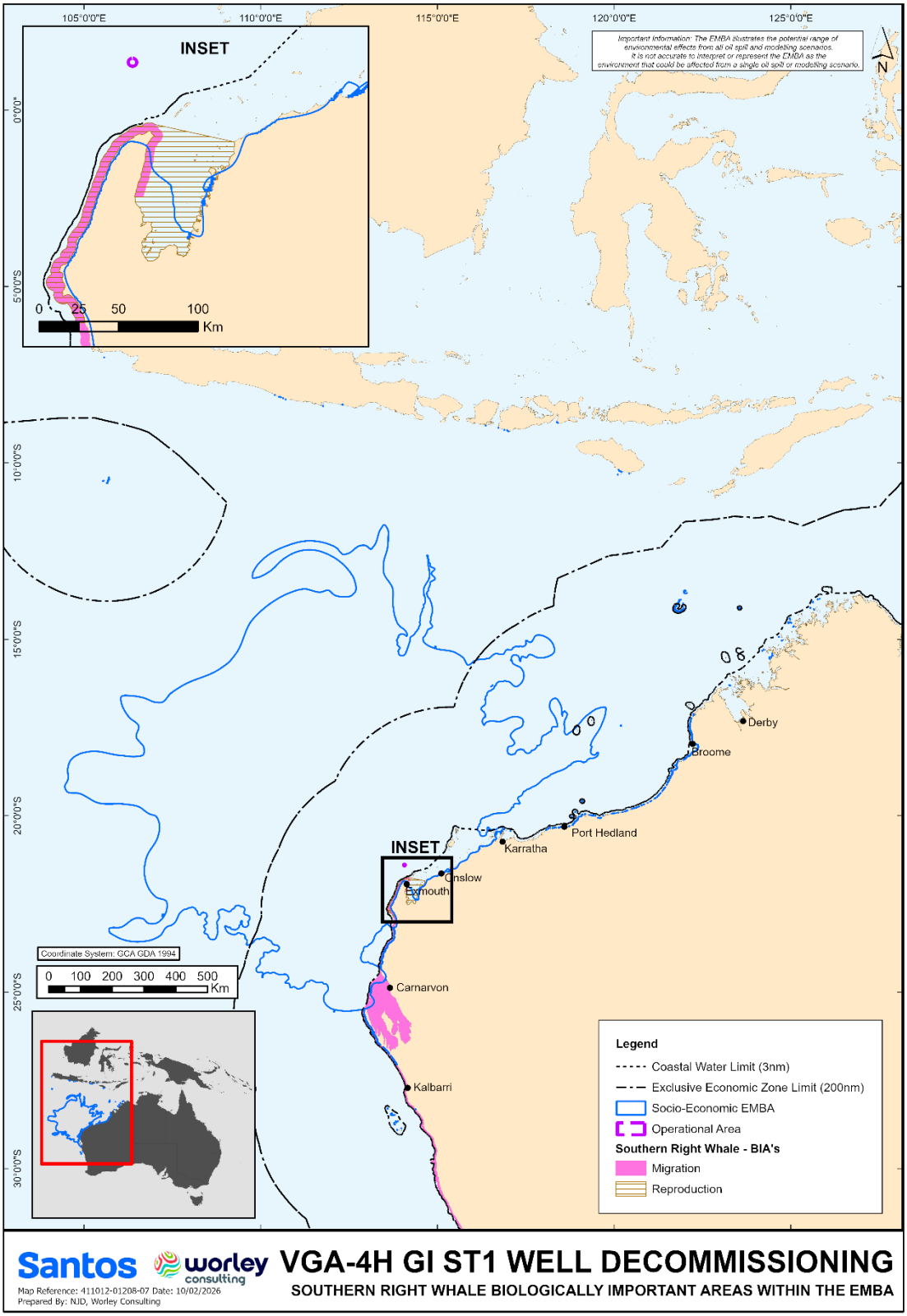

Figure 3-11: Biologically important areas for Southern right whale within the environment that may be affected

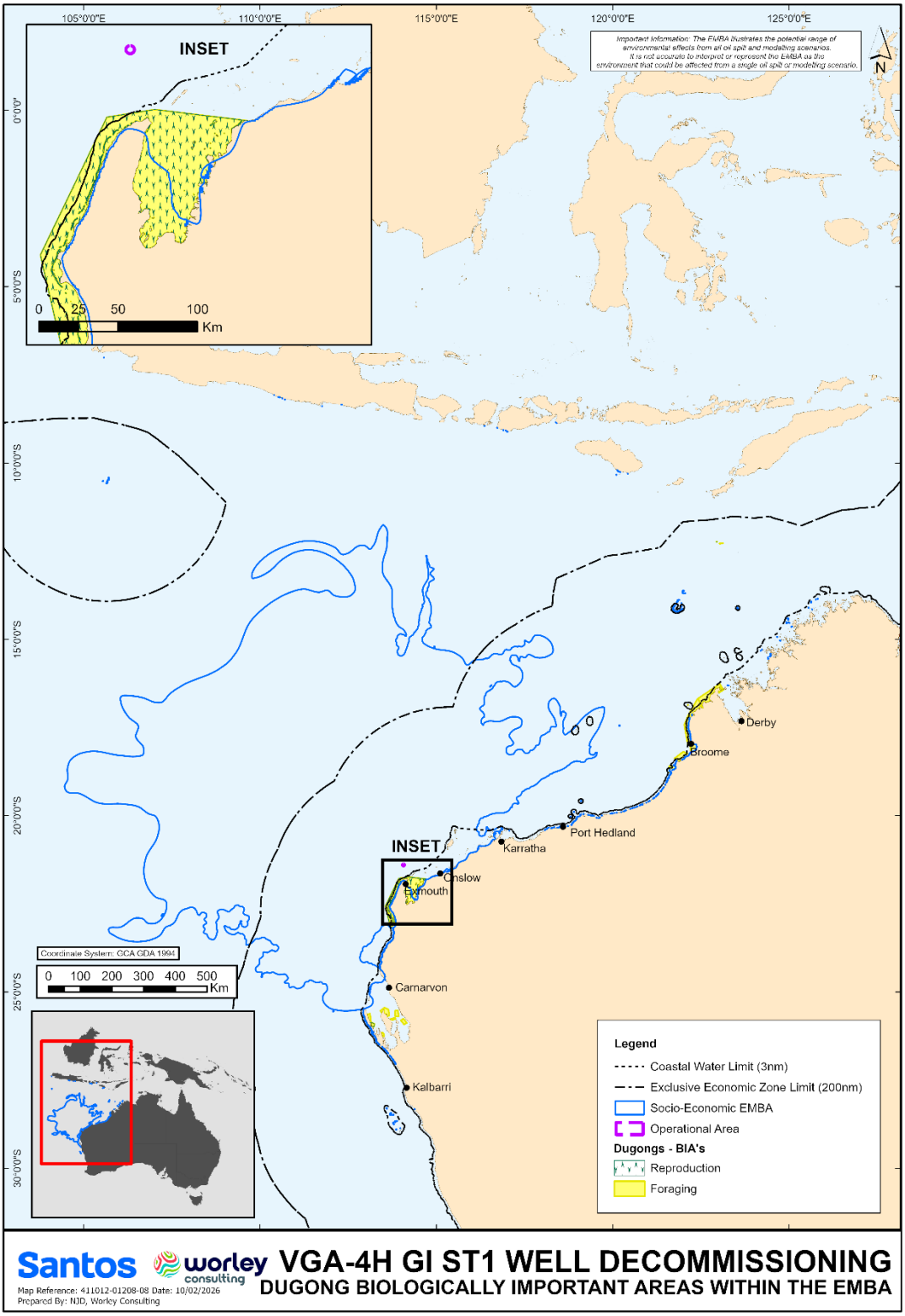

Figure 3-12: Biologically important areas for dugong environment that may be affected

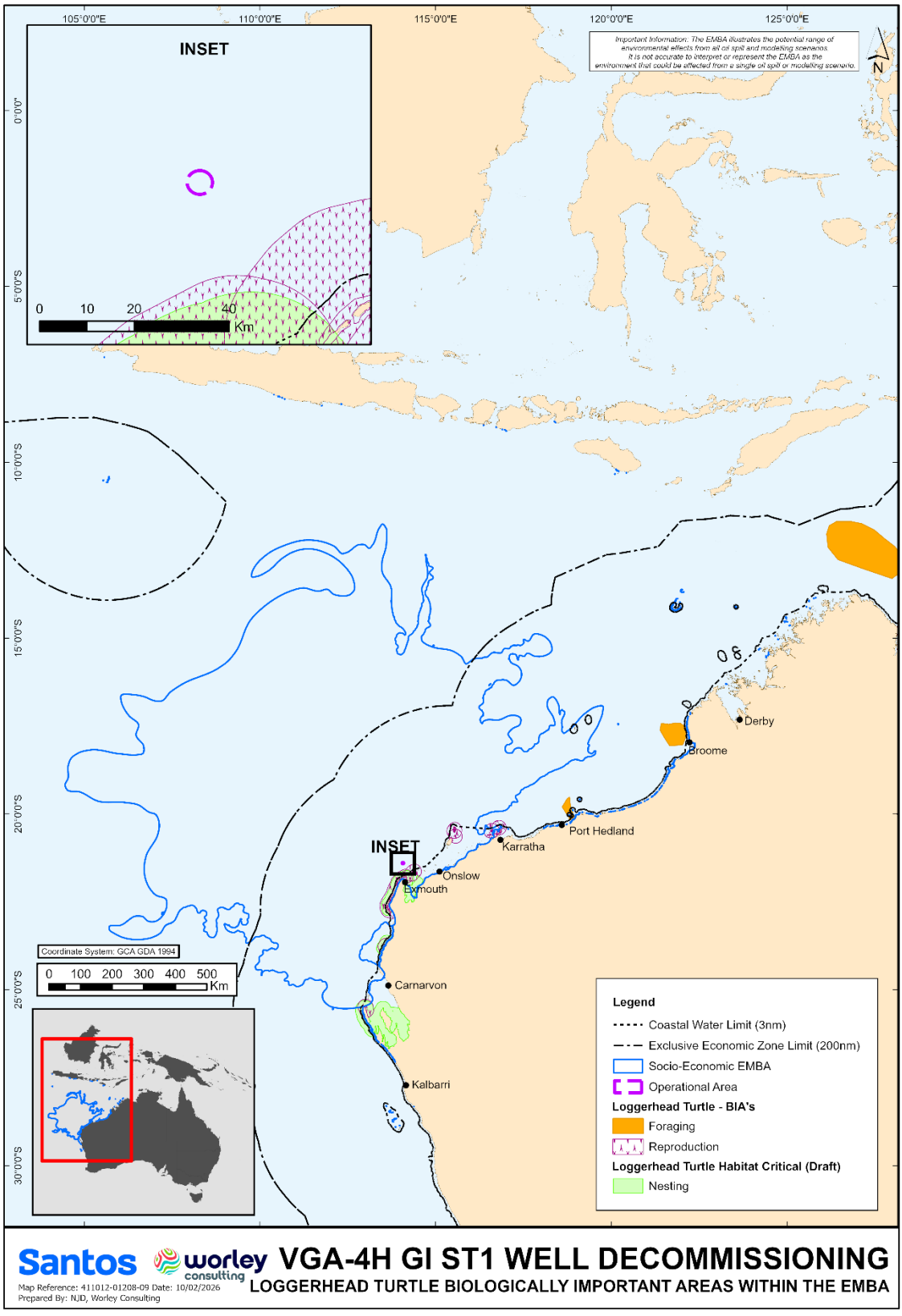

Figure 3-13: Biologically important areas for loggerhead turtles the environment that may be affected

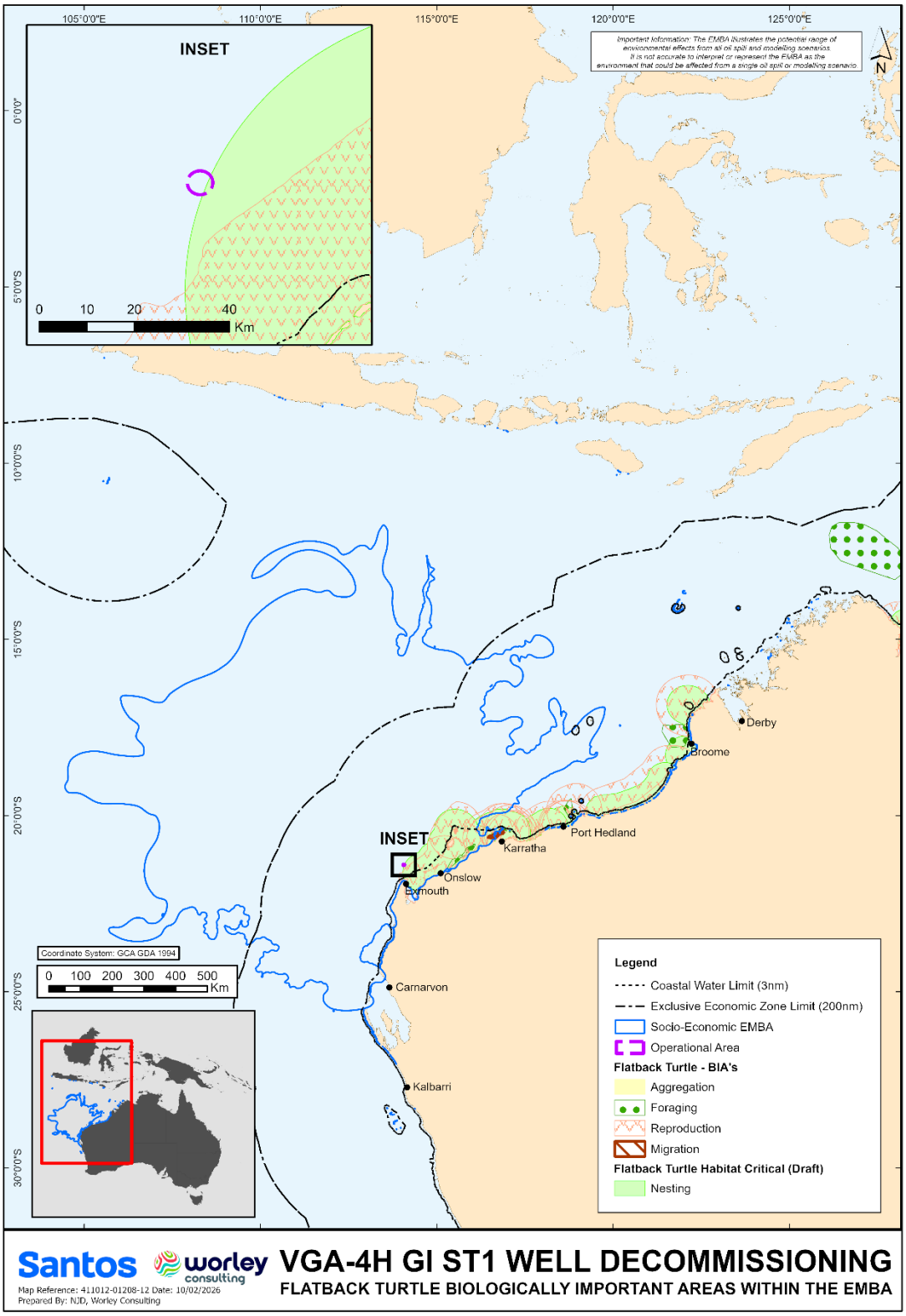

Figure 3-14: Biologically important areas for flatback turtles within the environment that may be affected

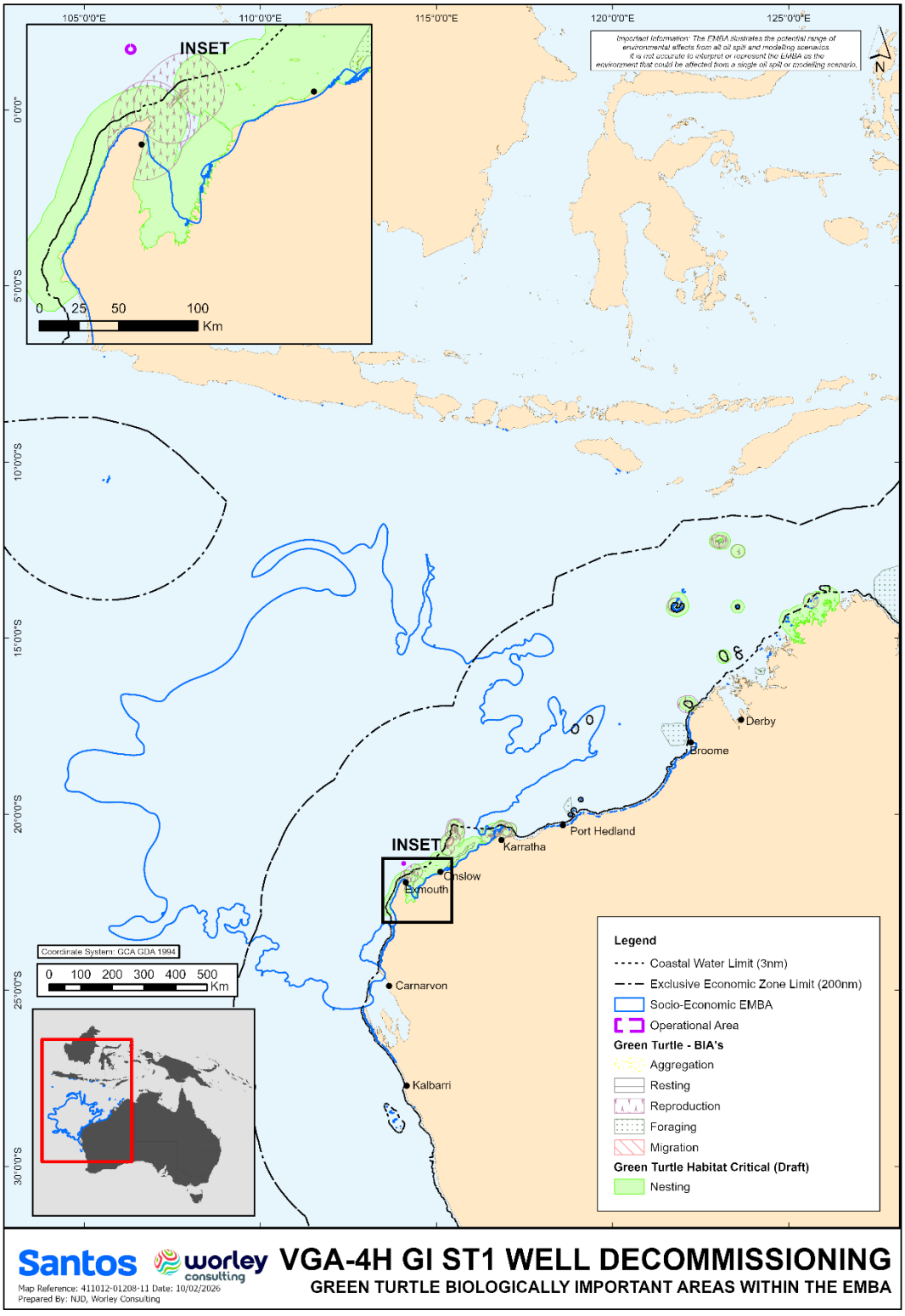

Figure 3-15: Biologically important areas for green turtles within the environment that may be affected

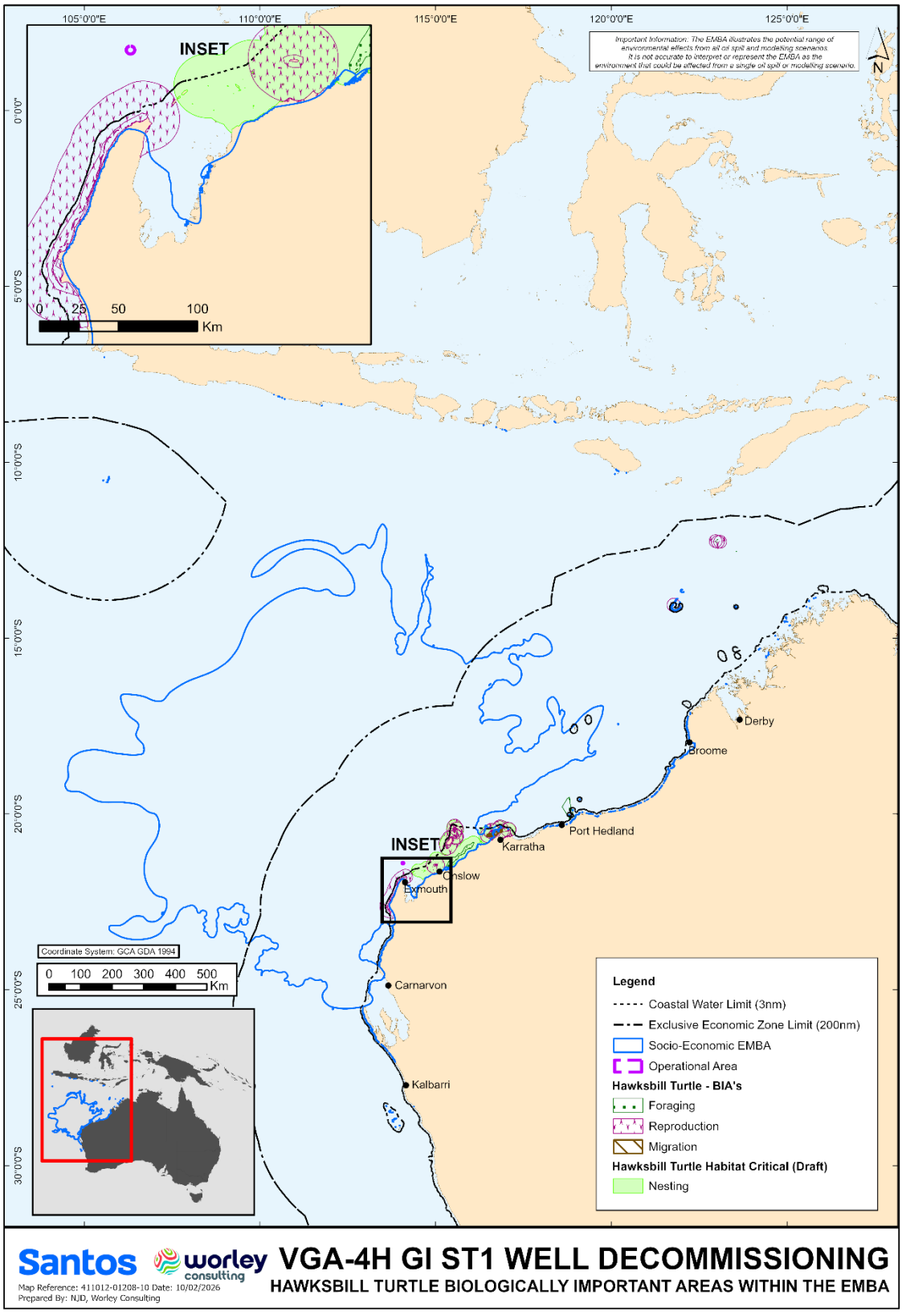

Figure 3-16: Biologically important areas for hawksbill turtles within the environment that may be affected

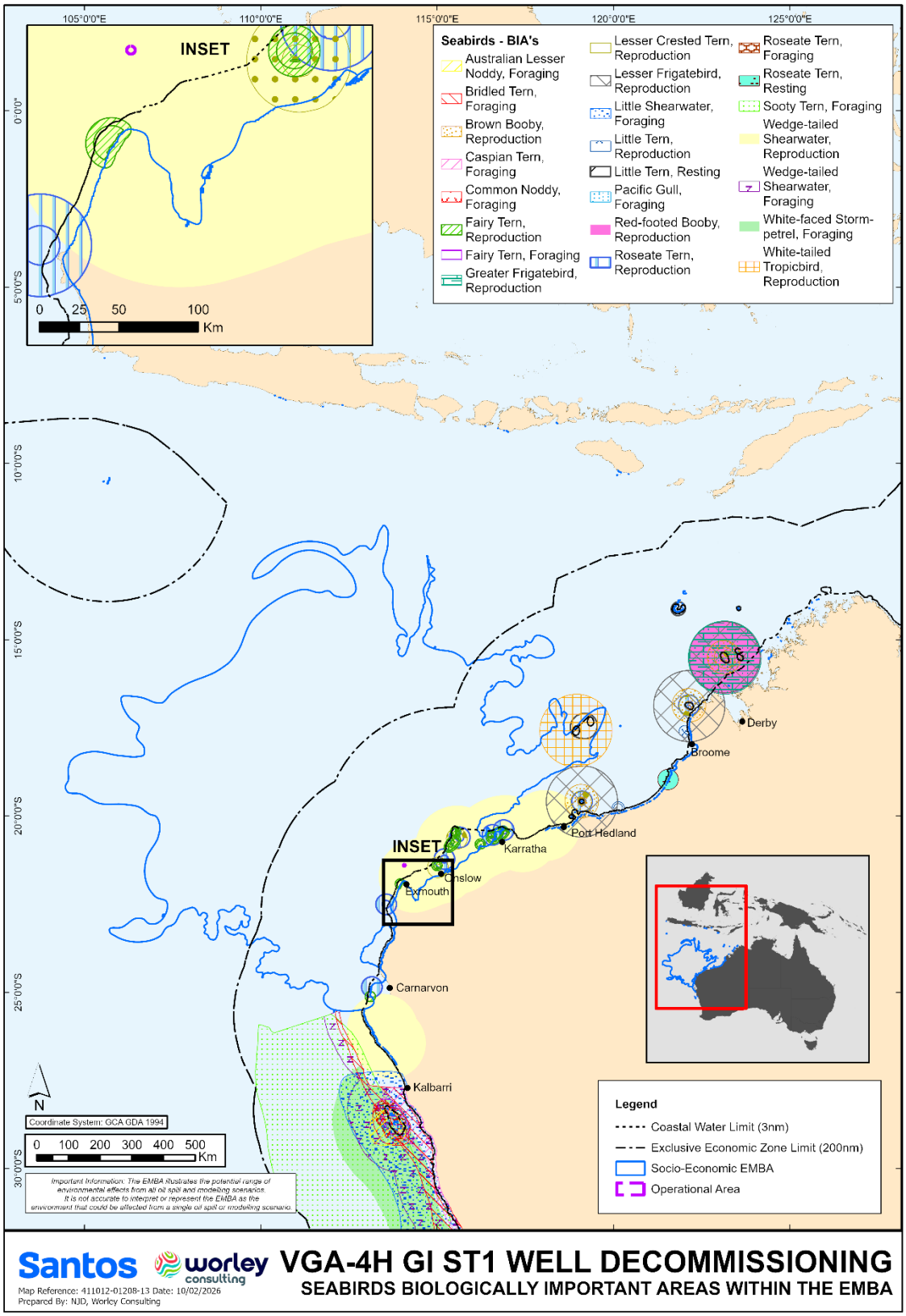

Figure 3-17: Biologically important areas for seabirds within the environment that may be affected

Table 3-10: Relevant threats identified in recovery plans, conservation advice and management plans for species that occur or may occur within the Operational Area and environment that may be affected

Name	Recovery Plan/Conservation Advice/ Management Plan	Threats/Strategies Identified as Relevant to the Activity	Relevant Conservation Advice	Addressed (Where Relevant) in EP Section
All vertebrate fauna	Threat Abatement Plan for impacts of marine debris on vertebrate wildlife of Australia's coasts and oceans (CoA, 2018a)	Marine debris	No explicit management actions for non-fisheries related industries (note that management actions in the plan relate largely to management of fishing waste (for example 'ghost' gear), and State and Commonwealth management through regulation.	7.1
Fish and sharks				
Dwarf sawfish	Approved Conservation Advice for *Pristis clavata* (Dwarf Sawfish) (DEWHA, 2009)	Habitat degradation and modification	Identify risks to important sawfish and river shark habitat and measures needed to reduce those risks.	6.6, 6.7, 7.1, 7.6, 7.7
Freshwater sawfish	Approved Conservation Advice for *Pristis pristis* (largetooth sawfish) (DCCEEW, 2025)			
Green sawfish	Commonwealth Conservation Advice on *Pristis zijsron* (green sawfish) (Threatened Species Scientific Committee (TSSC), 2008a)			
Narrow sawfish	Sawfish and River Sharks Multispecies Recovery Plan (Department of the Environment (DoE), 2015a)			
Great white shark	Recovery Plan for the White Shark (*Carcharodon carcharias*) (DSEWPaC, 2013a)	Ecosystem effects as a result of habitat modification and climate change	No explicit relevant management actions: habitat modification and climate identified as a threat.	7.6, 7.7
Grey nurse shark	Recovery Plan for the Grey Nurse Shark (*Carcharias taurus*) (DoE, 2014a)	Pollution and disease	Review and assess the potential threat of introduced species, pathogens and pollutants.	7.6, 7.7
		Ecosystem effects – habitat degradation/modification and climate change	Review the level and spatial extent of protection measures at key aggregation sites to ensure appropriate levels of protection, and a consistent approach to the designation and implementation of protective measures, are applied. Use BIAs to help inform the development of appropriate conservation measures, including through the application of advice in the marine bioregional plans on the types of actions which are likely to have a significant impact on the species and updating such conservation measures as new information becomes available.	

Name	Recovery Plan/Conservation Advice/ Management Plan	Threats/Strategies Identified as Relevant to the Activity	Relevant Conservation Advice	Addressed (Where Relevant) in EP Section
		Ecosystem effects – climate change	No explicit relevant management actions; climate change identified as a threat.	
Whale shark	Approved Conservation Advice for *Rhincodon typus* (whale shark) (TSSC, 2015a)	Vessel strike	Minimise offshore developments and transit time of large vessels in areas close to marine features likely to correlate with whale shark aggregations along the northward migration route that follows the northern Western Australian coastline along the 200 m isobath (as set out in the Conservation Values Atlas, DoE, 2014).	6.1, 6.3, 6.6, 6.7, 7.1, 7.3, 7.6, 7.7
		Habitat disruption from mineral exploration, production and transportation	Implement measures to reduce adverse impacts of habitat degradation and/or modification.	
		Marine debris	No explicit relevant management actions; marine debris identified as a threat.	
		Climate change	No explicit relevant management actions; climate change identified as threat.	
Marine mammals				
Blue whale	Conservation Management Plan for the Blue Whale (CoA, 2015a)	Noise interference	Assess and address anthropogenic noise: shipping, industrial and seismic noise.	6.1, 6.3, 6.6, 6.7, 7.1, 7.3, 7.6, 7.7
		Vessel disturbance	Minimise vessel collisions: • Develop a national vessel strike strategy that investigates the risk of vessel strike on blue whales and also identifies potential mitigation measures. • Ensure all vessel strike incidents are reported in the National Ship Strike Database. • Ensure the risk of vessel strikes on blue whales is considered when assessing actions that increase vessel traffic in areas where blue whales occur and, if required, appropriate mitigation measures are implemented.	

Name	Recovery Plan/Conservation Advice/ Management Plan	Threats/Strategies Identified as Relevant to the Activity	Relevant Conservation Advice	Addressed (Where Relevant) in EP Section
		Climate change impacts	Understanding impacts of climate variability and change. Continue to meet Australia's international commitments to reduce greenhouse gas (GHG) emissions and regulate the krill fishery in Antarctica.	
		Marine debris	No explicit management measures for marine debris.	
		Habitat degradation including pollution (increasing port expansion and coastal development)	No explicit management actions. Habitat degradation identified as a threat.	
Fin whale	Approved Conservation Advice for *Balaenoptera physalus* (fin whale) (TSSC, 2015b)	Anthropogenic noise and acoustic disturbance	Once the spatial and temporal distribution (including BIAs) of fin whales is further defined, assess the impacts of increasing anthropogenic noise (including seismic surveys, port expansion, and coastal development).	6.1, 6.3, 6.6, 6.7, 7.1, 7.3, 7.6, 7.7
		Habitat degradation including pollution (increasing port expansion and coastal development)	No explicit management actions. Habitat degradation identified as a threat.	
		Pollution (persistent toxic pollutants)	No explicit management actions. Pollution identified as a threat.	
		Vessel strike	Develop a national vessel strike strategy that investigates the risk of vessel strikes on fin whales and identifies potential mitigation measures. Ensure all vessel strike incidents are reported in the National Vessel Strike Database.	
		Climate change impacts	Understanding impacts of climate variability and change. Continue to meet Australia's international commitments to reduce GHG emissions and regulate the krill fishery in Antarctica.	

Name	Recovery Plan/Conservation Advice/ Management Plan	Threats/Strategies Identified as Relevant to the Activity	Relevant Conservation Advice	Addressed (Where Relevant) in EP Section
		Marine debris	No explicit management measures for marine debris.	
Sei whale	Approved Conservation Advice for *Balaenoptera borealis* (sei whale) (TSSC, 2015c)	Anthropogenic noise and acoustic disturbance	Once the spatial and temporal distribution (including BIAs) of sei whales is further defined, assess the impacts of increasing anthropogenic noise (including seismic surveys, port expansion, and coastal development).	6.1, 6.3, 6.6, 6.7, 7.1, 7.3, 7.6, 7.7
		Habitat degradation including pollution (increasing port expansion and coastal development)	No explicit management actions. Habitat degradation identified as a threat.	
		Pollution (persistent toxic pollutants)	No explicit management actions. Pollution identified as a threat.	
		Vessel strike	Minimising vessel collisions: • Develop a national vessel strike strategy that investigates the risk of vessel strikes on sei whales and identifies potential mitigation measures. • Ensure all vessel strike incidents are reported in the National Vessel Strike Database.	
		Climate change impacts	Understanding impacts of climate variability and change. Continue to meet Australia's international commitments to reduce GHG emissions and regulate the krill fishery in Antarctica.	
		Marine debris	No explicit management measures for marine debris.	
Southern right whale	National Recovery Plan for the Southern Right Whale (*Eubalaena australis*) (DCCEEW, 2024a)	Vessel disturbance	Develop a national ship strike strategy that quantifies vessel movements within the distribution ranges of southern right whales and outlines appropriate mitigation measures that reduce impacts from vessel collisions.	6.1, 6.3, 6.6, 6.7, 7.1, 7.3, 7.6, 7.7

Name	Recovery Plan/Conservation Advice/ Management Plan	Threats/Strategies Identified as Relevant to the Activity	Relevant Conservation Advice	Addressed (Where Relevant) in EP Section
		Marine debris	No explicit relevant management actions; entanglement in marine debris identified as a threat.	
		Noise interference	Assess and address anthropogenic noise: shipping, industrial and seismic noise.	
		Climate change impacts	Understanding impacts of climate variability and change. Continue to meet Australia's international commitments to reduce GHG emissions and regulate the krill fishery in Antarctica.	
		Habitat degradation including pollution (increasing port expansion and coastal development)	No explicit management actions. Habitat degradation identified as a threat.	
Marine reptiles				
All marine turtles	National Light Pollution Guidelines for Wildlife Including Marine Turtles, Seabirds and Migratory Shorebirds (DCCEEW, 2023a)	Light pollution	N/A	6.1, 6.2, 6.6, 6.7, 7.1, 7.3, 7.6, 7.7
	Recovery Plan for Marine Turtles in Australia 2017 to 2027 (Department of the Environment and Energy (DoEE), 2017a)	Habitat degradation/modification	Manage anthropogenic activities to ensure marine turtles are not displaced from identified habitat critical to the survival. Manage anthropogenic activities in BIAs to ensure biologically important behaviour can continue.	
		Vessel disturbance	Vessel interactions identified as a threat; no specific management actions in relation to vessels prescribed in the plan.	

Name	Recovery Plan/Conservation Advice/ Management Plan	Threats/Strategies Identified as Relevant to the Activity	Relevant Conservation Advice	Addressed (Where Relevant) in EP Section
		Light pollution	Minimise light pollution: • Artificial light within or adjacent to habitat critical to the survival of marine turtles will be managed such that marine turtles are not displaced from these habitats. • Develop and implement best practice light management guidelines for existing and future developments adjacent to marine turtle nesting beaches. • Identify the cumulative impact on turtles from multiple sources of onshore and offshore light pollution.	
		Noise interference	Assess and address anthropogenic noise: • Understand the impacts of anthropogenic noise on marine turtle behaviour and biology.	
		Pollution (persistent toxic pollutants)	Minimise chemical and terrestrial discharge.	
		Climate change	Adaptively manage turtle stocks to reduce risk and build resilience to climate change and variability. Continue to meet Australia's international commitments to address the causes of climate change. Identify, test and implement climate-based adaptation measures.	
		Marine debris	Reduce the impacts from marine debris. Support the implementation of the EPBC Act Threat Abatement Plan for the impacts of marine debris on vertebrate marine life.	

Name	Recovery Plan/Conservation Advice/ Management Plan	Threats/Strategies Identified as Relevant to the Activity	Relevant Conservation Advice	Addressed (Where Relevant) in EP Section
Seabirds and shorebirds				
All migratory seabirds and shorebirds	National Light Pollution Guidelines for Wildlife Including Marine Turtles, Seabirds and Migratory Shorebirds (DCCEEW, 2023a)	Light pollution	Best practice lighting design incorporates the following design principles: • Start with natural darkness and only add light for specific purposes. • Use adaptive light controls to manage light timing, intensity and colour. • Light only the object or area intended – keep lights close to the ground, directed and shielded to avoid light spill. • Use the lowest intensity lighting appropriate for the task. • Use non-reflective, dark-coloured surfaces. • Use lights with reduced or filtered blue, violet and ultra-violet wavelengths	6.2
All migratory shorebirds	Wildlife Conservation Plan for Migratory Shorebirds (CoA, 2015b)	Anthropogenic disturbance	Ensure all areas of important habitat for seabirds are considered in the development assessment process. Manage the effects of anthropogenic disturbance to seabird breeding and roosting areas.	6.2, 7.1, 7.6, 7.7
All seabirds	Wildlife Conservation Plan for Seabirds (CoA, 2020c)	Habitat modification, marine debris	No explicit relevant management actions.	7.1, 7.6, 7.7
All albatross and petrels	Threat Abatement Plan for the Incidental Catch (or Bycatch) of Seabirds During Oceanic Longline Fishing Operations (CoA, 2018a)	Marine pollution	No explicit relevant management actions.	7.1, 7.4, 7.6, 7.7, 7.8
	National Recovery Plan for Albatrosses and Petrels (CoA, 2022a)	Habitat degradation and modification, pollution and contamination		
Abbott's booby	Approved Conservation Advice for *Papasula abbotti* (Abbott's Booby) (TSSC, 2020)	Habitat loss, disturbance and modifications	No explicit management actions; habitat loss, disturbance and modifications as threats.	7.6, 7.7

Name	Recovery Plan/Conservation Advice/ Management Plan	Threats/Strategies Identified as Relevant to the Activity	Relevant Conservation Advice	Addressed (Where Relevant) in EP Section
Australian fairy tern	Approved Conservation Advice for *Sternula nereis nereis* (Fairy Tern) (TSSC, 2011)	Habitat loss, disturbance and modifications Oil spills affecting breeding habitat	Ensure appropriate oil spill contingency plans are in place for the subspecies' breeding sites that are vulnerable to oil spills.	7.6, 7.7
Australian lesser noddy	Conservation Advice *Anous tenuirostris melanops* (Australian lesser noddy) (CoA, 2015d)	Habitat loss, disturbance and modifications	No explicit relevant management actions; oil pollution recognised as a threat.	7.6, 7.7
Australian painted snipe	Approved Conservation Advice for *Rostratula australis* (Australian Painted Snipe) (DSEWPaC, 2013b)	Habitat loss, disturbance and modifications	Habitat recovery actions are a priority.	7.6, 7.7
	National Recovery Plan for the Australian Painted Snipe (*Rostratula australis*) (CoA, 2022b)	Habitat degradation and modification, pollution and contamination	No explicit relevant management actions.	7.1, 7.4, 7.6, 7.7, 7.8
Blue petrel	Approved Conservation Advice *Halobaena caerulea* (Blue petrel) (TSSC, 2015e)	Habitat loss, disturbance and modifications	No explicit management actions that relate to the activity.	7.6, 7.7
Christmas Island frigatebird	Approved Conservation Advice *Fregata andrewsi* (Christmas Island Frigatebird) (TSSC, 2016a) National Recovery Plan for the Christmas Island Frigatebird (*Fregata andrewsi*) (Hill & Dunn, 2004)	Habitat loss, disturbance and modifications	Preventing activities in habitat critical to the survival that will remove nesting and roosting habitat. Preventing activities in buffer areas identified in Map 1 that may disturb nesting and roosting birds.	7.6, 7.7
Christmas Island goshawk	National Recovery Plan for the Christmas Island Goshawk Accipiter *fasciatus natalis* (Hill, 2004)	Habitat loss, disturbance and modifications	No explicit management actions that relate to the activity.	7.6, 7.7
Christmas Island white-tailed tropicbird (golden bosunbird)	Conservation Advice *Phaethon lepturus fulvus* white-tailed tropicbird (Christmas Island) (TSSC, 2014)	Introduced predators to the island	No explicit management actions that relate to the activity.	7.2
Curlew sandpiper	Conservation Advice for *Calidris ferruginea* (Curlew Sandpiper) (DCCEEW, 2023b)	Habitat loss and degradation from pollution	No explicit relevant management actions; oil pollution recognised as a threat.	7.1, 7.4, 7.6, 7.7, 7.8
Eastern curlew	Conservation Advice for *Numenius madagascariensis* (Far Eastern Curlew) (DCCEEW, 2023c)	Habitat loss and degradation from pollution	No explicit relevant management actions; habitat loss and degradation recognised as a threat.	7.1, 7.4, 7.6, 7.7, 7.8
Great knot	Approved Conservation Advice *Calidris tenuirostriss* (Great Knot) (TSSC, 2016b)	Habitat loss and degradation, pollution and climate change	No explicit management actions that relate to the activity.	6.3, 6.4, 7.1, 7.4, 7.6, 7.7, 7.8
Greater sand plover	Conservation Advice for *Charadrius leschenaultii* (Greater Sand Plover) (DCCEEW, 2023c)	Habitat loss and degradation and pollution	No explicit relevant management actions; oil pollution recognised as a threat.	6.3, 6.4, 7.1, 7.4, 7.6, 7.7, 7.8

Name	Recovery Plan/Conservation Advice/ Management Plan	Threats/Strategies Identified as Relevant to the Activity	Relevant Conservation Advice	Addressed (Where Relevant) in EP Section
Grey falcon	Conservation Advice *Falco hypoleucos* Grey Falcon (TSSC, 2020b)	Habitat loss and degradation, pollution and climate change	No explicit management actions that relate to the activity.	6.3, 6.4, 7.1, 7.4, 7.6, 7.7, 7.8
Lesser sand plover	Approved Conservation Advice *Charadrius mongolus* (Lesser Sand Plover) (TSSC, 2016c)	Habitat loss and degradation and pollution	Outlines research and survey priorities and recommends habitat restoration/maintenance.	6.3, 6.4, 7.1, 7.4, 7.6, 7.7, 7.8
Northern Siberian bar-tailed godwit (Russkoye bar-tailed godwit)	Conservation Advice for *Limosa lapponica menzbieri* (Yakutian Bar-tailed Godwit) (DCCEEW, 2024d)	Habitat loss and degradation, pollution and climate change	No explicit management actions that relate to the activity.	6.3, 6.4, 7.1, 7.4, 7.6, 7.7, 7.8
Red goshawk	National Recovery Plan for the red goshawk *Erythrotriurchis radiatus* (Department of Environment and Resource Management, 2012)	Habitat loss and degradation	No explicit management actions that relate to the activity.	7.6, 7.7
Red knot	Approved Conservation Advice for *Calidris canutus* (Red Knot) (DCCEEW, 2024a)	Habitat loss, disturbance and degradation, climate change, pollution and direct mortality (oil spills)	No explicit management actions that relate to the activity.	7.6, 7.7
Shy albatross	Conservation Advice *Thalassarche cauta* (Shy Albatross) (CoA, 2022)	Climate change and marine pollution	No explicit management actions that relate to the activity.	6.3, 7.6, 7.7
Sharp-tailed sandpiper	Conservation Advice for *Calidris acuminata* (Sharp-Tailed Sandpiper) (DCCEEW, 2024b)	Habitat degradation and modification, pollution and contamination.	No explicit management actions that relate to the activity.	6.3, 6.4, 7.1, 7.4, 7.6, 7.7, 7.8
Soft-plumaged petrel	Approved Conservation Advice for *Pterodroma mollis* (Soft-Plumaged Petrel) (TSSC, 2015f)	Habitat loss, disturbance and modifications	No explicit management actions; habitat loss, disturbance and modifications as threats.	7.6, 7.7

3.2.7 Socio-economic receptors

3.2.7.1 Cultural features

3.2.7.1.1 Introduction

Santos acknowledges the tradition of the First Nations people of Australia includes a cultural and spiritual connection to their land and waters, including Sea Country. These connections are rooted in their traditional communal beliefs and practices. First Nations people view their land and waters as integral to their identity, culture, and spirituality and they have a deep respect for the natural world.

The cultural heritage of First Nations peoples includes a vast array of tangible and intangible cultural artifacts, practices, and beliefs. The protected heritage of First Nations peoples is also of cultural value to Australia and the global community. The cultural value of First Nations protected heritage to Australia is evidenced and given force by a range of factors, including the laws, regulations and institutions established across Australia that are designed specifically to protect First Nations rights and interests in relation to sacred sites and other aspects of First Nations cultural heritage.

For First Nations Indigenous People, Country is a combination of the land, sea, rivers, and islands and all that they contain and sustain. “Country refers to more than just a geographical area: it is shorthand for all the values, places, resources, stories and cultural obligations associated with that geographical area.” (Smyth, 2007).

It is recognised that spiritual corridors extend from terrestrial areas into nearshore and offshore waters, that a number of marine animals are totems for Indigenous people.

Aboriginal people use and actively manage the coastal and marine environments as a resource and to maintain cultural identity, health, and wellbeing. Fishing, hunting and the maintenance of culture and heritage through ritual, stories and traditional knowledge continue as important uses of nearshore and adjacent areas.

First Nations people in northwest WA continue to rely on coastal and marine environments and resources of the region for their cultural identity, health and wellbeing, and their domestic and commercial economies (Smyth, 2007).

3.2.7.1.2 Sea Country

Sea Country is described in state, territory and Commonwealth marine park management plans. The Australian Marine Parks North-west MPNMP 2018 defines Sea Country as “*the areas of the sea that Aboriginal and Torres Strait Islander groups are particularly affiliated with through their traditional lore and customs*” (DNP, 2018). Sea Country is valued for Aboriginal cultural identity, health, and wellbeing.

The AMP management plans include the objective to provide for the protection and conservation of biodiversity and other natural, cultural and heritage values of marine parks. The plans define cultural values as “*living and cultural heritage recognising Indigenous beliefs, practices and obligations for Country, places of cultural significance and cultural heritage sites*” (DNP, 2018). AMP management plans list the Aboriginal people who have responsibilities for Sea Country in the Marine Parks, and the Native Title Representative Body for the region.

Aboriginal people of north-western Australia have been sustainably using and managing their Sea Country for tens of thousands of years, in some cases since before rising sea levels created these marine environments (DNP, 2018).

A common feature of coastal Aboriginal cultures is the connectedness of land and sea: together they form a Country of significant cultural sites and dreaming tracks of the creation ancestors (National Oceans Office, 2002). As a result, coastal environments are an integrated cultural landscape/seascape that is conceptually different from the broader Australian view of land and sea (National Oceans Office, 2002).

Animals can be totems for Aboriginal people. Aboriginal people share the land and water with animals and their relationship with totem animals is fundamental to continued practice and cultural responsibility; for food, health, shelter, cultural expression, and spiritual wellbeing (Victorian Aboriginal Heritage Council, 2021). Caring for plants, animals and their habitats is therefore seen as a keyway of expressing culture (Victorian Aboriginal Heritage Council, 2021).

As presented in Section 3.2.5.1, the PMST Report identified the EMBA for this EP overlaps several AMPs (Table 3-5). The closest AMPs to the Operational Area are Ningaloo and Gascoyne AMPs, which form part of the North-west MPNMP. Other relevant management plans are for the South-west Marine Parks Network and the Christmas Island Marine Park.

Information presented in Table 3-11 has been drawn from the marine park management plans referenced above and has been considered as part of Santos' relevant person identification process outlined in Section 4.5.2. Refer to Section 4.5.2.4 and Table 4-7 for which of the people/groups listed below have been consulted as relevant persons for this EP.

Table 3-11: Australian Marine Parks and representative bodies

Australian Marine Park	Sea Country Responsibilities	Representative Organisation	Representative Aboriginal, Torres Strait Islander Body
Abrolhos AMP	The relevant management plan states that the Nanda and Naaguja People have responsibilities for Sea Country in this AMP.	The native title holders for the Nanda people are represented by the Nanda Aboriginal Corporation The Naaguja People are part of the Yamatji Nation, for which the native title holders are represented by the Bundi Yamatji Aboriginal Corporation	Yamatji Marlpa Aboriginal Corporation
Argo-Rowley Terrace AMP	The relevant management plan states that there is limited information about the cultural significance of this AMP and does not identify any people or groups with Sea Country responsibilities for this AMP.	Not applicable	Not applicable
Carnarvon Canyon AMP	The relevant management plan does not include any references to Sea Country responsibilities with respect to First Nations people or groups.	Not applicable	Not applicable
Christmas Island AMP	The relevant management plan does not include any references to Sea Country responsibilities with respect to First Nations people or groups.	Not applicable	Not applicable
Dampier AMP	The relevant management plan states that the Ngarluma, Yindjibarndi, Yaburara, and Mardudhunera people have responsibilities for Sea Country in this AMP.	The native title holders for these people are represented by the Ngarluma Aboriginal Corporation and Yindjibarndi Aboriginal Corporation	Yamatji Marlpa Aboriginal Corporation
Eighty Mile Beach AMP	The relevant management plan states that the Nyangumarta, Karajarri and Ngarla people have responsibilities for Sea Country in this AMP.	The native title holders for these people are represented by the Karajarri Aboriginal Corporation, Nyangumarta Karajarri Aboriginal Corporation, Nyangumarta Warrarn Aboriginal Corporation, and Wanparta Aboriginal Corporation	Yamatji Marlpa Aboriginal Corporation and Kimberley Land Council
Gascoyne AMP	The relevant management plan states that the Gnulli people have responsibility for Sea Country in this AMP. Gnulli is the collective name to represent the Yinggarda, Baiyungu and Thalanyji people.	The native title holders for these people are represented by Nganhurra Nganhurra Thanardi Garrbu Aboriginal Corporation (Baiyungu and Thalanyji people) and Yinggarda Aboriginal Corporation (Yinggarda people)	Yamatji Marlpa Aboriginal Corporation

Australian Marine Park	Sea Country Responsibilities	Representative Organisation	Representative Aboriginal, Torres Strait Islander Body
Kimberley AMP	The relevant management plan states that the Sea Country for the Wunambal Gaambera, Dambimangari, Mayala, Bardi Jawi and the Nyul Nyul people extends into this AMP.	Native title holders are represented by the Wanjina-Wunggurr (Native Title) Aboriginal Corporation, Bardi and Jawi Niimidiman Aboriginal Corporation and Nyul Nyul Aboriginal Corporation	Kimberley Land Council
Mermaid Reef AMP	The relevant management plan states that the relevant management plan states that there is limited information about the cultural significance of this AMP and does not identify any people or groups with Sea Country responsibilities for this AMP.	Not appliable	Not applicable
Montebello AMP	The relevant management plan states that there is limited information about the cultural significance of this AMP and does not identify any people or groups with Sea Country responsibilities for this AMP. The Management Plan notes that the Yamatji Marlpa Aboriginal Corporation as the Native Title Representative Body for the Pilbara region.	Not applicable	Yamatji Marlpa Aboriginal Corporation
Ningaloo AMP	The relevant management plan states that the Gnulli people have responsibility for Sea Country in this AMP. Gnulli is the collective name to represent the Yinggarda, Baiyungu and Thalanyji people.	The native title holders for these people are represented by Nganhurra Nganhurra Thanardi Garrbu Aboriginal Corporation (Baiyungu and Thalanyji people) and Yinggarda Aboriginal Corporation (Yinggarda people)	Yamatji Marlpa Aboriginal Corporation
Roebuck AMP	The relevant management plan states that the Yawuru people have responsibilities for Sea Country in this AMP.	The Native Title Representative Body for the AMP is the Yawuru Native Title Holders Aboriginal Corporation	Kimberley Land Council
Shark Bay AMP	The relevant management plan states that the Gnulli and Malgana people have responsibility for Sea Country in this AMP. Gnulli is the collective name to represent the Yinggarda, Baiyungu and Thalanyji people.	The native title holders for these people are represented by Nganhurra Nganhurra Thanardi Garrbu Aboriginal Corporation (Baiyungu and Thalanyji people), Yinggarda Aboriginal Corporation (Yinggarda people) and Malgana Aboriginal Corporation (Malgana people)	Yamatji Marlpa Aboriginal Corporation

The Representative Aboriginal and Torres Strait Islander Body areas have been presented in relation to the Operational Area and EMBA in Figure 3-18.

3.2.7.1.3 Indigenous Land Use Agreements, native title claims and determinations

An Indigenous Land Use Agreement (ILUA) is a voluntary agreement between native title parties and other people or bodies about the use and management of areas of land and/or waters. An ILUA can be made over areas where:

- native title has been determined to exist in at least part of the area
- a native title claim has been made
- no native title claim has been made.

While registered, ILUAs bind all native title holders to the terms of the agreement. ILUAs also operate as a contract between the parties. The Register of ILUAs is kept by the Native Title Registrar in accordance with section 199A of the *Native Title Act 1993* and includes a description of the ILUA area, the parties' names, the term of the ILUA and other information as the Registrar considers is appropriate (section 199B of the *Native Title Act*.

Registration confers a contractual effect on the ILUA and binds all persons holding native title regardless as to whether they are already parties to the ILUA (section 24EA of the *Native Title Act*).

Data from the National Native Title Tribunal identified no native title claims/determinations or ILUAs within the Operational Area.

The EMBA overlaps 33 ILUAs and 21 native title determinations as described in Table 3-12 and Table 3-13. Native title determinations are also presented in Figure 3-19.

Table 3-12: Indigenous Land Use Agreements within the Operational Area and environment that may be affected

ILUA	Spatial Overlap with Operational Area	Spatial Overlap with Socio-economic EMBA	Representative Organisations	Native Title Representative Body
Alinta-Kariyarra Electricity Infrastructure ILUA	No	Yes	Kariyarra Aboriginal Corporation	Kimberley Land Council and Yamatji Marlpa Aboriginal Corporation
Ashburton Salt Project Indigenous Land Use Agreement (Body Corporate Agreement)	No	Yes	Buurabalayji Thalanyji Aboriginal Corporation	Yamatji Marlpa Aboriginal Corporation
Cape Preston Project Deed (YM Mardie ILUA)	No	Yes	Wirrawandi Aboriginal Corporation	Yamatji Marlpa Aboriginal Corporation
Cape Preston West Export Facility	No	Yes	Wirrawandi Aboriginal Corporation	Yamatji Marlpa Aboriginal Corporation
Dambimangari KSCS Marine Parks ILUA	No	Yes	Dambimangari Aboriginal Corporation and Wanjina-Wunggurr (Native Title) Aboriginal Corporation	Kimberley Land Council
Eco Beach ILUA	No	Yes	Yawuru Native Title Holders Aboriginal Corporation	Kimberley Land Council
Gnaraloo Indigenous Land Use Agreement	No	Yes	Nganhurra Thanardi Garrbu Aboriginal Corporation	Yamatji Marlpa Aboriginal Corporation
Great Sandy Desert Project ILUA – Infrastructure	No	Yes	Karajarri Traditional Lands Association	Kimberley Land Council
Quobba – Yinggarda Pastoral ILUA	No	Yes	Yinggarda Aboriginal Corporation	Yamatji Marlpa Aboriginal Corporation

ILUA	Spatial Overlap with Operational Area	Spatial Overlap with Socio-economic EMBA	Representative Organisations	Native Title Representative Body
Ningaloo Conservation Estate ILUA	No	Yes	Nganhurra Thanardi Garrbu Aboriginal Corporation	Yamatji Marlpa Aboriginal Corporation
Malgana Aboriginal Corporation Conservation Estate ILUA	No	Yes	Malgana Aboriginal Corporation	Yamatji Marlpa Aboriginal Corporation
Malgana Tamala Pastoral Lease Agreement	No	Yes	Malgana Aboriginal Corporation	Yamatji Marlpa Aboriginal Corporation
Nanda Conservation Estate ILUA	No	Yes	Nanda Aboriginal Corporation	Yamatji Marlpa Aboriginal Corporation
Nganhurra Thanardi Garrbu Aboriginal Corporation Conservation Estate ILUA	No	Yes	Nganhurra Thanardi Garrbu Aboriginal Corporation	Yamatji Marlpa Aboriginal Corporation
Macedon ILUA	No	Yes	Buurabalayji Thalanyji Aboriginal Corporation	Yamatji Marlpa Aboriginal Corporation
Kuruma Marthudunera and Yaburara and Coastal Martuthunira Indigenous Land Use Agreement	No	Yes	Wirrawandi Aboriginal Corporation	Yamatji Marlpa Aboriginal Corporation
RTIO Ngarluma Indigenous Land Use Agreement (Body Corporate Agreement)	No	Yes	Ngarluma Aboriginal Corporation	Yamatji Marlpa Aboriginal Corporation
KM & YM Indigenous Land Use Agreement 2018	No	Yes	Kuruma Marthudunera Aboriginal Corporation (for the southern and inland part of the agreement area) Wirrawandi Aboriginal Corporation (for the northern and coastal part of the agreement area)	Yamatji Marlpa Aboriginal Corporation
FMG-Kariyarra Land Access ILUA	No	Yes	Kariyarra Aboriginal Corporation	Yamatji Marlpa Aboriginal Corporation
Karajarri Traditional Lands Association KSCS Eighty Mile Beach ILUA	No	Yes	Karajarri Traditional Lands Association	Kimberley Land Council
Kariyarra and State ILUA	No	Yes	Kariyarra Aboriginal Corporation	Yamatji Marlpa Aboriginal Corporation
Mayala Country Marine Park Indigenous Land Use Agreement	No	Yes	Mayala Inninalang Aboriginal Corporation	Kimberley Land Council
Nanda Conservation Estate ILUA	No	Yes	Nanda Aboriginal Corporation	Yamatji Marlpa Aboriginal Corporation

ILUA	Spatial Overlap with Operational Area	Spatial Overlap with Socio-economic EMBA	Representative Organisations	Native Title Representative Body
Ngarla Pastoral ILUA	No	Yes	Wanparta Aboriginal Corporation	Yamatji Marlpa Aboriginal Corporation
Nyangumarta PBC KSCS ILUA	No	Yes	Nyangumarta Warrarn Aboriginal Corporation	Kimberley Land Council and Yamatji Marlpa Aboriginal Corporation
Nyangumarta Warrarn Aboriginal Corporation & Wallal Downs Pastoral Lease ILUA	No	Yes	Nyangumarta Warrarn Aboriginal Corporation	Kimberley Land Council and Yamatji Marlpa Aboriginal Corporation
Nyangumarta Warrarn Aboriginal Corporation & Mandora Pastoral Lease ILUA	No	Yes	Nyangumarta Warrarn Aboriginal Corporation	Kimberley Land Council
Nyangumarta Karajarri and Anna Plains Station ILUA	No	Yes	Nyangumarta Karajarri Aboriginal Corporation	Kimberley Land Council
Karajarri Traditional Lands Association KSCS Eighty Mile Beach ILUA	No	Yes	Karajarri Traditional Lands Association	Kimberley Land Council
Yamatji Nation Agreement	No	Yes	Bundi Yamatji Aboriginal Corporation	Yamatji Marlpa Aboriginal Corporation
Yawuru Area Agreement ILUA	No	Yes	Yawuru Native Title Holders Aboriginal Corporation	Kimberley Land Council
Yawuru Nagulagun/Roebuck Bay Marine Park ILUA	No	Yes	Yawuru Native Title Holders Aboriginal Corporation	Kimberley Land Council
Yawuru Prescribed Body Corporate ILUA – Broome	No	Yes	Yawuru Native Title Holders Aboriginal Corporation	Kimberley Land Council

Table 3-13: Native title areas within the Operational Area and environment that may be affected

Native Title Determined Areas	Spatial Overlap with Operational Area	Spatial Overlap with Socio-economic EMBA	Representative Organisations	Native Title Representative Body
Malgana Part A	No	Yes	Malgana Aboriginal Corporation	Yamatji Marlpa Aboriginal Corporation
Gulli, Gnnulli #2 and Gnulli #3 – Yinggarda, Baiyungu and Thalanyji People	No	Yes	Nganhurra Thanardi Garrbu Aboriginal Corporation (Baiyungu and Thalanyji people for the northern part of the determined area) Yinggarda Aboriginal Corporation (Yinggarda people for the southern part of the determined area)	Yamatji Marlpa Aboriginal Corporation
Thalanyji	No	Yes	Buurabalayji Thalanyji Aboriginal Corporation	Yamatji Marlpa Aboriginal Corporation
Yaburara & Mardudhunera People	No	Yes	Wirrawandi Aboriginal Corporation	Yamatji Marlpa Aboriginal Corporation
Ngarluma/Yindjibarndi	No	Yes	Ngarluma Aboriginal Corporation (for the northern and coastal part of the determined area) Yindjibarndi (for the southern and inland part of the determined area)	Yamatji Marlpa Aboriginal Corporation
Kariyarra	No	Yes	Kariyarra Aboriginal Corporation	Kimberley Land Council and Yamatji Marlpa Aboriginal Corporation
Ngarla and Ngarla #2 (Determination Area A)	No	Yes	Wanparta Aboriginal Corporation	Kimberley Land Council and Yamatji Marlpa Aboriginal Corporation
Nyangumarta People (Part A)	No	Yes	Nyangumarta Warrarn Aboriginal Corporation	Kimberley Land Council and Yamatji Marlpa Aboriginal Corporation
Nyangumarta-Karajarri Overlap Proceeding (Yawinya)	No	Yes	Nyangumarta-Karajarri Aboriginal Corporation	Kimberley Land Council
Karajarri People (Area A)	No	Yes	Karajarri Traditional Lands Association	Kimberley Land Council and Yamatji Marlpa Aboriginal Corporation
Karajarri People (Area B)	No	Yes	Karajarri Traditional Lands Association	Kimberley Land Council
Rubibi Community	No	Yes	Yawuru Native Title Holders Aboriginal Corporation	Kimberley Land Council
Jabirr Jabirr/Ngumbarl	No	Yes	Gogolanyngor Aboriginal Corporation	Kimberley Land Council
Yamatji Nation	No	Yes	Bundi Yamatji Aboriginal Corporation	Kimberley Land Council and Yamatji Marlpa Aboriginal Corporation
Uunguu Part A	No	Yes	Wanjina-Wunggurr (Native Title) Aboriginal Corporation	Kimberley Land Council
Yaburara and Mardudhunera People	No	Yes	Wirrawandi Aboriginal Corporation	Yamatji Marlpa Aboriginal Corporation
Dambimangari	No	Yes	Wanjina-Wunggurr (Native Title) Aboriginal Corporation	Kimberley Land Council

Native Title Determined Areas	Spatial Overlap with Operational Area	Spatial Overlap with Socio-economic EMBA	Representative Organisations	Native Title Representative Body
Mayala People	No	Yes	Mayala Inninalang Aboriginal Corporation	Kimberley Land Council
Nanda People and Nanda People #2	No	Yes	Nanda Aboriginal Corporation	Yamatji Marlpa Aboriginal Corporation
Nanda People Part B and Malgana 2 and Malgana 3	No	Yes	Nanda Aboriginal Corporation and Malgana Aboriginal	Yamatji Marlpa Aboriginal Corporation
Bindunbur	No	Yes	Gogolanyngor Aboriginal Corporation (central and western part of the Dampier Peninsula) Nyul Nyul Aboriginal Corporation (central and western part of the Dampier Peninsula) Nimanburr Aboriginal Corporation (central and eastern part of the Dampier Peninsula)	Kimberley Land Council
Thalanyji/Nhuwala People	No	Yes	Thalanyji/Nhuwala People are being assisted in its claim by a legal firm.	Yamatji Marlpa Aboriginal Corporation
Nhuwala Claim Group	No	Yes	Nhuwala Claim Group is being assisted in its claim by Yamatji Marlpa Aboriginal Corporation	Yamatji Marlpa Aboriginal Corporation

3.2.7.1.4 Indigenous Protected Areas

Indigenous Protected Areas (IPAs) are areas of land and sea that Traditional Owners have agreed to manage for biodiversity conservation. IPAs represent more than 50% of National Reserve System.

The Sea Country IPA Program seeks to increase the area of sea in IPAs to strengthen the conservation and protection of Australia's unique marine and coastal environments, while creating employment and economic opportunities for Indigenous Australians.

A search of the National Native Title Tribunal identified no IPAs within the Operational Area. The following two IPAs were identified as overlapping the EMBA (Table 3-5):

- Karajarri IPA: the representative organisation for this IPA is the Karajarri Traditional Lands Association
- Yawuru IPA: the representative organisation for this IPA is the Yawuru Native Title Holders Aboriginal Corporation.

3.2.7.1.5 Aboriginal Cultural Heritage Inquiry System

The WA Department of Planning, Lands and Heritage Aboriginal Cultural Heritage Inquiry System (ACHIS) provides information about Aboriginal sites (as defined under the *Aboriginal Heritage Act 1972* (WA)) in Western Australia. To identify Aboriginal sites that may be affected by the Activities, a search of the ACHIS (undertaken July 2025) indicated there are:

- no registered Aboriginal sites or lodged places within the Operational Area
- three hundred and twelve registered Aboriginal sites within the EMBA
- one hundred and forty seven lodged Aboriginal sites within the EMBA.

None of these Aboriginal sites will be disturbed by planned activities. Refer to Appendix E for ACHIS search results.

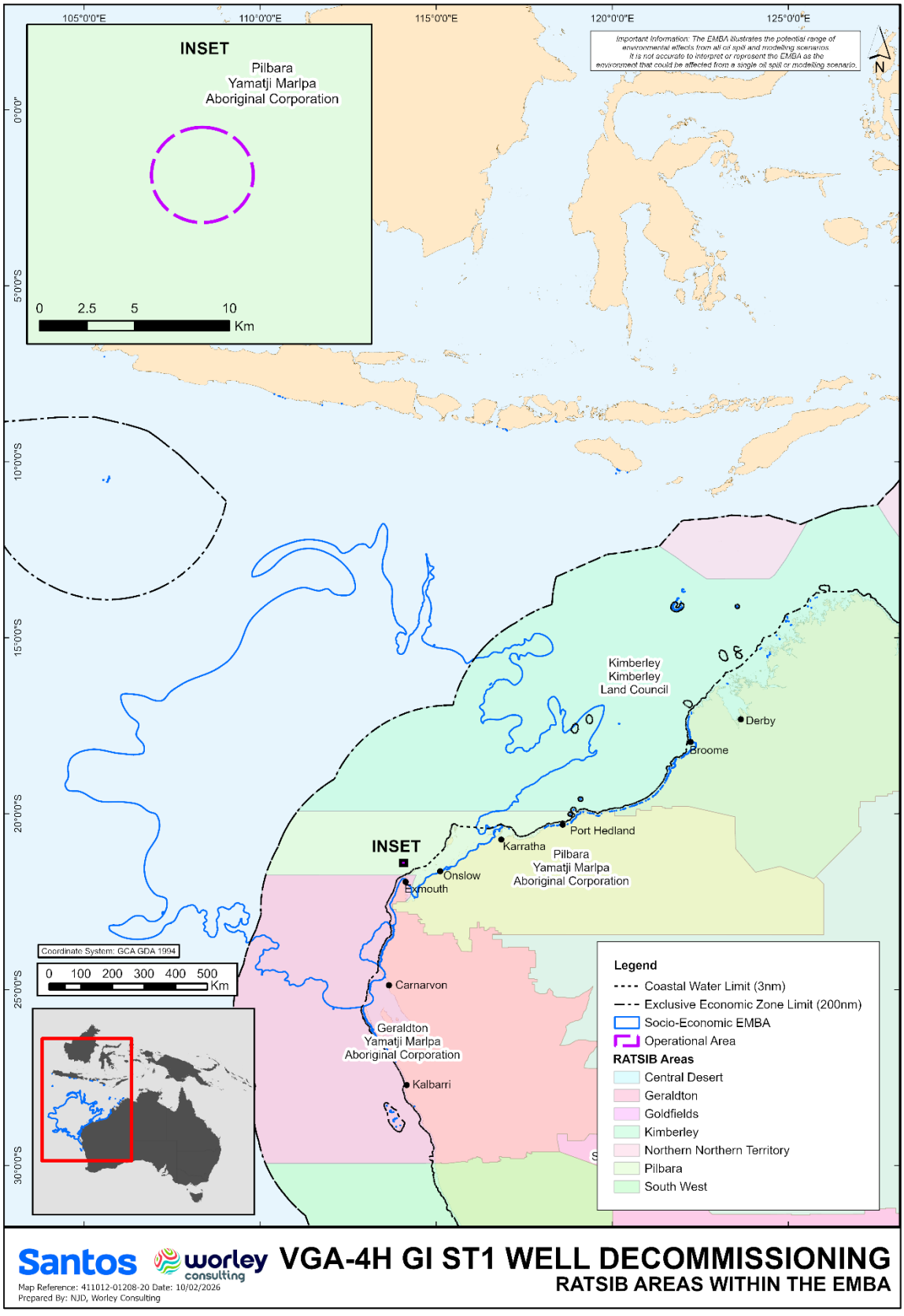

Figure 3-18: Representative Aboriginal and Torres Strait Islander Body areas within the environment that may be affected

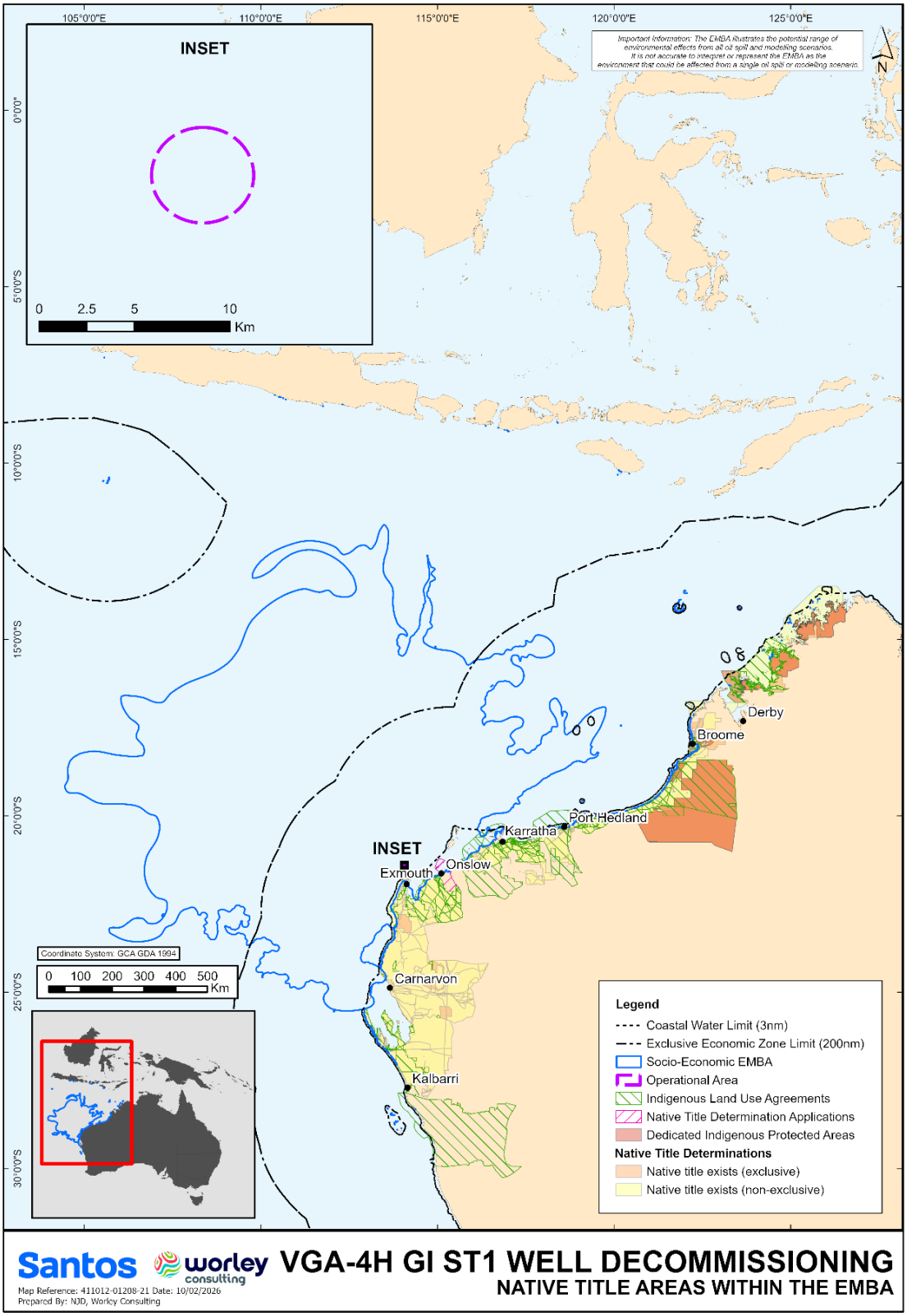

Figure 3-19: Native title determinations, Indigenous Land Use Agreements and Indigenous Protected Areas within the environment that may be affected

3.2.7.2 Maritime heritage

There are no listed World Heritage areas, Aboriginal heritage, cultural heritage places or records of shipwrecks within or in the vicinity of the Operational Area. The closest known shipwreck to the Operational Area is the Gem, which was wrecked in 1893 approximately 10 km southeast of the Operational Area.

Refer to Appendix C for further information.

3.2.7.3 Commercial fisheries

Offshore and coastal waters in the North-West Marine Region support a valuable and diverse commercial fishing industry. The major fisheries in the Pilbara region target tropical finfish, large pelagic fish, crustaceans (prawns and scampi) and pearl oysters (Butler et al., 2024).

These North-West Marine Region fisheries are managed by either the Department of Primary Industries and Regional Development (DPIRD) (state fisheries) with specific management plans, regulations, and a variety of subsidiary regulatory instruments under the *Fish Resources Management Act 1994*, or by the Australian Fisheries Management Authority (AFMA), which manages Commonwealth fisheries within the 200 nm Australian Fishing Zone.

Commonwealth and State fisheries overlapping with the Operational Area and the EMBA are described in Table 3-14 and shown in Figure 3-20 to Figure 3-23.

Fishing activity data was sourced from the FishCube database utilising the one 10 nm grid square that overlapped the Operational Area, as well as datasets from the Australian Bureau of Agricultural and Resource Economics and Sciences (ABARES) fishery status reports (ABARES, 2024).

Previous consultation with DPIRD has identified commercial fishing interests that exist in or in close proximity to the activities proposed under this EP. This consultation also identified key fish species that may be aggregating or spawning in the EMBA. This information is included in Table 3-14, where relevant. No active commercial fishing effort was identified within or adjacent to the Operational Area for these Commonwealth fisheries. Of the 26 state managed fisheries, six were fisheries zones that spanned the whole of Western Australia and while fishers could fish across the whole of the state, efforts are typically concentrated further south and no active fishing effort was identified. Of the remaining state fisheries, none had recorded recent (within five years) fishing efforts within or adjacent to the Operational Area, based on the FishCube data.

Table 3-14: Commonwealth and state fisheries that overlap the Operational Area and environment that may be affected

Fishery	Fishery Licence Area Overlap			Description[1]	Fishing activity within Operational Area
	Operational Area	Ecological EMBA	Socio-economic EMBA		
Commonwealth managed fisheries					
North West Slope Trawl Fishery	✓	✓	✓	Fishery extends from 114° E to approximately 125° E off the WA coast between the 200 m isobath and the outer limit of the Australian Fishing Zone (AFZ). Demersal crustacean trawl occurs seaward of the 200 m isobath.	No active commercial fishing in or near the Operational Area in the past ten years
Southern Bluefin Tuna Fishery	✓	✓	✓	Consists of all Australian waters to 200 nm from the coast. Fishing activity concentrated off south-east Australia and in the Great Australian Bight.	No active commercial fishing effort reported in WA, as fishing efforts are concentrated off South Australia
Western Deepwater Trawl Fishery	✗	✓	✓	Extends in the north from the boundary of the AFZ to 114° E, to the southern boundary of the AFZ to 115°08' E. Fishing occurs from the 200 m isobath to the edge of the AFZ.	No active commercial fishing in or near the Operational Area in the past 5 years
Western Skipjack Tuna Fishery	✓	✓	✓	Separated into two sectors (east and west). Fishery is located in all Australian waters west of 142°30'00 E, out to 200 nm from the coast.	No active commercial fishing in or near the Operational Area in the past ten years
Western Tuna and Billfish Fishery	✓	✓	✓	Extends west from Cape York Peninsula (Queensland) to 34° S off the Western Australian coast. The fishery also extends east across the Great Australian Bight to 141° E. Fishing effort concentrated off south-west WA. Since 2005, there has been fewer than five vessels active in the Western Tuna and Billfish Fishery each year, which has reportedly declined from 50 active vessels in 2000. Fishing activity in the Western Tuna and Billfish Fishery concentrates in waters off south-west WA, and off South Australia.	No active commercial fishing in or near the Operational Area in the past 5 years

[1] *All descriptions based on Butler et al. (2024) and Newman et al. (2024) unless otherwise cited.*

Fishery	Fishery Licence Area Overlap			Description[1]	Fishing activity within Operational Area
	Operational Area	Ecological EMBA	Socio-economic EMBA		
State managed fisheries					
Abrolhos Island and Midwest Trawl	✗	✗	✓*	This fishery focused on harvesting saucer scallops (*Ylistrum balloti*) and, to a lesser extent, western king prawns (*Penaeus latisulcatus*) in the waters around the Abrolhos Islands and the mid-west coast.	FishCube data shows no recent active fishing in the Operational Area
Broome Prawn Fishery	✗	✗	✓*	This trawl fishery operates off Broome and targets western king prawns (*Penaeus latisulcatus*) and coral prawns.	FishCube data shows no recent active fishing in the Operational Area
Exmouth Gulf Prawn Managed Fishery	✗	✓	✓	This fishery operates in sheltered waters on the western half of the Exmouth Gulf. The Muiron Islands and Point Murat provide western boundary; Serrurier Island provides northern limit.	FishCube data shows no recent active fishing in the Operational Area
Gascoyne Demersal Scalefish Managed Fishery	✗	✓	✓	The fishery operates between latitudes 23°07'30" S and 26°30'S in the waters of the Indian Ocean and Shark Bay. Vessels not permitted to fish in inner Shark Bay. Merchandised handlines.	FishCube data shows no recent active fishing in the Operational Area
Kimberley Crab Fishery	✗	✗	✓*	A small developing fishery that targets the green (giant) mud crab and the brown (orange) mud crab via the use of crab traps, between Broome and Cambridge Gulf near the WA and Northern Territory border. Most fishing effort is concentrated around Cambridge Gulf, Admiralty Gulf, York Sound and King Sound.	FishCube data shows no recent active fishing in the Operational Area
Kimberley Gillnet and Barramundi	✗	✗	✓*	This fishery targets barramundi and takes threadfin species, operating in nearshore and estuarine zones from the Northern Territory border to the top end of Eighty Mile Beach, south of Broome.	FishCube data shows no recent active fishing in the Operational Area
Kimberley Prawn Managed Fishery	✗	✗	✓*	This trawl managed fishery operates off the north of WA between Koolan Island and Cape Londonderry. It predominantly targets banana prawns but also catches tiger prawns, endeavour prawns and western king prawns.	FishCube data shows no recent active fishing in the Operational Area
Nickol Bay Prawn Managed Fishery	✗	✓	✓	Extends northward from the Exmouth Prawn Fishery and east to the 200 m isobath at 114° 39.9'.	FishCube data shows no recent active fishing in the Operational Area

Fishery	Fishery Licence Area Overlap			Description[1]	Fishing activity within Operational Area
	Operational Area	Ecological EMBA	Socio-economic EMBA		
Northern Demersal Scalefish Managed Fishery	✗	✓	✓	This fishery operates off the northwest coast of Western Australia in the waters east of 120° E longitude. These waters extend out to the edge of the Australian Fishing Zone (200 nm). Consists of three zones: Zone A (inshore area), Zone B (most active fishing area) and Zone C (offshore deep slope developmental area). Further divided into two sections consisting of an offshore and inshore sector.	FishCube data shows no recent active fishing in the Operational Area
Onslow Prawn Managed Fishery	✗	✓	✓	The boundaries of this fishery are 'all the WA waters between the Exmouth Prawn Fishery and the Nickol Bay Prawn Fishery east of 114°39.9' on the landward side of the 200 m depth isobath'. Prawn trawling activities focus on inshore areas between Onslow and Karratha.	FishCube data shows no recent active fishing in the Operational Area
Pearl Oyster Managed Fishery	✗	✓	✓	The fishery operates in shallow coastal waters along the North Coast Bioregion of WA from Exmouth Gulf to the Northern Territory border. The harvesting of wild stock occurs mainly along Eighty Mile Beach.	FishCube data shows no recent active fishing in the Operational Area
Pilbara Demersal Scalefish Fisheries (includes trap and trawl fisheries)	✗	✓	✓	Comprised of the: • Pilbara Fish Trawl (Interim) Managed Fishery occupying the waters north of latitude 21°35' S and between longitudes 114°9'36" E and 120° E; seaward of the 50 m isobath and landward of the 200 m isobath, consists of two zones • Pilbara Trap Managed Fishery, permitted to operate between 21°56´ S latitude and the high water mark on the western side of the North West Cape • Pilbara Line Fishery, limited within Pilbara waters from 21°56' S to 120° E.	FishCube data shows no recent active fishing in the Operational Area
Pilbara Developmental Crab Managed Fishery	✓	✓	✓	Concentrated in coastal embayments and estuaries between Geographe Bay and Nickol Bay. Fishing in the Pilbara coast primarily occurs from Onslow to Port Hedland in inshore waters.	FishCube data shows no recent active fishing in the Operational Area
Shark Bay Crab Managed Fishery	✗	✓	✓	Located within the waters of Shark Bay extending from Dirk Hartog Island to Steep Point on the mainland.	FishCube data shows no recent active fishing in the Operational Area
Shark Bay Prawn Managed Fishery	✗	✓	✓	Located within the waters of Shark Bay extending from south of Denham to north of Koks Island and Carnarvon.	FishCube data shows no recent active fishing in the Operational Area

Fishery	Fishery Licence Area Overlap			Description[1]	Fishing activity within Operational Area
	Operational Area	Ecological EMBA	Socio-economic EMBA		
Shark Bay Scallop Managed Fishery	✗	✓	✓	Located within the waters of Shark Bay extending between 23°34' S and 26°30' S to the 200 m isobath.	FishCube data shows no recent active fishing in the Operational Area
West Coast Deep Sea Crustacean Managed fishery	✓	✓	✓	Targets crystal crabs, giant crabs, and champagne crabs in the shelf edge waters (over 150 m) of the West Coast and Gascoyne bioregions. The fishery's area extends from Cape Leeuwin to Western Australia's border with the Northern Territory, encompassing parts of the Indian Ocean and Timor Sea, within Australia's exclusive economic zone.	FishCube data shows no recent active fishing in the Operational Area
West Coast Demersal Scalefish	✗	✓	✓	This fishery encompasses the inshore areas (coastline to 250 m depth) and the offshore area (250 m depth to the 200 nautical mile limit) from north of Kalbarri to Augusta.	FishCube data shows no recent active fishing in the Operational Area
West Coast Gillnet/ Demersal Longline	✗	✗	✓*	This fishery operates in continental shelf waters along the south and lower west coasts. The main shark species targeted in the Temperate Demersal Gillnet and Demersal Longline Fishery are gummy shark (*Mustelus antarcticus*), dusky shark *(Carcharhinus obscurus*), whiskery shark (*Furgaleus macki)* and sandbar shark (*Carcharhinus plumbeus*).	FishCube data shows no recent active fishing in the Operational Area
West Coast Rock Lobster Managed Fishery	✗	✓	✓	This fishery targets the western rock lobster between Shark Bay and Cape Leeuwin. Baited traps (pots) and with a commercial and recreational fishing season.	FishCube data shows no recent active fishing in the Operational Area
State managed fisheries (whole of the state)					
Abalone Managed Fishery	✗	✗	✓	Shallow coastal waters off the coast of Western Australia. Divided into eight management areas, commercial fishing for greenlip/brownlip abalone is managed in three sectors.	FishCube data shows no recent active fishing in the Operational Area
Mackerel Managed Fishery	✓	✓	✓	Trolling or handline. Near-surface trolling gear from vessels in coastal areas around reefs, shoals, and headlands.	FishCube data shows no recent active fishing in the Operational Area
Marine Aquarium Fish Managed Fishery	✓	✓	✓	Operates in Western Australian state waters. Restricted by diving depths. Commercial operators are permitted to take over 250 species of finfish as well as coral, live rock, algae, seagrass, and invertebrates.	FishCube data shows no recent active fishing in the Operational Area

Fishery	Fishery Licence Area Overlap			Description[1]	Fishing activity within Operational Area
	Operational Area	Ecological EMBA	Socio-economic EMBA		
Octopus Interim Managed Fishery	✗	✗	✓*	Lines and pots, trawl and trap land octopus as by-product. Fishery is in development phase and occurs between Kalbarri and Esperance.	FishCube data shows no recent active fishing in the Operational Area
South-West Coast Salmon Fishery	✓	✓	✓	There are currently six licences. Licensees are not restricted to specific beaches but in practice only a few beaches are fished. In 2018 there were three active vessels in this fishery.	FishCube data shows no recent active fishing in the Operational Area
Specimen Shell Managed Fishery	✓	✓	✓	Dive based fishery, operates all year through Western Australian waters between the high water mark and the 200 m isobath'. Hand harvest method used; an exemption method being employed is using a remote-controlled underwater vehicle between depths of 60–300 m.	FishCube data shows no recent active fishing in the Operational Area

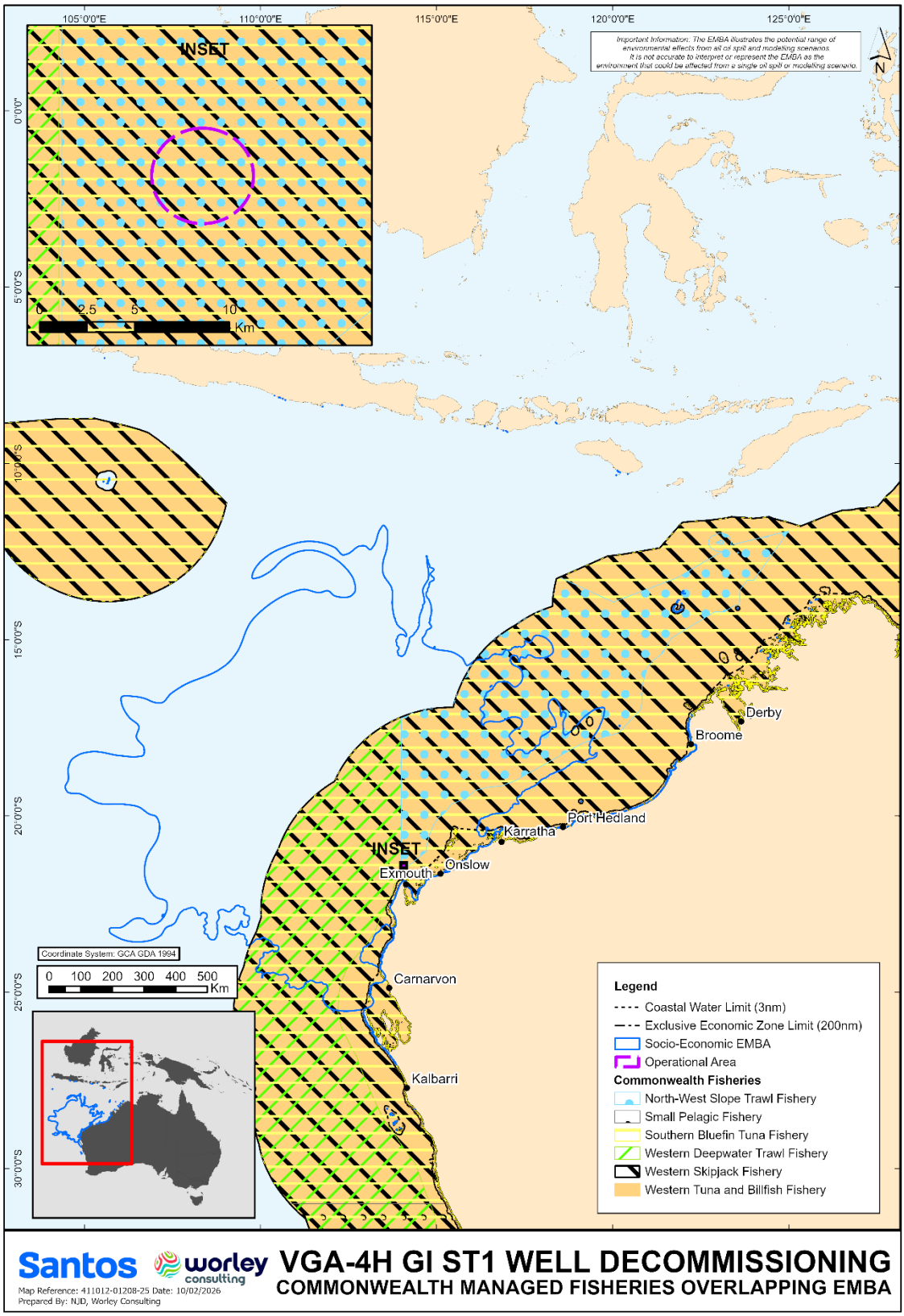

Figure 3-20: Commonwealth commercial fisheries within the environment that may be affected

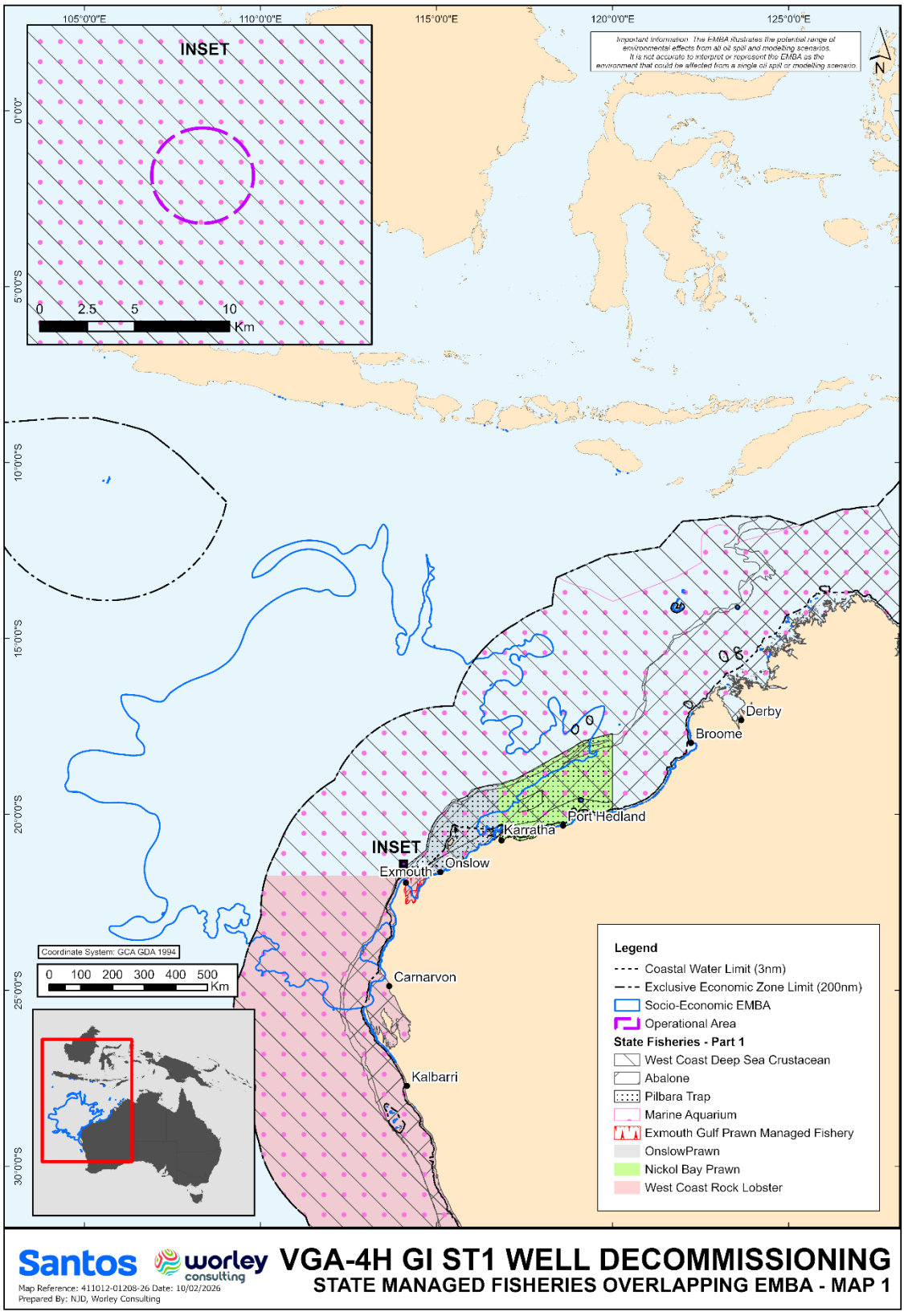

Figure 3-21: State commercial fisheries within the environment that may be affected (Figure 1 of 3)

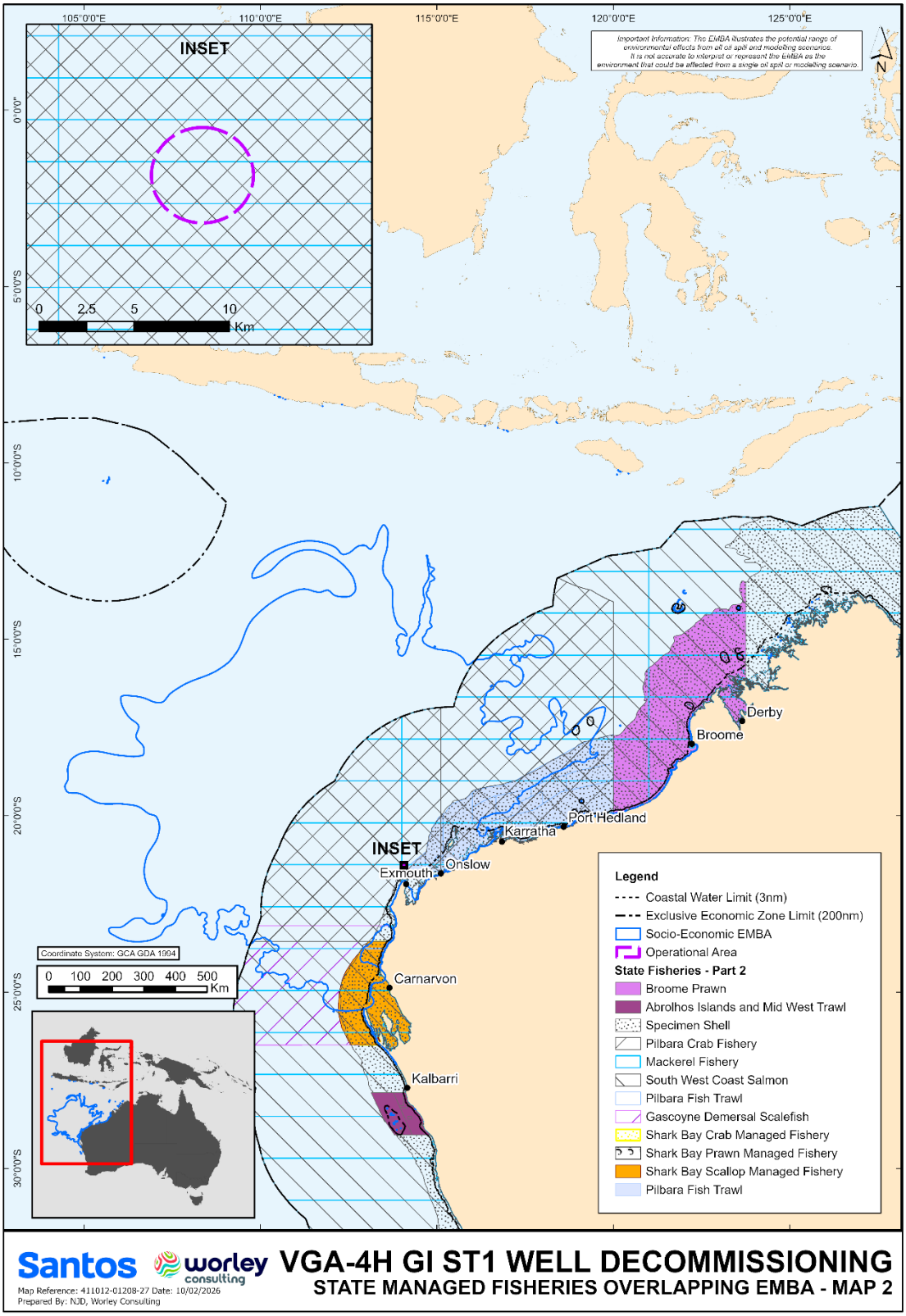

Figure 3-22: State commercial fisheries within the environment that may be affected (Figure 2 of 3)

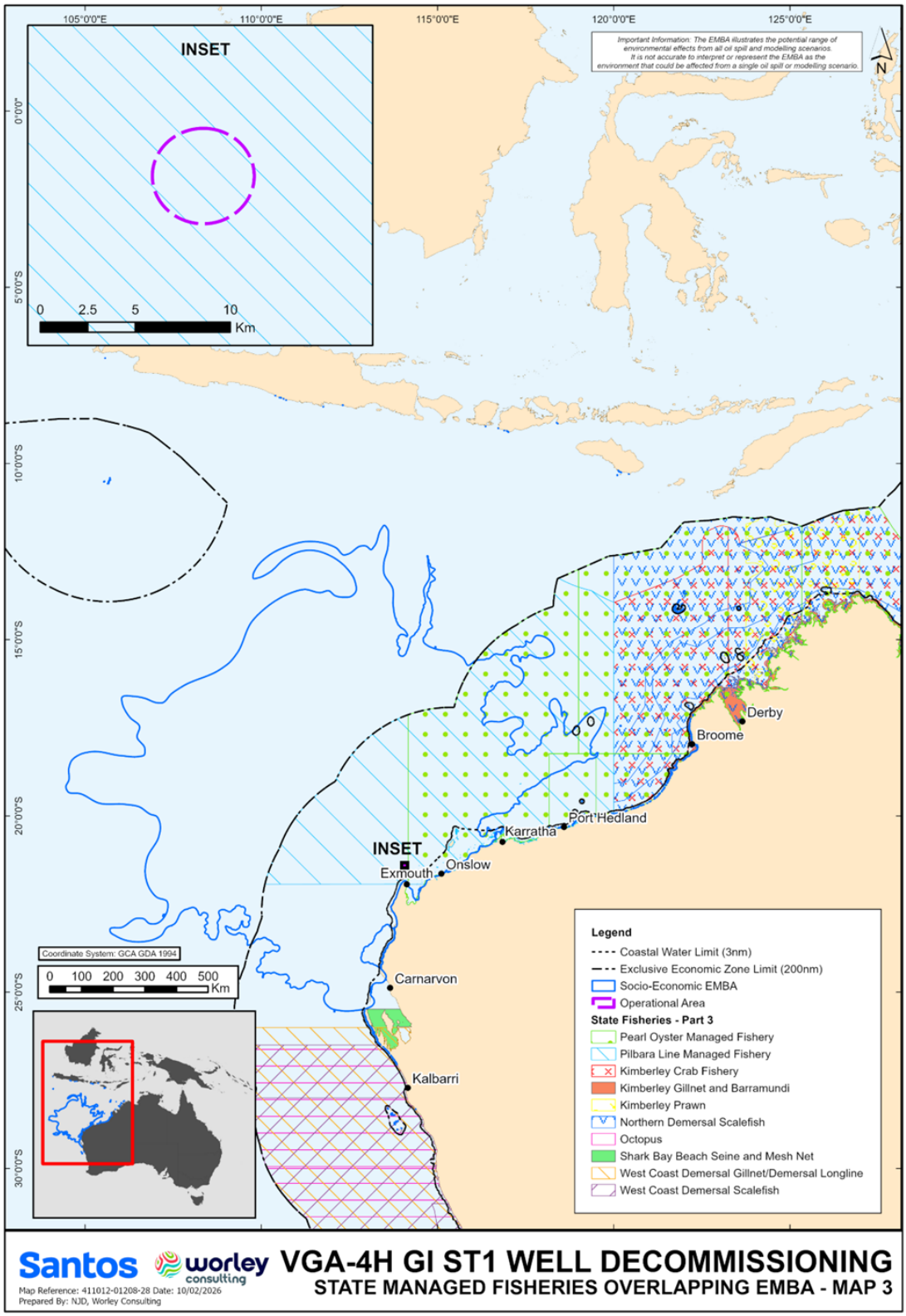

Figure 3-23: State commercial fisheries within the environment that may be affected (Figure 3 of 3)

3.2.7.4 Recreational fisheries

Given the Operational Area's water depths (>340 m), lack of seabed features and distance offshore, recreational fishing activity is not expected. Therefore, no interaction with recreational fishers is anticipated in the Operational Area but may occur in the EMBA.

The closest recreational fishing activities expected to occur within the EMBA are around the Ningaloo Marine Park, which is located approximately 28 km from the Operational Area. The Ningaloo Marine Park is known to support diverse and abundant marine life and is considered a highly valued recreational fishing location. The Ningaloo Marine Park is well known among avid fishers for the productive fishing and various fishing charter businesses.

3.2.7.5 Tourism and recreation

Tourism activities are not expected to occur in the Operational Area given the water depths (>340 m) and distance from shore (approximately 42 km north of North West Cape). Whale shark tours, fishing charters and whale watching tours all likely to occur closer to the mainland and may occur within the EMBA, including seasonal nature-based tourism, such as humpback whale watching, whale shark encounters and tours of turtle hatching around Ningaloo Reef and Cape Range National Park.

Popular water-based activities that may occur in the EMBA include fishing, swimming, snorkelling, diving, surfing, windsurfing, kiting, and boating. Within the EMBA these activities are concentrated in the vicinity of the population centres such as Coral Bay and Exmouth.

3.2.7.6 Oil and gas industry

The Exmouth region has a long history of oil and gas industry since oil was first discovered in the Rough Range field in 1953, 65 km south of Exmouth. Subsequently, the Exmouth Sub-Basin and surrounding basins have been subject to exploration activity due to their highly prospective hydrocarbon fields. The Operational Area and surrounding waters are predominantly used for petroleum exploration and development as shown in Figure 3-24.

The nearest petroleum activities are two Woodside-operated facilities:

- Enfield Development in WA-28-L – the production licence area overlaps the Operational Area
- Pyrenees Development in WA-42-L – Pyrenees Venture FPSO, approximately 13 km south east of the Operational Area.

3.2.7.7 Commercial shipping

Shipping occurs in the vicinity of the Operational Area. Shipping using NWS waters includes iron ore carriers, oil tankers and other vessels proceeding to or from the ports of Dampier, Port Walcott and Port Hedland; however, these are predominantly heading north from these ports. Shipping occurs within the EMBA; however, there is no designated shipping route within the Operational Area, with the nearest located approximately 40 km northwest. Other vessels may wish to transit the area although shipping traffic is excluded from the 500 m petroleum safety zone (PSZ) around the well location. Shipping routes are shown in Figure 3-25.

3.2.7.8 Defence

The Operational Area is located within a designated Defence Practice Area. While RAAF Base Learmonth is approximately 90 km away, military exercises may occur in waters and airspace over the Operational Area following appropriate notifications. The defence training and exercise areas are shown in Figure 3-26.

3.2.8 Windows of sensitivity

Timing of peak activity for threatened and migratory species and other relevant, significant sensitivities is given in Table 3-15.

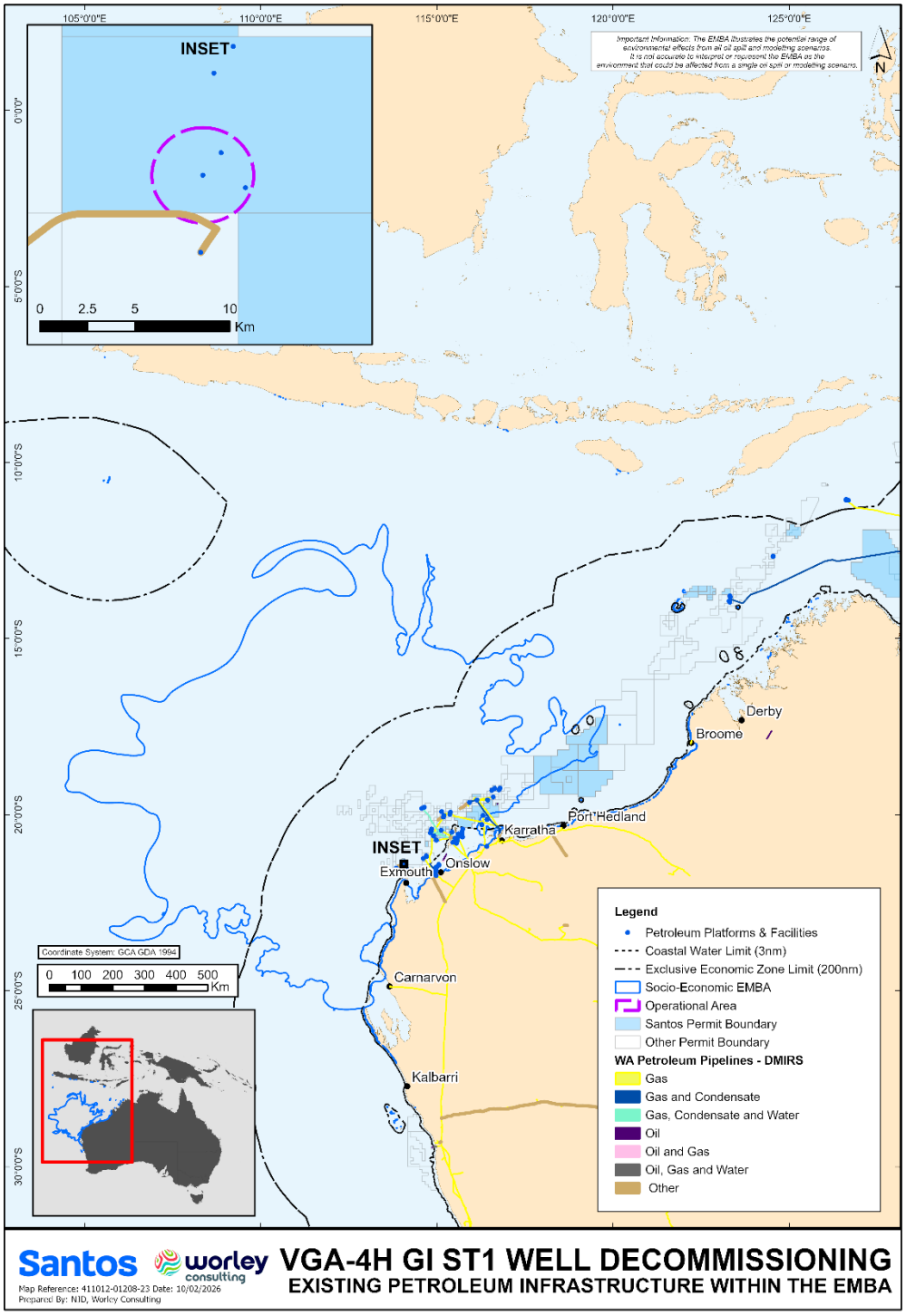

Figure 3-24: Existing petroleum infrastructure within the environment that may be affected

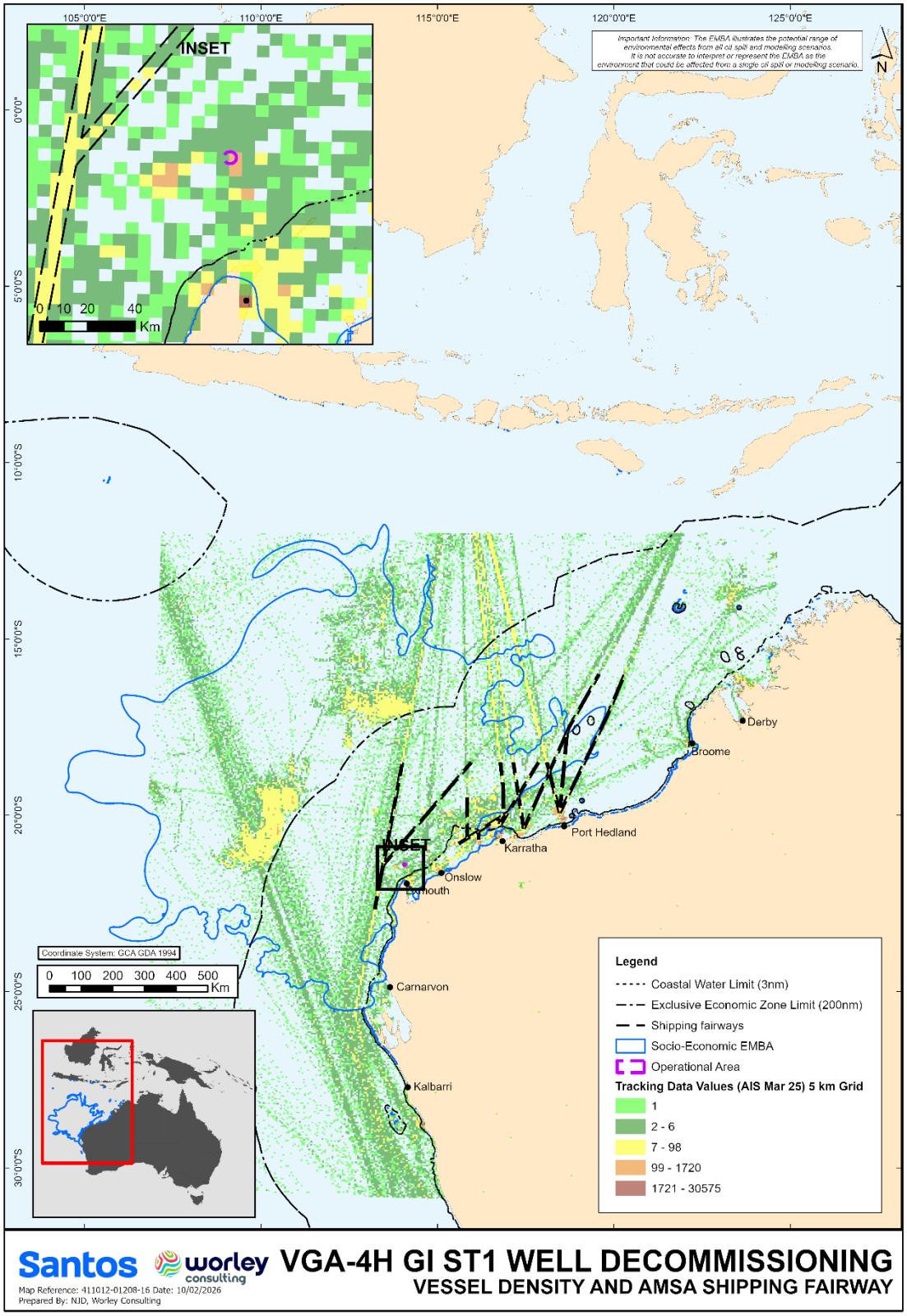

Figure 3-25: Vessel density and shipping fairways within the environment that may be affected

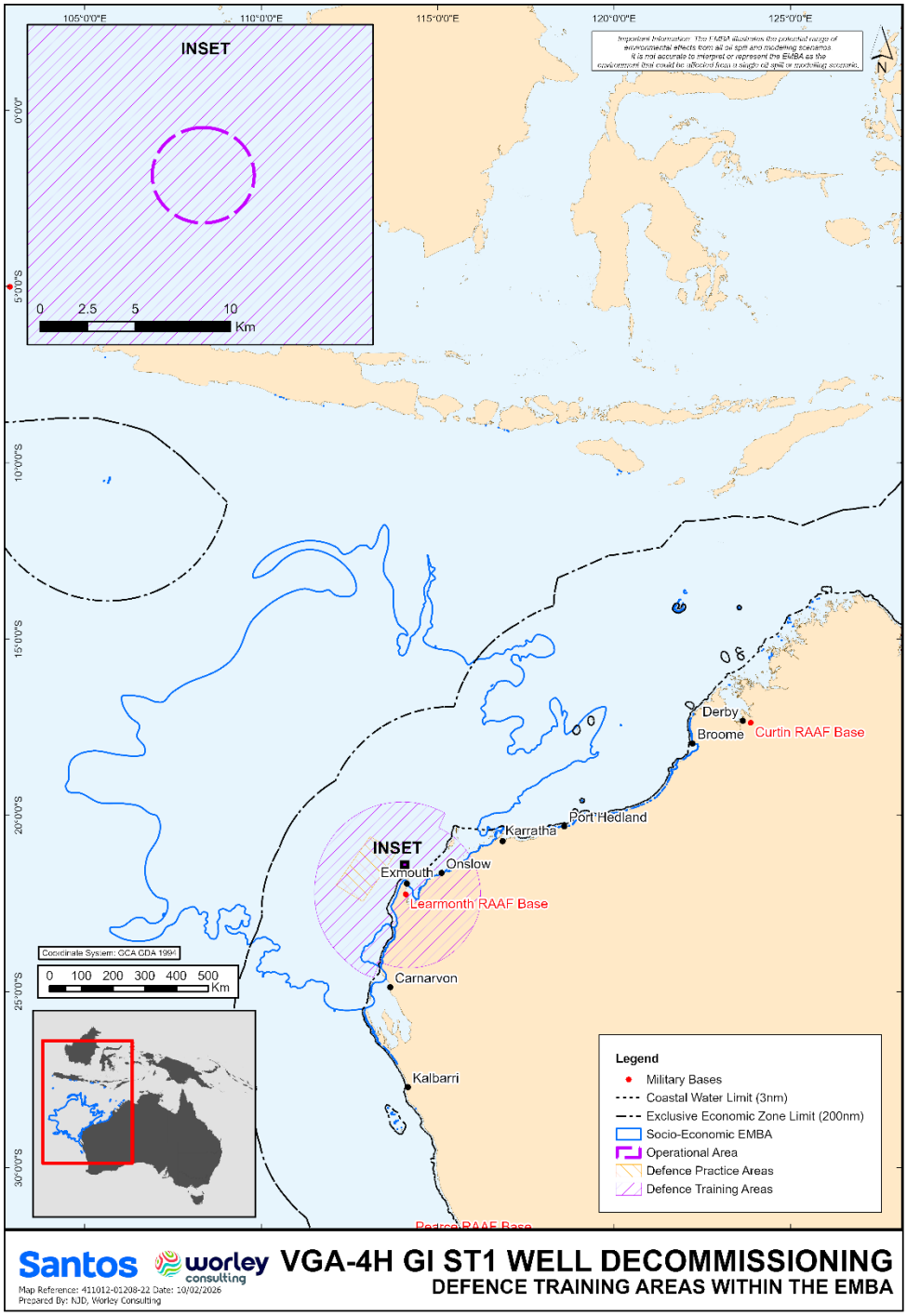

Figure 3-26: Existing defence training and practice areas within the environment that may be affected

Table 3-15: Windows of sensitivity in the vicinity of the environment that may be affected

Categories	Receptors (Critical Life Cycle Stages)	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Physical environment and habitats	Non-coral benthic invertebrates												
	Coral (spawning periods)												
	Macroalgae	growing				shedding fronds				growing			
	Other benthic habitats												
Marine fauna (incl. threatened and migratory species)	**Fish/sharks and fisheries species**												
	Whale sharks			aggregations: Ningaloo Coast									
	Fisheries species spawning/aggregation times[1]												
	Baldchin groper												
	Blacktip shark												
	Crystal crab												
	Goldband snapper												
	King George whiting												
	Pink snapper												
	Rankin cod												
	Red emperor												
	Spangled emperor												
	Sandbar shark												
	Spanish mackerel												
	Marine mammals												
	Dugong (breeding)	breeding								breeding			
	Humpback whale (migration)						northern		southern				
	Blue whale (migration)					northern						southern	
	Marine reptiles												
	Hawksbill turtles resident adult and juveniles[2]	Widespread throughout NWS waters, highest density of adults and juveniles over hard bottom habitat (coral reef, rocky reef, pipelines, etc)											

Categories	Receptors (Critical Life Cycle Stages)	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
	Hawksbill turtle (mating aggregations[2])												
	Hawksbill turtle (nesting and internesting[2])												
	Hawksbill turtle (hatching[1])												
	Flatback turtles (resident adult and juveniles[2])	Widespread throughout NWS waters, increased density over soft bottom habitat 10 – 60 m deep, post hatchling age classes and juveniles spread across shelf waters											
	Flatback turtle (mating aggregations[2])												
	Flatback turtle (nesting and internesting[2])												
	Flatback turtle (hatching[2])												
	Flatback turtle (nesting[2])												
	Green turtles (resident adult and juveniles[2])	Widespread throughout the NWS waters, highest density associated with seagrass beds and macro algae communities, high density juveniles in shallow waters off beaches, amongst mangroves and in creeks											
	Green turtle (mating aggregations[2])												
	Green turtle nesting and internesting[2])												
	Green turtle (hatching[2])												
	Loggerhead turtles (resident adult and juveniles[2])	Widespread throughout the NWS waters, increased density associated with soft bottom habitat supporting their bivalve food source, juveniles associated with nearshore reef habitat											
	Loggerhead turtle (mating aggregations[2])												
	Loggerhead turtle (nesting and internesting[2])												
	Loggerhead turtle (hatching[2])												
	Olive Ridley turtle (nesting)												
	Leatherback turtles	Can occur at low density across the NWS year-round											
	Short-nosed sea snake	Can occur at low density across the NWS year-round											

Categories	Receptors (Critical Life Cycle Stages)	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
	Seabirds												
	Terns, shearwaters, petrels (nesting)												
	Commercial managed fisheries												
	Oil and gas												
	Shipping												
	Tourism and recreational	None applicable											

KEY/NOTES			
	Peak activity, presence reliable and predictable	[1] Information provided from Department of Fisheries consultation
	Lower level of abundance/activity/presence	[2] Information provided by K. Pendoley
	Very low activity/presence	
	Activity can occur throughout year	
	Proposed timing of activity	

4. Stakeholder consultation

4.1 Consultation background

Santos has undertaken consultation with relevant persons (agencies, authorities, organisations or persons as described in section 25(1) of the OPGGS(E)R) for this EP in compliance with OPGGS(E)R consultation requirements, applicable case law and applicable guidance (e.g. NOPSEMA guidance issued in May 2024).

Consultation with relevant persons under section 25 of the OPGGS(E)R commenced in April 2024, building on Santos' long history of consultation in the region to support ongoing production from the Ningaloo Vision FPSO, which commenced operations in 2010.

Most recent relevant consultation was undertaken to support the Ningaloo Vision Cessation of Production and Floating Asset Removal EP, which was accepted in 2024, with cessation of production activities undertaken in Q3 2025.

Santos considers there has been an appropriate level of consultation with relevant persons for this EP, including by way of providing each with sufficient information to allow them to make an informed assessment of the potential consequences of the proposed activities on their functions, interests and activities and by allowing a reasonable period for the consultation.

- **Sufficient information** – For this EP, Santos provided information in different formats and with differing levels of detail including emails; a general fact sheet; online and print advertisements; radio advertisements; social media posts; phone calls; in-person/online consultation meetings using dedicated presentation materials; and provision of information on the Santos Consultation Hub website. At a minimum, all authorities and organisations were provided with a consultation email and a general fact sheet, with the general fact sheet made available at in-person meetings.
- **Reasonable period of time** – For this EP, Santos provided a minimum 30 days from the date of providing consultation information for review and response by relevant persons identified for consultation.
- **Publishing of information –** For this EP, Santos provided statements in its consultation materials and discussed at consultation sessions that relevant persons could request that information they provide not be published and that, if so requested, Santos would ensure information is included in a separate report that is not published on NOPSEMA's website. In support, consultation emails and materials included a reference to the NOPSEMA "Consultation on offshore environment plans" (2023) brochure. Hard copies were also provided at in-person meetings.

A report detailing all consultations with relevant persons, as required by section 24(b) of the OPGGS(E)R, is included at Appendix F. That report includes, among the other content required by the regulations, an assessment of the merits of any objections or claims raised about adverse impacts of the proposed activities.

In accordance with section 22(15) of the OPGGS(E)R, the implementation strategy in Section 8 provides for appropriate consultation with relevant government authorities and other relevant interested persons or organisations over the life of the Activity including the provision of activity notifications requested during consultation or where Santos has standing arrangements. Activity notifications, if required, are included in Table 8-4 and Table 8-6.

Consultation in preparing this EP has been completed and Santos believes it has met the applicable regulatory requirements in respect of consultation.

4.2 Regulatory requirements

Table 4-1 outlines the applicable regulatory requirements for consultation with authorities, persons and organisations for this EP.

Table 4-1: Consultation requirements under the Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2023

OPGGS(E)R 2023 Requirements
Section 28(1)
If NOPSEMA's provisional decision under section 27 is that the environment plan includes material apparently addressing all the provisions of Division 2 (Contents of an environment plan), NOPSEMA must publish on the NOPSEMA's website as soon as practicable: • the plan with the sensitive information part removed • the name of the titleholder who submitted the plan • a description of the activity or stage of the activity to which the plan relates • the location of the activity • a link or other reference to the place where the accepted offshore project proposal (if any) is published • details of the titleholder's nominated liaison for the activity.
Section 25
25(1) In the course of preparing an environment plan (including a revised environment plan referred to in Division 5) a titleholder must consult each of the following (a relevant person): (a) each Commonwealth, State or Northern Territory agency or authority to which the activities to be carried out under the environment plan may be relevant (b) if the plan relates to activities in the offshore area of a State – the Department of the responsible State Minister (c) if the plan relates to activities in the Principal Northern Territory offshore area – the Department of the responsible Northern Territory Minister (d) a person or organisation whose functions, interests or activities may be affected by the activities to be carried out under the environment plan (e) any other person or organisation that the titleholder considers relevant. 25(2) For the purpose of the consultation, the titleholder must give each relevant person sufficient information to allow the relevant person to make an informed assessment of the possible consequences of the activity on the functions, interests or activities of the relevant person. 25(3) The titleholder must allow a relevant person a reasonable period for the consultation. 25(4) The titleholder must tell each relevant person the titleholder consults that: (a) the relevant person may request that particular information the relevant person provides in the consultation not be published (b) information subject to such a request is not to be published under this Part.
Section 22(15)
The implementation strategy must provide for appropriate consultation with: (a) relevant authorities of the Commonwealth, a State or Territory (b) other relevant interested persons or organisations.
Section 24(b)
The environment plan must contain the following: (b) a report on all consultations under section 25 of any relevant person by the titleholder, that contains: I. a summary of each response made by a relevant person II. an assessment of the merits of any objection or claim about the adverse impact of each activity to which the environment plan relates III. a statement of the titleholder's response, or proposed response, if any, to each objection or claim IV. a copy of the full text of any response by a relevant person.

4.3 Government and industry guidance

Santos has considered the following NOPSEMA guidance in developing its consultation activities and approach:

- GL2086 – Consultation in the course of preparing an environment plan (EP Consultation Guideline) (NOPSEMA, 2024a)
- GN1847 – Responding to public comment on Environment Plans (NOPSEMA, 2024b)
- GL1887 – Consultation with Commonwealth agencies with responsibilities in the marine area (NOPSEMA, 2024c)
- GL1721 – Environment plan decision making (NOPSEMA, 2024d)
- GN1344 – Environment plan content requirement (NOPSEMA, 2025b)
- GN1488 – Oil Pollution Risk Management (NOPSEMA, 2025c)
- FM2281 – Titleholder report on consultation in the preparation of an Environment Plan (NOPSEMA, 2025d)
- Petroleum activities and Australian Marine Parks: A guidance note to support environmental protection and effective consultation (Australian Government, 2025). Jointly released by NOPSEMA and Parks Australia.

Santos has also considered other government and industry guidance, including:

- International Standards Organization (ISO)
  - ISO 14001:2015 Environmental Management Systems
- Australian Fisheries Management Authority
  - Petroleum industry consultation with the commercial fishing industry
- Australian Heritage Commission
  - Ask First – A guide to respecting Indigenous heritage places and values
- Commonwealth Department of Agriculture, Fisheries and Forestry
  - Fisheries and the Environment – Offshore Petroleum and Greenhouse Gas Act 2006
  - Offshore Installations Biosecurity Guide
- Commonwealth Department of Climate Change, Energy, the Environment and Water
  - Interim Engaging with First Nations People and Communities on Assessments and Approvals under the *Environment Protection and Biodiversity Conservation Act 1999*
- Commonwealth Ministerial Council on Mineral and Petroleum Resources
  - Principles for Engagement with Communities and Stakeholders
- International Association for Public Participation
  - Quality Assurance Standard for Community and Stakeholder Engagement
- WA Department of Primary Industries and Regional Development
  - Guidance statement for oil and gas industry consultation with the Department of Fisheries
- WA Department of Transport and Major Infrastructure
  - Offshore Petroleum Industry Guidance Note – Marine Oil Pollution: Response and Consultation Arrangements
  - WA Incident Management Plan: Marine Oil Pollution, September 2023
- Western Australian Fishing Industry Council

– Commercial Fishing Consultation Framework for the Offshore Oil and Gas Sector
  - Consultation Approach for Unplanned Events

4.4 Case law and guidance

In addition to considering the regulatory requirements and guidance set out in Sections 4.2 and 4.3 in conducting consultation for the activities covered by this EP, Santos has considered the following judgements, regarding environment plans prepared under the OPGGS(E)R (or its predecessor):

- Tipakalippa v National Offshore Petroleum Safety and Environmental Management Authority (No. 2) [2022] Federal Court of Australia (FCA) 1121
- Santos NA Barossa Pty Ltd v Tipakalippa [2022] Federal Court of Australia – Full Court (FCAFC) 193 (Appeal Judgment)
- Cooper v National Offshore Petroleum Safety and Environmental Management Authority (No 2) [2023] FCA 1158.
- Munkara v Santos NA Barossa Pty Ltd (No 3) [2024] FCA 9.

The EP Consultation Guideline (NOPSEMA, 2024a) provides a summary of the FCAFC's interpretation of "functions", "activities" and "interests" referenced in section 25(1)(d) of the OPGGS(E)R, adopted by NOPSEMA to assist in informing who may be a Relevant Person and how Relevant Persons may be identified, as defined in Table 4-2.

Table 4-2: Relevant person terms and definitions

Term	Definition
Functions	Refers to "a power or duty to do something"
Activities	To be read broadly and is broader than the definition of "activity" in section 5 of the OPGGS(E)R and is likely directed to what the relevant person is already doing
Interests	To be construed as conforming with the accepted concept of "interest" in other areas of public administrative law includes "any interest possessed by an individual whether or not the interest amounts to a legal right or is a proprietary or financial interest or relates to reputation"

Santos has also had regard to the purpose of consultation as outlined in the Appeal Judgment and EP Consultation Guideline, the emphasis that superficial or tokenistic consultation is not sufficient and that:

- consultation must be appropriate and adapted to the nature of each relevant person
- for each relevant person, the appropriate manner and method of consultation (including the nature of information, time periods for consultation and mode of communication) may differ
- there is good reason to adopt pragmatic and practical approaches to consultation conducted in accordance with section 25 of the OPGGS(E)R.

4.5 Santos' consultation methodology

4.5.1 Overview

Santos has a well-established methodology for identifying and determining relevant persons (agency, authority, organisation or person) for consultation.

This methodology draws on Santos' extensive historic consultation, while considering the nature of the activity, the environment in which the activity is being undertaken and the possible impacts and risks of the activity in order to identify relevant persons within the meaning of section 25 of the OPGGS(E)R.

Santos consults to ensure any activity it is proposing under an EP is carried out in a manner:

- consistent with the principles of ecologically sustainable development (ESD) set out in section 3A of the EPBC Act
- by which the environmental impacts and risks of the proposed activity will be reduced as low as reasonably practicable
- by which the environmental impacts and risks of the proposed activity will be of an acceptable level.

The consultation process is designed to assist Santos to further ascertain, understand and assess values and sensitivities of the environment that may be affected by a proposed activity and the potential environmental impacts and risks, through information obtained during consultations.

Such environment (and values and sensitivities thereof) includes:

- ecosystems and their constituent parts, including people and communities
- natural and physical resources
- the qualities and characteristics of locations, places and areas
- the heritage value of places
- the social, economic and cultural features of the aspects mentioned above.

Santos may then refine its proposed control measures to address potential environmental impacts and risks of the proposed activity based on that information or any claims or objections raised through consultation.

Santos' consultation methodology and process adopted in developing this EP comprised the following key steps:

Consultation planning

1. Consider the values and sensitivities of the environment, including its social, economic and cultural features, as described in Section 3.
2. Identify relevant persons for consultation, having regard to the kinds of functions, interests and activities that may be affected by impacts from planned activities and risks of unplanned events, including having regard to historic consultation for other EPs that may be relevant to understanding this. See Table 4-6 and Table 4-7 for a list of authorities, persons and organisations consulted for this EP.
3. Consider the spatial extent of the:
   - Operational Area as defined in Section 2.1.1, and any other areas where environmental impacts occur from planned activities; these impacts are described and evaluated in Section 6
   - EMBA as defined in Section 3.1 and the nature and extent of potential impacts from unplanned events within that area; these potential impacts are described and evaluated in Section 7.
4. Develop consultation materials to support an informed assessment by relevant persons identified for consultation of the possible consequences of the proposed activity on their functions, interests or activities and to outline how to provide input to Santos.
5. Develop a public awareness campaign targeted at coastal communities proximate to the perimeter of the EMBA as described in Section 4.5.3 promote awareness about the proposed activity and publicise consultation opportunities for potentially relevant authorities, persons and organisations.

Consultation

6. Undertake consultation with relevant persons identified for consultation that is appropriate, having regard to the environmental impacts and risks of the proposed activity, is appropriate and adapted to the nature of each authority, person or organisation identified for consultation, and involves providing:
   - sufficient information for the relevant person to make an informed assessment of potential consequences of the proposed activity on their functions, interests or activities.
   - a reasonable timeframe for the relevant person to review, consider, and respond to the information.
7. Provide statements in consultation materials and outlining at consultation sessions that relevant persons could request that information they provide not be published and that, if so requested, Santos would ensure information is included in a separate report that is not published on NOPSEMA's website.
8. Assess the merits of claims or objections made by relevant persons about possible adverse impacts and risks of each activity to which the EP relates and providing responses to queries, requests and feedback, as summarised in Appendix F.
9. Determine what (if any) additional measures are to be taken to bring environmental impacts/risks of the proposed activity to ALARP and acceptable levels.
10. Document and appropriately store the consultation outcomes in Santos' designated central management system.

Environment Plan development

11. Provide in this EP a report on all consultation undertaken under section 25, in accordance with section 24(b) of the OPGGS(E)R. See Appendix F.
12. Update this EP, as required, in light of the consultation described above.

13. Develop a strategy for appropriate consultation with relevant government authorities and other relevant interested persons or organisations over the life of the EP. Refer to the implementation strategy in Section 8.

4.5.2 Consultation planning

Santos has considered NOPSEMA's Guideline, Consultation in the course of preparing an environment plan (May 2024), with respect to identifying relevant persons for consultation and undertaken the following steps in the consultation planning phase.

This guideline affirms the importance of consultation to inform the management of environmental impacts and risks to which the activity and EP relate.

4.5.2.1 Consideration of historic consultation

Santos has a long history of consultation to support operations in the Carnarvon Basin, including developments and decommissioning of assets.

Santos has considered the input received from these historical consultations and other regionally proximate stakeholders in the Carnarvon Basin, or activity analogous consultations in other regions, to inform relevant person categories and their consultation preferences as described in Section 4.5.3 (i.e. how they prefer to be consulted). These historical consultations have demonstrated across these regions that:

- those relevant persons with potentially affected functions, interests or activities at or proximate to the Operational Area are likely to provide feedback on planned activity impacts and risks
- those relevant persons with potentially affected functions, interests or activities more remote from the Operational Area are likely to provide feedback on activity risks only.

A sample of feedback from historic consultation across Santos' operating areas that has been considered when identifying relevant person categories is provided by way of example in Table 4-3, noting that feedback on:

- impacts from planned activities typically relate to physical presence, disturbance to the environment and ecological impacts to protected or totemic species
- potential impacts from unplanned events typically relate to activity notifications in the event of a spill or opportunities to participate in oil spill response, as well as disturbance to the environment and ecological impacts to protected or totemic species.

A sample of the feedback in Table 4-3 has been drawn from regionally proximate and/or analogous proposed activities for published Commonwealth EPs, noting that the extent of relevant person functions, interests and activities are not limited by Commonwealth/State/Territory jurisdiction.

Table 4-3: Historic consultation for Commonwealth environment plans

Relevant Person Category	Feedback	Consultation Example References
Government authorities with responsibilities for protected species and marine and terrestrial park management	Feedback has focused on impacts from planned activities to sensitive receptors, such as BIAs and KEFs. These authorities have also sought to be notified in the event that a spill has potential to impact these receptors.	Refer to DNP for Reindeer Wellhead Platform and Gas Supply Pipeline Operations and Cessation of Production EP in relation to comments provided on the overlap of the activity with a marine park and emergency response notifications. Refer Department of Biodiversity, Conservation and Attractions (DBCA) for the Ningaloo Vision Cessation of Production and Floating Asset Removal EP with reference to petroleum production activities in proximity to ecologically sensitive receptors.

Relevant Person Category	Feedback	Consultation Example References
Government authorities with responsibilities for management of commercial fishing	Feedback has focused on impacts from planned activities, including the physical presence whereby fishers may be displaced from day-to-day activities, or where impacts, such as light and noise, may result in the in the dispersal of target species. These authorities have also sought to be notified in the event that a spill has potential to impact fishers, including ecological impacts to spawning areas and nursery grounds from a spill.	Refer to AFMA for Eos 3D Marine Seismic Survey EP in relation to impacts from planned activities. Refer to DPIRD for Eos 3D Marine Seismic Survey EP in relation to impacts to fishing in the Operational Area and spill contingency planning.
Government authorities with responsibilities management of maritime safety	Feedback has focused on impacts from planned activities, including the physical presence of petroleum activities that may impact maritime safety. These organisations typically have not provided feedback with respect to potential impacts from unplanned events.	Refer to Australian Maritime Safety Authority (AMSA) for the Reindeer Wellhead Platform and Gas Supply Pipeline Operations and Cessation of Production EP in relation to impacts to commercial shipping from planned activities.
Government authorities with responsibilities management of submerged cultural heritage	Feedback has focused on physical impacts to places of cultural significance.	Refer to DCCEEW for the Barossa Production Operations EP in relation to *Underwater Cultural Heritage Act 2018* protections, key responsibilities and obligations, management considerations and recommendations in Operational Area. Refer to Department of Planning, Lands and Heritage for the Halyard-2 Drilling & Completions EP in relation to Operational Area overlap with registered sites in the Aboriginal Cultural Heritage Directory. Refer to WA Museum for the Halyard-2 Drilling & Completions EP in relation to identifying and managing impacts and risks to Aboriginal and non-Aboriginal underwater cultural heritage within the Operational Area.
Energy industry organisations	Feedback has focused on physical impacts to other operator infrastructure due to the physical presence of proposed Santos activities. These organisations typically have not provided feedback with respect to potential impacts from unplanned events.	Refer to Chevron for Halyard-2 Drilling and Completions EP (Cth) in relation to potential impacts to Chevon assets resulting from operational activities.
Environmental conservation organisations	Feedback has focused on ecological impacts to protected species and climate change matters. These organisations have requested to be notified of when activities are initiated and/or completed.	Refer Exmouth Community Liaison Group for Ningaloo Vision Cessation of Production and Floating Asset Removal EP in relation to collapse of a production flowline and the potential for a release of hydrocarbons to the environment. Refer to Care for Hedland for Halyard-2 Drilling & Completions EP in relation to be sent activity notifications.

Relevant Person Category	Feedback	Consultation Example References
First Nations people and organisations	Feedback from First Nations people and organisations has focused on ecological impacts from planned activities to totemic species, such as turtles and whales. Feedback from these organisations has also focused on the potential impacts from unplanned events to inshore/coastal cultural heritage (registered sites and places of importance). Importantly, these groups sought opportunities to support spill response efforts. Feedback from these organisations has also focused on potential impact to intangible cultural features where new infrastructure has been proposed or due to the presence of equipment. Potential impacts to intangibles have not been a focus in WA for Santos where proposed activities have to date been temporary (e.g. short-duration exploration activities) or associated with existing operations or the removal of infrastructure for proposed decommissioning.	Refer to First Nations people and groups for the Barossa Production Operations EP in relation to impacts from planned activities to turtles, whales and dugongs. Refer to Wanparta Aboriginal Corporation for the Halyard-2 Drilling & Completions EP in relation to the protection of places of importance in the event of a spill and opportunities for Wanparta rangers to support spill response Refer to Kariyarra Aboriginal Corporation for the Bedout Multi-Well Exploration and Appraisal Drilling EP in relation to the protection of places of importance in the event of a spill. Refer to feedback from Tiwi clans and people about 'intangible cultural features' in relation to construction of infrastructure and the presence of equipment for the Barossa Gas Project.
Local government authorities	Feedback has focused on local business opportunities where these authorities are proximate to the Operational Area. Feedback has focused potential impacts from unplanned events where these authorities are remote to the Operational Area.	Refer to Town of Port Hedland for the Bedout Multi-Well Exploration and Appraisal Drilling EP with respect to impacts to town infrastructure and community economic wellbeing. Refer to Shire of Manjimup for the Halyard-2 Drilling & Completions EP in relation to potential impacts from a spill event.
Marine and/or coastal tourism organisations – e.g. dive charter, fishing charter, whale watching tours.	These organisations typically have provided feedback with respect to impacts from planned activities where the activity is proximate. These organisations typically have not provided feedback with respect to potential impacts from unplanned events.	Refer to Equinox Fishing Charters in the Barossa Production Operations EP in relation to potential impacts on fishing. Refer to Fish the Top End Fishing Charters in the Barossa Production Operations EP in relation to not having feedback on the environment plan as it did not affect their functions, interests or activities.
Recreational and community organisations	Feedback from recreational fishing industry representative organisations has focused on ecological impacts to target species from activity impacts, with requests for as well as ecological impacts from a spill. These organisations have also requested Santos to directly consult recreational clubs most proximate to the Operational Area.	Refer to Recfishwest for the WA-20-L EP in relation organisation advice to consult recreational fishing clubs most proximate to proposed activities. Refer to Margaret River Chamber of Commerce and Industry for the Mutineer Exeter Plug and Abandonment EP in relation to how the WA southwest could be affected by proposed activities.
Research organisations	Feedback from research organisations has focused on physical presence and on-water interactions. These organisations typically have not provided feedback with respect to potential impacts from unplanned events.	Refer to Australian Marine Sciences Association Northern Territory for the Barossa Production Operations EP in relation to feedback on ensuring surveys are held to protect BIAs.

4.5.2.2 Consideration of the Operational Area and environment that may be affected

In terms of geographical extent, impacts from planned activities are generally limited to the Operational Area except in that lighting impacts can extend to areas beyond the Operational Area, but still within a 20 km buffer zone (Section 6.2).

Risks from unplanned events may be expected to extend beyond this, to other areas of the EMBA, as described in Section 3.1.

Santos notes that there is significant conservatism associated with the spill modelling that has been primarily used to inform Santos' preparedness for potential spill response and does not consider the suite of mitigations described in the OPEP that would be implemented and reduce the EMBA extent in the unlikely event of a spill.

Santos, therefore, has considered the geographical extent of the EMBA to assist in identify whether an activity may be relevant to authorities, and to assist in identifying who are relevant persons that may be affected by the activity as described in Section 2 of this EP.

Where Santos identified a relevant agency or authority or a person or organisation with functions, interests or activities within the EMBA that may be affected by the activity, Santos has consulted that relevant person for the purposes of section 25 of the OPGGS(E)R.

This planning approach is further supported by learnings from historical consultation undertaken by Santos (described in Section 4.5.2.1) for other EPs, which has shown the main interest from relevant persons have generally been limited to the following:

Impacts from activities

This includes impacts to environmental values and sensitivities that intersect the Operational Area, as well as potential on-water interactions with other marine users (the presence of vessels) undertaking petroleum activities.

First Nations people and groups have also consistently expressed interest in impacts from planned activities (e.g. noise, light, vessel or infrastructure presence) on tangible cultural features (e.g. totemic species) and intangible features.

Risks from unplanned events

Where relevant persons have been interested in activity risks, specifically in relation to spills from unplanned events, Santos' experience is that the interest from authorities, persons and organisations has generally been limited to:

- potential ecological impacts to:
  - fish and other species targeted by commercial and recreational fishers
  - protected marine species of interest to government agencies, and academic and research organisations
  - protected areas of interest to government agencies, communities and environmental conservation groups
  - totemic marine species of cultural importance to First Nations peoples
- the protection of areas of cultural importance, most noticeably those areas where impacts may result from shoreline hydrocarbon contact.

As such this historical consultation has informed the fact that potential impacts from surface and dissolved hydrocarbons as well as shoreline accumulation of hydrocarbons, need to be considered when identifying relevant persons, and the EMBA (as described in 3.1.1) is the geographical extent of these using low thresholds.

In addition, our approach to determine who maybe a relevant person for the purpose of consultation for this EP has also considered:

- NOPSEMA guidance with respect to considering and consulting (for the purpose of sections 25(1)(a) and (b) of the OPGGS(E)R):
  - each Commonwealth and WA Government agency or authority to which the activities to be carried out under the EP may be relevant
  - the Department of the responsible WA Government Minister
- NOPSEMA guidance with respect to considering and consulting (for the purpose of section 25(1)(d)) persons or organisations whose functions, interests or activities may be affected by the activities to be carried out under the EP

- potentially relevant persons who have self-identified, as supported by our public awareness campaign outlined below.

Santos has considered this guidance and reviewed values and sensitivities of the environment, including its social, economic and cultural features, as described in Section 3.2 and mapped these values and sensitivities to:

- government departments or agencies who have authorities or responsibilities with respect to the proposed activity or the values and sensitivities present in the EMBA, such as regulation and management of commercial fisheries, marine parks, maritime safety and defence activities
- persons and organisations (inclusive of representative organisations) who have authorisations to undertake certain activities or have other activities, functions or interests within the Operational Area and the EMBA, such as First Nations people and organisations, commercial fishers, recreational fishing organisations, other recreational, community and infrastructure organisations, and other affected businesses.

Actions undertaken in the mapping review are described in Table 4-4.

Table 4-4: Actions to identify authorities, persons and organisations for consultation

Categories of Authorities	Actions to Identify Authorities, Persons and Organisations for Consultation
Department or agencies of the Commonwealth	Review of the geographical extent of impacts and risks to environmental, social, economic and cultural values and sensitivities. Review of government agency websites and directories to understand agency roles, functions and responsibilities. Review of government department and agency guidance on consultation expectations.
Department or agencies of Western Australia	Review of the geographical extent of impacts and risks to environmental, social, economic and cultural values and sensitivities. Review of government agency websites and directories to understand agency roles, functions and responsibilities. Review of government department and agency guidance on consultation expectations.
Commercial fishing organisations	Review of the spatial overlap of the Operational Area and EMBA with Commonwealth and WA Government commercial fisheries. Review of Commonwealth and WA Government commercial fishing catch and effort data.
Energy industry organisations Offshore petroleum Electricity generation (renewables) Carbon capture and storage	Review of the spatial overlap of the Operational Area and EMBA with petroleum, GHG and any other National Offshore Petroleum Titles Administrator issued titles.
First Nations people and organisations	Review of the spatial overlap and proximity of the Operational Area and EMBA with: • native title determined areas and claims • ILUAs • land rights and IPAs. Review of the spatial overlap and proximity of the Operational Area and EMBA to Representative Aboriginal/Torres Strait Island Bodies Areas. Review of the spatial overlap and proximity of the Operational Area and EMBA with registered sites of cultural heritage. Review of marine park management plans relevant to the Operational Area and EMBA. Further details on activities to identify First Nations people and groups is described in Section 4.5.2.4.
Infrastructure organisations	Review of the spatial overlap of the Operational Area and EMBA with offshore and onshore infrastructure, such as submarine telecommunications cables.
International persons	Review of the spatial overlap of the Operational Area and EMBA international marine and terrestrial interests. Further details on activities to identify international persons is described in Section 4.5.2.5.
Local government authorities	Review of the spatial overlap of the Operational Area and EMBA with boundaries of local government areas.
Maritime safety organisations and port authorities	Review of the spatial overlap of the Operational Area and EMBA with offshore maritime areas, such as shipping fairways, and nearshore maritime areas, such as port jurisdictions.

The above was supplemented by online searches used to identify relevant persons in the following category groups who may have functions, interests or activities that may be affected by the proposed activity in the Operational Area or the broader EMBA:

- academic organisations
- research organisations
- environmental conservation organisations
- marine and/or coastal tourism organisations – e.g. dive charter, fishing charter, whale watching tours
- recreational and community organisations – i.e. recreational fishing clubs, representative community organisations with a consultative role (e.g. Energy Operators Exmouth Community Liaison Group).

For all category groups Santos also reviewed the following to further inform its identification of authorities, persons and organisations for consultation in the course of preparing this EP:

- published NOPSEMA and industry guidance relevant to consultation as described in Section 4.3
- publicly available EPs submitted by other titleholders that may be relevant to proposed activities to be managed under this EP.

During the consultation period, Santos also asked identified authorities, persons and organisations if there were other authorities, persons or organisations who may need to be consulted.

Lists of authorities, persons and organisations consulted for this EP is included in Table 4-7.

4.5.2.3 Public awareness campaign

In addition to undertaking the process for identification of authorities, persons and organisations for consultation, as described above, Santos undertook a range of activities to promote opportunities for potential authorities, persons and organisations to self-identify for consultation if they felt that their functions, interests or activities may be affected by the proposed activity. This approach has ensured a broad capture of potential relevant persons and provided them an opportunity to provide input if they feel their functions, interests or activities may be impacted.

These promotional activities include public information campaigns using a range of delivery methods, including radio advertising, print advertising and targeted social media with links (where appropriate) to provide information about the proposed activity and its potential environmental risks and impacts.

Details of the public information campaign for this EP, including targeted efforts to provide First Nations organisations and individuals the same opportunities, is included in Table 4-5.

Such activities and information sharing provided a more than reasonable opportunity for organisations and individuals to self-identify for the purpose of OPGGS(E)R consultation, where they consider themselves to have interests or activities that may be affected by the proposed activities and to provide input.

Santos' consultation process involves the provision of reasonable timeframes for the self-identification or nomination of others for consultation, to consider consultation information, ask questions and give input and for Santos to consider and assess the merits of any objections and claims.

For this EP, no authorities, persons or organisations self-identified for consultation.

Table 4-5: Summary of public awareness campaign

Publication Date	Media Outlet	Towns/Communities Distribution Area	Reach
Social media			
12 October to 8 November 2025	Facebook, Instagram and Messenger	Geotargeted PPL18+ Carnarvon, Exmouth, Onslow, Karratha, Port Hedland, Broome	N/A
Radio advertising and social media			
12 October to 8 November 2025	Karratha HIT 106.5	Karratha towns and communities, focusing on remote communities	N/A
12 October to 8 November 2025	WA Remote HIT WA FM	WA remote towns and communities	N/A
12 October to 8 November 2025	Broome HIT 101.3	Broome towns and communities, focusing on remote communities	N/A
12 October to 8 November 2025	Port Hedland | HIT 91.7	Port Hedland towns and communities, focusing on remote communities	N/A
12 October to 8 November 2025	Geraldton | HIT 96.5 FM	Geraldton towns and communities, focusing on remote communities	N/A
12 October to 8 November 2025	Broome to Geraldton Aboriginal Media Radio	Broome to Geraldton towns and communities, focusing on remote communities	N/A
Print advertising			
15 October 2025	Pilbara News	Dampier, Exmouth, Karratha, Onslow and Port Hedland areas Half page, page 4	Targeted WA with reach of 17,611
15 October 2025	North West Telegraph	Port Hedland area Half page, page 10	Targeted WA with reach of 8,154
15 October 2025	Midwest Times	Mid West region of WA – Jurien Bay to Meekatharra and Kalbarri Half page, page 14	Targeted WA with reach of 50,534
16 October 2025	Broome Advertiser	Boome and Derby areas Half page, page 6	Targeted WA with reach of 14,474
16 October 2025	The West Australian	Statewide area Half page, page 7	Targeted WA with reach of 359,000

4.5.2.4 Identification and consultation with First Nations people and groups

Santos acknowledges the tradition of First Nations people of Australia includes a cultural and spiritual connection to their land and waters and that communal cultural interests, including Sea Country interests, could extend into the EMBA, and as such the above identification steps considers the potential for Sea Country.

As part of the identification steps set out above, Santos has developed a comprehensive and adaptive process for identifying and undertaking effective consultation with First Nations relevant persons.

As with Santos' process for identifying relevant persons and organisations generally, this is an iterative process with multiple avenues of enquiry including the information review steps described in Table 4-4 as well as, but not limited to, the following actions:

- Identify First Nations relevant persons and organisations, whose functions, interests and activities are in areas where they may be affected by the proposed activity and providing opportunities to provide input in EP development. These organisations include:
  - Registered Native Title Prescribed Bodies Corporate (PBCs) associated with native title determinations
  - native title claim groups

  - Native Title Representative Bodies in their own capacity, as well as in their capacity where PBCs have nominated them as their preferred contact for consultation
  - PBCs or groups who may be parties to relevant IPAs, or named in ILUAs
  - existing relevant liaison committees or reference groups, where these committees or groups have been established between native title parties, Native Title Representative Bodies and industry/government
  - other representative First Nations organisations
  - individual First Nations people or organisations who self-identify as relevant persons or organisations (if any).
- Ask identified persons and organisations (including relevant Native Title Representative Bodies and land councils) if there are other persons or organisations who ought to be considered for consultation.
- Advertise broadly to ensure relevant persons and organisations that are not otherwise identified by Santos are given the opportunity to self-identify.

The above has included Santos providing consultation opportunities to Native Title Representative Bodies and PBCs noting that they are well placed to represent certain native title holders and provide relevant input, noting their responsibilities under the *Native Title Act 1993* (Cth) for representing native title holders whose rights and interests in respect of traditional land and waters have been recognised under Australian law and that the vast majority of the Western Australian coastline is settled under the native title regime.

Further, native title holders may decide that they also wish their PBC to engage in a broader range of activities, not directly related to the management of native title, such as social and economic development for their communities. As such, PBCs are the first point of contact for government and other parties wishing to undertake activities that have implications for recognised traditional lands and waters.

This means that the process for consultation in Western Australia places greater emphasis on, but is not limited to, Native Title Representative Bodies and PBCs.

Santos recognises that Native Title Representative Bodies and PBCs are bound by the traditional laws and customs of the native title group they represent. This includes, among other things, in respect of management and protection of cultural values.

In addition to the above and feedback from historical consultations, since mid-2023 Santos has been actively working with Native Title Representative Bodies and PBCs to confirm it is appropriate to consult with them on behalf on Traditional Owners and other First Nations individuals and understand their preference on how to consult. For PBCs this typically occurs at PBC Board level, in recognition of the role that elected Board Directors have in representing the native title holders.

This includes establishing and maintaining consultation agreements (which we complied with) to support ongoing, regular and effective consultation and engagement activities. These consultation agreements generally also outline the process to determine the need for community meetings to provide additional information to individuals.

For this EP, after applying the above processes, Santos has provided consultation opportunities and supporting information to First Nations relevant persons (i.e. authorities, persons and organisations) for the purpose of assisting to identify and appropriately consulting with relevant authorities and relevant persons and organisations.

This conservative approach has ensured a very broad capture of relevant persons for consultation and provided them an opportunity to provide input if they feel they may be impacted.

In addition, consultation with First Nations relevant persons and organisations on this EP has been actioned by Santos sending emails to PBCs and Native Title Representative Bodies to forward the consultation information and invitations to consult with their communities and members. For reference:

- Kimberley Land Council is the Native Title Representative Body for the Kimberley Native Title Representative Body Area and is mandated to assist native title claimants and holders. From its website, the Kimberley Land Council works with Aboriginal people of the Kimberley to secure native title, conduct conservation and land management activities and develop cultural business enterprises.
- Yamatji Marlpa Aboriginal Corporation is the Native Title Representative Body for the Geraldton (Yamatji) and Pilbara Native Title Representative Body Areas. From its website, the Yamatji Marlpa Aboriginal Corporation services include native title claim and future act representation; heritage services; executive office, community, and economic development assistance; land administration, and natural resource management support.

Based on Santos' consultation experience, the likelihood of First Nations people having Sea Country or other interests (or activities or functions) that may be affected by the proposed Activities becomes increasingly unlikely with increasing distance from the Operational Area, given the remote possibility of any major unplanned spill event, and the inherent conservatism of modelling from which the EMBA is determined. Santos applies this experience to identification of First Nations relevant persons and organisations with respect to people or groups named in marine park management plans.

As a result we have consulted with First Nations relevant persons and organisations where the areas in respect of which they have functions, interests or activities are understood to be in or proximal to the EMBA, but we have not consulted with First Nations relevant persons and organisations where the areas in respect of which they have functions, interests or activities are understood to remote from where the EMBA intersects.

It is on this basis that some groups referenced in Section 3.2.7.1 as being mentioned in marine park management plans, but have not been consulted for this EP, while others have. For example, the EMBA overlaps the Dampier Australian Marine Park. The management plan for this park refers to the Ngarluma, Yindjibarndi, Yaburara and Mardudhunera people as having Sea Country interests within the park. The management plan does not provide detail on where these interests are within the park, which covers an area of more than 1,250 m². Santos then reviewed the published interests of these groups to understand interests within or proximate to the EMBA as a basis for consultation. Those groups consulted are included in Table 4-6, noting the groups' preferred organisation for consultation. Notwithstanding this assessment, Santos' approach was supplemented by its broad-reaching promotional campaign, which also extended to remote areas.

4.5.2.5 Identification and consultation with international persons

With regard to the location of the proposed activities, there are no impacts from planned activities that may affect the functions, interests or activities of international authorities, persons and organisations (see map of Operational Area in Figure 1-1.

However, the worst-case credible spill scenario modelled for this EP indicates a possibility international waters could be in contact with residual entrained or floating hydrocarbons. The modelling indicates overlap with international waters at the outer extremities of the EMBA (see map of EMBA in Figure 3-1).

As stated in Section 4.5.2.1, there is significant conservatism associated with the spill modelling and it does not take into account the suite of mitigations described in the OPEP that would be implemented and reduce the EMBA extent in the unlikely event of a spill.

Therefore, no international relevant authorities or relevant persons or organisations have been identified for consultation.

Notwithstanding this, Santos has consulted the Department of Foreign Affairs and Trade (DFAT) which has a function in coordinating and facilitating communication between Australia and international governments to invite any relevant input that DFAT might have.

4.5.2.6 Authorities, persons and organisations consulted

Santos developed a preliminary list of relevant persons for consultation as result of activities outlined in Sections 4.5.2.1 and 4.5.2.2.

No relevant persons self-identified as a result of the public awareness campaign as described in Section 4.5.2.3.

The final list of Commonwealth and Western Australian authorities consulted for this EP as determined by application of the above described process is included in Table 4-6 and the final list of persons and organisations consulted for this EP is included in

Table 4-7.

Table 4-6: Authorities consulted for this Environment Plan

Department or Agency	Authority Description
Commonwealth	
Australian Border Force	Australian Border Force is a Commonwealth Government agency responsible for regulating communications and media services across Australia.
Australian Communications and Media Authority	Australian Communications and Media Authority is a Commonwealth Government agency that regulates communications and media services in Australia.

Department or Agency	Authority Description
Australian Fisheries Management Authority	Australian Fisheries Management Authority is a Commonwealth Government agency responsible for the efficient management and sustainable use of Commonwealth fish resources.
Australian Hydrographic Office	Australian Hydrographic Office is a Commonwealth Government agency supporting safe maritime navigation.
Australian Institute of Marine Science	Australian Institute of Marine Science is a Commonwealth Government agency that leads tropical marine research, delivering innovative insights and solutions for Australia's vast and diverse marine ecosystems.
Australian Maritime Safety Authority – marine pollution	Australian Maritime Safety Authority – marine pollution is a Commonwealth Government agency oversees maritime safety, vessel emergencies, and marine pollution prevention in Australian waters.
Australian Maritime Safety Authority – maritime safety	Australian Maritime Safety Authority – maritime safety is a Commonwealth Government agency is responsible for maritime safety, vessel emergencies, and preventing ship-sourced pollution in Commonwealth waters.
Department of Agriculture, Fisheries and Forestry – Biosecurity marine pests	Department of Agriculture, Fisheries and Forestry – Biosecurity is a Commonwealth Government agency leads a National System with governments, industries, and scientists to prevent, manage, and minimise the impact of marine pests in Australia.
Department of Agriculture, Fisheries and Forestry – Fisheries Division	Department of Agriculture, Fisheries and Forestry – Fisheries Division is a Commonwealth Government agency coordinates with governments, industry, scientists, and stakeholders to sustainably manage Australia's fisheries through regulations and catch limits.
Department of Climate Change, Energy, the Environment and Water – Director of National Parks	Department of Climate Change, Energy, the Environment and Water – Director of National Parks is a Commonwealth Government agency was established under the EPBC Act to manage Commonwealth reserves, often with Indigenous Boards and Advisory Committees, to guide protected area policies and priorities.
Department of Climate Change, Energy, the Environment and Water – Underwater Cultural Heritage	Department of Climate Change, Energy, the Environment and Water – Underwater Cultural Heritage is a Commonwealth Government agency protects Australia's natural environment and heritage, addresses climate change, manages resources, and administers the *Underwater Cultural Heritage Act*.
Department of Defence (DoD)	Department of Defence is a Commonwealth Government agency safeguards Australia's national interests, security, and stability by managing the military forces and coordinating defence policies and operations.
Department of Foreign Affairs and Trade	Department of Foreign Affairs and Trade is a Commonwealth Government agency advances Australia's security and prosperity by fostering international partnerships, trade, stability, and support for Australians abroad.
Department of Industry, Science and Resources	Department of Industry, Science and Resources is a Commonwealth Government agency drives innovation, industry growth, and investment while regulating mineral and energy resources in Australia.
Department of Infrastructure, Transport, Regional Development, Communications and the Arts	Department of Infrastructure, Transport, Regional Development, Communications and the Arts administers the Indian Ocean Territories of the Commonwealth Government including responsibility for managing fisheries within 12 nm of Christmas Island.
Fisheries Research and Development Corporation	Fisheries Research Development Corporation is a Commonwealth Government agency that funds research and innovation to enhance the sustainability, productivity, and profitability of Australia's fisheries in collaboration with government and industry.
Regional Development Australia – Kimberley	Regional Development Australia – Kimberley is a WA State Government agency that is a collection of local leaders collaborating to enhance the Kimberley region, reporting to the Commonwealth Minister.
Regional Development Australia – Mid West Gascoyne	Regional Development Australia – Mid West Gascoyne is a WA State Government agency that is a collection of local leaders collaborating to enhance the Mid-West and Gascoyne regions, reporting to the Commonwealth Minister.
Regional Development Australia – Pilbara	Regional Development Australia – Pilbara is a WA State Government agency that works to develop the Ashburton, East Pilbara, Karratha, and Port Hedland areas, reporting to the Commonwealth Minister.

Department or Agency	Authority Description
Western Australia	
Department of Biodiversity, Conservation and Attractions	Department of Biodiversity, Conservation and Attractions is a WA Government agency manages State marine parks, reserves, and protected marine wildlife in Western Australia.
Department of Creative Industries, Tourism and Sport	The Department of Creative Industries, Tourism and Sport supports is a WA Government agency that promotes Western Australia as a holiday destination.
Department of Mines, Petroleum and Exploration	The Department of Mines, Petroleum and Exploration is a WA Government agency responsible for regulating and managing the state's energy, mining, and industrial sectors,
Department of Planning, Lands and Heritage	Department of Planning, Lands and Heritage is a WA Government agency that manages land use, heritage, and Aboriginal affairs within Western Australia.
Department of Primary Industries and Regional Development	Department of Primary Industries and Regional Development – Fisheries is a WA Government agency that regulates and advances agriculture, fisheries, and regional development in Western Australia.
Department of Transport and Major Infrastructure – Marine pollution	Department of Transport and Major Infrastructure – marine pollution is a WA Government agency that manages commercial vessel movements and leads marine pollution emergency responses in WA state waters.
Gascoyne Development Commission	Gascoyne Development Commission is a WA Government agency that facilitates and monitors economic and social development in the Gascoyne region of Western Australia.
Kimberley Development Commission	Kimberley Development Commission is a WA Government agency that focuses on the economic and social development of the Kimberley region.
Ningaloo Coast World Heritage Advisory Committee	Ningaloo Coast World Heritage Advisory Committee is a WA Government agency that advises governments on protecting and managing the World Heritage values of the Ningaloo Coast.
Pilbara Development Commission	Pilbara Development Commission is a WA Government agency that focuses on the economic and social development of the Gascoyne region.
Shark Bay World Heritage Advisory Committee	Shark Bay World Heritage Advisory Committee is a WA Government agency advising federal and state environment ministers on protecting and managing Shark Bay's World Heritage values.
Western Australian Museum	Western Australian Museum is a WA Government agency that maintains a database of shipwrecks along the WA coast.

Table 4-7: Persons or organisations consulted for this Environment Plan

Organisation	Description
Academic organisations	
Curtin University Centre for Marine Science and Technology	Curtin University (Centre or Marine Science and Technology) is an academic research organisation.
Edith Cowan University	Edith Cowan University is an academic research organisation.
James Cook University	James Cook University is an academic research organisation.
Murdoch University	Murdoch University is an academic research organisation.
University of Western Australia Oceans Institute	University of Western Australia Oceans Institute is an academic research organisation.
Research organisations	
Australian Institute of Marine Science – WA Branch	The Australian Marine Sciences Association is a research organisation promoting marine science across Australia.
Commonwealth Scientific and Industrial Research Organisation – Australian Capital Territory (ACT) Corporate Headquarters	The Commonwealth Scientific and Industrial Research Organisation is Australia's national science agency.

Organisation	Description
Dampier Archipelago Environmental Advisory Group	The Dampier Archipelago Environmental Advisory Group is a research organisation focused on the conservation and management of the Dampier Archipelago.
Exmouth Gulf Taskforce	The Exmouth Gulf Taskforce is a research organisation that advises the Environment Minister on managing the region's environmental, cultural, and social values, partnering with Traditional Owners.
Kimberley Marine Research Station	The Kimberley Marine Research Station is established by the Cygnet Bay Pearl Farm to facilitate independent marine research in the Kimberley.
Roebuck Bay Working Group	Roebuck Bay Working Group is a citizen science group that oversees participation in local research projects to monitor shorebirds, seagrass, nesting turtles, mud invertebrates, nearshore dolphins and marine debris.
Shark Bay Dolphin Project	Shark Bay Dolphin Project is a research organisation.
The Pew Charitable Trusts	The Pew Charitable Trusts is an environmental organisation dedicated to the research and conservation of lands and oceans globally.
Western Australian Coastal and Marine Network	The Western Australian Coastal and Marine Network is a research organisation focusing on enhancing the health and sustainability of WA's coastal and marine environments.
Western Australian Marine Science Institution	The Western Australian Marine Science Institution is a leading independent research organisation delivering large-scale, long-term marine studies on WA's marine estate through collaboration with government, industry, and academia.
Commercial fisheries	
Commonwealth fisheries	
Western Australian Marine Science Institution	The Western Australian Marine Science Institution is a leading independent research organisation delivering large-scale, long-term marine studies on WA's marine estate through collaboration with government, industry, and academia.
North West Slope Trawl Fishery	The North West Slope Trawl Fishery is a Commonwealth commercial fishery.
Southern Bluefin Tuna Fishery	The Southern Bluefin Tuna Fishery is a Commonwealth commercial fishery.
Western Deepwater Trawl Fishery	The Western Deepwater Trawl Fishery is a Commonwealth commercial fishery.
Western Skipjack Tuna Fishery	The Western Skipjack Tuna Fishery Management Advisory Committee is a Commonwealth commercial fishery.
Western Tuna and Billfish Fishery	The Western Tuna and Billfish Fishery is a Commonwealth commercial fishery.
Commonwealth fisheries that spatially overlap the EMBA are described in Section 3.2.7.3 Of these, none have been active in the Operational Area In line with consultation preferences previously advised consultation has been undertaken with relevant government authorities and commercial fishing representative organisations acknowledging the potential impact to all identified fisheries in the unlikely event of a spill	Commonwealth fishery government authorities and representative organisations are listed elsewhere in this table.
WA fisheries	
WA fisheries that spatially overlap the EMBA are described in Section 3.2.7.3 Of these, none have been active in the Operational Area In line with consultation preferences previously advised consultation has been undertaken with licence holders in these fisheries who may	WA fishery government authorities and representative organisations are listed elsewhere in this table.

Organisation	Description
be affected by impacts from planned activities Santos has also consulted relevant government authorities and commercial fishing representative organisations acknowledging the potential impact to all identified fisheries in the unlikely event of a spill	
Energy industry organisations	
InCapture P/L	InCapture is a Greenhouse Gas Licence holder.
Chevron Australia	Chevron Australia is an energy industry titleholder/licence holder.
Woodside Energy Group Ltd	Woodside Energy Group Ltd is an energy industry titleholder/licence holder.
Beagle No.1 Pty Ltd	Beagle No. 1 Pty Ltd is an energy industry titleholder.
BP Developments Australia	BP Developments Australia is an energy industry titleholder.
ExxonMobil	ExxonMobil is an energy industry titleholder.
Finder Energy Holdings Ltd	Finder Energy Holdings Ltd is an energy industry titleholder.
Jadestone Energy (Australia) Pty Ltd	Jadestone Energy (Australia) Pty Ltd is an energy industry titleholder.
KATO Energy	KATO Energy is an energy industry titleholder.
KUFPEC Australia Pty Ltd	KUFPEC Australia Pty Ltd is an energy industry titleholder.
Melbana Energy Ltd	Melbana Energy Ltd is an energy industry titleholder.
Pathfinder Energy Pty Ltd	Pathfinder Energy Pty Ltd is an energy industry titleholder.
Western Gas Pty Ltd	Western Gas Pty Ltd is an energy industry titleholder.
Environmental (non-government) conservation organisation	
Australian Conservation Foundation	The Australian Conservation Foundation is a non-government environmental conservation organisation.
Australian Marine Conservation Society	The Australian Marine Conservation Society is a non-government environmental conservation organisation.
Cape Conservation Group	The Cape Conservation Group is a non-government environmental conservation organisation.
Care for Hedland Environmental Association	The Care for Hedland Environmental Association is a non-government environmental conservation organisation.
Conservation Council of WA	The Conservation Council of WA is a non-government environmental conservation organisation.
Coral Bay Progress Association	The Coral Bay Progress Association is a non-government environmental conservation organisation.
Environs Kimberley	Environs Kimberley is a non-government environmental conservation organisation.
Greenpeace Australia Pacific	Greenpeace Australia Pacific is a non-government environmental conservation organisation.
International Fund for Animal Welfare	The International Fund for Animal Welfare is a non-government environmental conservation organisation.
Protect Ningaloo	Protect Ningaloo is a non-government environmental conservation organisation.
Save the Kimberley	Save the Kimberley is a non-government environmental conservation organisation.
Sea Shepherd Australia	Sea Shepherd Australia is a non-government environmental conservation organisation.
Whale and Dolphin Conservation Society	The Whale and Dolphin Conservation Society (WDCS) is a non-government environmental conservation organisation.

Organisation	Description
Wilderness Society	The Wilderness Society is a non-government environmental conservation organisation.
First Nations people and groups	
Native Title Representative Body	
Kimberley Land Council	The Kimberley Land Council is a Western Australian (First Nations) Native Title Representative Body for the Kimberley region.
Yamatji Marlpa Aboriginal Corporation	The Yamatji Marlpa Aboriginal Corporation is a Western Australia (First Nations) Native Title Representative Body for the Geraldton and Pilbara region.
Aboriginal Corporation and Representative Body	
Murujuga Aboriginal Corporation	The Murujuga Aboriginal Corporation is a Western Australia (Frist Nations) approved corporate body and representative body (Pilbara region).
Yamatji Southern Regional Corporation	The Yamatji Southern Regional Corporation is a First Nations Aboriginal Corporations and Representative Body of Western Australia (Geraldton region).
Registered Native Title Bodies Corporate	
Bundi Yamatji Aboriginal Corporation	The Bundi Yamatji Aboriginal Corporation is a First Nations Registered Native Title Bodies Corporate of Western Australia (Geraldton region).
Buurabalayji Thalanyji Aboriginal Corporation	The Buurabalayji Thalanyji Aboriginal Corporation is the Registered Native Title Body Corporate for the Thalanyji people (Pilbara region).
Dambimangari Aboriginal Corporation	The Dambimangari Aboriginal Corporation is a First Nations Registered Native Title Bodies Corporate of Western Australia (Kimberley region).
Gogolanyngor Aboriginal Corporation	The Gogolanyngor Aboriginal Corporation is a First Nations Registered Native Title Body Corporate of Western Australia (Kimberley region).
Karajarri Traditional Lands Association	The Karajarri Traditional Lands Association is the Registered Native Title Body Corporate for the Karajarri people (Kimberley region).
Kariyarra Aboriginal Corporation	The Kariyarra Aboriginal Corporation is the Registered Native Title Body Corporate for the Kariyarra people (Pilbara region).
Malgana Aboriginal Corporation	The Malgana Aboriginal Corporation is the Registered Native Title Body Corporate for the Malgana people (Geraldton region).
Mayala Inninalang Aboriginal Corporation	The Mayala Inninalang Aboriginal Corporation is a First Nations Registered Native Title Bodies Corporate of Western Australia (Kimberley region).
Nanda Aboriginal Corporation	The Nanda Aboriginal Corporation is a First Nations Registered Native Title Bodies Corporate of Western Australia (Geraldton region).
Nganhurra Thanardi Garrbu Aboriginal Corporation	The Nganhurra Thanardi Garrbu Aboriginal Corporation is the Registered Native Title Body Corporate for the Baiyungu, Thalanyji and Yinggarda native title holders (Geraldton region).
Ngarluma Aboriginal Corporation	The Ngarluma Aboriginal Corporation is the Registered Native Title Body Corporate for the Ngarluma people (Pilbara region).
Nyangumarta Karajarri Aboriginal Corporation	The Nyangumarta Karajarri Aboriginal Corporation is the Registered Native Title Body Corporate for the Nyangumarta and Karajarri peoples (Pilbara region). The Kimberley Land Council is the nominated contact for this corporation.
Nyangumarta Warrarn Aboriginal Corporation	Nyangumarta Warrarn Aboriginal Corporation is the Registered Native Title Body Corporate for the Nyangumarta people (Pilbara region).
Nyul Nyul Aboriginal Corporation	The Nyul Nyul Aboriginal Corporation is a First Nations Registered Native Title Bodies Corporate of Western Australia (Kimberley region).
Wanjina Wunggurr Aboriginal Corporations	The Wanjina Wunggurr Aboriginal Corporations are a First Nations Registered Native Title Bodies Corporate of Western Australia (Kimberley region).
Wanparta Aboriginal Corporation	The Wanparta Aboriginal Corporation is the Registered Native Title Body Corporate for the Ngarla people (Pilbara region).
Wirrawandi Aboriginal Corporation	The Wirrawandi Aboriginal Corporation is the Registered Native Title Body Corporate for the Mardudhunera and Yaburara people (Pilbara region).

Organisation	Description
Yawuru Native Title Holders Aboriginal Corporation	The Yawuru Native Title Holders Aboriginal Corporation is the Registered Native Title Bodies Corporate for the Yawuru people (Kimberley region).
Yinggarda Aboriginal Corporation	The Yinggarda Aboriginal Corporation is the Registered Native Title Body Corporate Yinggarda people (Geraldton region).
Lodged/registered native title claim organisations	
Nhuwala Claim Group	Nhuwala Claim Group hold a Western Australia (First Nations) pending and registered native title claim in the Pilbara region of Western Australia.
Thalanyji Nhuwala People	Thalanyji Nhuwala Peoples hold a Western Australia (First Nations) pending and registered native title claim in the Pilbara region of Western Australia.
Industry associations	
Industry associations – commercial fishing	
Aquaculture Council of Western Australia	The Aquaculture Council of Western Australia is a commercial fishing industry association and representative body.
Australian Southern Bluefin Tuna Industry Association	The Australian Southern Bluefin Tuna Industry Association is a commercial fishing industry association and representative body.
Commonwealth Fisheries Association	The Commonwealth Fisheries Association is a commercial fishing industry association and representative body.
Tuna Australia	Tuna Australia-Western Tuna and Billfish Fishery is a commercial fishing industry association and representative body.
Western Australian Fishing Industry Council	The Western Australian Fishing Industry Council is a commercial fishing industry association and representative body.
Western Rock Lobster Council	The Western Rock Lobster Council is a commercial fishing industry association and representative body.
Industry associations – energy industry	
Australian Energy Producers	Australian Energy Producers is an energy industry association.
Industry associations – commercial shipping	
Maritime Industry Australia Ltd	Maritime Industry Australia Ltd is a commercial shipping industry association.
Industry associations – Local government	
WA Local Government Association	The WA Local Government Association is an association representing the Western Australia local government sector.
Industry associations – local industry	
Broome Chamber of Commerce and Industry	The Broome Chamber of Commerce and Industry is an independent local industry association supporting businesses in Broome and surrounding areas.
Carnarvon Chamber of Commerce and Industry	The Carnarvon Chamber of Commerce and Industry is an independent local industry association supporting businesses in Carnarvon and surrounding areas.
Christmas Island of Commerce and Industry	The Christmas Island of Commerce and Industry is an independent local industry association supporting businesses Christmas Island
Exmouth Chamber of Commerce and Industry	The Exmouth Chamber of Commerce and Industry is an independent local industry association supporting businesses in Exmouth and surrounding areas.
Karratha & Districts Chamber of Commerce and Industry	The Karratha and Districts Chamber of Commerce and Industry is an independent Local industry association supporting businesses in Karratha and surrounding areas.
Mid West Chamber of Commerce and Industry	The Mid West Chamber of Commerce and Industry is an independent local industry association supporting businesses in the City of Geraldton-Greenough, and the shires of Chapman Valley and Northampton.
Onslow Chamber of Commerce and Industry	The Onslow Chamber of Commerce and Industry is an independent local industry association supporting businesses in Onslow and surrounding areas.
Port Hedland Chamber of Commerce & Industry	The Port Hedland Chamber of Commerce and Industry is an independent local industry association supporting businesses in Port Hedland and surrounding areas.

Organisation	Description
Port Hedland Industries Council	The Port Hedland Industries Council is an independent local industry association that helps industry partners share knowledge and manage their community impacts in Port Hedland and surrounding areas.
Industry associations – recreation and community	
Ashburton Anglers Incorporated	Ashburton Anglers Incorporated is a recreation and community association.
Broome Fishing Club Inc	Broome Fishing Club Inc is a recreation and community association.
Carnarvon Fishing Club Incorporated	Carnarvon Fishing Club Incorporated is a recreation and community association.
Exmouth Community Liaison Group	The Exmouth Community Liaison Group is a recreation and community association representing the interests of local government, industry, and community interests on energy-related issues in the Exmouth region.
Exmouth Game Fishing Club Inc	Exmouth Game Fishing Club Inc is a recreation and community association.
Geraldton & Districts Fishing Club Inc	Geraldton & Districts Fishing Club Inc is a recreation and community association.
King Bay Game Fishing Club Inc	King Bay Game Fishing Club Inc is a recreation and community association.
Nickol Bay Sportfishing Club Inc	Nickol Bay Sportfishing Club Inc is a recreation and community association.
Port Hedland Game Fishing Club Inc	Port Hedland Game Fishing Club Inc is a recreation and community association.
Industry associations – recreational fishing	
Recfishwest	Recfishwest is a recreational fishing association.
Western Australian Game Fishing Association	The Western Australian Game Fishing Association is a recreational fishing association.
Industry associations – tourism	
Marine Tourism Western Australia	Marine Tourism Western Australia is a tourism industry association.
Tourism Council of Western Australia	The Tourism Council of Western Australia is a tourism industry association.
Western Australian Indigenous Tourism Operators Council	The Western Australian Indigenous Tourism Operators Council is a tourism industry association.
Infrastructure organisations	
Pilbara Ports Authority	Pilbara Ports Authority is a port and infrastructure operator of Western Australia.
Telstra	Telstra is a telecommunications infrastructure organisation.
Vocus Group Ltd	Vocus Group Ltd is a telecommunications infrastructure organisation.
Local government	
City of Greater Geraldton	The City of Greater Geraldton is a Western Australia local government authority.
City of Karratha	The City of Karratha is a Western Australia local government authority.
Shire of Ashburton	The Shire of Ashburton (Onslow) is a Western Australia local government authority.
Shire of Broome	The Shire of Broome is a Western Australia local government authority.
Shire of Carnarvon	The Shire of Carnarvon is a Western Australia local government authority.
Shire of Christmas Island	The Shire of Christmas Island is a Western Australia local government authority.
Shire of Derby/West Kimberley	The Shire of Derby/West Kimberley is a Western Australia local government authority.
Shire of East Pilbara	The Shire of East Pilbara is a Western Australia local government authority.
Shire of Exmouth	The Shire of Exmouth is a Western Australia local government authority.
Shire of Northampton	The Shire of Northampton is a Western Australia local government authority.
Shire of Shark Bay	The Shire of Shark Bay is a Western Australia local government authority.
Shire of Wyndham-East Kimberley	The Shire of Wyndham-East Kimberley is a Western Australia local government authority.

Organisation	Description
Town of Port Hedland	The Town of Port Hedland is a Western Australia local government authority.
City of Greater Geraldton	The City of Greater Geraldton is a Western Australia local government authority.
Tourism organisation	
Abrolhos Island Charters	Abrolhos Island Charters is a marine and coastal tourism organisation.
Absolute Ocean Charters	Absolute Ocean Charters is a marine and coastal tourism organisation.
All the Gear No Idea Sportfishing	All the Gear No Idea Sportfishing is a marine and coastal tourism organisation.
Apache Charters	Apache Charters is a marine and coastal tourism organisation.
Aqualand Charters	Aqualand Charters is a marine and coastal tourism organisation.
Archipelago Adventures	Archipelago Adventures is a marine and coastal tourism organisation.
Baiyungu Dreaming	Baiyungu Dreaming is a marine and coastal tourism organisation.
Batavia Sea Safaris	Batavia Sea Safaris is a marine and coastal tourism organisation.
Blue Horizon Charters	Blue Horizon Charters is a marine and coastal tourism organisation.
Blue Juice Charters	Blue Juice Charters is a marine and coastal tourism organisation.
Blue Lightning Charters	Blue Lightning Charters is a marine and coastal tourism organisation.
BlueSun2 Boat Charters	Blue Sun2 Boat Charters is a marine and coastal tourism organisation.
Brian Lee Hunters Creek Tagalong Tours	Brian Lee Hunters Creek Tagalong Tours is a marine and coastal tourism organisation.
Broome Hovercraft	Broome Hovercraft is a marine and coastal tourism organisation.
Broome Tours Pty Ltd	Broome Tours Pty Ltd is a marine and coastal tourism organisation.
Broome Whale Watching & Eco Tours	Broome Whale Watching & Eco Tours is a marine and coastal tourism organisation.
Bunda Bunda NJ Tours	Bunda Bunda NJ Tours is a marine and coastal tourism organisation.
Bundy's Cultural Tours	Bundy's Cultural Tours is a marine and coastal tourism organisation.
Cannon Charters The Kimberley	Cannon Charters The Kimberley is a marine and coastal tourism organisation.
Coral Bay Ecotours	Coral Bay Ecotours is a marine and coastal tourism organisation.
Coral Coast Tours	Coral Coast Tours is a marine and coastal tourism organisation.
Dampier Archipelago and Murujuga Sea Kayak Expedition	Dampier Archipelago and Murujuga Sea Kayak Expedition is a marine and coastal tourism organisation.
Dive Ningaloo	Dive Ningaloo is a marine and coastal tourism organisation.
Diversity Charters	Diversity Charters is a marine and coastal tourism organisation.
Eco Abrolhos	Eco Abrolhos is a marine and coastal tourism organisation.
Eighty Mile Beach Caravan Park, WA	Eighty Mile Beach Caravan Park is a marine and coastal tourism organisation.
Evolution Fishing Charters Exmouth	Evolution Charters Exmouth is a marine and coastal tourism organisation.
Exmouth Adventure Co	Exmouth Adventure Co is a marine and coastal tourism organisation.
Exmouth Dive & Whalesharks Ningaloo	Exmouth Dive & Whalesharks Ningaloo is a marine and coastal tourism organisation.
Exmouth Fishing Adventures	Exmouth Fishing Adventures is a marine and coastal tourism organisation.
Fishabout Tours	Fishabout Tours is a marine and coastal tourism organisation.
GT Diving A	GT Diving A is a marine and coastal tourism organisation.
Image Dive and Charters	Image Dive and Charters are a marine and coastal tourism organisation.
InnKeeper Sport Fishing Charter	Innkeeper Sport Fishing Charter is a marine and coastal tourism organisation.
Karma IV Charters	Karma IV Charters is a marine and coastal tourism organisation.

Organisation	Description
Karratha Adventure Sports	Karratha Adventure Sports is a marine and coastal tourism organisation.
Kimberley Day Cruise	Kimberley Day Cruise is a marine and coastal tourism organisation.
Kimberley Outback Tours	Kimberley Outback Tours is a marine and coastal tourism organisation.
Kimberley Pearl Charters	Kimberley Pearl Charters is a marine and coastal tourism organisation.
Kings Ningaloo Reef Tours	Kings Ningaloo Reef Tours is a marine and coastal tourism organisation.
Lethal Adventures	Lethal Adventures is a marine and coastal tourism organisation.
Live Ningaloo	Live Ningaloo is a marine and coastal tourism organisation.
Lombadina	Lombadina is a marine and coastal tourism organisation.
Mac Attack Fishing Charters	Mac Attack Fishing Charters is a marine and coastal tourism organisation.
Maccy Dave's Kayak Fishing Adventures	Maccy Dave's Kayak Fishing Adventures is a marine and coastal tourism organisation.
Mackerel Islands Pty Ltd	Mackerel Islands Pty Ltd is a marine and coastal tourism organisation.
Mahi Mahi Fishing Charters	Mahi Mahi Fishing Charters is a marine and coastal tourism organisation.
Montebello Island Safaris	Montebello Island Safaris is a marine and coastal tourism organisation.
Murujuga Rock Art & Cultural Tours Pilbara WA	Murujuga Rock Art & Cultural Tours Pilbara WA is a marine and coastal tourism organisation.
Ningaloo Car & Boat Hire	Ningaloo Car & Boat Hire is a marine and coastal tourism organisation.
Ningaloo Coral Bay Boats	Ningaloo Coral Bay Boats is a marine and coastal tourism organisation.
Ningaloo Marine Interactions	Ningaloo Marine Interactions is a marine and coastal tourism organisation.
Ningaloo Reef Dive	Ningaloo Reef Dive is a marine and coastal tourism organisation.
Ningaloo Safari Tours	Ningaloo Safari Tours is a marine and coastal tourism organisation.
Ningaloo Sportfishing Charters	Ningaloo Sportfishing Charters is a marine and coastal tourism organisation.
Ningaloo Whale Shark N Dive	Ningaloo Whale Shark N Dive is a marine and coastal tourism organisation.
Ocean Dream Charters	Ocean Dream Charters is a marine and coastal tourism organisation.
Odyssey Expeditions	Odyssey Expeditions is a marine and coastal tourism organisation.
Offshore Charters WA	Offshore Charters WA is a marine and coastal tourism organisation.
On Point Spearfishing	On Point Spearfishing is a marine and coastal tourism organisation.
On Strike Charters	On Strike Charters is a marine and coastal tourism organisation.
Onslow Beach Resort	Onslow Beach Resort is a marine and coastal tourism organisation.
Peak Sportfishing Charters	Peak Sportfishing Charters is a marine and coastal tourism organisation.
Pelican Charters	Pelican Charters is a marine and coastal tourism organisation.
Perfect Nature Cruises	Perfect Nature Cruises is a marine and coastal tourism organisation.
Pilbara Dive and Tours	Pilbara Dive and Tours is a marine and coastal tourism organisation.
Pilbara Tours	Pilbara Tours is a marine and coastal tourism organisation.
Reef Seeker Charters	Reef Seeker Charters is a marine and coastal tourism organisation.
Reel Teaser Fishing Adventures	Reel Teaser Fishing Adventures is a marine and coastal tourism organisation.
Sail Ningaloo	Sail Ningaloo is a marine and coastal tourism organisation.
Sal Salis	Sal Salis is a marine and coastal tourism organisation.
Seaforce Fishing Charters	Seaforce Fishing Charters is a marine and coastal tourism organisation.
Seastar Boat Charters	Seastar Boat Charters is a marine and coastal tourism organisation.
Shark Bay Charters	Shark Bay Charters is a marine and coastal tourism organisation.
Shark Bay Coastal Tours	Shark Bay Coastal Tours is a marine and coastal tourism organisation.

Organisation	Description
Shark Bay Eco Tours	Shark Bay Eco Tours is a marine and coastal tourism organisation.
Silverado Charters	Silverado Charters is a marine and coastal tourism organisation.
Southern Cross Cultural Tours at Lullumb	Southern Cross Cultural Tours at Lullumb is a marine and coastal tourism organisation.
The Great Escape Charter Company	The Great Escape Charter Company is a marine and coastal tourism organisation.
Top Gun Charters	Top Gun Charters is a marine and coastal tourism organisation.
True North Fishing Charters	True North Fishing Charters is a marine and coastal tourism organisation.
Unreel Adventure Safaris	Unreel Adventure Safaris is a marine and coastal tourism organisation.
View Ningaloo	View Ningaloo is a marine and coastal tourism organisation.
West Kimberley Fishing Tours	West Kimberley Fishing Tours is a marine and coastal tourism organisation.
Willie Pearl Lugger Cruises	Willie Pearl Lugger Cruises is a marine and coastal tourism organisation.
Wula Gura Nyinda Eco Cultural Adventures	Wula Gura Nyinda Eco Cultural Adventures is a marine and coastal tourism organisation.
Union organisation	
Maritime Union of Australia	The Maritime Union of Australia is a union organisation.

4.5.3 Consultation

In developing this EP, Santos made itself available to work with relevant persons on pragmatic and practical approaches to consultation that aligned with regulatory requirements.

A key aspect of these approaches recognised, based on publicly available information and where Santos had first-hand knowledge through previous consultation and engagement activities, that the interests or activities of relevant persons identified for consultation may be affected either by:

- impacts from planned activities and risks from unplanned events given their proximity to proposed activities, or
- risks from unplanned events only given their significant distance from proposed activities.

As a result, Santos developed consultation email types to reflect the above assessments.

Santos has also developed a third consultation email type for persons and organisations identified for consultation in circumstances where the potential for the proposed activities to affect the functions, interests or activities of the person or organisation was unclear. Those to whom Santos sent this third consultation email type were given the opportunity to tell Santos if they wished to be consulted for the purposes of section 25(1) of the OPGGS(E)R.

These consultation approaches ensured that email recipients were clear about why Santos was contacting them. Examples of these email types are included in Appendix F.

Those to whom Santos sent the third consultation email type, but did not respond to the opportunity provided them to self-identify for consultation under section 25(1) of the OPGGS(E)R, were still included in subsequent consultation processes, including being invited to provide input for the EP.

It should also be noted that the likelihood of relevant persons along the WA coastline, having a function, interests or activity that may be affected by an unplanned spill event, becomes increasingly unlikely with increasing distance from the Operational Area.

While Santos has included in its consultation, relevant persons whose functions, interests or activities may only be affected by an unplanned spill event and has implemented its public awareness campaign in the EMBA (Table 4-4) (thereby providing consultation opportunities for authorities, persons and organisations in regions many hundreds of kilometres from the proposed activities), Santos has focused its consultation effort (including use of alternative communications channels) more closely on those relevant persons whose potentially affected functions, interests and activities are most proximate to the Operational Area where activity impacts typically occur. The latter includes, for example, commercial fishers and other marine users, as well as organisations representing the interests of First Nations people, local communities and business, which are more proximate to the Operational Area.

Also, in the event of a hydrocarbon spill, organisations will be notified as outlined in Table 8-4 and Table 8-6.

All the above efforts are reflected in the Consultation Report (consultation summary) in Appendix F.

Santos also considered consultation preferences of respective relevant persons, which have been previously communicated to Santos through:

- prior consultation in the WA including the Carnarvon region
- ongoing community engagement with key WA stakeholders
- published preferences of certain organisations.

Santos' consultation materials also encourage relevant persons to tell Santos how they would like to be consulted and any additional information they need.

By way of example, Santos took the following actions for each of the following groups:

All authorities, persons and organisations

- Provide information using different mediums and platforms, including by telephone, email, website, electronic materials and/or in person and/or virtual meetings.
- Make information available about proposed activities to be managed under this EP on the Santos website at www.santos.com/offshoreconsultation. Hyperlinks to this website were included in consultation emails, print adverts and social media adverts.

Commonwealth fisheries

- Recognise previous feedback from the Australian Fisheries Management Authority to contact to relevant industry bodies where the interests or activities of commercial fishers may be affected.

Western Australian fisheries

- Recognise previous advice from the WA DPIRD that Santos should initiate and maintain ongoing consultation with peak fishing sector bodies in WA to ensure fishers are consulted prior to proposed activities.
- Recognise Western Australian Fishing Industry Council's (WAFIC) published guidance that petroleum titleholders consult directly with those Western Australian fishery licence holders that have been historically active in Operational Area, while maintaining a list of all fisheries that spatially overlap the EMBA. This approach acknowledges previous feedback from WAFIC regarding consultation fatigue among Western Australia's estimated 1,500 fishing boat licence holders.

Recreational fisheries

- Recognise previous advice from Recfishwest for it to be the focal point for consultation activities, while also ensuring fishing clubs proximate to proposed activities are consulted. This approach acknowledges DPIRD's published estimate that there are 620,000 recreational fishers in Western Australia.

It should be noted that Santos maintains a list of all fisheries that overlap the EMBA to support emergency communications via government authorities and representative organisations in the event a spill from an unplanned event has the potential to impact the fishery and the day-to-day activities of fishers.

A summary of consultation activities is outlined in Table 4-8.

Table 4-8: Summary of consultation activities

Activity	Purpose	Timing
Consultation email – general Email to identified authorities, persons and organisations with general fact sheet	Notify Santos-relevant persons of the commencement and closing dates for consultation, provision of sufficient information to allow an informed assessment of the potential consequences of the proposed activity, if any, for them.	From 13 October 2025
Consultation Hub website Website content and activity fact sheets developed and made available at https://www.santos.com/wp-content/uploads/2025/10/Consultation-Information-Sheet-Van-Gogh-Coniston-Novara-VGA-4H-GI-ST1-Well-Intervention-Plug-Abandonment-Environment-Plan.pdf	Provide information as described in Section 4.5.2.3.	13 October 2025
Social media campaign Facebook, Instagram and Messenger geotargeted PPL18+ Carnarvon, Exmouth, Onslow, Karratha, Port Hedland, Broome	Promote awareness of proposed activities to create opportunities for relevant persons to self-identify and provide feedback.	From 12 October to 8 November 2025
Radio advertising campaign Advertisements on these radio stations: • Karratha HIT 106.5 • WA Remote MMM • Port Hedland HIT 91.7 • Geraldton HIT 96.5 FM • Pilbara and Kimberley Aboriginal Media Radio	Promote awareness of proposed activities to create opportunities for relevant persons to self-identify and provide feedback.	From 12 October to 8 November 2025
Print advertising campaign Advertisements in these publications: • The West Australian • North West Telegraph • Pilbara News Guardian • Broome Advertiser • Midwest Times	Promote awareness of proposed activities to create opportunities for relevant persons to self-identify and provide feedback.	From 12 October to 8 November 2025
Consultation reminder email – general Reminder email to all identified potential authorities, persons and organisations with general fact sheet	Notify Santos-identified relevant persons of the closing date for consultation.	From 3 October 2025
Reminder phone calls Reminder phone calls to targeted authorities. persons and organisations	Notify Santos-identified relevant persons one week prior to the closing date for consultation.	From 5 October 2025

4.5.3.1 Consultation materials

Santos provided authorities, persons and organisations with sufficient information so they could make an informed assessment about the possible consequences of the proposed activity on their functions, interests or activities.

Santos provided authorities, persons and organisations with information regarding:

- the activity proposed under this EP, including its proposed timing and duration
- the environment that may be affected by the proposed activity, including depictions of the modelled EMBA and explaining how the EMBA was determined
- the potential environmental impacts and risks of the proposed activity and proposed control measures
- the environmental approval process
- the purpose of consultation, who may be a relevant authority, person or organisation and how to self-nominate as such

- the titleholder's obligations during consultation in the course of preparing an environment plan, including informing relevant persons that they can request that particular information they provide during consultation not be published and that information subject to such a request will not be published under the relevant regulations (and will instead be included in a separate report that will not be published on NOPSEMA's website)
- the obligation of the titleholder not to publish particular information if so requested by the authority, person or organisation that provided the information
- how to provide feedback, including contact details for the person responsible for coordinating the consultation
- a link to NOPSEMA's information sheet 'Consultation on offshore petroleum environment plans.'

At a minimum, this information was made available on the Santos website and included in the fact sheet Santos sent to authorities, persons and organisations by email, and made available during consultation sessions (where applicable).

Authorities, persons and organisations were alerted to and/or provided access to information in different formats and different levels of detail, including in emails, a general fact sheet, online and print advertisements, radio advertisements, social media posts, phone calls, in-person/online consultation meetings and on the Santos Consultation Hub website.

Santos' Privacy Statement was also made available at in-person for meetings with First Nations people and groups and referenced during online meetings. A link was provided in consultation campaign emails to the Santos' WA and Northern Territory Privacy Policy, which is published on the Santos Consultation Hub website.

Examples of the consultation materials used are included in Appendix F.

4.5.4 Environment Plan development

In developing this EP, Santos has:

- Provided, in accordance with section 24(b) of the OPGGS(E)R, a Consultation Report on all consultations under section 25 of the OPGGS(E)R (see Appendix F), which includes a consultation summary (including a summary of each response made by a relevant person), an assessment of the merits of any objection or claim about the adverse impact of the proposed activity, Santos' response, or proposed response, if any, to each objection or claim and, where applicable, a reference to relevant sections of the EP, including where relevant control measures are described. A collation of the full text of any responses by relevant persons has also been prepared for the purpose of section 24(b)(iv) and is included in the sensitive information part of the EP, in accordance with section 26(8) of the OPGGS(E)R.
- Updated this EP to reflect any feedback that informs:
  - changes to the activity description in Section 2
  - the existing environment in Section 3
  - evaluation of environmental risks of the activity and associated management measures in Sections 6 and 7
  - Santos' implementation strategy, including insofar as it provides for appropriate consultation with relevant authorities, and other relevant interested persons or organisations over the life of the EP; refer Section 8.

The implementation strategy in Section 8 includes activity notifications requested by authorities, persons and organisations during consultation or where Santos has standing activity notifications, if required, prior to, during or upon completion of activities. See Table 8-4 and Table 8-6. Santos carries out ongoing consultation during the life of an EP, including after an EP has been accepted by the regulator.

Santos' post EP acceptance consultation implementation strategy is described in Section 8.12 and activity notifications, if required, are outlined in Table 8-6.

If, during the course of post acceptance consultation, Santos receives information demonstrating a new or increased environmental impact or risk that is not provided for in this EP (as in force at the time), Santos will apply its MoC process outlined in Section 8.10.2.

5. Impact and risk assessment methodology

OPGGS(E)R 2023 Requirements
Section 21. Environmental assessment
Evaluation of environmental impacts and risks 21(5) The environment plan must include: (a) details of the environmental impacts and risks for the activity (b) an evaluation of all the impacts and risks, appropriate to the nature and scale of each impact or risk (c) details of the control measures that will be used to reduce the impacts and risks of the activity to as low as reasonably practicable and an acceptable level. 21(6) To avoid doubt, the evaluation mentioned in paragraph (5)(b) must evaluate all the environmental impacts and risks arising directly or indirectly from: (a) all operations of the activity (b) potential emergency conditions, whether resulting from accident or any other reason.

Environmental impact and risk assessment refers to a process whereby planned and unplanned events that will or may occur during an activity are quantitatively and/or qualitatively assessed for their impact on the environment (physical, biological, and socio-economic) at a defined location and specified period. In addition, unplanned events are assessed based on their likelihood of occurrence, which contributes to their level of risk.

Santos has undertaken environmental impact and risk assessments for the planned events (including any routine, non-routine and contingency activities) and unplanned events in accordance with the OPGGS(E)R.

Provided in this section of the EP is information relating to the environmental impact and risk assessment approach, specifically:

- terminology used
- summary of the approach

A full description of the process applied in identifying, analysing and evaluating the impacts and risks relating to the planned activity is documented in Santos' Offshore Division Environmental Hazard Identification and Assessment Guideline (EA-91-IG-00004_6).

5.1 Impact and risk assessment methodology

Common terms applied during the impact and risk assessment process, and used in this EP, are defined in Table 5-1. For a more comprehensive listing of the terms and definitions used in environmental impact and risk assessment, refer to Santos' Offshore Division Environmental Hazard Identification and Assessment Guideline (EA-91-IG-00004_6).

Table 5-1: Impact and risk assessment terms

Term	Definition
Acceptability	Determined for both impacts and risks. Acceptability of events is in part determined by the consequence of the impact following management controls. Acceptability of unplanned events is in part determined from its risk ranking following management controls. For both impacts and risks, acceptability is also determined from a demonstration of the ALARP principle, consistency with Santos policies, consistency with all applicable legislation and consideration of relevant stakeholder consultation when determining management controls.
Activity	Specific tasks and actions undertaken throughout the life cycle of oil and gas exploration, production and decommissioning.
ALARP	The term refers to reducing risk to a level that is as low as reasonably practicable. In practice, this means showing, through reasoned and supported arguments, that there are no other practicable options that could reasonably be adopted to reduce risks further.
Authorised person	Person with authority to make the decision or take the action. Examples are Vessel Master, Field Superintendent, Supervisor, Person-in-Charge, Company Authorised Representative, and Project Manager.

Term	Definition
Control measure	Means a system, an item of equipment, a person or a procedure, that is used as a basis for managing environmental impacts and risks[2].
DMPE	Department of Mines Petroleum and Exploration
Environment	Includes the natural and socio-economic values and sensitivities that will or may be affected by the activity. Is defined by NOPSEMA and DMPE as: (a) ecosystems and their constituent parts, including people and communities (b) natural and physical resources (c) the qualities and characteristics of locations, places and areas (d) the heritage value of places (e) the social, economic and cultural features of the matters mentioned in paragraphs (a), (b), (c) and (d).
Environmental consequence	A consequence is the outcome of an event affecting objectives. Note 1: An event can be one or more occurrences and can have several cases. Note 2: An event can consist of something not happening. (Reference ISO 73:2009 Risk vocabulary)
Environmental impact	Defined by NOPSEMA as any change to the environment, whether adverse or beneficial, wholly or partly resulting from a planned or unplanned event[1]. Defined by DMPE[3] as any change to the environment, whether adverse or beneficial, that wholly or partly results from a petroleum activity of an operator.
ENVID	Environmental hazard identification workshop
Environmental risk	Applies to unplanned events. Risk is a function of the likelihood of the unplanned event occurring and the consequence of the environmental impact that arises from that event.
Hazard	A situation with the potential to cause harm.
Grossly disproportionate	Where the sacrifice (cost and effort) of implementing a control measure (CM) to reduce impact or risk, grossly exceeds the environmental benefit to be gained.
Impact assessment	The process of determining the consequence of an impact (in terms of the consequence to the environment) arising from a planned or unplanned event over a specified period of time.
Likelihood	The chance of an unplanned event occurring.
Non-routine planned event	An attribute of the planned activity that may occur or will occur infrequently during the planned activity. A non-routine planned event is intended to occur at the time.
NOPSEMA	National Offshore Safety Petroleum and Environment Management Authority
Planned activity	A description of the activity to be undertaken including the services, equipment, products, assets, personnel, timing, duration and location and aspect of the activity.
Planned event	An event arising from the activity that is done with intent (i.e. not an unplanned event) and has some level of environmental impact. A planned event could be routine (expected to occur consistently throughout the activity) or non-routine (may occur infrequently if at all). Air emissions, bilge water discharge and drill cuttings discharge would be examples of planned events.
Receptor	A feature of the environment that may have environmental, social and/or economic values.
Risk	The effect of uncertainty on objectives.
Risk assessment	The process of determining the likelihood of an unplanned event and the consequence of the impact (in terms of economic, human safety and health, or ecological effects) arising from the event over a specified period of time.
Routine planned event	An attribute of the planned activity that results in some level of environmental impact and will occur continuously or frequently through the duration of the planned activity.

[2] *Defined by the Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2023.*

Term	Definition
Unplanned event	An event that results in some level of environmental impact and may occur despite preventative safeguards and control measures being in place. An unplanned event is not intended to occur during the activity.

5.2 Summary of the environmental impact and risk assessment approach

5.2.1 Overview

Santos operates under an overarching Risk Policy. The company Risk Management and Assurance Operating Standard, underpins the Risk Management Policy and is consistent with the requirements of *AS/NZS ISO 31000:2018, Risk Management – Guidelines* (ISO, 2018).

The key steps to risk management are illustrated in Figure 5-1. The forum used to undertake the assessment is the environmental hazard workshop, referred to as an ENVID, which is described in Section 4 of Santos' Offshore Division Environmental Hazard Identification and Assessment Guideline .

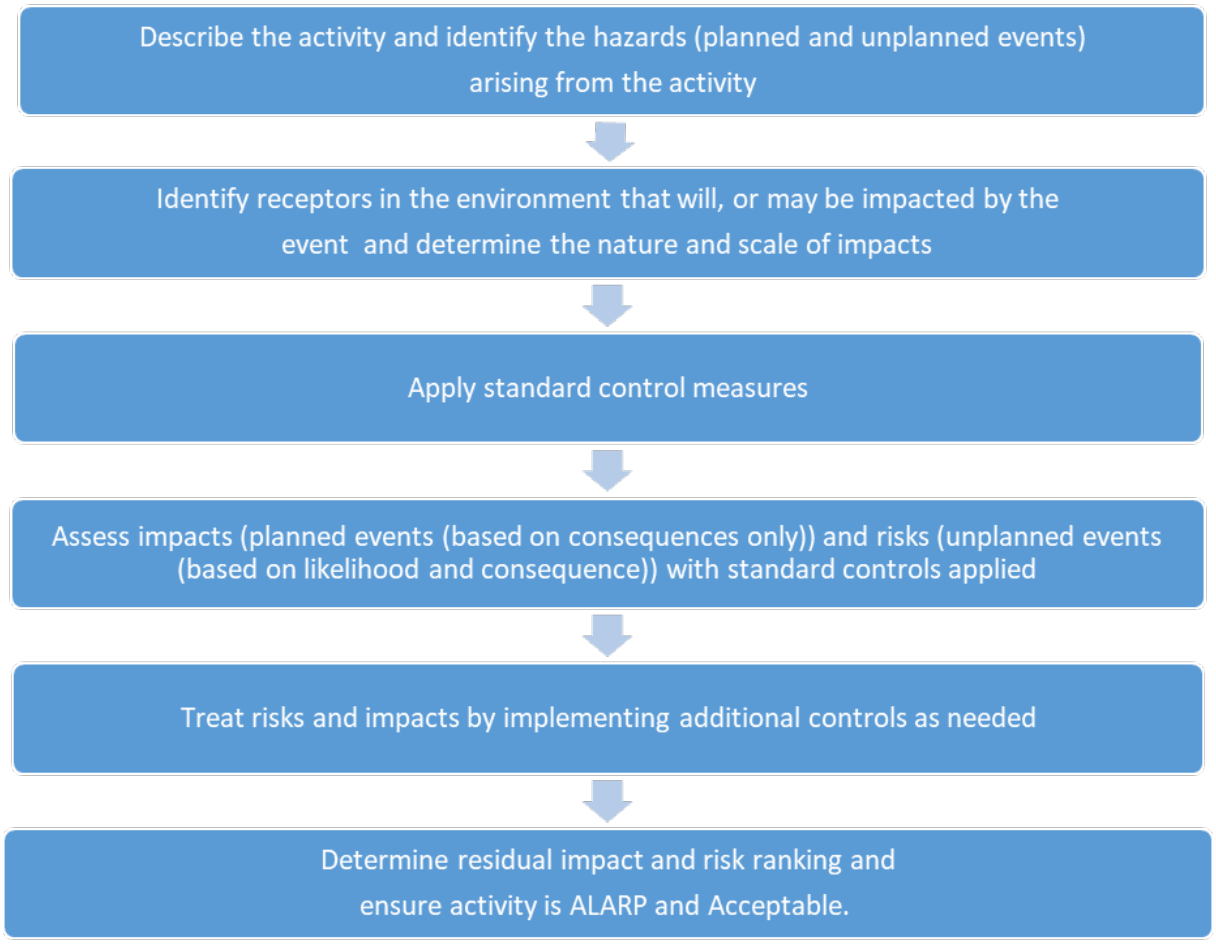

Figure 5-1: Hazard identification and assessment guideline

5.2.2 Context setting

Santos' Offshore Division Environmental Hazard Identification and Assessment Guideline (EA-91-IG-00004_6) includes consideration of key areas in an impact and risk assessment, specifically:

- description of the activity (including location and timing)
- description of the environment (potentially affected by both planned and unplanned activities)
- identification of relevant persons
- identification of legal requirements ('legislative controls') that apply to the activity

- Santos' policy and Santos Management System requirements
- principles of ESD
- Santos acceptable levels of impact and risk.

These factors are considered in environmental impact and risk assessment workshops in which environmental hazards are identified and assessed (ENVID workshop). The workshop involves participants from Santos' Health, Safety and Environment (HSE), Drilling and Spill Response departments and specialist environmental consultants.

5.2.3 Describe the activities and hazards (planned and unplanned events)

A description of the activity is required in order to determine the planned events that will take place and the credible unplanned events that may occur. The location, timing and scope of the activity must be described in order to determine the impacts from planned events, and the impacts and risks from unplanned events since these have a bearing upon the environment that may be affected by the activity.

The outcome of this assessment is detailed in the relevant sub-sections of Sections 6 and 7.

5.2.4 Identify receptors and determine nature and scale of impacts

A description of the environment (natural and socio-economic) within which hazards from the activity will, or may, occur is required. This constitutes a crucial stage of the risk assessment, as an understanding of the environment that will or may be affected is required to determine the type and consequence of impacts from the activity being assessed. The environment must be understood with respect to the spatial and temporal limits of the activity and key resources at risk that will or could be impacted by planned and unplanned events. Santos has developed a Van Gogh Coniston Novara VGA-4H GI ST1 Well Decommissioning Values and Sensitivities of the Marine and Coastal Environment (Appendix C) reference document, which describes the existing environment that may be affected by Santos activities and is reviewed and updated on an annual basis.

Where the existing environment is being reviewed for regulatory approvals, a comparison shall be made against the Values and Sensitivities of the Marine and Coastal Environment (EA-00-RI-10062). A new protected matters search is required to ensure a thorough understanding of the existing environment to ensure all risks are assessed.

The extent of actual impacts from each planned activity or risks from each unplanned activity, are assessed using, where required, modelling (for example, hydrocarbon spills) and scientific reports. The duration of the event is also described, including the potential duration of any impacts should they occur. Receptors identified as potentially occurring within impacted area(s) are detailed in Section 3 and Appendix C.

5.3 Describe the environmental performance outcomes and control measures

For each planned and unplanned event, a set of environmental performance outcomes (EPOs), CMs, environmental performance standards (EPSs) and measurement criteria (MC) are identified. The definitions of the EPOs, CMs, EPSs and MC must be consistent with the OPGGS(E)R 2023, and the NOPSEMA EP Content Requirements Guidance Note (NOPSEMA,2025b).

For any hazard, additional controls must also be considered and either accepted for use or rejected, based on whether the standard controls reduce impacts and risks to levels that are ALARP and acceptable.

Controls are allocated in order of preference according to Figure 5-2.

Control	Effectiveness	Example
Eliminate		*Removal of the risk.* Refueling of vessels at port eliminates the risks of an offshore refueling.
Substitute		*Change the risk for a lower one.* The use of low-toxicity chemicals that perform the same task as a more toxic additive.
Engineering		*Engineer out the risk.* The use of oil-in-water separator to minimise the volume of oil discharged.
Isolation		*Isolate people or the environment from the risk.* The use of bunding for containment of bulk liquid materials.
Administrative		*Provide instructions or training to people to lower the risk.* The use of Job Hazard Analysis to assess and minimise the environmental risks of an activity.
Protective		*Use of protective equipment.* Containment and recovery of spilt hydrocarbons.

Figure 5-2: Hierarchy of controls

5.4 Determine the impact consequence level and risk rankings)[4]

This step looks at the causal effect between the aspect/hazard and the identified receptor. Impact mechanisms and any thresholds for impacts are determined and described, using scientific literature and modelling where required. Impact thresholds for different critical life stages are also identified where relevant.

The consequence level of the impact is then determined for each planned and unplanned event using the Santos Environment Consequence Descriptors (Appendix G).

These detailed environmental consequence descriptions are based on the consequence of the impact to relevant receptors within the categories of:

- threatened/migratory/local fauna
- physical environment/habitat
- threatened ecological communities
- protected areas
- socio-economic receptors.

This process determines a consequence level, based on set criteria for each receptor category, and takes into consideration the duration and extent of the impact, receptor recovery time and the effect of the impact at a population, ecosystem, or industry level.

The level of information required to complete the impact or risk assessment depends on the nature and scale of the impact or risk. This process determines a consequence level based on set criteria for each receptor category and takes into consideration the duration and extent of the impact, receptor recovery time and the effect of the impact on a population, ecosystem, or industry level. Impacts to social and economic values are also considered based on existing knowledge and feedback from stakeholder consultation. As the result of historic consultation with stakeholders, the social and economic values in the region that are of interest are evident.

[4] *On the basis that all control measures have been implemented.*

As planned events are expected to occur during the activity, the likelihood of their occurrence is not considered during the risk assessment, and only a consequence level is assigned Table 5-2.

For unplanned events, the consequence level of the impact is combined with the likelihood of the impact occurring (Table 5-3), to determine a residual risk ranking using the Santos corporate risk matrix (Table 5-4). For oil spill events, potential impacts to environmental receptors are assessed where they occur within the EMBA using results from modelling.

Table 5-2: Summary environmental consequence descriptors

Consequence Level	Consequence Level Description
I	**Negligible** – No impact or negligible impact
II	**Minor** – Detectable but insignificant change to local population, industry or ecosystem factors
III	**Moderate** – Significant impact to local population, industry or ecosystem factors
IV	**Major** – Major long-term effect on local population, industry or ecosystem factors
V	**Severe** – Complete loss of local population, industry or ecosystem factors AND/OR extensive regional impacts with slow recovery
VI	**Critical** – Irreversible impact to regional population, industry or ecosystem factors

Table 5-3: Likelihood description

No.	Matrix	Description
f	Almost Certain	Occurs in almost all circumstances OR could occur within days to weeks
e	Likely	Occurs in most circumstances OR could occur within weeks to months
d	Occasional	Has occurred before in Santos OR could occur within months to years
c	Possible	Has occurred before in the industry OR could occur within the next few years
b	Unlikely	Has occurred elsewhere OR could occur within decades
a	Remote	Requires exceptional circumstances and is unlikely even in the long term

Table 5-4: Santos risk matrix

		Consequence					
		I	II	III	IV	V	VI
Likelihood	f	Low	Medium	High	Very High	Very High	Very High
	e	Low	Medium	High	High	Very High	Very High
	d	Low	Low	Medium	High	High	Very High
	c	Very Low	Low	Low	Medium	High	Very High
	b	Very Low	Very Low	Low	Low	Medium	High
	a	Very Low	Very Low	Very Low	Low	Medium	Medium

5.5 First Nations cultural features assessment

The definition of ‘environment’ under the OPGGS(E)R 2023 is broad, and means:

- ecosystems and their constituent parts, including people and communities
- natural and physical resources
- the qualities and characteristics of locations, places, and areas
- the heritage value of places
- and includes the social, economic, and cultural features of the matters mentioned above.

When assessing the consequence level of impact to cultural features, Santos considers the different types of cultural features and types of impacts. For impacts to cultural features, in the form of impacts to marine species that are either a cultural food source or are considered culturally significant to First Nations people, Santos assesses impacts with reference to the consequence assessment for threatened/migratory/local fauna.

Similarly, where cultural features are linked to a specific place, impacts to cultural features are assessed with reference to the consequence assessment for physical environment/threatened ecological communities/protected areas as applicable.

Where there are concerns raised about cultural and spiritual beliefs that do not link to a specific place (or physical/tangible feature), Santos will evaluate impact and risk acceptability through the consideration of:

- impacts from other activities in the vicinity of the EP activities (e.g. historical drilling, trawl fishing activity, shipping, commercial developments)
- information provided from people and/or organisations who assert the cultural and spiritual connections
- any expert assessment(s) from suitably qualified expert(s) people with relevant experience and credentials
- culturally appropriate control measures raised by relevant people, organisations, or experts; or proposed by Santos and workshopped with relevant people, organisations, or experts.

Impact and risk evaluation of cultural and spiritual beliefs will not form part of an ENVID workshop, and a consequence (or risk) ranking will not be assigned. Instead, a qualitative assessment demonstrating that impacts and risks of the activity will be reduced to ALARP and be of an acceptable level will be presented in the Environment Plan as informed by the above considerations.

5.6 Evaluate if impacts and risks are as low as reasonably practicable (ALARP)

For planned and unplanned events, an ALARP assessment is undertaken to demonstrate that the standard control measures adopted reduce the impact (consequence level) or risk to ALARP. This process relies on demonstrating that further potential control measures would require a disproportionate level of cost/effort in order to reduce the level of impact or risk. If this cannot be demonstrated, then further control measures are adopted. The level of detail included within the ALARP assessment is based upon the nature and scale of the potential impact or risk. For example, more detail is required for a risk ranked as `Medium' compared to a risk ranked as `Low'.

5.7 Evaluate impact and risk acceptability

Santos considers an impact or risk associated with the proposed activity to be acceptable if the following criteria are met:

- The consequence of a planned event is ranked as I or II; or a risk of impact from an unplanned event is ranked Very Low to Medium.
- An assessment has been completed to determine whether further information or studies are required to support or validate the consequence assessment.
- Assessment and management of risks have addressed the principles of ESD, and it can be demonstrated that the acceptable levels of impact and risks have been informed by relevant species recovery plans, threat abatement plans and conservation advice.
- Performance standards are consistent with legal and regulatory requirements.
- Performance standards are consistent with the Environment Policy.
- Performance standards are consistent with industry standards and best practice guidance (e.g. National Biofouling Management Guidance Guidelines for the Petroleum Production and Exploration Industry (Marine Pest Sectoral Committee, 2018) and the Australian Biofouling Management Requirements (DAFF, 2023).
- Performance outcomes and standards are consistent with stakeholder expectations.
- Performance standards have been demonstrated to reduce the impact or risk to ALARP the consequence and risks associated with the proposed activity are not inconsistent with the relevant principles of ESD under the EPBC Act as presented in Table 5-5.

Table 5-5: Activity relevant principles of ecologically sustainable development

No.	ESD Principle	Relevance
(a)	**Integration principle** Decision-making processes should effectively integrate both long-term and short-term economic, environmental, social, and equitable considerations	Santos' environmental impact and risk assessment determines impact consequence levels considering the duration and extent of the impact, receptor recovery time and the effect of the impact on a population, ecosystem, or industry level. The Santos Environment Consequence Descriptors highlights the integration of long-term and short-term environmental, and socio-economic considerations (Appendix G). The assessment of impact consequence levels for the proposed activity simultaneously assesses the activity's potential implications against this principle. Additional assessment of this principle in relation to acceptability will not be conducted.
(b)	**Precautionary Principle** If there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation	For planned activities, assessment of this ESD principle is inherent in Santos' environmental impact and risk assessment process, as Santos does not proceed with activities if the consequence of a planned event is ranked III (Moderate) or above. For unplanned events, if the residual risk is ranked between Medium and Very High, an assessment against this principle is required. If the residual risk is Medium to Very High and there is significant scientific uncertainty associated with the aspect, additional assessment against this principle is required.
(c)	**Intergenerational principle** The principle of inter-generational equity – that the present generation should ensure the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations	For planned activities, assessment of this ESD principle is inherent in Santos' environmental impact and risk assessment process, as Santos does not proceed with activities if the consequence of a planned event is ranked III (Moderate). For an unplanned event, if the residual risk is ranked between Medium and Very High, an assessment against this principle is required. The assessment of this principle is implemented through further details on ALARP assessment highlighting assurance that potential impacts and risks are managed, and the environment is maintained for the benefit of future generations. Evaluation of the importance and relevance of stakeholder interest for this principle, if triggered, is fundamental in demonstrating that the environment is maintained for the benefit of future generations.
(d)	**Biodiversity principle** The conservation of biological diversity and ecological integrity should be a fundamental consideration in decision-making	Evaluate if there is the potential to affect biological diversity and ecological integrity.
(e)	**Valuation principle** Improved valuation, pricing and incentive mechanisms should be promoted	This principle refers to activities which involve valuation, pricing and/or incentive mechanisms for the production, delivery, distribution or consumption of goods and services, especially those that are derived from natural or social capital or from ecological services. This principle is not relevant to the proposed activity as the proposed activity does not involve the production, delivery, distribution or consumption of goods and services.

6. Planned activities risk impact assessment

OPGGS(E)R 2023 Requirements
Section 21. Environmental assessment.
21(5) The environment plan must include: (a) details of the environmental impacts and risks for the activity (b) an evaluation of all the impacts and risks, appropriate to the nature and scale of each impact or risk (c) details of the control measures that will be used to reduce the impacts and risks of the activity to as low as reasonably practicable and an acceptable level. 21(6) To avoid doubt, the evaluation mentioned in paragraph (5)(b) must evaluate all the environmental impacts and risks arising directly or indirectly from: (i) all operations of the activity (ii) potential emergency conditions, whether resulting from accident or any other reason.

An ENVID workshop (as described in Section 5) for planned activities was held on 30 June 2025. This workshop identified eight potential sources of environmental impact associated with the planned activities to be undertaken in the Operational Area. The results of the impact assessments are summarised in Table 6-1. Given that the risk of a planned event occurring is 100% likely (i.e. it will occur), the residual risk ranking is not assessed (as explained in Section 5.1). The potential impact assessment for each planned event and the subsequent control and management measures proposed by Santos to reduce the extent of the impacts are detailed in the following subsections.

Table 6-1: Summary of the consequence level rankings for hazards associated with planned events

EP Section Reference	Hazard		Residual Consequence Level
6.1	Noise emissions		II – Minor
6.2	Light emissions		I – Negligible
6.3	Atmospheric emissions		I – Negligible
6.4	Seabed and benthic habitat disturbance		II – Minor
6.5	Interaction with other marine users		I – Negligible
6.6	Operational discharges		I – Negligible
6.7	Drilling and cement discharges		II – Minor
6.8	Contingency spill response operations	Light emissions	I – Negligible
		Noise emissions	I – Negligible
		Atmospheric emissions	I – Negligible
		Operational discharges and waste	I – Negligible
		Chemical dispersant	II – Minor
		Physical presence and disturbance	II – Minor
		Disruption to other users of marine and coastal areas and townships	II – Minor

6.1 Noise emissions

6.1.1 Description of event

Event	Potential impacts from noise emissions may occur in the Operational Area from the following sources: • MODU activities (e.g. drilling equipment, DP systems (if a DP MODU), engines and machinery) • LWIV activities (e.g. DP systems, engines and machinery) • up to three support vessels (e.g. vessel engines, thrusters and other machinery such as winches). • site surveys in the Operational Area that will be conducted using SBES or MBES, SSS (or similar) • flaring during well bleed-off activities (intermittently for six to 12 hours over two to three days) • positioning equipment installed temporarily on the seabed • ROV activities (e.g. thrusters, debris clearing activities and cutting activities) • helicopter activities relating to crew change requirements (e.g. aircraft engine).
Extent	Impacts from noise emissions will be localised on the following basis: • Support vessel using main engines and bow thrusters to maintain position will become inaudible above background noise within approximately 4 to 5 km. • MODU/LWIV operating on DP will become inaudible will become inaudible above background noise within approximately 4 to 5 km. • Flaring noise is expected to attenuate rapidly with distance from the stack, with noise levels at background noise levels within approximately 1.5 km from the source. • Noise from ROV operations will be limited to when ROVs are operating within the Operational Area. • Noise from helicopters will be limited to when they are transiting over the Operational Area.
Duration	Continuous and intermittent noise for the duration of the activity.

Terms used in this noise emissions assessment are defined in Table 6-2.

Table 6-2: Terms used in this underwater noise assessment

Terms	Definition
Acoustic noise	Sound that interferes with an acoustic process.
Auditory injury	Damage to the inner ear that can result in the destruction of tissue, such as the loss of cochlear neuron synapses or auditory neuropathy. Auditory injury may or may not result in a permanent threshold shift (PTS) (National Marine Fisheries Service (NMFS), 2024).
Behavioural response	A behavioural response or disturbance in a species from sound pressure. Behavioural response will depend on the audible frequency range of each potential receptor in relation to the frequency of the noise (as species will only respond to acoustic signals they can detect), as well as the intensity of the noise.
Continuous sound	A sound whose sound pressure level remains above the background noise during the observation period and may gradually vary in intensity with time, e.g. sound from a marine vessel.
Decibel (dB)	Unit of level used to express the ratio of one value of a power quantity to another on a logarithmic scale. Especially suited to quantify variables with a large dynamic range.
Ensonified	Exposed to sound.
Hearing threshold	For a given species or functional hearing group, the sound level for a given signal that is barely audible (i.e. that would be barely audible for a given individual in the presence of specified background noise during a specific percentage of experimental trials).
Impulsive sound	Qualitative term meaning sounds that are typically transient, brief (less than one second), broadband, with rapid rise time and rapid decay. They can occur in repetition or as a single event. Sources of impulsive sound include, among others, explosives, seismic airguns, and impact pile drivers.
Masking	Obscuring of sounds of interest by other sounds at similar frequencies.
Peak sound pressure level (PK), zero-to-peak sound pressure level	The level (Lpk) of the squared maximum magnitude of the sound pressure (p^2_{pk}) in a stated frequency band and time window. Defined as Lpk = 10log10(p^2_{pk}/p^2_0) = 20log10(ppk/p0). Unit: decibel (dB). Reference value (p^2_0) for sound in water: 1 µPa^2.

Terms	Definition
Permanent threshold shift (PTS)	An irreversible loss of hearing sensitivity caused by excessive noise exposure. Considered auditory injury. Compare with temporary threshold shift.
Sound pressure level (SPL), rms sound pressure level	The level (Lp) of the time-mean-square sound pressure (p^2_{rms}) in a stated frequency band and time window: Lp = 10log10(p^2_{rms}/p^2_0) = 20log10(prms/p0), where rms is the abbreviation for root-mean-square. Unit: decibel (dB). Reference value for sound in water: 1 μPa^2. SPL can also be expressed in terms of the rms with a reference value of p0 = 1 μPa. The two definitions are equivalent.
Source level	A property of a sound source equal to the sound pressure level measured in the far field plus the propagation loss from the acoustic centre of the source to the receiver position. Unit: decibel (dB). Reference value: 1 μPa^2 m².
Sound exposure level (SEL)	The level (LE) of the sound exposure (E) in a stated frequency band and time window: LE = 10log10(E/E0) (ISO 18405:2017). Unit: decibel (dB). Reference value (E0) for sound in water: 1 μPa^2 s.
Temporary threshold shift (TTS)	Reversible loss of hearing sensitivity caused by noise exposure.

6.1.1.1 Noise generated by MODU/LWIV

The MODU/LWIV will generate noise from the operation of on-board machinery. Machinery on board the MODU includes diesel engines, mud pumps, ventilation fans (and associated exhaust) and electrical generators, and also from drilling equipment. Whilst there are no direct studies or data for underwater noise relating to an LWIV operating on DP, the LWIV is likely to have similar DP thruster power to a MODU.

McCauley (1998) reported noise levels generated by a semi-submersible rig; during non-drilling periods the typical broadband level encountered was approximately 113 dB (rms) re 1 μPa@125 m with various tones from the machinery observable in the noise spectra. There was significant variation in the broadband noise during non-drilling periods, attributed to the operation of specific types of machinery. During drilling periods, the broadband noise level increased to the order of 177 dB (rms) re 1 μPa@125 m. Studies undertaken in the Arctic on different MODU types (including semi-submersible and drill ships) indicate that noise levels dropped to 117 dB re 1 μPa within 1 km of the MODU and are much lower than those for large commercial vessels operating at normal speeds (Austin et al., 2018). Hence source levels from the MODU are reasonably assumed to be <170.7 dB re 1 μPa, concentrated below 2 kHz and reduce rapidly with distance from the MODU.

Indicative DP MODU underwater noise measurements taken for the West Aquarius MODU by JASCO on the Scotian Shelf in Canada recorded broadband sound levels of 186.3 dB re 1 μPa (Martin et al., 2019). This is similar to measurements taken for the Maersk Discoverer drill rig on the NWS (Woodside Energy Ltd, 2011), with a recorded source level between 176 and 185 dB re 1 μPa SPL at 1 m. Underwater noise from a MODU/LWIV operating on DP is expected to drop below 120 dB re 1 μPa within 4 to 5 km.

6.1.1.2 Noise generated by flaring during well bleed-off

Flaring noise from well bleed off is expected to occur intermittently over approximately two to three days for short duration (typically six to 12 hours). Noise from flaring is emitted at the top of the flare tower, which is more than 100 m above sea level. Noise from the tip of the flare is not constrained and spreads spherically in all directions. Received levels from airborne propagation modelling were used to ascertain the underwater received levels during flaring activities for a drilling and subsea installation activity (Woodside, 2019). Only a very small fraction of the acoustic energy produced from flaring will transmit through the air/water boundary due to the surface of water acting as a reflective plane and a significant component of acoustic energy reflecting back into the air. While underwater received sound pressure level during flaring is estimated to be 136 dB re 1μPa at 1m (SPL) below the sea surface it is estimated to attenuate to ambient levels within a very short distance (e.g. metres) (Woodside, 2024) and therefore is not considered further in the impact assessment.

6.1.1.3 Noise generated by support vessels

Vessel operational noise consists of machinery noise (e.g. engine and equipment noise) and hydrodynamic noise (e.g. water flowing past the hull and propeller singing). All machinery on a ship radiates sound through the hull into the water. However, sound emitted from support vessels differs significantly depending on factors such as speed, size, load, type and state of propulsion system, and meteorological and oceanographic conditions, such as sea surface and currents (MacGillivray et al., 2018).

For support vessels, the noisiest anticipated activity is when the vessel uses thrusters to maintain its position. McCauley (1998) measured underwater sound pressure levels equivalent to approximately 182 dB re 1 µPa @ 1 m with a frequency range of 20 Hz to 10 kHz from a support vessel holding station in the Timor Sea. The thruster noise dropped below 120 dB re 1 µPa within 3 to 4 km and was audible above ambient noise up to 20 km away (McCauley, 1998). McCauley (1998) measured underwater sound levels from the Pacific Ariki, a 64 m long support vessel with 8,000 HP (6,000 kW) main engines during calm conditions in the Timor Sea in 110 m of water while transiting at 11 knots, and found the distance to 120 dB re 1 µPa to be approximately 1 km. More recently, Koessler & McPherson (2020) modelled underwater sound levels from an offshore support vessel in 90 m of water, with underwater SPL of 183 dB re 1 µPa @ 1 m whilst operating all three thrusters. The modelling indicated that thruster noise dropped below 120 dB re 1 µPa within 4 to 5 km.

This has been taken as the greatest noise-generating activity for assessment purposes, as other vessel activities will require the vessel to be idle or moving. Up to three support vessels may be present in the Operational Area at any one time. The presence of all three support vessels in the Operational Area plus the MODU operating on DP simultaneously and in close proximity to each other would conservatively result in an estimated sound pressure of 201 dB re 1 µPa @ 1 m (183 dB + 6 dB + 6 dB + 6 dB). However, all three support vessels would only be in the Operational Area simultaneously for short periods of time and would only use thrusters to maintain positions for short, intermittent periods of time, and may be carrying out support activities (e.g. ROV surveys) with spatial separation from each other.

6.1.1.4 Noise generated from remotely operated vehicle operations

An ROV may be used for various purposes during activities, notably prior and post activity inspections of the seabed, debris clearing, interfacing with subsea equipment, equipment cutting and removal activities and recovery of dropped objects. This will be undertaken from a vessel or MODU and the noise generated will typically be of considerably lower intensity than vessel/MODU noise.

As underwater sound levels are dependent on the primary (noisiest) sound source rather than being strictly additive, and since ROV operations will be undertaken from a vessel or MODU, they will make little contribution to the overall noise emissions associated with MODU and/or vessel activities, as described above and are not risk assessed further.

6.1.1.5 Noise generated from side scan sonar or echo sounders

SSS, SBES and MBES are used to develop high-resolution images of the seafloor or objects on the seafloor such as subsea infrastructure. Sound pressure levels for SBESs and MBESs typically range from 210 to 245 dB re 1 µPa @ 1 m, and SSS typically range from 220 to 226 dB re 1 µPa @ 1 m (Department of Energy and Climate Change, 2011).

A modelling study completed in 2013 (Zykov, 2013) indicated the maximum distances at which sound pressure levels were reduced to just above background level (120 dB re 1 µPa) from different equipment types. These were:

- MBES: approximately 1 km from the sound source
- SBES: approximately 350 m from the sound source
- SSS: 1.5 km from the sound source.

SBES, MBES and SSS used for surveys have the potential to cause some temporary behavioural disturbance to marine fauna. However, noise levels are well below injury thresholds. Due to the short duration chirps, the temporary and intermittent use and the mid-frequencies used by positioning and survey equipment, the acoustic noise from the survey equipment is unlikely to have a substantive effect on the behavioural patterns of marine fauna.

6.1.1.6 Noise generated by positioning equipment

A long baseline or ultrashort baseline transponder may be installed on the seabed for metrology and positioning. Transponders typically emit pulses of medium frequency sound, generally within the range 21 to 31 kHz. The estimated SPL would be 180 to 206 dB re 1 µPa at 1 m (Jiménez-Arranz et al., 2019). Transmissions are not continuous but consist of short ‘chirps’ with a duration that ranges from 3 to 40 milliseconds. Transponders will only be active when positioning is required.

6.1.1.7 Noise generated by helicopters

Sound traveling from a source in the air (e.g. a helicopter) to a receiver underwater is affected by both in-air and underwater propagation processes, which are further complicated by processes occurring at the air-seawater surface interface (e.g. wind and waves). The level of noise received underwater depends on source altitude and lateral distance, receiver depth, water depth, and other variables.

Helicopter engine noise is emitted at various frequencies however, the dominant tones are generally of a low frequency below 500 Hz (Richardson et al., 1995). Sound pressure in the water directly below a helicopter is greatest at the surface and diminishes with increasing receiver depth. Noise also reduces with increasing helicopter altitude, but the duration of audibility often increases with increasing altitude, with sound penetrating water at angles less than 13°. The noise from the flyover of a Bell 214 helicopter (stated to be a noisy model) has been recorded underwater (Richardson et al., 1995). The sound source was 162 dB re 1 µPa @ 1 m at its peak and had frequency of 155 Hz.

6.1.2 Nature and scale of environmental impacts

Potential receptors: Threatened or migratory fauna (marine mammals, marine turtles, sharks, fish, rays and seabirds) cultural receptors (totemic species).

A PMST search was conducted on the Operational Area to identify any MNES species within the potential area of impact from noise (Appendix C). A 20 km buffer around the Operational Area was also assessed to identify any nearby MNES species that may also be impacted by noise emissions. Three BIAs (humpback whale migration, pygmy blue whale migration, wedge-tailed shearwater Reproduction) were identified as overlapping the Operational Area and an additional five BIAs were identified as overlapping the 20 km buffer surrounding the Operational Area, as outlined in Table 3-9.

The use of sound in the underwater environment is important for marine animals, particularly cetaceans, to navigate, communicate and forage effectively, along with turtles, sharks, rays, and other fish, for a range of functions such as social interaction, foraging and orientation. Underwater noise may impact on marine fauna through:

- attraction to the noise source
- increased stress levels
- disruption to underwater acoustic cues
- localised avoidance
- disturbance, leading to behavioural changes or displacement from areas
- masking or interference with other biologically important sounds such as communication or echolocation
- physical injury to hearing or other organs
- indirectly by inducing behavioural and physiological changes in predator or prey species.

The nature and scale of impacts must be considered in the context of the ambient noise environment. Ambient underwater noise levels are dependent on location, and are often dominated by local wind noise, waves, biological noise, and ship traffic. Wind speed and seabed conditions have a clear influence on the ambient noise level. Existing anthropogenic underwater noise sources in the region of the proposed activity include shipping, small vessel traffic, and petroleum-production activities.

Marine fauna respond variably when exposed to underwater noise from anthropogenic sources, with effects dependent on a number of factors, including distance from the sound source, water depth and bathymetry, the animal's hearing sensitivity, type and duration of sound exposure and the animal's activity at time of exposure. Broadly, the effects of sound on marine fauna can be categorised as:

- Acoustic masking – anthropogenic sounds may interfere with, or mask, biological signals, therefore reducing the communication and perceptual space of an individual. Auditory masking impacts may occur when there is a reduction in audibility for one sound (signal) caused by the presence of another sound (noise). For this to occur the noise must be loud enough and have a similar frequency to the signal and both signal and noise must occur at the same time.
- Behavioural response – behavioural impacts will depend on the audible frequency range of each potential receptor in relation to the frequency of the noise, as marine animals will only respond to acoustic signals they can detect, as well as the intensity of the noise. The intensity of behavioural responses of marine mammals to sound exposure ranges from subtle responses, which may be difficult to observe and have little implications for the affected animal, to obvious responses, such as avoidance or panic reactions. The

context in which the sound is received by an animal affects the nature and extent of responses to a stimulus. The threshold for elicitation of behavioural responses depends on received sound level, as well as multiple contextual factors such as the activity, state of animals exposed to different sounds, the nature and novelty of a sound, spatial relations between a sound source and receiving animals, and the gender, age, and reproductive status of the receiving animal.

- Physiological impacts - auditory threshold shift (temporary and permanent hearing loss) – marine fauna exposed to intense sound may experience a loss of hearing sensitivity, or even potentially mortal injury. Hearing loss may be in the form of a TTS from which an animal recovers within minutes or hours, or a PTS from which the animal does not recover.

Available threshold criteria associated with behavioural and physiological impacts for sensitive receptors have been derived from a number of sources (NMFS, 2018a; Popper et al., 2014; Southall et al., 2019; NMFS, 2024). These criteria have been compared with measured and predicted sound levels for different sound sources to assess potential impacts.

6.1.2.1 Marine mammals

No known aggregation, resting, breeding or feeding areas for cetaceans lie close to the Operational Area, however, the migration BIA for the pygmy blue whale and humpback whale intersect the Operational Area. Additionally, the recovery plan for blue whales lists noise interference as a potential threat.

Marine mammals, especially cetaceans, rely on sound for individual recognition, socialising, detecting predators and prey, navigation, and reproduction (Erbe, 2012; Erbe et al., 2016; Weilgart, 2007). Underwater noise can affect marine mammals in various ways including interfering with communication (masking), behavioural changes, a shift in the hearing threshold (PTS and TTS), physical damage and stress (Erbe, 2012).

The thresholds that could result in a behavioural response, TTS and auditory injury onset (AIO) for cetaceans as a result of continuous and impulsive noise sources are presented in Table 6-3 and Table 6-4. These thresholds have been adopted by the United States National Oceanic and Atmospheric Administration (NOAA, 2019a), NMFS (2024) and Southall et al. (2019).

Behavioural reactions to acoustic exposure are generally more variable, context-dependent, and less predictable than the effects of noise exposure on hearing or physiology. Hence, it is difficult to determine thresholds for behavioural response in individual cetaceans as the way they respond often varies (Nowacek et al., 2004; Gomez et al., 2016; Southall et al., 2019) and is influenced by both biological and environmental factors such as age, sex and the activity at the time. Observed disturbance responses to anthropogenic sound in cetaceans include altered swimming direction; increased swimming speed including pronounced ‘startle’ reactions; changes to surfacing, breathing and diving patterns; avoidance of the sound source area and other behavioural changes.

Table 6-3: Thresholds for behavioural responses, temporary threshold shift and auditory injury onset for cetaceans and sirenians for continuous noise

Hearing Group	Auditory Injury Onset Threshold: SEL_{24h} (dB re 1 μPa^2 s)	TTS Onset Threshold: SEL_{24h} (dB re 1 μPa^2 s)	Behavioural Response (dB re 1 µPa)
Low frequency cetaceans	197	177	120
High frequency cetaceans	201	181	160
Very high frequency cetaceans	181	161	160
Sirenians	200	180	-
Otariid pinnipeds	199	179	160

Source: NMFS (2024), Southall et al. (2019), NOAA (2019a)

Table 6-4: Thresholds for behavioural response, temporary threshold shift and auditory injury onset for cetaceans and sirenians for impulsive noise

Hearing Group	NOAA (2019b)	NMFS (2024)			
	Behaviour	Auditory Injury Onset Thresholds (Received Level)		TTS Onset Thresholds (Received Level)	
	SPL (L_p; dB re 1 µPa)	Weighted SEL_{24h} ($L_{E,24h}$; dB re 1 $\mu Pa^{2 \cdot s}$)	PK (L_{PK}; dB re 1 µPa)	Weighted SEL_{24h} ($L_{E,24h}$; dB re 1 $\mu Pa^{2 \cdot s}$)	PK (L_{PK}; dB re 1 µPa)
Low frequency cetaceans	160	183	222	168	216
High frequency cetaceans	160	193	230	178	224
Very high frequency cetaceans	160	159	202	144	196
Sirenians	-	186	225	171	219
Otariid pinnipeds	160	185	230	170	224

Source: NMFS (2024)

Cetaceans may travel through the Operational Area; small sections of the migration BIA for the pygmy blue whale and humpback whale overlap the Operational Area (Figure 3-9 and Figure 3-10).

No known aggregation, resting, breeding or feeding areas for cetaceans lie close to the Operational Area. The recovery plan for blue whales list noise interference as a potential threat (Table 3-10). Other species of cetaceans including high-frequency cetaceans (toothed whales except porpoises), Sirenians and Pinnipeds may also be exposed to underwater noise from the activities; However, humpback and pygmy blue whales (low frequency cetaceans) are considered to be the most vulnerable to impacts due to their known seasonal presence in the vicinity of the Operational Area and noise interference listed as a potential threat.

The Conservation Management Plan for the Blue Whale (CoA, 2015b), a recovery plan made under the EPBC Act, defines BIAs for pygmy blue whales, with particular emphasis placed on foraging areas and migration corridors. Action Area A.2.3 of the Conservation Management Plan for the Blue Whale states: “Anthropogenic noise in BIAs will be managed such that any blue whale continues to utilise the area without injury and is not displaced from a foraging area”. Based on the Guidance on Key Terms within the Blue Whale Conservation Management Plan (Department of Agriculture, Water and Environment (DAWE), 2021), underwater noise emissions from the petroleum activities must not:

- result in injury (TTS or AIO) to any pygmy blue whale in BIAs
- displace a pygmy blue whale from a foraging BIA.

Thums et al. (2022) suggest that the pygmy blue whale migration corridor may extend much further west from the shelf edge, into waters deeper than the migration BIA established by DCCEEW and deeper than those of the Operational Area. Consequently, pygmy blue whales are unlikely to occur in the Operational Area in significant numbers, with observed and modelled distributions of pygmy blue whales occurring further offshore in deeper water (Double et al., 2014; Thums et al., 2022). It is likely that transient individuals or small groups are occasionally in and around the Operational Area during migration periods (April to July and October to January, respectively) (McCauley, 2011; Gavrilov et al., 2018; Thums et al., 2022). Significant numbers of pygmy blue whales are not expected to be encountered, particularly outside peak periods for northbound or southbound migrations.

Humpback whales are seasonally present in the NWS region during their annual migrations to and from breeding areas in northern Western Australia. The migration BIA for humpback whales overlaps the Operational Area. Aerial surveys and tagging studies of humpback whales indicate that most migrating humpbacks occur in shallower water than the Operational Area, but considerable numbers of humpback whales have been observed in the region in water depths similar to the Operational Area (Double et al., 2010; Double et al., 2012; RPS Environment and Planning, 2010; Thums et al., 2018). It is reasonable to conclude that a portion of the humpback whale population may occur in or near the Operational Area during seasonal migrations and hence be exposed to underwater noise at levels that may cause impacts. Other known important areas for humpback whales, such as foraging or cow/calf resting areas do not occur in or near (within 20 km) the Operational Area.

Vessels (including the MODU/LWIV) holding station using DP have the greatest potential to cause impacts to pygmy blue whales and humpback whales due to their relatively high source level and broadband nature, which includes low frequency components that overlap the functional hearing range of humpback whales. Other noise

sources are less likely to result in impacts due to their lower source levels (e.g. ROV, positioning equipment noise), relatively high frequency and consequent rapid attenuation (e.g. positioning equipment noise) or short duration (e.g. helicopter noise). Source levels of noise from vessels using DP will not credibly exceed the AIO threshold for low frequency cetaceans. Noise levels would only credibly exceed the TTS threshold in the immediate vicinity of the source (i.e. tens of metres from a thruster) and would require a pygmy blue whale or humpback whale to remain in this proximity to the noise source for a sustained period of time. Pygmy blue whales and humpback whales receiving sufficient noise for AIO and TTS is not considered credible.

Noise levels that exceed the behavioural impact threshold may extend from vessels to approximately 5 km (see Section 6.1.1). Migrating pygmy blue whales and humpback whales within this area may experience behavioural disturbances, such as avoidance of the noise source, increased swimming speed and increased diving frequency. These behavioural responses have been observed in response to the presence of vessels in humpback migration areas, although the effect of the vessel (and seismic source) did not stop migration (Dunlop et al., 2015). Consequently, underwater noise emissions may induce short-term behavioural responses in pygmy blue whales and humpback whales where they are present close to vessels, but this will affect a small portion of the population and is not considered to impact migration behaviour.

Vessel noise may also mask whale calls, which may interfere with the perception of communication and result in species increasing their call volumes. Masking would only credibly occur when vessels are holding station using DP. Adult male humpback whales call most frequently and loudly during migration, with females and calves vocalising more quietly and far less frequently (Gosby et al., 2022; Salgado-Kent et al., 2012).

Helicopter noise would only credibly impact upon cetaceans during take-off and landing at the MODU or vessels. Cetaceans are unlikely to be close to the MODU during helicopter take-off and landings, as they are likely to be displaced due to the noise generated by the MODU and vessels. Given helicopter noise is largely be reflected by the sea surface and take-off and landing operations are short-term, impacts to cetaceans from helicopter noise are very unlikely to occur.

High and very high frequency cetaceans, such as dolphins, may occur in or adjacent (within 20 km) the Operational Area. High and very high frequency cetaceans may be impacted by underwater noise generated by the activities, particularly acoustic emissions from positioning equipment (e.g. ultrashort baseline and long baseline) operate in frequencies that overlay the functional hearing range of high-frequency cetaceans. Source levels for acoustic positioning equipment may exceed the TTS and behavioural impact thresholds for high and very high frequency cetaceans (Table 6-3; Table 6-4). High-frequency noise attenuates rapidly in seawater and the noise emissions from positioning equipment on the seabed (>300 m water depth) will be substantially lower power for receivers near the sea surface, which is where high frequency cetaceans are most likely to occur. High frequency noise from positioning equipment will be of relatively short duration (e.g. several hours when positioning equipment) and infrequent during the activities. The Operational Area is not known to be important habitat for high and very high frequency cetaceans. Consequently, impacts to high frequency cetaceans are likely to be limited to short-term behavioural impacts.

There are no significant habitat or BIAs for sirenians in or near the Operational Area.

6.1.2.2 Marine turtles

There are four species of marine turtle that may occur within the Operational Area: flatback turtle, green turtle, hawksbill turtle, and loggerhead turtle (refer to Section 3.2.6). The nearest BIA for marine turtles is the flatback turtle reproduction (internesting) BIA, located approximately 8 km south-east of the Operational Area. While this BIA and other critical nesting habitats for green, hawksbill, and loggerhead turtles are situated within the surrounding 20 km buffer zone, they do not directly overlap with the Operational Area itself (see Section 3.2.6.1). However, critical habitat for the survival of flatback turtles does partially overlap with the Operational Area (Figure 3-14).

Recent tagging studies have identified that waters utilised by flatback turtles during post-nesting migration and foraging are typically less than 50 m deep and less than 66 km from shore (Whittock et al., 2016; Thums et al. 2018). Thums et al. (2018) specifically studied flatback turtles during their post-nesting migration from the Lacepede Islands and during foraging. The study found that flatback turtles migrated along the coast in water depths of 63 ± 5 m. Given the water depths of the Operational Area (>300 m), it is expected that individual marine turtles may pass through the Operational Area, however, it is considered unlikely that significant numbers of internesting turtles would be present within the Operational Area.

The Recovery Plan for Marine Turtles in Australia (CoA, 2017) identifies noise interference from anthropogenic activities as a threat to marine turtles with the following priority actions identified for all stocks of marine turtles:

- Manage anthropogenic activities to ensure marine turtles are not displaced from identified habitat critical to the survival.
- Manage anthropogenic activities in BIAs to ensure biologically important behaviours can continue.

The plan also highlights noise interference from anthropogenic activities as a threat to marine turtles. The plan refers to vessel noise and the operation of some oil and gas equipment as sources of chronic (continuous) noise in the marine environment, exposure to which may lead to avoidance of important turtle habitat.

The recommended criteria for continuous and impulsive sound sources are shown in Table 6-5 and Table 6-6, respectively.

Table 6-5: Acoustic effects of continuous noise on marine turtles

Potential Marine Fauna Receptor	Popper et al. (2014)	NMFS (2024) dB SPL rms	Finneran et al (2017) Weighted SEL_{24h} (LE_{24h}; dB re 1 $\mu Pa^2 \cdot s$)	
	Masking	Behaviour	PTS Onset Threshold	TTS Onset Threshold
Marine turtle	(N) High (I) High (F) Moderate	175	220	200

Note: Relative risk (high, moderate, low) is given for animals at three distances from the source defined in relative terms as near (N) – tens of metres, intermediate (I) – hundreds of metres, and far (F) – thousands of metres.

Table 6-6: Acoustic effects of impulsive noise on marine turtles

NMFS (2024)	NMFS (2024) Finneran et al (2017)			
Behaviour	PTS onset threshold		TTS onset threshold	
dB SPL RMS	Weighted SEL_{24h} (LE_{24h}; dB re 1 μPa^2 s)	PK (Lpk; dB re 1 µPa)	Weighted SEL_{24h} (LE_{24h}; dB re 1 $\mu Pa^2 \cdot s$)	PK (L_{pk}; dB re 1 µPa)
175	204	232	189	226

There is a paucity of data regarding responses of turtles to acoustic exposure, and no studies of hearing loss due to exposure to loud sounds. Popper et al. (2014) suggested thresholds for onset of mortal injury (including PTS) and mortality for sea turtles and, in absence of taxon-specific information, adopted the levels for fish that do not hear well (suggesting that this likely would be conservative for sea turtles).

Finneran et al. (2017) proposed revised thresholds for marine turtle injury and hearing impairment (TTS and PTS). Their rationale is that marine turtles have best sensitivity at low frequencies and are known to have poor auditory sensitivity (Ketten & Barol, 2006). Accordingly, TTS and PTS thresholds for turtles are likely more similar to those of fishes than to marine mammals (Popper et al., 2014).

Studies show that behavioural responses such as an increase in swimming activity occurred with received sound levels of approximately 166 dB re 1 µPa and an avoidance response and behaving erratically occurred at around 175 dB re 1 µPa (McCauley et al., 2000; NMFS, 2024). Source levels from vessels using DP may exceed these levels and hence may result in behavioural responses in marine turtles.

Based on the criteria detailed within Table 6-5 and if vessels operating on DP emit approximately 182 dB re 1 µPa at 1 m (rms SPL) (McCauley, 1998), PTS and TTS will not credibly occur. Behavioural changes, for example, avoidance and diving, are only predicted for individuals in close proximity to noise sources, particularly vessels holding station using DP. These are expected to occur in within hundreds of metres of the noise source and hence may result in a short-term displacement of marine turtles around vessels. Turtles have not been shown to have a reliance on sound for finding food or avoiding predators, hence masking is unlikely to occur.

Injury to marine turtles from impulsive noise sources (i.e. positioning equipment) will not credibly occur. Behavioural changes, for example, avoidance and diving, are only predicted for individuals in close proximity to the noise sources, which are near the seabed where individuals are unlikely to be present.

6.1.2.3 Sea snakes

No EPBC Act listed sea snake species were identified as potentially occurring within the Operational Area, however one sea snake species, the short-nosed sea snake, was identified as potentially occurring within the 20 km buffer surrounding the Operational Area.

There is limited information about the effects of noise on sea snakes. A current research project investigating the impacts of seismic surveys found that hearing sensitivity of sea snakes is similar to species of fish without a swim bladder (see Section 6.1.2.4). Therefore, it is considered that there is a moderate risk in the near and intermediate distances (which extends hundreds of metres) of behavioural impacts to sea snakes, with the impacts being limited to temporary avoidance of the area.

6.1.2.4 Sharks, rays, and fish

All fish species can detect noise sources, although hearing ranges and sensitivities vary substantially between species (Dale et al., 2015). Sensitivity to sound pressure seems to be functionally correlated in fishes to the presence and absence of gas-filled chambers in the sound transduction system. These enable fishes to detect sound pressure and extend their hearing abilities to lower sound levels and higher frequencies (Ladich & Popper, 2004).

Based on their morphology, Popper et al. (2014) classified fishes into three animal groups comprising:

- fishes with swim bladders whose hearing does not involve the swim bladder or other gas volumes
- fishes whose hearing does involve a swim bladder or other gas volume
- fishes without a swim bladder that can sink and settle on the substrate when inactive.

Although specific exposure criteria for sharks and rays are not available, the same thresholds used for fish are generally applied, noting that sharks and rays typically lack swim bladders.

Underwater noise impact thresholds for continuous and impulsive noise for the fish categories listed above are provided in Table 6-7 and Table 6-8 for continuous and impulsive noise, respectively. Thresholds for PTS and recoverable injury are between 207 dB PK and 213 dB PK (depending on the presence or absence of a swim bladder), and the threshold for TTS is 186 dB SELcum (Popper et al., 2014).

Table 6-7: Criteria for continuous noise exposure for fish

Potential Marine Fauna Receptor	Mortality and Potential Mortal Injury	Impairment			Behaviour
		Recoverable Injury	TTS	Masking	
Fish: No swim bladder (particle motion detection)	(N) Low (I) Low (F) Low	(N) Low (I) Low (F) Low	(N) Moderate (I) Low (F) Low	(N) High (I) High (F) Moderate	(N) Moderate (I) Moderate (F) Low
Fish: Swim bladder not involved in hearing (particle motion detection)	(N) Low (I) Low (F) Low	(N) Low (I) Low (F) Low	(N) Moderate (I) Low (F) Low	(N) High (I) High (F) Moderate	(N) Moderate (I) Moderate (F) Low
Fish: Swim bladder involved in hearing (primarily pressure detection)	(N) Low (I) Low (F) Low	170 dB SPL for 48 hrs	158 dB SPL for 12 hrs	(N) High (I) High (F) High	(N) High (I) Moderate (F) Low
Fish eggs and fish larvae	(N) Low (I) Low (F) Low	(N) Low (I) Low (F) Low	(N) Low (I) Low (F) Low	(N) High (I) Moderate (F) Low	(N) Moderate (I) Moderate (F) Low

Note: Relative risk (high, moderate, low) is given for animals at three distances from the source defined in relative terms as near (N) – tens of metres, intermediate (I) – hundreds of metres, and far (F) – thousands of metres.

Source: Popper et al. (2014).

Table 6-8: Criteria for impulsive noise exposure for fish

Potential Marine Fauna Receptor	Mortality and Potential Mortal Injury	Impairment			Behaviour
		Recoverable Injury	TTS	Masking	
Fish: No swim bladder (particle motion detection)	>219 dB SEL_{24h} or >213 dB PK	>216 dB SEL_{24h} or >213 dB PK	>186 dB SEL_{24h}	(N) Low (I) Low (F) Low	(N) High (I) Moderate (F) Low
Fish: Swim bladder not involved in hearing (particle motion detection)	210 dB SEL_{24h} or >207 dB PK	203 dB SEL_{24h} or >207 dB PK	>186 dB SEL_{24h}	(N) Low (I) Low (F) Low	(N) High (I) Moderate (F) Low
Fish: Swim bladder involved in hearing (primarily pressure detection)	207 dB SEL_{24h} or >207 dB PK	203 dB SEL_{24h} or >207 dB PK	186 dB SEL_{24h}	(N) Low (I) Low (F) Moderate	(N) High (I) High (F) Moderate
Fish eggs and fish larvae	>210 dB SEL_{24h} or >207 dB PK	(N) Moderate (I) Low (F) Low	(N) Moderate (I) Low (F) Low	(N) Low (I) Low (F) Low	(N) Moderate (I) Low (F) Low

Note: Relative risk (high, moderate, low) is given for animals at three distances from the source defined in relative terms as near (N) – tens of metres, intermediate (I) – hundreds of metres, and far (F) – thousands of metres.

Source: Popper et al. (2014)

Based on these criteria, noise impacts from the MODU operations and support vessels presents a low risk of mortality and a moderate risk of TTS impacts for fish within tens of metres from the source. The most likely impacts to fish from noise will be behavioural responses. The most likely impact is behavioural disturbance, with moderate risk identified at near (tens of metres) and intermediate (hundreds of metres) distances. Masking could occur within thousands of metres under a worst-case scenario of vessel operations; however, typically any effect will be limited to within hundreds of metres.

The Operational Area and 20 km buffer overlap with the continental slope demersal fish KEF and the canyons linking the Cuvier Abyssal Plain KEF (5 km). Individual demersal fish may be impacted in the immediate vicinity of the activity, and mobile pelagic species such as tuna and billfish may transverse the Operational Area. However, the Operational Area are not known to be an important spawning or aggregation habitat for commercially caught targeted species and FishCube data did not identify any recent active fishing effort within the Operational Area. Therefore, no impacts to fish stocks are expected.

The whale shark foraging BIA is located approximately 10 km to the south-east of the Operational Area. While whale sharks may be exposed to operational noise, they are expected to exhibit avoidance behaviour if noise levels are sufficiently high or disruptive. However, observations from the NWS and Ningaloo Coast suggest that whale sharks can tolerate low level anthropogenic noise. For example, acoustic telemetry data has shown that whale sharks tagged at Ningaloo Reef have been repeatedly detected near oil and gas platforms of the NWS, including North Rankin A and Pluto, indicating a degree of habituation or tolerance to platform-associated noise and activity (Thomson et al., 2021). Additionally, whale sharks are regularly observed swimming close to charter vessels during tourism operations at Ningaloo (Raudino et al., 2016), further supporting the assumption that low-level operational noise is unlikely to result in significant behavioural disturbance.

In summary, based on thresholds outlined by Popper et al. (2014), fish, sharks, and rays may exhibit avoidance behaviour in response to operational noise. However, impacts are expected to be localised, temporary, and not ecologically significant at the population level.

6.1.2.5 Invertebrates

Benthic invertebrates are unlikely to be negatively impacted from noise generated from vessel operations; there is no convincing scientific evidence for any significant effects induced by non-impulsive noise in benthic invertebrates.

Plankton, including fish eggs and larvae, and pelagic invertebrates could drift into proximity to high energy noise sources (for example, bow thrusters). However, any negative impacts that could occur would be restricted to within metres of the sound source. At such a localised extent, impacts would be negligible at an ecosystem or population level.

6.1.2.6 Seabirds

The Operational Area overlaps the reproduction BIA for the wedge-tailed shearwater. Seabirds and migratory shorebirds within the Operational Area are unlikely to be directly affected by underwater noise generated during the activity. Given the expected low density of seabirds and migratory shorebirds within the Operational Area, the relative infrequency of helicopter flights and lack of lasting effect of potential behavioural responses to helicopter and vessel noise, impacts are expected to be negligible.

6.1.2.7 Cultural receptors

Totemic species of cultural value may pass through the Operational Area; however, during consultation Santos has not been made aware of any other cultural receptors within the Operational Area. Noise impacts to marine species and seabirds have been assessed above.

6.1.2.8 Cumulative impacts

Up to three support vessels may be present in the Operational Area at any one time. However, all three support vessels would only be in the Operational Area simultaneously for short periods of time and would only use thrusters to maintain positions for short, intermittent periods of time, and may be carrying out support activities (e.g. delivering equipment and consumables to the MODU or LWIV) with spatial separation from each other.

Continuous noise levels from the MODU/LWIV, helicopters and vessels that may cause behavioural responses are expected to generally be confined to the Operational Area and concentrated within a radius of a few hundred metres of the noise source, and as such cumulative impacts from project activities are not expected. The activities will not occur concurrently with the FAR campaign and therefore no potential cumulative noise impacts from concurrent activities within the VGCN Field will occur. Consultation with other operators have not identified any concurrent activities, therefore no potential additive or cumulative noise impacts from concurrent activities with other operators will occur.

6.1.3 Environmental performance outcomes and control measures

The EPO relating to this event is:

- No injury or mortality to *Environment Protection and Biodiversity Conservation Act 1999* and the WA *Biodiversity Conservation Act 2016* listed fauna during activities [VGCN-EPO-01].

The control measures considered for this activity are shown in Table 6-9, and the EPSs and measurement criteria for the EPOs are described in Section 8.

Table 6-9: Control measure evaluation for noise emissions

Control Measure Reference No.	Control Measure	Environmental Benefit	Potential Cost/Issues	Evaluation
Standard controls				
VGCN-CM-001	Procedure for interacting with marine fauna	Reduces risk of physical and behavioural impacts to marine fauna from vessel, because if they are sighted, then the vessel can slow down or move away, and helicopters can increase distances from sighted fauna if required.	Operational costs to adhere to marine fauna interaction restrictions, such as vessel speed and direction, are based on legislated requirements and must be accepted.	**Adopted** – Benefits in reducing impacts to marine fauna outweigh the costs incurred by Santos. Control drives compliance with EPBC Regulations (Part 8).
VGCN-CM-002	Vessel planned maintenance system (PMS) to maintain vessel DP, engines and machinery	Reduces noise emissions from the vessels because equipment is operating within its parameters.	Costs are standard for routine PMS.	**Adopted** – Benefits in reducing noise impacts.
VGCN-CM-003	MODU PMS to maintain vessel DP, engines and machinery	Reduces noise emissions from the vessels because equipment is operating within its parameters.	Costs are standard for routine PMS.	**Adopted** – Benefits in reducing noise impacts.

Control Measure Reference No.	Control Measure	Environmental Benefit	Potential Cost/Issues	Evaluation
VGCN-CM-004	Marine assurance standard	Ensures contracted vessels are operated, maintained and manned in accordance with industry standards (for example, Marine Orders) and regulatory requirements (this EP) and the relevant Santos procedures mentioned in this EP.	Costs are expected as part of standard procedure.	**Adopted** – Benefits in reducing noise impacts.
VGCN-CM-005	Vessel bridge crew receive induction in marine fauna observations, marine fauna interaction procedure requirements	Reduces risk of physical and behavioural impacts to marine fauna from vessel, because if they are sighted, then the vessel can slow down or move away.	Minor additional costs associated with induction/training material and time.	**Adopted** – Benefits in reducing noise impacts.
Additional controls				
N/A	Undertake site specific acoustic modelling	The distance at which fauna could experience behavioural impacts can be predicted and compared to literary publications. Additional management controls can then be included if required to support an ALARP justification and reduce potential impacts to marine fauna.	Additional cost to contract consultant to develop a model and produce predicted noise outputs.	**Not Adopted** – The cost associated with site specific modelling, outweighs any environmental benefit, and no further controls can be implemented to reduce vessel noise other than not undertaking the activity. Given the potential impacts are expected to be minor and limited to temporary and minor behavioural changes only, and noise levels from vessels and helicopters will decay rapidly; site-specific modelling will not provide additional information which would alter the current ALARP position. Also, the activity does not occur in a humpback whale resting, foraging, calving or confined migratory pathway.

Control Measure Reference No.	Control Measure	Environmental Benefit	Potential Cost/Issues	Evaluation
N/A	Develop a noise management plan	Potential reduction in impacts to marine fauna, however the impacts are predicted to be minor (e.g. potential temporary and minor behavioural changes).	Additional cost to develop a noise management plan.	**Not Adopted** – The activity does not occur in any resting, foraging, calving or confined migratory pathway for protected cetacean species. Therefore, the cost associated with developing a management plan outweighs the little or no benefit for a short duration activity which has a minor impact (e.g. potential temporary and minor behavioural changes).
N/A	Operational activities to avoid coinciding with sensitive periods for marine fauna present in the Operational Area	Reduce risk of impacts from noise emissions during environmentally sensitive periods for listed marine fauna.	High cost in moving or delaying activity schedule. The risk to all listed marine fauna cannot be reduced due to variability in timing of environmentally sensitive periods and unpredictable presence of some species.	**Not Adopted** – The Operational Area overlaps the pygmy blue whale and humpback whale migration BIA, and the whale shark foraging BIA. These species could be present all year round. AIO and TTS to low-frequency whales (such as humpback and pygmy blue whales) could occur near a vessel, but this scenario is unlikely as animals will move away from harmful levels of continuous noise. Behavioural impacts may occur at up to 5 km from a vessel using DP. As whales and whale sharks are always moving and transiting through the area, they are expected to actively avoid the noise source while transiting. The activity will not restrict the movement of any species within the area as the BIA and the area within which they are distributed in is widespread. Cost is disproportionate to increase in environmental benefit.

Control Measure Reference No.	Control Measure	Environmental Benefit	Potential Cost/Issues	Evaluation
N/A	Dedicated Marine Mammal Observer (MMO) (as per EPBC Policy Statement 2.1 – Part B.1)	Improved ability to spot and identify marine fauna at risk of impact from vessel and survey noise.	Additional cost of contracting several specialist marine fauna observers while the risk to all listed marine fauna cannot be reduced due to variability in timing of environmentally sensitive periods and unpredictable presence of some species.	**Not Adopted** – While the Operational Area intersects the migration BIA of pygmy blue whales and humpback whales, minimal encounters are expected due to the short duration (10 to 40 days) of the activity Cetaceans transiting through the Operational Area are not restricted and therefore impacts are expected to be behavioural in nature. Cost disproportionate to increase in environmental benefit and given that crew members will be observing for marine fauna during MODU and vessel activities.
N/A	Use of passive acoustic monitoring (PAM)	Improve detection of some sensitive receptors.	Costs of PAM operators. Operational costs of shut-downs potentially prolonging the activity.	**Not Adopted** – Cost disproportionate to increase in environmental benefit given the low-level behavioural response expected. Limited ability of PAM to detect cetaceans would provide little benefit to the species expected to be present.
N/A	Verification of noise levels	Allow implementation of adaptive management controls should impact be greater than expected.	Costs of deploying noise monitoring equipment and processing of data.	**Not Adopted** – Cost disproportionate to increase in environmental benefit given the rapid reduction in noise levels from the MODU and vessels and the low-level behavioural response expected.
N/A	Start-up of acoustic equipment and ROV equipment only when ROV in position near the seabed	Restricts ROV noise emissions to smaller portion of water column near seabed. Reduces potential noise interactions with marine fauna.	Not possible – equipment needs to be functioning on deployment.	**Not Adopted** – Control not feasible.

6.1.4 Environmental impact assessment

Receptor	Consequence Level
Noise emissions	
Threatened, migratory or local fauna	While the level of noise expected from temporary and intermittent operational activities has the potential to cause physical injury to marine fauna, most species that may transit through the area are expected to demonstrate avoidance behaviour if noise levels approach those that could cause pathological effects. Avoidance behaviour is likely to be localised within the area of the activity (due to small spatial extent of elevated noise) and temporary, i.e. for the duration of the activity only. The Operational Area overlaps the Pygmy Blue Whale migration BIA and the Humpback Whale migration BIA. However, since pygmy blue whales show preference for water depths >500 m, only a small number of individuals are likely to be encountered transiting the Operational Area (360 m to 400 m). Potential AIO to low-frequency marine mammals (e.g. blue whales and humpback whales) could occur within 12 m of the centre of a support vessel if the vessel and the marine mammal remained in the same place for 24 hours. However, this is not considered a credible scenario. Behavioural responses to vessel or MODU noise are expected to be limited to within 5 km of the vessel. Individuals are not expected to be displaced from foraging areas (located 42 km from the Operational Area for blue whales) or from potential opportunistic foraging activities. Any migrating individuals ae expected to show avoidance behaviour with no significant impact or disruption to migratory pathways or behaviour expected, especially given the small of overlap with the BIAs. Nesting habitat critical to the survival of flatback turtles is located within the Operational Area, all other critical habitat for marine turtles and BIAs occur adjacent to the Operational Area (within 20 km buffer). The flatback turtle reproduction BIA is located approximately 8 km from the Operational Area. The water depths of the Operational Area (340 m to 400 m) are deeper than the water depths that critical internesting activities are known to occur in (<50 m) (Whittock et al., 2016; Thums et al., 2018). Hence turtles are not expected to be displaced from critical habitat or BIAs. Individual turtles may be encountered within the Operational Area but are unlikely to be internesting females due to the distance from the closest nesting beaches (>30 km). Given the relatively short duration of the activity and the proposed management measures, it is reasonable to conclude noise emissions will not affect the conservation status of marine turtles or compromise the objectives of the marine turtle recovery plan. A whale shark foraging BIA is located within the 20 km buffer zone of the Operational Area, approximately 10 km to the south east of the Operational Area. It is therefore possible that whale sharks could pass through the Operational Area, particularly before and after their annual aggregation off Ningaloo Reef. Any impacts to whale sharks will be limited to potential short-term behavioural impacts given the sensitivity of this species and the nature and scale of the noise emissions from the activities. The slow working speed of vessels within the Operational Area further reduces the risk of any negative impacts attributable to vessel noise. The Conservation Advice *Rhincodon typus* Whale Shark (TSSC, 2015a) identifies habitat disturbance as a risk. The expected noise levels and behavioural response are not considered to result in habitat disturbance, which is consistent with this advice. The foraging BIA is widespread across the NWS compared to the Operational Area, so no significant impacts are expected to occur to whale shark populations. Impacts to other fish species are considered to be similar to those summarised for the whale shark, limited to short-term behavioural impacts. Seabirds are also unlikely to be directly affected by underwater noise generated during the activity. Although a reproduction BIA for the wedge-tailed shearwater overlaps the Operational Area, due to the distance of the Operational Area from any seabird nesting colonies, the potential for airborne noise from the activity to cause disturbance to seabirds is extremely low. Given the generally low level of noise expected from the vessels, helicopters and associated activities, and the relatively short duration of noise emissions, significant impacts to threatened or migratory species are not expected. Some temporary and localised behavioural response may result from the noise levels emitted, but these will not be at levels that could cause mortality or injury to marine fauna or cause a decrease in local population size or area of occupancy of species. The consequence level for fauna is considered to be II – Minor.
Physical environment or habitat	Not applicable – Noise emissions will not impact the physical environment/habitats, apart from increasing ambient noise levels, which is considered under other receptors.
Threatened ecological communities	Not applicable – No threatened ecological communities identified in the area over which noise emissions are expected.
Protected areas	Not applicable – The only protected area within the Operational Area is the Continental Shelf Demersal Fish KEF. Noise emissions associated with the activity are not expected to impact this feature or habitats or species at a population or community level.

Receptor	Consequence Level
Socio-economic receptors	Tourism activities are not expected to occur in the Operational Area, given the water depth, lack of seafloor features and distance from shore. The Operational Area is not extensively fished (commercially, traditionally or recreationally) and no impacts from noise are expected to impact fisheries. There is no recreation areas within the area expected to be impacted by noise. Noise levels are not expected to impact on socio-economic receptors due to their low activity level within the vicinity of the Operational Area. There is no recreation areas within the area expected to be impacted by noise. EP stakeholder consultation did not raise any concerns regarding potential impacts to cultural features including Sea Country. Impacts to totemic species have been assessed under local fauna. The consequence level for socio-economic receptors is I – Negligible.
Overall worst-case consequence	II – Minor

6.1.5 Demonstration of ALARP

The use of vessels is unavoidable if the operational activities are to proceed as required and operating 24 hours a day will reduce the overall activity timeframe and exposure to impacts and risks. Equipment maintenance will keep the vessel noise levels to within normal operating limits, which will also aid in keeping noise emissions within the boundaries that have been risk assessed.

The support vessels and LWIV/MODU are expected to produce similar noise emissions to other marine vessels that frequent or transit through the vicinity of the Operational Area (oil and gas industry vessels, commercial shipping). The vessels will adhere to the EPBC Regulations (Part 8) to ensure actions are undertaken to avoid marine mammals (and whale sharks) within 100 m of a vessel, and all crews will be inducted into these requirements. It is further expected that the vessels will typically emit sufficient noise for sensitive marine fauna to exhibit avoidance behaviour and move away from the activity to avoid physical impact zones.

The use of helicopters to transfer personnel to and from the vessels is necessary to allow operational activities to occur safely and effectively, with some personnel required to be rotated to and from other locations, and to provide for a rapid method of transferring to and from the vessels in the case of an emergency. A performance standard prohibiting helicopters from landing or taking off in the presence of marine megafauna would introduce an unacceptable risk to human life.

Management controls are in place to reduce operating noise, including vessel and helicopter operational protocols through adherence to the Santos' Protected Marine Fauna Interaction and Sighting Procedure (EA-91-11-00003). This requires compliance with Part 8 of the Environment Protection and Biodiversity Conservation Regulations 2000 and includes controls to reduce the risk of disturbance to or collision with EPBC Act listed marine fauna. Santos has considered the actions prescribed in the Recovery Plan for Marine Turtles in Australia (CoA, 2017) when developing these controls to minimise noise impacts on marine turtles.

Any behavioural impact caused by vessel activity noise is likely to be localised and temporary, with marine species expected to resume normal behavioural patterns in the open oceanic waters surrounding the Operational Area in a short timeframe with no significant impact on their normal behaviour, including during sensitive periods such as migration, nesting, or foraging.

Avoiding periods of higher sensitivity such as migration or nesting periods for whales and turtles (for example) is not considered feasible. The Operational Area overlaps with three BIAs for fauna: humpback whale migration, pygmy blue whale migration, and wedge-tailed shearwater breeding. Given the low potential impacts to individual fauna, there is not expected to be an impact at population level or significant impacts on migratory, foraging or breeding behaviours.

Significant impacts are not expected to marine fauna, including cetaceans and turtles, and the assessed residual consequence for this impact is Minor (II). Additional control measures were considered but rejected since the associated cost or effort was grossly disproportionate to any benefit (see Section 6.1.3). Therefore, the impact from noise associated with the activities is considered ALARP.

6.1.6 Acceptability evaluation

Is the consequence ranked as I (Negligible) or II (Minor)?	Yes – maximum consequence from noise emissions is II (Minor).
Is further information required in the consequence assessment?	No – potential impacts and risks are well understood through the information available.
Are the risks and impacts consistent with the principles of ESD?	Yes – activity evaluated in accordance with Santos' Environmental Hazard Identification and Assessment Procedure that considers principles of ESD.
Are risks and impacts consistent with relevant legislation, international agreements and conventions, guidelines, and codes of practice (including species recovery plans, threat abatement plans, conservation advice and Australian marine park zoning objectives)?	Yes – Management consistent with EPBC Regulations Part 8 (vessels and aircraft) and Part A of EPBC Act Policy Statement 2.1. Controls implemented will minimise the potential impacts from the activity to species identified in recovery plans and conservation advice as having the potential to be impacted by noise emissions. Relevant species recovery plans, conservation management plans and management actions, including but not limited to the: • Recovery Plan for Marine Turtles in Australia (CoA, 2017) • Approved Conservation Advice for *Balaenoptera borealis* (sei whale) (TSSC, 2015c) • Approved Conservation Advice for *Balaenoptera physalus* (fin whale) (TSSC, 2015b) • Approved Conservation Advice for *Rhincodon typus* (whale shark) (TSSC, 2015a) • North-west Commonwealth Marine Reserves Network Management Plan 2014–2024 (DNP, 2018) • Conservation Management Plan for the Blue Whale: A Recovery Plan under the *Environment Protection and Biodiversity Conservation Act 1999* 2015–2025 (CoA, 2015b) • Conservation Management Plan for the Southern Right Whale: A Recovery Plan under the *Environment Protection and Biodiversity Conservation Act 1999* 2011–2021 (DSEWPaC, 2012).
Are risks and impacts consistent with Santos' Environment Policy?	Yes – aligns with Santos' Environment Policy.
Are risks and impacts consistent with stakeholder expectations?	Yes – no concerns raised.
Are performance standards such that the impact or risk is considered to be ALARP?	Yes – see ALARP above.

The controls proposed are consistent with relevant standards, including Part A of EPBC Act Policy Statement 2.1, EPBC Regulations Part 8 (vessels and aircraft), and aligned with the applicable management actions outlined in relevant recovery plans, conservation management plans and approved conservation advice. No concerns from stakeholders (including fisheries) have been raised regarding noise emissions during the activity.

The activities described in Section 2 will be conducted over approximately 10 to 40 days. The activities that will generate noise are standard offshore industry practices and the potential impacts are well documented. With the controls proposed and considering the relatively short duration and characteristics of noise types planned, the potential consequences of impacts to noise sensitive receptors in the area, including are assessed to be Minor (II) and ALARP.

Management plans and conservation advice for cetaceans

The Operational Area intersects BIAs for humpback whale migration and pygmy blue whale migration.

The Conservation Management Plan for the Blue Whale (CoA, 2015b) outlines relevant information and requirements related to these considerations:

- interim Objective No. 4: "Anthropogenic threats are demonstrably minimised"
- section 5C: discusses threats from noise interference including seismic surveys, acute and chronic industrial noise, masking from anthropogenic noise, shipping noise and aircraft noise
- action A.2.3 under Anthropogenic threats are demonstrably minimised states that "Anthropogenic noise in biologically important areas will be managed such that any blue whale continues to utilise the area without

injury and is not displaced from a foraging area". The Guidance on Key Terms within in the Blue Whale Conservation Management Plan (DAWE, 2021) provides guidance on what constitutes a foraging area, including opportunistic foraging areas outside of known foraging BIAs.

Activities are considered consistent with the objectives of the conservation management plan and the impacts acceptable for the following reasons:

- A review of noise monitoring data from sources associated with the activity, including the MODU, support vessels, ROV operation, SSS or echosounders, positioning equipment, helicopters and flaring, determined that the highest noise emitting activity is associated with support vessels using their thrusters to maintain position. The sound pressure level for continuous noise, such as thrusters, above which behavioural impacts are expected for low-frequency cetaceans including the pygmy blue whale, is 120 dB re 1 µPa. Thruster noise from support vessels has been measured below 120 dB re 1 µPa within 1-5 km from the noise source (McCauley, 1998; Koessler & McPherson, 2020). For short, intermittent durations when up to three support vessels may be present in the Operational Area and operating thrusters to maintain position, and located close enough to each other to be considered a single point source of underwater noise, the distance from the source to the behavioural threshold for cetaceans may increase slightly from approximately 5 km. Noise from other continuous noise sources, such as MODU operation, is expected to attenuate to below the behavioural impact threshold of 160 dB re 1 µPa within 1 km (Austin et al., 2018).
- Given the Operational Area overlaps the migration BIAs, acoustic masking and avoidance behaviour may be expected if pygmy blue whales or humpback whales come within approximately 5 km from the noise source.
- The controls to manage anthropogenic noise include adaptive management in the event that whales are encountered by vessels and helicopters. Santos' Procedures for Interacting with Marine Fauna (EA-91-11-00003) drives activity compliance with EPBC Regulations (Part 8) for managing the risks of noise to cetaceans. Additionally, the activities will not displace an individual or individuals from foraging areas (located distant from the Operational Area) or from potential opportunistic foraging.
- Additional controls were considered, such as dedicated marine mammal observers, scheduling operational activities outside of sensitive periods, and noise monitoring; however, they were assessed and rejected because the risk of impact from noise on the BIAs is considered minor and therefore the cost is disproportionate to the increase in environmental benefit.

Recovery plan for marine turtles

The Recovery Plan for Marine Turtles in Australia: 2017–2027 (CoA, 2017) highlights noise interference from anthropogenic activities as a threat to marine turtles. The plan refers to vessel noise and the operation of some oil and gas equipment as sources of chronic (continuous) noise in the marine environment, exposure of which may lead to avoidance of important turtle habitat.

It specifies the following priority action related to noise, for all marine turtle stock:

- Manage anthropogenic activities to ensure marine turtles are not displaced from identified habitat critical to the survival.

The closest marine turtle BIA is 8 km from the Operational Area. Studies show that behavioural responses may occur at sound levels of approximately 175 dB re 1 µPa. Source levels from vessels using DP may exceed these levels and hence may result in behavioural responses in marine turtles. If vessels operating on DP emit approximately 182 dB re 1 µPa at 1 m (rms SPL) (McCauley, 1998), PTS and TTS will not credibly occur. Injury to marine turtles from impulsive noise sources (i.e. positioning equipment) will not credibly occur. Whilst transiting individuals may occur in the Operational Area, given the relatively short duration of the activity and the proposed management measures, it is reasonable to conclude noise emissions will not displace marine turtles from BIAs or habitat critical to the survival of marine turtles or compromise the objectives of the marine turtle recovery plan. Therefore, potential impacts are acceptable.

Summary

With the controls proposed and considering the relatively short duration and characteristics of noise types planned, the potential consequences of impacts to noise sensitive receptors in the area are assessed to be II – Minor and ALARP.

6.2 Light emissions

6.2.1 Description of event

Event	Potential impacts from light emissions may occur in the Operational Area from: • safety, operational and navigational lighting on the MODU/LWIV • safety, operational and navigational lighting on the support vessels • ROV spot lighting while it is operational underwater on an as-needed basis • light from flaring during well bleed-off. Lighting will typically consist of bright white (i.e. metal halide, halogen, fluorescent) lights typical of lighting used in the offshore petroleum industry and not dissimilar to lighting used for other offshore activities in the region, including shipping and fishing.
Extent	Impacts from light emissions will be localised on the following basis: • There is limited light 'spill' or 'glow' on surface waters surrounding the MODU/LWIV and support vessels. Impacts expected to remain within the Operational Area. • The amount of light produced from well bleed-off is dependent on the characteristics of the reservoir and the flare flow rate. Flaring will be visible at distances of tens of kilometres. • The light assessment boundary of 20 km from the source will be used as the extent of light exposure in accordance with National Light Pollution Guidelines for Wildlife (CoA, 2020).
Duration	Navigational and operational task lighting is required 24 hours a day for the duration of the activity. Flaring is an intermittent source of light emission that typically occurs for approximately six to 12 hours over two to three days during well bleed-off.

6.2.2 Nature and scale of environmental impacts

Potential receptors: Threatened, migratory or local fauna (marine mammals, marine turtles, sharks, rays, fish and seabirds), cultural receptors (totemic species).

This section evaluates the potential impacts of artificial light on listed species and other marine fauna known to be affected by light, including impacts on behaviour, survival, and/or reproduction, following the National Light Pollution Guidelines for Wildlife (CoA, 2023). In line with these guidelines, the EP has assessed the potential for light impacts within 20 km of the Operational Area (CoA, 2023). This is considered conservative, based on observed impacts of sky glow on marine turtle hatchlings, which have been seen at distances of 15 to 18 km from the light source, and on fledgling seabirds, which have been grounded by artificial light from 15 km away. The potential for light glow to cause biological harm varies depending on factors like the number, intensity, spectral output, and positioning of the light sources. It's important to note that, for certain species and under specific environmental conditions, the impact of light glow can extend beyond 20 km (CoA, 2023). The sensitivity of different species to different wavelengths is summarised in Figure 6-1, which shows that most species are sensitive to short wavelength light (ultraviolet/violet/blue).

Light is a form of energy emitted across a range of frequencies and wavelengths in the electromagnetic spectrum. The visible range for humans is typically 380 to 780 nm, with ultraviolet below and infrared above this range. Fauna, however, perceive light differently, with their visible spectrum varying between approximately 300 nm and over 700 nm, depending on the species (CoA, 2023). This means potential impacts from artificial light depend on the light's characteristics (e.g. intensity, wavelength) and the species' sensitivity, in addition to the distance from the light source.

Santos commissioned light modelling for the Dorado Offshore Project Proposal (Pendoley Environmental, 2020), with the modelled scenario similar in nature to the artificial light emissions from the LWIV and MODU activities (i.e. operational lighting from a facility and flaring). In the non-flaring scenario, the model results show that radiance has reduced to ambient (less than 0.01 full moon equivalent) at 17.7 km from the source. In the flaring scenario, the flare is no longer directly visible at 42.4 km, when the flare drops below the horizon. At this distance, the radiance is equivalent to 0.25 full moons. As the flare drops below the horizon, radiance declines rapidly and is no longer visible.

The flare tower modelled by Pendoley Environmental (2020) was higher, and hence visible at greater distance, than the flare tower of a typical semi-submersible MODU.

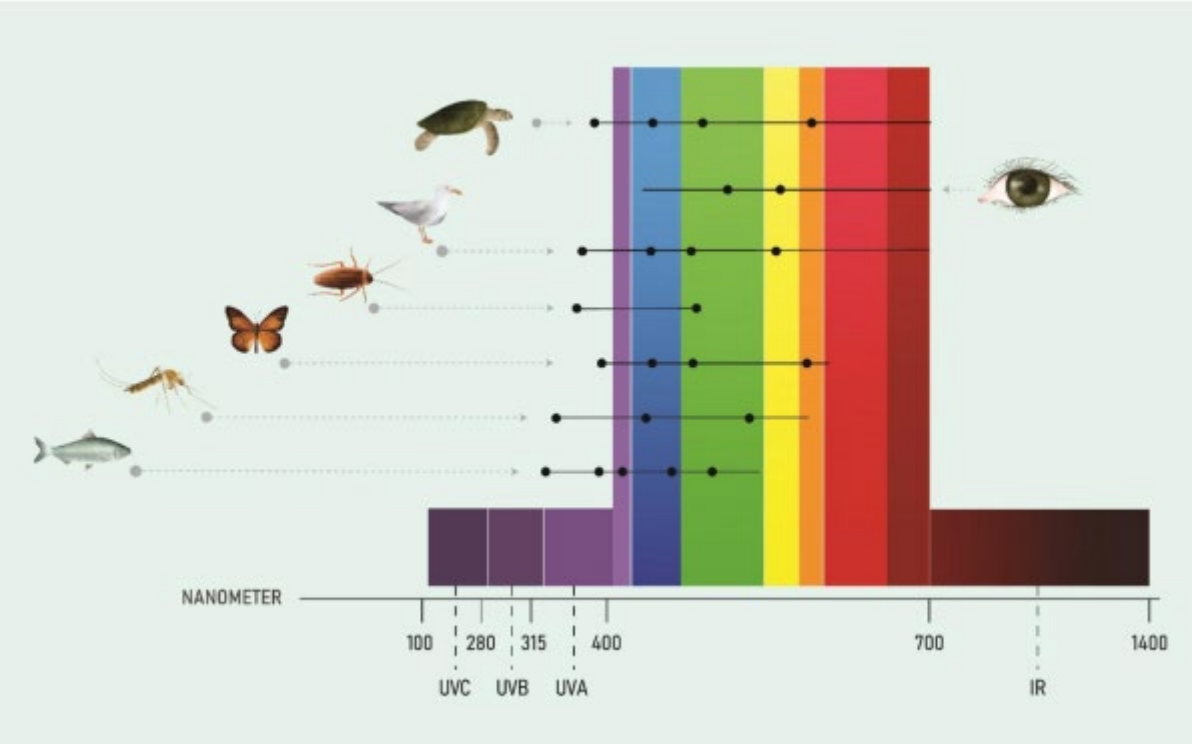

Figure 6-1: Visibility of different wavelengths of light in humans and wildlife is shown by horizontal lines; black dots represent reported peak sensitivity (CoA, 2023)

A PMST search was conducted on the Operational Area, including a 20 km buffer, to identify any MNES species within the potential area of impact from light emissions (Appendix C). Light emissions have the potential to disrupt ecological processes that rely on natural light for visual cues. Light emissions can affect fauna in two main ways:

- Behaviour – Many organisms are adapted to natural levels of lighting and the natural changes associated with the day and night cycle as well as the phase of the moon. Artificial lighting has the potential to create a constant level of light at night that can override these natural levels and cycles.
- Orientation – Species such as marine turtles and birds may use lighting from natural sources to orient themselves in a certain direction at night. In instances where an artificial light source is brighter than a natural source, the artificial light may override natural cues, leading to disorientation.

Continuous lighting in the same location for an extended period of time may result in alterations to fauna behaviour; the specific impacts on different fauna groups is described below:

- Marine turtles and turtle hatchlings may be misoriented and disoriented by lights.
- Seabirds may either be attracted by the light source itself or indirectly due to marine fauna prey (such as fish and invertebrates) attracted to light.
- Fish and zooplankton may be directly or indirectly attracted to lights.

6.2.2.1 Marine mammals

There is a paucity of research investigating the effects of artificial lighting on marine mammals and direct effects of artificial lighting on cetaceans have not been reported. Many dolphin species are thought to be diurnal, or at least more active during the day, possibly related to prey availability (Sekiguchi & Kohshima, 2003). Since fish species may pool in areas of light spill, dolphins may be indirectly attracted to lit structures or illuminated marine environments for feeding purposes.

Mammals use variations in the length of day to anticipate environmental changes and time their reproduction. Marine mammals occurring in the area that may be affected by light will be transient, hence no impacts to biologically important behaviours will credibly occur. There is potential for opportunistic foraging for odontocetes should prey abundance be increased around light sources.

As described in Section 3.2.6.1, the pygmy blue whale migration BIA and humpback whale migration BIA overlap the Operational Area (Table 3-9, Figure 3-9). However, there are no reports of direct effects of artificial light on marine mammals, cetaceans and other marine mammals are not known to be significantly attracted to light sources at sea. Therefore, impacts are thought to be unlikely.

6.2.2.2 Marine turtles

Marine turtles are highly sensitive to artificial lighting, which can disrupt nesting females, newly emerged hatchlings, and hatchlings dispersing in nearshore waters (Salmon, 2003; Salmon et al., 1995a, 1995b; Salmon and Wyneken, 1987; Wilson et al., 2018). However, potential impacts on feeding turtles are limited, primarily due to secondary effects of light on prey distribution (Kebodeaux, 1994). Marine turtles do not feed during the breeding season (Limpus et al., 2013), and light does not influence their internesting behaviours. Internesting turtles are usually found in water depths of less than 30 m (Whittock et al., 2016), which is significantly shallower than the Operational Area.

The Recovery Plan for Marine Turtles in Australia 2017–2027 (CoA, 2017) identifies artificial light as a threat to marine turtles. The plan notes that artificial lighting can reduce overall reproductive success and hinder species recovery by:

- inhibiting nesting by females
- disrupting hatchling orientation and sea-finding behaviour
- creating light pools that attract swimming hatchlings and increase their risk of predation.

The National Light Pollution Guidelines states that a 20 km buffer (based on sky glow) to important habitat for turtles should be applied when considering possible impacts (CoA, 2023). The 20 km buffer surrounding the Operational Area intersects with a number of marine turtle BIAs and habitat critical to the survival of marine turtles (Sections 3.2.6.1 and 3.2.6.2). The closest BIA to the Operational Area is the flatback turtle reproduction (internesting) BIA, located 8 km away. Therefore, it is possible that individual turtles may occur within the Operational Area. However, considering the water depths of the Operational Area (360 m to 400 m) compared to observed water depths of internesting turtles (<50 m deep, Whittock et al., 2016), large numbers of the species are not expected.

Adult female marine turtles return to land, mostly at night, to nest on sandy beaches. During this process, they rely on visual cues to select and navigate towards nesting sites, as well as to find their way back to the ocean after nesting. Experienced nesting females are unlikely to be disturbed by light, but first-time nesters may be disturbed by light when they are selecting their first nesting beach (Pendoley, 2014).

The most significant risk posed to marine turtles from artificial lighting is the potential disorientation of hatchlings following their emergence from nests by light spill on beaches. This disruption can occur because hatchlings orient themselves to the lowest-elevation light horizon and away from high silhouettes when moving from the nest to the sea (Pendoley & Kamrowski, 2015; Lohmann et al., 1997; Limpus & Kamrowski, 2013). Hatchlings can become disoriented by artificial lights, such as those from platforms and vessels, and may end up trapped in the illuminated areas. This can lead to increased energy expenditure, higher predation risk, and decreased survival rates (Witherington & Martin, 2003; CoA, 2023). Disoriented hatchlings may take longer to reach the sea or even fail to reach it (if the artificial light attracts them away from the sea), resulting in dehydration, exhaustion, predation, and increased mortality (Salmon & Witherington, 1995). Once in the water, turtle hatchlings orientate by wave fronts and do not appear to rely on visual cues (Pendoley, 2014), however, there have been observations of hatchlings orienting themselves towards light cues while swimming offshore, instead of following wave and current cues (Harewood & Horrocks, 2008; Thums et al., 2013, 2016; Wilson et al., 2018).

The nearest marine turtle nesting beaches are located at the Muiron Islands and Ningaloo Coast, approximately 38 km and 42 km respectively, from the Operational Area. Light modelling indicates that under non-flaring conditions, radiance reduces to ambient levels (less than 0.01 full moon equivalent) at 17.7 km from the source (Pendoley, 2020). At this distance, light emissions are not expected to cause disorientation to nesting females or emergent hatchling.

Under flaring conditions, the modelled scenario indicates that flare light remains visible at a distance up to 42 km, with radiance equivalent to 0.25 full moons (Pendoley, 2020). This level of radiance, while relatively low compared to direct artificial lighting, is above ambient night-time conditions and may be sufficient to elicit behavioural responses in sensitive life stages of marine turtles. Although nesting females are generally less sensitive to low-level offshore light sources, particularly experienced individuals, there is a possibility that elevated radiance from flaring could influence the behaviour of first-time nesters during beach selection. However, at a distance of 40 km and with radiance levels equivalent to only a quarter of a full moon, the likelihood of significant disturbance is considered low.

Hatchlings, in particular, that rely on natural light cue to orient towards the ocean, and elevated radiance, even at low levels, can potentially interfere with this process (Witherington & Bjorndal, 1991). Given the offshore location of the flare, there is a possibility that hatchlings could be attracted toward the light source, rather than following wave and current cues once in the water. This attraction could result in increased energy expenditure, exposure to predators, and reduced survival rates. However, the flare tower used in the modelling was taller than that of a

typical semi-submersible MODU, suggesting actual radiance levels under operational conditions may be lower. Additionally, flaring is expected to occur intermittently and for short duration (typically six to 12 hours) substantially limiting the potential for sustained exposure. Any impacts to individual turtles are expected to be localised and temporary and are not anticipated to result in population-level effects or compromise the objectives of the marine turtle recovery plan.

6.2.2.3 Sharks, fish and rays

The response of fish to light emissions varies according to species and habitat. Experiments using light traps have found that some fish and zooplankton species are attracted to light sources (Meekan et al., 2001), with traps drawing catches from up to 90 m away (Milicich, 1992).

Lindquist et al. (2005) concluded from a study that artificial lighting associated with offshore oil and gas activities resulted in an increased abundance of clupeids (herring and sardines) and engraulids (anchovies). These species are known to be highly photopositive. The artificial light serves to focus their marine plankton prey and consequently leads to enhanced foraging success for planktivorous fishes. It may also lead to higher rates of predation on planktivorous fishes by predators. In a light trap study conducted by Shaw et al. (2002), it was noted that the juvenile tunas (*Scombridae*) and jacks (*Carangidae*), which are highly predatory were preying on the concentrations of zooplanktons that had been attracted to the light field of the platforms. This led to increased predation rates as compared to the unlit areas. Artificial light is shown to impact hatching success of fish eggs, however, the spawning behaviour of adult fish, in terms of frequency and duration, was no different under artificial light conditions compared to natural conditions (Fobert et al., 2019).

The Operational Area is approximately 10 km from the whale shark foraging BIA (Figure 3-8) and therefore, artificial light from the activities is not considered to have the potential to attract foraging whale sharks.

The potential for increased predator activity is unlikely to result in significant impacts to the fish populations considering the low level of light and the relatively short duration of the activity. Given the relatively small impact area in respect to fish habitat, potential impacts are expected to be highly localised and unlikely to have discernible consequences at population level.

6.2.2.4 Birds (seabirds/shorebirds)

Artificial lighting can attract and disorient seabirds, leading to changes in behaviour (e.g. circling around light sources or disrupted foraging), as well as potential injury or mortality near the light (Gaston et al., 2014; Longcore & Rich, 2004). Studies conducted in the North Sea between 1992 and 2002 demonstrated that artificial light caused birds to gather around illuminated offshore structures (Marquenie et al., 2008). Birds may either be attracted by the light source itself or indirectly as structures in deep water environments tend to attract marine life at all tropic levels, creating food sources and providing artificial shelter for seabirds. The light from vessels may also provide enhanced capability for seabirds to forage at night.

The most vulnerable life stages for seabirds and migratory shorebirds are nesting adults or fledglings. As the Operational Area is offshore and away from islands or other emergent features and does not host any permanent infrastructure above the sea, any presence of seabirds or shorebirds is considered likely to be of a transient nature only, such as migrating or foraging.

Species with a nocturnal component of their life history, such as procellariforms (including shearwaters) are at greater risk of negative impacts. Fledglings are particularly vulnerable to artificial light (Montevecchi, 2006; Mitkus et al., 2016) with impacts upon the synchronized mass exodus of fledgling seabirds from their nesting sites being well documented (Deppe et al., 2017; Raine et al., 2007; Rodriguez et al., 2015a; Le Corre et al., 2002; Reed et al., 1985). Fledglings leaving the colony for the first time are unlikely to be impacted by the artificial light considering the distance between the nearest land and the Operational Area (>38 km). However, newly fledged juveniles maybe more susceptible to attraction, disorientation and collision in the weeks or months following fledging, compared to adults and older juveniles. This is especially true for smaller species like storm-petrels, petrels, and shearwaters, which rely on nocturnal foraging and may be more prone to colliding with the structures. The Operational Area and 20 km buffer overlap the wedge-tailed shearwater reproduction BIA (Figure 3-17). Lighting from the vessels may result in behavioural impacts to seabirds including shearwaters. However, as the activities will be for a short duration and the distance from the Operational Area to the closest nesting area (>20 km), the consequence is considered negligible.

There is limited research on how diurnal seabirds respond to different wavelengths of light. Studies on gulls and terns have shown that some species possess visual pigments for short-wavelength ultraviolet and blue light, but this is not universal (Machovsky-Capuska et al., 2011). Tagging studies of wedge-tailed shearwaters by Cannell et al. (2019) indicated that most foraging activity occurred around nesting islands. However, tagged birds were also observed foraging widely in the Indian Ocean.

Artificial light may also attract migratory shorebirds in flight (Longcore et al., 2013) influencing stop-over selection and impacting successful migration (McLaren et al., 2018). Artificial light has the potential to disrupt the natural migratory patterns of migratory birds that rely on visual cues, such as ambient light, moonlight, and starlight, in addition to their magnetic compass for navigation. This is especially true in areas where there are no terrestrial landmarks to guide them. Studies conducted in the North Sea have shown that light emissions from offshore platforms can attract migrating birds, with those that migrate during the night being particularly affected (Verheijen, 1985). Furthermore, it has been observed that birds traveling within a 5 km radius of illuminated offshore platforms may deviate from their intended route and either circle or land on the nearby platform (Marquenie et al., 2008). However, beyond this distance, it is believed the strength of the light source is not sufficient to lure birds away from their preferred migration route.

Seabirds may be temporarily attracted to light from the activities, or fauna aggregated by light. This behavioural disturbance is expected to be localised to within the vicinity of the MODU/LWIV vessel and/or vessels within the Operational Area. The light source from the activities will be temporary, therefore any impacts are predicted to be at an individual level and not a population level. The temporary behavioural disturbance of birds will be localised around the light sources and not result in a substantial adverse effect on a population of species or its lifecycle. Migratory shorebirds may be present in, or fly through the region, between July and December, and again between March and April as they complete migrations between Australia and offshore locations (CoA, 2015c). The risk associated with collision from shorebirds attracted to the light is considered to be low, based on the short-term duration and localised nature of the activities, as well as the distance offshore. Impacts are expected to be limited to temporary behavioural disturbance to isolated individuals, not expected to disrupt migration of seabirds.

6.2.2.5 Cultural receptors

Totemic species of cultural value may pass through the Operational Area; however, during consultation Santos was not made aware of any other cultural receptors within the Operational Area. Light impacts to marine species and seabirds have been considered above.

6.2.2.6 Cumulative impacts

The Operational Area and 20 km buffer overlap with the reproduction BIA for the wedge-tailed shearwater and flatback turtles, raising potential for behavioural impacts due to cumulative lighting from multiple vessels operating within the Operational Area. However, the Operational Area is located approximately 40 km from nesting sites for both species, which significantly reduces the likelihood of disorientation in nesting individuals. Therefore, cumulative impacts from light emissions on marine turtles are considered unlikely due to the distance of the nesting sites from the activities. The activities will not occur concurrently with the FAR campaign and therefore no potential cumulative light impacts from concurrent activities within the VGCN Field will occur. Consultation with other operators have not identified any concurrent activities, therefore no potential additive or cumulative light impacts from concurrent activities with other operators will occur.

6.2.3 Environmental performance outcomes

The EPO relating to this event is:

- Reduce impacts to marine fauna from lighting on vessels through limiting lighting to that required by safety and navigational lighting requirements [VGCN-EPO-02].

The control measures considered for this activity are shown in Table 6-10 and measurement criteria for the EPOs described in Section 8.

Table 6-10: Control measure evaluation for artificial lighting

Control Measure Reference No.	Control Measure	Environmental Benefit	Potential Cost/Issues	Evaluation
Standard controls				
VGCN-CM-006	Lighting will be used as required for safe work conditions and navigational purposes	Light spill from unnecessary lighting reduced, even further lowering likelihood of impacts to the fauna from vessel lighting. Lighting is assessed to only provide necessary lighting for safety and navigation during the activity. Reducing the potential for additional light pollution to the environment, thus reducing the potential impacts to fauna.	No additional costs to Santos. Standard requirement for vessel navigation lighting and equipment to be compliant with COLREGS/Marine Orders 30: Prevention of collisions, and with Marine Orders 21: Safety of navigation and emergency procedures.	**Adopted** – Cost is considered acceptable for the benefit that may be realised from this control.
VGCN-CM-007	Premobilisation review and planning of lighting on vessels is undertaken prior to vessel based activities	Where an activity may require 24-hour lighting, a project execution plan, planning and inductions, will include a requirement to minimise external lighting where practicable during the activity.	Cost associated with personnel involved in preparation of the execution plan.	**Adopted –** Cost is considered acceptable for the benefit that may be realised from this control.
Additional controls				
N/A	Manage the timing of the activity to avoid sensitive periods at the location (e.g. turtle nesting/hatching)	Reduce risk of impacts from light emissions during environmentally sensitive periods for listed marine fauna (e.g. turtle nesting/hatching).	The Operational Area are not located in an area that is likely to cause impact to turtle nesting or hatching and therefore timing the activity to avoid this would not change the potential environmental impacts.	**Not Adopted** – Given the minimal risk of impacts to listed marine species (e.g. turtles) occurring due to lighting, the financial and environmental costs of extending the activity duration are deemed grossly disproportionate to negligible environmental benefits.
N/A	Use of shrouding on external lights	Reduces potential for impacts on turtles from light emissions during hours of darkness when light sources are more apparent and potential impacts are greatest.	Cost associated with retro fitting external lighting with shrouding/shielding. Can only be done for lighting that does not impact on navigational requirements or safety.	**Not Adopted** – The financial and environmental costs disproportionate to low environmental benefits.
N/A	Review lighting to a type (colour, intensity, frequency) that has less impact	Could reduce potential impacts of artificial light on certain fauna.	High cost to complete lighting change out on MODU/LWIV and vessels in area of low sensitivity. Navigational lighting colours are stipulated by law.	**Not Adopted** – Given the minimal risk of impacts to listed marine species (e.g. turtles) occurring due to lighting, the financial costs of replacing lighting types on vessels are deemed grossly disproportionate to low environmental benefits.

Control Measure Reference No.	Control Measure	Environmental Benefit	Potential Cost/Issues	Evaluation
N/A	Limit or exclude night time operations	Would eliminate potential impacts of artificial light during hours of darkness when light sources are more apparent and potential impacts are greatest.	Would double duration of activity, increase impacts or potential impacts in other areas, including increase in waste, air emissions, and risk of vessel collision. A minimal level of artificial lighting will still be required on-board the MODU/LWIV and vessels on a 24-hour basis for safety reasons.	**Not Adopted** – Given the minimal risk of impacts to turtles occurring, the financial and environmental costs by requiring all works to be undertaken during daylight hours only are not considered appropriate, given the extended duration of the activity that would occur.
N/A	Use of dark, matte surfaces to reduce sky glow across all activities	Reduce potential for impacts on turtles from light emissions during hours of darkness when light sources are more apparent and potential impacts are greatest.	Additional cost to repaint vessel surfaces.	**Not Adopted** – Given the minimal risk of impacts to listed marine species (e.g. turtles) occurring due to lighting, the financial costs of repainting vessels surfaces are deemed grossly disproportionate to low environmental benefits.
N/A	No flaring	Eliminates artificial light associated with flaring.	There is no safe and feasible alternative to flaring to complete the well decommissioning process.	**Not Adopted** – No practical or feasible to eliminate flaring during well bleed-off.

6.2.4 Environmental impact assessment

Receptor	Consequence Level
Light emissions	
Threatened, migratory or local fauna	Sensitive receptors that may be impacted by light emissions in the same location for an extended period of time include marine mammals, turtles, shark, and seabirds. Impacts to marine fauna are expected to be restricted to localised attraction and temporary disorientation but with no long-term or residual impact and no decrease in local population size, area of occupancy of species or loss or disruption of critical habitat/disruption to the breeding cycle. The potential impacts are therefore considered to be I (Negligible). **Marine mammals** The pygmy blue whale migration and humpback whale migration BIA overlaps the Operational Area. However, cetaceans and other marine mammals are not known to be significantly attracted to light sources at sea. Cetaceans predominantly use acoustic senses to monitor their environment rather than visual cues (Simmonds et al., 2004). Therefore, impacts are considered unlikely. **Turtles** Habitat critical to the survival of marine turtles, for four species intersects the 20 km light buffer, and the nesting BIA for flatback turtles intersects the Operational Area. Lighting from operational activities, including vessel lighting and flaring, may result in localised attraction and temporary disorientation of marine turtles. Flaring, in particular, can be visible over considerable distances offshore, with light potentially detectable beyond 20 km under certain atmospheric conditions. However, flaring is expected to be intermittent and short in duration, and when combined with the overall short campaign (20 to 40 days), the potential for sustained impacts is low. It is considered that the activity will not compromise the objectives as set out in the marine turtle recovery plan and the impact of lighting associated with the activity to turtles is negligible. **Sharks, rays, fish and plankton** The BIA for whale sharks intersects the Operational Area, however sharks and rays are not known to be significantly attracted to light sources at sea. Therefore, disturbances to behaviour may occur. Light emissions from the MODU/LWIV and vessels are unlikely to lead to large-scale changes in species abundance or distribution. Impacts on transient species will be limited to short-term behavioural effects, with negligible decrease in local population size or area of occupancy of species, nor loss or disruption of critical habitat or disruption to breeding cycles. **Seabirds** A BIA (reproduction) for wedge-tailed shearwaters overlaps the Operational Area. Lighting from operational activities, including vessel lighting and flaring, may result in temporary behaviour disturbance such as disorientation or attraction of seabirds, particularly during nocturnal periods. Flaring events can generate intense light that may be visible well beyond 20 km offshore, with visibility influenced by factors such as cloud cover and atmospheric clarity, which can amplify lateral light dispersion. Despite this, the short duration of the campaign (approximately 10 to 40 days for vessel lighting and 6-12 hours flaring), combined with the offshore location and separation from nesting sites, limits the likelihood of sustained or ecologically significant interactions. The activity is not expected to interfere with breeding behaviours or compromise the values of the BIA. With appropriate lighting management measures in place, the overall consequence to wedge-tailed shearwaters from flaring and other operational lighting is considered negligible.
Physical environment or habitat	Negligible – No impacts to physical environments and/or habitats from light emissions are expected.
Threatened ecological communities	Not applicable – No threatened ecological communities identified in the area over which light emissions are expected.
Protected areas	Negligible – The closest AMPs are the Gascoyne and Ningaloo AMPs, located around 28 km from the Operational Area, beyond the 20 km precautionary limit threshold for light emission impacts. Similarly, the Continental Slope Demersal Fish Communities KEF, which intersects the Operational Area, is not expected to be impacted by light emissions.
Socio-economic receptors	Not applicable – Lighting is not expected to cause an impact to socio-economic receptors other than to act as a visual cue for avoidance of the area by other marine users for safety purposes. EP stakeholder consultation did not raise any concerns regarding potential impacts to cultural features including Sea Country. Impacts to totemic species have been addressed under local fauna.
Overall worst-case consequence	I – Negligible

6.2.5 Demonstration of ALARP

Artificial lighting will be required on a continuous 24-hour basis during the activity to maintain safe working conditions and navigational safety standards. Lighting levels will be minimised to the extent possible without compromising operational safety. Standard controls adopted include the use of lighting for safe work conditions and navigational purposes only, consistent with relevant industry and maritime standards. MODU and vessel crews will be trained to minimise unnecessary lighting, reducing light spill and associated impacts while maintaining compliance with safety requirements. The costs associated with these standard controls, such as staff training, are considered acceptable given the operational benefits and minor environmental improvements achieved.

Additional control measures were evaluated (Table 6-10). All additional control measures were not adopted as their cost, complexity, or operational impacts were grossly disproportionate to the minor environmental benefit that could be gained. Managing the timing of activities to avoid sensitive marine fauna periods, or limiting night-time operations, was not adopted because it would significantly extend the duration of activities, thereby increasing emissions, discharges, and the period of potential marine user exclusion without net environmental benefit (the nearest known turtle nesting beach is approximately 40 km from the Operational Area). Changing lighting types or colours to alternatives recommended in the National Light Pollution Guidelines was also not adopted, as navigational lighting is prescribed by law and retrofitting a MODU and vessels operating far from sensitive habitats would involve disproportionate cost for minimal benefit.

The use of dark, matte surfaces on vessels and MODU to reduce sky glow was considered but not adopted for similar reasons, as was ceasing flaring during well bleed off. Flaring is essential for safety reasons and will occur over a very short duration (six to 12 hours over a period of two to three days).

Implementing additional light management actions, such as blackout blinds or switching off deck lighting when not required for navigation or safety, was also not adopted, as the measures would not materially change the risk profile.

Lighting from the activities will not compromise the objectives outlined in the Marine Turtle Recovery Plan (CoA, 2017), the Wildlife Conservation Plan for Seabirds (CoA, 2020a), or the National Light Pollution Guidelines for Wildlife (DCCEEW, 2023a). The short duration of the activity and the implemented controls will ensure nesting adults, foraging individuals, and emerging or dispersing hatchlings are not adversely affected.

All practical control measures have been reviewed (Section 6.2.3), and those adopted, as detailed in Table 6-10, are considered appropriate to manage the impacts such that the residual consequence is assessed to be I – Negligible and cannot be reduced further. The proposed management controls for light emissions are in accordance with the Santos' risk management criteria and are considered appropriate to manage the risk to ALARP.

6.2.6 Acceptability evaluation

Is the consequence ranked as I or II?	Yes – maximum consequence from light emissions is I (Negligible).
Is further information required in the consequence assessment?	No – potential impacts and risks are well understood through the information available.
Are risks and impacts consistent with the principles of ESD?	Yes – activity evaluated in accordance with Santos' Environmental Hazard Identification and Assessment Procedure (EA-91-IG-00004_6), which considers principles of ESD. The consequence against this aspect is II (Minor) and therefore does not affect the outcomes of the principles of ESD as per Table 5-5.
Are risks and impacts consistent with relevant legislation, international agreements and conventions, guidelines, and codes of practice (including species recovery plans, threat abatement plans, conservation advice and Australian Marine Park zoning objectives)?	Yes – management consistent with International Convention on the Safety of Life at Sea (SOLAS) 1974 and the *Navigation Act 2012*. Relevant species recovery plans, conservation management plans and management actions, including but not limited to the: • Recovery Plan for Marine Turtles in Australia (CoA, 2017) • North-west Marine Parks Network Management Plan (DNP, 2018) • Blue Whale Conservation Management Plan 2015 to 2025 (DAWE, 2021) • National Light Pollution Guidelines for Wildlife Including Marine Turtles, Seabirds and Migratory Shorebirds (CoA, 2023) • Wildlife Conservation Plan for Seabirds (CoA, 2023).
Are risks and impacts consistent with Santos' Environment Policy?	Yes – aligns with Santos' Environment Policy.
Are risks and impacts consistent with stakeholder expectations?	Yes – no concerns raised.
Are performance standards such that the impact or risk is considered to be ALARP?	Yes – see ALARP.

The lighting on the MODU/vessels complies with industry standards and is necessary to meet relevant maritime and safety regulations. The potential impacts of these artificial light sources within the Operational Area are considered insignificant, limited to short-term behavioural effects on individual fauna present during the activity. No stakeholder concerns have been raised regarding lighting for the activities.

The Recovery Plan for Marine Turtles in Australia (CoA, 2017) highlights priority actions for the Pilbara genetic stock of flatback turtles and the NWS genetic stock of green turtles, specifically related to light pollution. It states that artificial light within or near critical habitat must be managed to ensure marine turtles are not displaced from these areas. Although a number of marine turtle BIAs and habitat critical to the survival of marine turtles occur within 20 km of the Operational Area, internesting marine turtles are unlikely to be present due to the deeper water depths of the Operational Area. Given that the closest nesting beach is approximately 38 km from the Operational Area, located at the Muiron Islands, nesting females and turtle hatchlings are not expected to be disorientated by vessel light emissions. There is potential for flare light to be visible at this distance, however, given the short duration (six to 12 hours) of flaring, potential impacts are expected to be localised and temporary.

The potential consequence of light emissions on receptors is assessed as I – Negligible. With the control measures in place, including lighting management procedures and compliance with navigational safety legislation, no significant impacts are expected. Therefore, the impacts of light emissions to the receiving environment are ALARP and considered environmentally acceptable.

6.3 Atmospheric emissions

6.3.1 Description of event

Event	Potential impacts from atmospheric emissions may occur in the Operational Area from the following sources: • Operation of MODU/LWIV and support vessel engines, helicopters, generators, mobile and fixed plant and equipment. These exhaust emissions will include GHG emissions, such as carbon dioxide (CO_2), methane (CH_4) and nitrous oxide (N_2O), and non-GHG emissions, such as sulphur oxides (SOx), nitrogen oxides (NO_X) and particulates. • Flaring from the MODU during well bleed off activities. The combustion of hydrocarbons from the well will include emissions of carbon dioxide (CO_2). Flaring is expected to last for approximately six to 12 hours over a period of two to three days. • Limited venting of hydrocarbons may occur as dead spaces or inaccessible areas of the well infrastructure are recovered and where any hydrocarbons cannot be directed to the bleed-off package. • Operation of incinerators on support vessels outside the 500 m exclusion zone around the MODU/LWIV. • When transferring dry bulk products used for drilling (e.g. barite, bentonite, cement), tank venting is necessary to prevent tank overpressure. The vent air will contain minor quantities of product particles, which will suspend in the air or settle on the sea surface. Although the MODU/LWIV and support vessels may use ozone depleting substances (ODS), this will be in a closed rechargeable refrigeration system and there is no plan to release ODS to the atmosphere.
Extent	Impacts from atmospheric emissions will be localised as the quantities of gaseous and solid (powder) emissions are relatively small and will, under normal circumstances, quickly dissipate into the surrounding atmosphere.
Duration	Continuous (e.g. engine combustion) and intermittent (e.g. flaring) emissions for the duration of the activity.

6.3.2 Nature and scale of environmental impacts

Potential receptors: Physical environment (air quality), socio-economic receptors, threatened, migratory or local fauna (seabirds) and cultural features.

The potential impacts from the release of emissions associated with the proposed activities include:

- deterioration of local air quality
- contribution to national GHG levels.

These impacts may in turn have indirect impacts on marine species and the environment to which First Nations people are connected.

The combustion of hydrocarbons can cause a temporary decrease in air quality in the environment immediately surrounding the discharge point during the activity. Incomplete combustion under certain scenarios may also generate dark smoke. These can lead to a reduction in local air quality, which can impact humans and seabirds in the immediate vicinity of release. Non-GHG emissions, such as NO_X and SO_X, can lead to a reduction in local air quality. GHG emissions are recognised to also contribute to the GHG emissions loading globally. Atmospheric emissions from these sources will under normal circumstances disperse quickly into the surrounding atmosphere. The air emissions are similar to those produced by other vessels in the region.

The Operational Area is in a remote offshore location, with no expected adverse interaction with populated areas or sensitive environmental receptors associated with air emissions. There are no nearby human receptors such as townships within 30 km and there are no resident bird population within the Operational Area. Transiting birds are not expected to reside on the vessels for the length of the time that would significantly expose them to reduced air quality conditions.

Direct GHG emissions associated with the MODU well decommissioning activities and LWIV well suspension activities are detailed in Table 6-11 and Table 6-12, respectively.

Emissions have been calculated based on forecast fuel usage using the following standards and guidelines:

- GHG Protocol – provides specific guidance on GHG estimation
- ISO 14064 – provides clarity and consistency for quantifying, monitoring, reporting and validating or verifying GHG emissions

- ISO 14040 – addresses quantitative assessment methods for the assessment of the environmental aspects of a product or service in its life cycle stages
- Australian Government Clean Energy Regulator – Emissions and energy threshold calculator, Version 1.6, July 2025
- National Greenhouse and Energy Reporting (Measurement) Determination 2008 (compilation date 1 July 2025)
- GHG Corporate Accounting and Reporting Standard (World Resources Institute, 2004), which provides guidance on preparing a GHG emissions inventory and covers the accounting and reporting of the GHGs covered by the Kyoto Protocol.

Table 6-11: Estimated greenhouse gas emissions based on a 40 day MODU well decommissioning campaign

Source	Greenhouse Gases (t CO_2-e)			Total GHG Emissions (t CO_2)	Percentage
	CO_2	CH_4	N_2O		
Support vessels fuel usage	2159	3	12	2,174	18
Flaring and venting	646	134	5	785	67
MODU fuel usage	1,619	2	9	1,630	1714
Helicopters fuel usage	151	0	1	152	1
Total	4575	139	27	**4,741**	

Table 6-12: Estimated greenhouse gas emissions based on a 30 day LWIV well suspension campaign

Source	Greenhouse Gases (t CO_2)			Total GHG Emissions (t CO_2)	Percentage
	CO_2	CH_4	N_2O		
Support vessels fuel usage	1619	2	9	1630	64
LWIV fuel usage	809	1	5	815	32
Helicopters fuel usage	115	0	1	116	5
Total	2543	3	15	**2,561**	

The higher GHG emissions estimate from the activities is associated with the 40-day MODU well decommissioning campaign (Table 6-11), estimated at 4741 t CO_2 equivalent. The GHG emissions associated with the LWIV campaign are expected to be less as no flaring is required for an LWIV campaign, estimated at 2,561 t CO2 equivalent.

The total estimated direct GHG emissions for this activity is estimated between 2,561 to 4,741 tCO2-e. The total annual Australian GHG emissions for the year of 2023 are estimated by the Commonwealth Government to be 453 Mt CO2-e[5]. The estimated GHG emissions from the VGCN well decommissioning activities are estimated to be approximately 0.0006 to 0.001% of the total annual Australian GHG emissions. The emissions from the VGCN well decommissioning activity comprise a nominal amount in the overall scheme of national emissions and will not materially or substantially contribute to Australia's GHG emissions levels.

The IPCC (2021) have reaffirmed the near-linear relationship between cumulative anthropogenic CO_2 emissions and global warming, highlighting the basis for setting net-zero emissions targets. It is known that the physical impacts of climate change on environmental receptors are the result of global GHG emissions from a multitude of sources (minus the GHG sinks) that have accumulated in the atmosphere (IPCC, 2018).

The impacts on the climate cannot be attributed to one specific sector or activity. In the context of evaluating potential impacts and risks that may be associated with GHG emissions from all sources globally, including from this Activity, this EP has considered broader climate change issues. Consideration for the purpose of this EP is framed by the contribution that the activity will make to national atmospheric emissions of GHG. This contribution is

[5] *Department of Climate Change, Energy, the Environment and Water (DCCEEW) n.d, Australia's National Greenhouse Accounts, https://www.greenhouseaccounts.climatechange.gov.au/, viewed January 2026*

small, estimated between 0.0006% and 0.001% of the total current annual Australian GHG emissions[6]. Santos, in its capacity as an independent company, recognises the scientific consensus on climate change assessed by the IPCC.

Potential impacts as a result of climate change have been modelled by Commonwealth Scientific and Industrial Research Organisation (CSIRO). Observations, reconstructions of past climate and climate modelling continue to provide a consistent picture of ongoing, long-term climate change interacting with underlying natural variability. Associated changes in weather and climate extremes—such as extreme heat, heavy rainfall, coastal inundation, fire weather and drought—exacerbate existing pressures on the health and wellbeing of our communities and ecosystems (CSIRO 2025)

ODS are used in closed refrigeration systems on board vessels. ODS have the potential to contribute to ozone-layer depletion if accidentally released to the atmosphere. ODS are not used, generated or discharged by vessel activity other than what is incidentally located and used in closed systems on board vessels. ODS will not be deliberately released during the course the activity. ODS air emissions would only occur in the event of damaged or faulty refrigeration equipment.

Tank venting during bulk transfers is a necessary safety control, and any dust emissions will be negligible and limited to the immediate vicinity of the MODU and support vessels.

Air emissions will be similar to other vessels operating in the region for both petroleum and non-petroleum activities. All vessels are required to comply with International Convention for the Prevention of Pollution from Ships (MARPOL) air emissions regulations, by using low sulphur fuel (3.5% reducing to 0.5% in 2020) and NO_X emissions controls as applicable to engine age and type. The quantities of gaseous emissions are relatively small and will quickly dissipate into the surrounding offshore atmosphere. Due to the volumes and highly dispersive nature of the emissions no adverse impacts to seabirds or humans are expected. Any impacts on air quality are expected to be short-term and limited to the immediate vicinity of the emissions. These atmospheric emissions are not predicted to have direct or cumulative effects on sensitive environmental areas or exceed Environmental Protection (Ambient Air Quality) Measures.

6.3.3 Environmental performance outcomes and control measures

The EPOs relating to this event include:

- No unplanned objects, emissions or discharges to sea or air [VGCN-EPO-03].
- Reduce impacts to air and water quality from planned discharges and emissions from the activities [VGCN-EPO-04].

The control measures for this event are shown in Table 6-13, and the EPSs and measurement criteria for the EPOs are described in Section 8.

Table 6-13: Control measure evaluation for atmospheric emissions

Control Measure Reference No.	Control Measure	Environmental Benefit	Potential Cost/Issues	Evaluation
Standard controls				
VGCN-CM-008	Waste incineration	Reduces the potential for emissions or particulates by ensuring only permissible waste is incinerated as per International Convention for the Prevention of Pollution from Ships (MARPOL Annex VI and Marine Order 97.	Personnel cost of maintaining waste records and training of staff.	**Adopted** – Negligible environmental impact outweighs the costs associated with transporting waste to shore for landfill.
VGCN-CM-009	Fuel oil quality	Reduces emissions through use of low sulphur fuel in accordance with Marine Order 97.	No additional costs, as this is a regulatory requirement.	**Adopted** – No additional costs.

[6] *Department of Climate Change, Energy, the Environment and Water (DCCEEW) n.d, Australia's National Greenhouse Accounts, https://www.greenhouseaccounts.climatechange.gov.au/, viewed January 2026.*

Control Measure Reference No.	Control Measure	Environmental Benefit	Potential Cost/Issues	Evaluation
VGCN-CM-010	International air pollution prevention certification	Ensure vessels are operating with acceptable emissions as per international standards. Ensure compliance with Australian Marine Orders as appropriate for vessel class.	No additional costs, as this is a regulatory requirement.	**Adopted** – Benefit of ensuring vessel is compliant outweighs the minimal costs and it is a legislated requirement.
VGCN-CM-011	Ozone-depleting substance handling procedures	Reduces probability of potential impacts to air quality due to ODS emissions.	Personnel cost of maintaining ODS record book or recording system.	**Adopted** – Benefit of ensuring no ODS release outweighs the minimal costs.
VGCN-CM-004	Marine assurance standard	Reduces emissions from vessels by operating equipment within its parameters.	Cost associated with implementing procedures.	**Adopted** – Benefit of implementing procedure outweighs the minimal costs.
VGCN-CM-002	Vessel planned maintenance system (PMS) to maintain vessel DP, engines and machinery	Ensure vessel is running efficiently and routine maintenance is conducted to ensure emissions are minimal.	Costs are standard for routine PMS.	**Adopted** – Benefit outweighs the minimal costs.
VGCN-CM-003	MODU planned maintenance system (PMS) to maintain vessel DP, engines and machinery	Reduces emissions from vessels by operating equipment within its parameters.	Costs are standard for routine PMS.	**Adopted** – Benefit outweighs the minimal costs.
VGCN-CM-012	Well test procedures	Includes control measures that reduce the risk of poor quality incineration of hydrocarbons entering the atmosphere. Whenever possible this will be accomplished by re-injecting the hydrocarbons back into the reservoir, reducing any flaring or venting.	Cost associated with implementing procedures.	**Adopted** – Benefit of ensuring quality incineration outweighs the minimal costs.
Additional controls				
N/A	No incineration during MODU/LWIV/vessel-based operations activities	Removes all emissions associated with incineration activities during the project.	Increase in health risk from storage of wastes. Limited space available to store additional waste, additional trips to shore would be required to transport waste. Increase in risk due to transfers (increased fuel usage, potential increase in collision risk, disposal on land).	**Not Adopted** – Health and safety risks outweigh the benefit, given the offshore location. Cost associated with transporting waste to shore for landfill or incineration outweighs onboard incineration. Incineration on the vessels (outside the 500 m PSZ) is a permitted maritime operation.

Control Measure Reference No.	Control Measure	Environmental Benefit	Potential Cost/Issues	Evaluation
N/A	Removal of all ozone-depleting substance containing equipment	Eliminates potential of ozone-depleting substance emissions occurring, impacting on air quality.	Lack of refrigeration systems on board the vessels would lead to unacceptable workplace conditions (i.e. air conditioning) and poor food hygiene standards, limiting the vessel's ability to undertake the activity therefore there is no practical solution to the use of refrigeration. It is noted that ozone-depleting substances are rarely found on vessels.	**Not Adopted** – Based on cost to replace all equipment and there is only a low potential for ozone-depleting substance releases.
N/A	Use incinerators and engines with higher environmental efficiency	Improves air quality by more efficient burning or fuel combustion.	Significant cost in changing MODU/LWIV/vessel equipment.	**Not Adopted** – Cost grossly disproportionate to low environmental benefit (impact rated Negligible).
N/A	No support vessels	Reduces the emissions and GHG associated with activity.	The MODU/LWIV require support vessels for anchoring, transfer of materials/supplies during the campaign and a vessel is also on standby to provide emergency services. Alternative transfer of supplies via helicopter is not feasible due to the size of containers/bulk product being transferred.	**Not Adopted** – Support vessels are required to undertake the activity, and no alternatives are considered feasible.
N/A	No flaring if full well decommissioning is conducted with a MODU.	Avoidance of flaring emissions and the associated greenhouse gasses.	There is no safe and feasible alternative to flaring to complete the well decommissioning process is full well decommissioning is conducted by a MODU.	**Not Adopted** – Not practical or feasible to eliminate flaring during well bleed-off.

6.3.4 Environmental impact assessment

Receptor	Consequence Level
Atmospheric emissions	
Threatened, migratory or local fauna	Emissions are relatively small and will, under normal circumstances, quickly dissipate into the surrounding atmosphere. Short-term behavioural impacts to seabirds could be expected if they overfly the location and may avoid the area. No decrease in local population size or area of occupancy of species, loss or disruption of critical habitat, disruption to the breeding cycle or introduction of disease is expected as a result of the activity. The consequence level for this receptor is assessed as Negligible (I).
Physical environment or habitat	All emissions associated with the activity will occur in a remote location and will not impact on the air quality in coastal towns or other socio-economic receptors. The quantities of gaseous and particulate emissions are relatively small and will, under normal circumstances, quickly dissipate into the surrounding atmosphere. The highly dispersive nature of local winds (i.e. strong and consistent) is expected to reduce potentially harmful or 'noticeable' gaseous concentrations within a short distance from the MODU/LWIV or vessels. GHG emissions will be released during the activity accounting for less than 0.003% of annual Australian GHG emissions. Given the relatively small quantity, detectable environmental impacts are not predicted. The consequence level for this receptor is assessed as Negligible (I).
Threatened ecological communities	Not applicable – No threatened ecological communities present.
Protected areas	Not applicable – Gaseous emissions are relatively small, will quickly dissipate into the surrounding atmosphere, and are not considered to be a potential source of impact for the only protected area, the Continental Slope Demersal Fish Communities KEF, overlapping the Operational Area.
Socio-economic receptors	All emissions associated with the activity will occur in a remote location and will not impact on the air quality in coastal towns or other socio-economic receptors. The quantities of gaseous and particulate emissions are relatively small and will, under normal circumstances, quickly dissipate into the surrounding atmosphere. The highly dispersive nature of local winds (i.e. strong and consistent) is expected to reduce potentially harmful or 'noticeable' gaseous concentrations within a short distance from the MODU/LWIV or vessels. EP stakeholder consultation did not raise any concern regarding potential impacts to cultural features including Sea Country. The consequence level for this receptor is assessed as Negligible (I).
Worst-case consequence level	I – Negligible

6.3.5 Demonstration of ALARP

Atmospheric emissions during the activity are largely unavoidable due to operational and health and safety requirements. Standard control measures (Table 6-13) have been adopted to ensure emissions are minimised as far as reasonably practicable. Waste incineration will be undertaken in accordance with MARPOL Annex VI and Marine Order 97 requirements, ensuring only permissible waste is incinerated and prohibiting incineration within 500 m PSZ. The use of low sulphur fuel and maintenance of air pollution prevention certification for vessels and MODU further ensure emissions remain within regulated limits. Ozone-depleting substance handling procedures will be followed to reduce any risk of release, supported by record-keeping and maintenance protocols. Well test procedures require high-efficiency burner heads and gas line pilots to ensure complete combustion during flaring, thereby reducing emissions. Marine assurance standards and planned maintenance systems for both MODU and vessels will ensure equipment is operated within safe parameters, further minimising emissions through proper upkeep and compliance with industry and regulatory standards.

These measures are consistent with best industry practice and ensure that residual impacts remain negligible.

Additional controls (Table 6-13) were considered but not adopted where they were found to be infeasible or grossly disproportionate to any potential environmental benefit. A complete ban on vessel incineration was not adopted due to the associated health risks from extended waste storage offshore and the limited available space, with maritime incineration operations permitted outside the exclusion zone. The removal of all ozone-depleting substance-containing equipment was not adopted as refrigeration is necessary for maintaining safe working conditions and food hygiene standards, and the likelihood of ozone-depleting substance release is already

extremely low. Using engines and incinerators with higher environmental efficiency was not adopted due to the significant cost of retrofitting unknown vessel equipment relative to the negligible environmental benefit, given the already low level of emissions. Alternative fuels for vessels and MODU were also not adopted as no feasible alternatives exist for the support functions required. Finally, eliminating flaring during well bleed off was deemed not feasible, as flaring is necessary to safely decommission the well, and is of short duration (six to 12 hours).

All reasonably practicable control measures have been reviewed (Section 6.3.3) and those adopted (Table 6-13) are considered consistent with maritime/petroleum industry standards and appropriate to manage the impacts such that the residual consequence is assessed to be I – Negligible. The proposed management controls for atmospheric emissions are in accordance with the Santos risk management criteria and are considered appropriate to manage impacts to ALARP.

6.3.6 Acceptability evaluation

Is the consequence ranked as I or II?	Yes – maximum consequence from atmospheric emissions is I (Negligible).
Is further information required in the consequence assessment?	No – potential impacts and risks are well understood through the information available.
Are risks and impacts consistent with the principles of ESD?	Yes – activity evaluated in accordance with Santos' Environmental Hazard Identification and Assessment Procedure (EA-91-IG-00004_6), which considers principles of ESD. The consequence against this aspect is I (Negligible) and therefore does not affect the outcomes of the principles of ESD as per Table 5-5.
Are risks and impacts consistent with relevant legislation, international agreements and conventions, guidelines and codes of practice (including species recovery plans, threat abatement plans, conservation advice and Australian Marine Park zoning objectives)?	Yes – atmospheric emissions from vessels are permissible under the *Protection of the Sea (Prevention of Pollution from Ships) Act 1983*, which is enacted in Australian waters by Marine Order 97 (Marine pollution prevention – air pollution). Controls implemented will minimise the potential impacts from the activity to species identified in recovery plans and conservation advices as having the potential to be impacted by atmospheric emissions. Relevant species recovery plans, conservation management plans and management actions are detailed in Table 3-10.
Are risks and impacts consistent with Santos' Environment Policy?	Yes – aligns with Santos' Environment Policy.
Are risks and impacts consistent with stakeholder expectations?	Yes – no concerns raised.
Are performance standards such that the impact or risk is considered to be ALARP?	Yes – see ALARP above.

Atmospheric emissions from the MODU and vessels are permissible under *the Protection of the Sea (Prevention of Pollution from Ships) Act 1983*, which is enacted in Australian waters by Marine Order 97 (Marine pollution prevention – air pollution) (which also reflects MARPOL Annex VI requirements). This is an internationally accepted standard that is utilised industry wide, and compliance with Australian Marine Order standards is considered to be an appropriate management measure in this case.

The residual consequence for this impact to the atmosphere and sensitive receptors are expected to be I – Negligible if the emissions management is adhered to and impacts from emissions that are generated by the activities are considered to be ALARP and acceptable.

6.4 Seabed and benthic habitat disturbance

6.4.1 Description of event

Event	Potential seabed disturbance may occur in the Operational Area from the following sources: • positioning and anchoring of the MODU at the well location with the assistance of support vessels, if a moored MODU is used • cutting of wellhead at the mudline • installation and recovery of pre lay equipment in preparation for rig arrival (this may include anchors and/or tether clump weights) • installation and recovery of any seabed mounted survey or monitoring equipment (this may include transponder clump weights) • marine growth removal from critical areas of the subsea infrastructure • break up of cement patio (note: cement component to remain in situ) • wet parking of equipment (e.g. XT) for future recovery during the field wide decommissioning campaign During the activity there will be no anchoring or mooring of the LWIV or support vessels within the Operational Area.
Extent	Seabed disturbance in the Operational Area is estimated as follows: • MODU anchoring up to 12 anchors may be laid approximately 1.5 to 2 km from the well, if a moored MODU is used. To be conservative, the footprint for large anchors (60 m²) has been employed and the catenary contact is estimated at 300 m × 0.5 m: equating to a total disturbance footprint of 210 m² per anchor or 2,520 m² for 12 anchors. If the anchors are dragged accidentally during laying or retrieval, a larger localised area may be temporarily disturbed around the anchor locations. These disturbance estimates also apply to pre lay anchors, if used during the activity. • Seabed clump weights: approximately four clump weights with a footprint of 5 m² (2.0 m × 2.5 m) may be used. • Transponder clump weights: approximately eight to 12 clump weights may be deployed on the seabed within 2 km of the well centre, with an approximate footprint of 1 m² each or 12 m² in total. • ROV baskets: placement of the ROV basket on the seabed may disturb up to 24 m² per placement activity. Various activities will have a minor, localised disturbance including: • installation and recovery of pre lay equipment in preparation for the MODU arrival • installation and recovery of seabed mounted survey or monitoring equipment • marine growth removal • cutting of wellhead using abrasive cutters • break up of cement patio • wet parking of equipment until future field wide decommissioning takes place.
Duration	Temporary – for the duration of the activity at the well site, with recovery within weeks to months following removal of the anchors/clump weights/other equipment from the seabed within the area. Equipment wet stored for future recovery during decommissioning phase.

6.4.2 Nature and scale of environmental impacts

Potential receptors: Benthic habitats and infauna, cultural receptors (spiritual values), Continental Slope Demersal Fish Communities KEF.

Operational activities may disturb seabed and benthic habitat through:

- direct physical disturbance of an area of seabed habitat including benthic fauna
- increased turbidity of the near-seabed water column
- indirect disturbance to benthic habitats and associated marine fauna by sedimentation.

The potential impacts to the seabed and benthic habitats from drilling discharges are discussed in Section 6.7.

6.4.2.1 Physical environment (water quality, benthic habitats)

The Operational Area does not contain any unique communities or communities of regional significance (RPS, 2011). As described in Section 3.2.4, the Operational Area consists of soft sediment seabeds as the dominant habitat with sparse epibenthic fauna (including anemones, sea stars, soft corals, crabs, shrimp, and sea urchins) and an infaunal community dominated by polychaetes and crustaceans. The depth of the Operational Area

(360 m to 400 m) precludes the existence of benthic primary producers (i.e. photosynthetic organisms including hard corals, seagrasses and macroalgae. There are no known offshore reefs or islands within or in close proximity (less than 20 km) to the Operational Area.

The positioning and anchoring of a moored MODU and other aspects of the activity that may interact with the seabed (as described in Section 6.4.1) will inevitably result in localised impact to benthic habitat (and associated fauna) in the Operational Area.

Impacts may occur from direct disturbance to the seabed or from elevated turbidity in the water column, which has the potential for slight and short-term impacts to benthic fauna through clogging of respiratory and feeding parts of filter-feeding organisms.

The potential impacts of seabed disturbance caused by the planned activities are considered minor due to the following:

- Although the Operational Area overlaps the Continental Slope Demersal Fish Communities KEF (Section 3.2.5.2, there are no benthic primary producer habitat (e.g. areas of hard corals, seagrass, macroalgae etc) present in the Operational Area and the area of disturbance will be contained within areas previously disturbed during the original drilling of the well. Anchor spreads and transponder clump weights will be within 2 km of the well centre and wet-stored equipment will be located close to its original location.
- Depressions on the seabed left by the temporary installation or wet parking of equipment and placement of ROV baskets are expected to infill as a result of movement of sediments by water currents and by the deposition of detrital matter. Given the nature of the habitat and associated benthic communities (Section 3.2.4), recolonisation would also be expected to be rapid.
- Any temporary turbidity and sedimentation associated with the installation and retrieval of equipment on the seabed, marine growth removal from equipment on the seabed, abrasive cutting of wellhead, break up of cement patio, recovery of defunct material or wet parking of equipment is not considered likely to cause a significant environmental impact. This is due to the high background levels of natural sediment movement in the area, the minor disturbance caused by the activity and the short duration of the activity.
- Benthic habitats in the VGCN field are largely bare sediments with associated sparse assemblages of filter- and deposit-feeders. This habitat type and associated biota are very widely represented in the region and not of conservation significance. The field is in approximately 360-380 m water depth and insufficient light reaches the seabed to support photosynthetic organisms such as zooxanthellate corals, seagrasses and macroalgae. Given the widespread representation of these communities and the localised and intermittent physical disturbance, negligible impacts are expected to occur as a result of the LWIV or decommissioning activities.

6.4.2.2 Threatened, migratory or local fauna

Habitat modification is noted as a potential threat to several marine fauna species in relevant recovery plans and conservation advice (Table 3-10), including the Recovery Plan for Marine Turtles in Australia 2017–2027 (CoA, 2017). However, the scale of seabed disturbance and any associated turbidity is not expected to significantly impact marine fauna such as marine mammals, marine reptiles, sharks, rays, and other fish.

6.4.3 Environmental performance outcomes and control measures

The EPO relating to this event is:

- Seabed disturbance is limited to planned activities and defined locations within the Operational Area [VGCN-EPO-05].

The control measures considered for this event are shown in Table 6-14, and the EPSs and measurement criteria for the EPOs are described in Section 8.

Table 6-14: Control measure evaluation for seabed and benthic habitat disturbance

Control Measure Reference No.	Control Measure	Environmental Benefit	Potential Cost/Issues	Evaluation
Standard controls				
VGCN-CM-013	Wet parking positioning	Wet parking of XT within 100 m of existing infrastructure limits the potential for environmental impacts.	Negligible costs of acquiring and operating ultrashort baseline/low baseline to position equipment that is wet stored.	**Adopted** – Benefits outweigh negligible costs to Santos.
VGCN-CM-014	MODU move procedure	No accidental contact with the seabed and subsea infrastructure during the MODU move.	Personnel costs associated with ensuring procedures are in place and implemented.	**Adopted** – Benefits of ensuring procedures are followed and measures implemented outweigh the costs of personnel time.
VGCN-CM-015	No planned anchoring of supporting vessels	No planned anchoring of support vessels within Operational Area reduces seabed disturbance area as no anchor or anchor chain drag/placement.	Additional fuel costs are due to vessels moving or idling.	**Adopted** – Support vessels do not require anchors. Benefits of ensuring procedure is followed and controls implemented outweigh the costs of personnel time in implementation of control.
VGCN-CM-016	MODU/LWIV station keeping system	Reduces risks to seabed habitat and petroleum infrastructure and mitigates consequences from objects remaining in the marine environment.	Cost associated with the mooring system.	**Adopted** – Standard industry practice.
VGCN-CM-018	Recovery of all deployed equipment (such as ROV baskets) during campaign	Prevents ongoing impact to the seabed due to equipment being left in situ.	Minimal additional cost to recover equipment.	**Adopted** – Helps to minimise impacts and extent of seabed disturbance.
VGCN-CM-019	Post activity ROV survey	Confirms understanding of physical environment in Operational Area post activities.	Costs associated with personnel and operations time in conducting surveys.	**Adopted** – Benefits considered to outweigh costs to Santos.

Control Measure Reference No.	Control Measure	Environmental Benefit	Potential Cost/Issues	Evaluation
Additional controls				
N/A	No temporary wet parking of XT on the seabed during well decommissioning.	Would eliminate the temporary seabed disturbance caused by wet parking.	If decommissioning of the well is undertaken, removal and temporary wet parking of XT until the field wide decommissioning campaign may be required and cannot be ruled out as a contingency. During well decommissioning activities it is possible that the MODU is not able to safely recover the XT, in which case the XT will be wet parked in accordance with VGCN-CM-012.	**Not Adopted** – Temporary wet parking of the XT cannot be ruled out as it may be required if the MODU is not able to safely recover the XT. Temporary wet parking impact of seabed disturbance is low, given the lack of sensitive receptors.

6.4.4 Environmental impact assessment

Receptor	Consequence Level
Seabed disturbance	
Threatened, migratory or local fauna	No sensitive seabed features are known to occur in either of the Operational Area. The areas of seabed that will be impacted are expected to be characterised by homogenous, flat, featureless soft sediment, predominately comprised of sand with small rubble/shell fragments. These sediments are un-vegetated and likely to have sparse benthic and epi-benthic communities with low biodiversity (refer to Section 3.2.4). Marine invertebrates may inhabit soft sediments and can contribute to the diet of some fauna. The area of soft sediment habitat that is potentially impacted is small compared to the amount of habitat available and therefore the disturbance is not expected to affect prey availability, or protected fauna species. Habitat modification is identified as a potential threat to a number of marine fauna species in relevant Recovery Plans and Conservation Advice (Table 3-10). However, the Operational Area has not been identified as a habitat that supports any protected species. Impacts will be temporary, and the area potentially impacted is small compared to the size of the areas used by these species for foraging. Therefore, no long-term impacts to these species are expected. No decrease in local population size, area of occupancy of species, loss or disruption of critical habitat or disruption to the breeding cycle of any of these protected matters is expected. Given the small-scale area of the activity, minor and short-term nature of direct and indirect impacts and the regional availability of the habitats present, seabed and benthic habitat disturbance is not expected to impact threatened or migratory species at a population level. The consequence level is therefore considered to be II (Minor).
Physical environment or habitat	Impacts may occur from direct disturbance to the seabed or from elevated turbidity in the water column, which has the potential for slight and short-term impacts to benthic fauna through clogging of respiratory and feeding parts of filter-feeding organisms. The area of physical environment and habitat that will be impacted during the proposed activities is small compared to the area of similar habitat in the wider environment and is expected to re-establish following disturbance. Given the widespread representation of these communities and the localised physical disturbance, long-term or significant impacts to habitat values or ecosystem function are not expected. Impacts to the physical environment or habitat are assessed as II (Minor).
Threatened ecological communities	Not applicable – No threatened ecological communities are identified in the area where seabed disturbance could occur.

Receptor	Consequence Level
Protected areas	The Operational Area does not intercept any marine parks or heritage areas; however, the Continental Slope Demersal Fish Communities KEF is present in the Operational Area (Section 3.2.5.2). However, there are no benthic primary producer habitat (e.g. areas of hard corals, seagrass, macroalgae) present in the Operational Area and the area of disturbance will be contained within pre-disturbed areas during original drilling of the well. Anchor spreads and transponder clump weights will be within 2 km of the well center and wet-parked equipment will be located close to its original location. Therefore, impacts to the protected areas are assessed as I (Negligible).
Socio-economic receptors	Not applicable – Disturbance of the seabed and benthic habitat within the Operational Area is highly unlikely to impact socio-economic receptors such as fishing and tourism. Any minor alteration or modification to habitats is not expected to impact commercial fisheries' target species based on the small size of disturbance relative to the available fishing grounds. No stakeholder concerns have been raised regarding socio-economic impacts.
Worst-case consequence level	II – Minor

6.4.5 Demonstration of ALARP

The planned activities will cause some disturbance of the seabed and associated fauna/habitats as well as short term and localised turbidity. The planned activities will take place in an area that has been previously disturbed. Given the remote offshore location, the sparse habitats in the Operational Area and the absence of significant fishing effort in the area, no sensitive environmental receptors will be affected.

The removal of subsea infrastructure, including the wellhead, guidebase and XT, is required to access the wellbore and complete permanent decommissioning. Wet parking of the XT is also necessary to facilitate access and contingency planning during the activity. These actions are integral to the decommissioning process and cannot be avoided if the well is to be permanently decommissioned. The environmental impact of seabed disturbance is expected to be low, particularly given the absence of sensitive receptors in the Operational Area.

A number of standard control measures have been adopted to minimise seabed disturbance and ensure interactions with the benthic environment and subsea infrastructure are appropriately managed (Table 6-14). Should wet parking of the XT occur during MODU well decommissioning, the XT will be positioned within 100 m of existing infrastructure to limit the spatial footprint of disturbance and will be removed during the field wide decommissioning campaign. LWIV/MODU move procedures are in place to prevent accidental contact with the seabed or subsea assets during repositioning. Anchoring of support vessels within the Operational Area will not occur, thereby avoiding anchor drag and placement impacts. LWIV/MODU station keeping systems will be used to maintain position without seabed contact, consistent with standard industry practice.

Standby vessel mooring procedures will be implemented to prevent damage to the LWIV/MODU, subsea infrastructure and benthic habitats, including coral and other KEFs. All deployed equipment, such as ROV baskets, will be recovered at the end of the activity to prevent long-term impacts from items left in situ. A post-activity ROV survey will be conducted to confirm the condition of the seabed and infrastructure following completion of operations. These measures are considered appropriate and effective in reducing the environmental impact of seabed disturbance to ALARP.

Additional control measures were considered but not adopted. Avoiding wet parking of the XT was considered but found to be infeasible, as wet parking until the future subsea asset removal campaign may be required if the MODU is not able to safely recover the XT during well decommissioning activities. If the XT is wet parked, it will be wet parked in accordance with VGCN-CM-012, and the associated seabed disturbance is expected to be minor and temporary.

All practicable control measures have been reviewed Section 6.4.2 and those adopted are considered appropriate to manage the impacts such that the residual consequence is assessed to be Minor and cannot be reduced further. The proposed management controls for seabed disturbance are in accordance with Santos' risk management criteria and are considered appropriate to manage the risk to ALARP.

6.4.6 Acceptability evaluation

Is the consequence ranked as I or II?	Yes – maximum consequence from seabed and benthic habitat disturbance is II (Minor).
Is further information required in the consequence assessment?	No – potential impacts and risks are well understood through the information available.
Are risks and impacts consistent with the principles of ESD?	Yes – activity evaluated in accordance with Santos' Environmental Hazard Identification and Assessment Procedure (EA-91-IG-00004_6), which considers principles of ESD. The consequence against this aspect is II (Minor) and therefore does not affect the outcomes of the principles of ESD as per Table 5-5.
Are risks and impacts consistent with relevant legislation, international agreements and conventions, guidelines and codes of practice (including species recovery plans, threat abatement plans, conservation advice and Australian Marine Park zoning objectives)?	Not applicable – no relevant requirements for this activity given the localised nature and extent of the activity and lack of threat to marine fauna or habitats.
Are risks and impacts consistent with Santos' Environment Policy?	Yes – aligns with Santos' Environment Policy.
Are risks and impacts consistent with stakeholder expectations?	Yes – no concerns raised.
Are performance standards such that the impact or risk is considered to be ALARP?	Yes – see ALARP above.

The potential consequence of seabed disturbance on receptors is assessed as II – Minor. With the control measures in place, including compliance with industry standards and legislation, no significant impacts are expected. Flatback turtles will not be displaced from habitat considered critical for their survival under the Recovery Plan for Marine Turtles in Australia 2017–2027 (CoA, 2017). Therefore, the impacts of seabed disturbance to the receiving environment are ALARP and considered environmentally acceptable.

6.5 Interaction with other marine users

6.5.1 Description of event

Event	Interaction with other marine users may occur as a result of, but not limited to: • MODU/LWIV presence in the Operational Area • support vessels presence in the Operational Area • well infrastructure and other equipment on the seabed. The presence of the activity, and associated petroleum safety (exclusion) zones, could potentially temporarily inhibit or impact other marine user groups including commercial and recreational fishing, tourism, commercial shipping and other oil and gas activities.
Extent	The Operational Area.
Duration	Temporary and intermittent interaction with the MODU/LWIV when mobilising/demobilising and vessels when transiting the Operational Area for the duration of the activity. Presence of wet stored well infrastructure on the seabed until removal during future decommissioning.

6.5.2 Nature and scale of environmental impacts

Potential receptors: Socio-economic (commercial fishers, tourism, shipping traffic, other oil and gas activities and defence training area). Potential impacts include displacement from the area while the vessels are in the Operational Area.

6.5.2.1 Commercial fishing

Four Commonwealth managed fisheries and six State managed fisheries overlap the Operational Area (Section 3.2.7.3). An analysis of the relevant factors including current fishery activities, depth range, historical fishing effort, fishing methods and stakeholder consultation feedback (Section 4) has revealed that there is a low likelihood of interaction with Commonwealth and State commercial fisheries. Although Commonwealth and State fishery management zones overlap the Operational Area, none of the fisheries identified in Section 3.2.7.3 are expected to be active in the Operational Area. This conclusion is supported by FishCube data, which shows recent active fishing effort in the 10 nm grid encompassing and surrounding the Operational Area.

Consultation confirmed that no recent fishing has occurred in the Operational Area and no concerns were raised by other marine users.

6.5.2.2 Recreational fishing

Recreational fishing is known to occur within the vicinity of the existing PSZ around the DTM location, near to the Operational Area for this activity. Recreational fishing and tourism are likely to occur within shallower waters closer to the mainland coast inshore and around reefs located outside of the Operational Area. Consultation with recreational fishers has raised no concerns about the activities.

6.5.2.3 Traditional fisheries

Indigenous subsistence fishing may occur in shallow waters, close to the coastline and therefore interactions with traditional fisheries will not occur. Consultation with First Nations Peoples has raised no concerns about the activities.

6.5.2.4 Tourism

There are no tourism related activities expected to occur in the area, given the distance from nearest shore and lack of any key features that would support tourism. Consultation confirmed that no recent recreation or tourism is expected in the Operational Area and no concerns were raised by other marine users.

6.5.2.5 Shipping traffic

In the Pilbara region there is significant commercial shipping activity, the majority of which is associated with the mining and oil and gas industry. AMSA has introduced a network of commercial shipping fairways to reduce the risk of vessel collisions with offshore infrastructure. The Operational Area does not overlap with any shipping fairways (Figure 3-25). Impacts on shipping movements are therefore expected to be minimal.

Any equipment wet parked in the course of activities will be located within the existing gazetted PSZs. These PSZ will be communicated via a Notice to Mariners, ensuring marine users are aware of their presence. As such, wet parked equipment is not expected to pose a navigation hazard., The ongoing presence of wet parked equipment within the existing PSZ is not expected to interfere with commercial shipping, given the well location remains marked on nautical charts and water depths exceed 360 m.

6.5.2.6 Defence

A defence training area overlaps the Operational Area (Figure 3-26). Defence activities in the vicinity of the Operational Area may include Naval vessel traffic and Air Force training exercise. Neither of these types of activities are expected to be a continuous presence in the area. Project vessels may encounter Defence vessels transiting or operating within the vicinity of the Operational Area. However, based on historical activity patterns and consultation with relevant authorities, the likelihood of significant interaction is considered low. Defence stakeholders were notified and provided feedback, including requests for standard pre-activity notifications.

6.5.3 Environmental performance outcomes and control measures

The EPO relating to this event is:

- Reduce impacts on other marine users through the provision of information to relevant stakeholders such that they are able to plan for their activities and avoid unexpected interference [VGCN-EPO-06].

The control measures for this activity are shown in Table 6-15. EPSs and measurement criteria for the EPOs are described in Section 8.

Table 6-15: Control measure evaluation for interaction with other marine users

Control Measure Reference No	Control Measure	Environmental Benefit	Potential Cost/Issues	Evaluation
Standard control				
VGCN-CM-020	Maritime notices	Ensures the presence of the MODU/LWIV and activities is available on the Australian Hydrographic Office (AHO) notifications to maritime users, reducing the likelihood of interactions.	Negligible costs.	**Adopted** – Benefits considered to outweigh negligible costs. Maritime requirement to issue marine notices.
VGCN-CM-021	Santos stakeholder consultation strategy	Santos will notify all relevant stakeholders listed, or as revised, in Table 8-4 of relevant activity details prior to commencement, including activity timing, vessel movements, proposed cessation date and vessel details.	Costs associated with personnel time in preparing and distributing information and collating/addressing any feedback provided. Stakeholders' time required to review consultation material and communicate with Santos.	**Adopted** – Benefits considered to outweigh negligible costs. Important control to ensure other marine users are aware of upcoming operations and potential business disruptions.
VGCN-CM-022	Existing (gazetted) PSZ around the well	Reduces potential for collision or interference with other marine user activities.	Negligible costs, requirement under the OPGGS Act	**Adopted** – Benefits considered to outweigh negligible costs to Santos.
VGCN-CM-023	MODU/LWIV identification system	Reduces potential for interaction with other users during MODU/LWIV moves.	Negligible costs, standard equipment on MODU/LWIV.	**Adopted** – Benefits considered to outweigh negligible costs to Santos.
VGCN-CM-024	No fishing from MODU/LWIV or support vessels	Reduce potential impacts to fisheries in the vicinity of the activity.	Negligible costs.	**Adopted** – Benefits considered to outweigh negligible costs to Santos.

Control Measure Reference No	Control Measure	Environmental Benefit	Potential Cost/Issues	Evaluation
VGCN-CM-025	Support vessel	Minimises risk of collision through visual identification and avoidance of other vessels.	Cost of vessel required to support the activity.	**Adopted** – Benefits considered to outweigh costs.
VGCN-CM-006	Lighting will be used as required for safe work conditions and navigational purposes	Ensures the MODU/LWIV and support vessels are seen by other marine users. Reduces risk of environmental impact from vessel collisions due to ensuring maritime safety requirements are fulfilled. Marine Order Part 30: Prevention of collisions, and with Marine Order Part 21: Safety of navigation and emergency procedures require vessels to have navigational equipment to avoid collisions.	No additional costs to Santos. Standard requirement for vessel navigation lighting and equipment to be compliant with COLREGS/Marine Orders 30: Prevention of collisions, and with Marine Orders 21: Safety of navigation and emergency procedures.	**Adopted** – The safety benefits of having navigation and lighting equipment and procedures outweighs any cost. This is a maritime requirement.
VGCN-CM-026	Seafarer certification	Requires appropriately trained and competent personnel to navigate MODU/LWIV and vessels to reduce interaction with other marine users.	Costs associated with personnel time in obtaining qualifications.	**Adopted** – Benefits considered to outweigh costs and is a legislated requirement.
VGCN-CM-027	Support Vessel identification system	Support vessels have an Automatic Identification System and radar to aid in their detection at sea.	Negligible costs of operating navigational equipment. Standard equipment on vessels.	**Adopted** – Benefits considered to outweigh costs and is a legislated requirement.
VGCN-CM-028	Constant bridge watch	Competent crew shall maintain constant bridge-watch.	Costs associated with personnel time in obtaining qualifications.	**Adopted** – Benefits considered to outweigh costs and is a legislated requirement.
VGCN-CM-029	Personnel inductions	Induction materials reinforce to the Vessel Master the importance of marine communications in the event of any potential interactions with active commercial fishers.	Costs associated with personnel time in obtaining qualifications.	**Adopted** – Benefits considered to outweigh costs and is a legislated requirement.
Additional controls				
N/A	Eliminate the use of vessels and MODU/ LWIV and support vessels	Would eliminate potential impacts to other marine users.	Not considered feasible as a MODU/LWIV and support vessels are the only form of equipment that can undertake the activities.	**Not Adopted** – Not feasible.

Control Measure Reference No	Control Measure	Environmental Benefit	Potential Cost/Issues	Evaluation
N/A	Manage the timing of the activity to avoid peak marine user periods (e.g. tourism and recreational fishing)	Would eliminate potential impacts to other marine users.	Not considered feasible as marine users could potentially be in the area all year round. The area that stakeholders are excluded from is small when compared to the area available to other marine users, and there is low fishing or tourism activity in the area as evidenced through previous consultation. Only the far-north corner of the eastern-most boundary of the Operational Area marginally overlaps the Dampier Shipping Fairway.	**Not Adopted** – Stakeholders and shipping in the area all year round. Cost grossly disproportionate to low socio-economic benefit, given the location of the activity has low usage by commercial fishers or areas of tourism and only marginally overlaps commercial shipping fairways.
N/A	Dedicated guard vessel in place during the activity to reduce potential for collision or interference with other marine users	Identifies and communicates with approaching third-party vessels to ensure exclusion (safety) zone is observed, preventing potential interaction or interference.	Significant additional cost of guard vessel for the duration of activities/campaigns.	**Not Adopted** – Cost grossly disproportionate to benefit, given the location of the activity has low usage by commercial fishers and does not overlap with any commercial shipping lanes or areas of tourism.
N/A	Avoidance of other active marine users, where safe to do so	The primary vessel (i.e. MODU, LWIV) doesn't have the ability to avoid other vessels under its own propulsion when on station for project activities, in the unlikely event interaction with marine user requires the MODU/LWIV to avoid other users.	The primary vessel needs to be stationary during activities and is not able to move readily from position. If moving from position is required, this may delay the activity and cause associated costs.	**Not Adopted** – Not feasible as the primary vessel needs to be stationary. However, primary controls to avoid other marine users is thorough stakeholder engagement.
N/A	Reducing or removing the PSZ for well suspension or decommissionin g activities	Reduces the area of displacement of other marine users.	The PSZ is mandated by the OPGGS Act and cannot be reduced.	**Not Adopted** – OPGGS Act requires PSZ is in place around infrastructure.

6.5.4 Environmental impact assessment

Receptor	Consequence Level
Interaction with other marine users	
Threatened, migratory or local fauna	Not applicable
Physical environment or habitat	
Threatened ecological communities	
Protected areas	Not applicable – The Operational Area does not intercept any protected areas.
Socio-economic receptors	The impact of the activity on socio-economic receptors are considered to be I (Negligible) due to the fact that: • the Operational Area is not within an AMSA defined shipping fairway • tourism activities are not expected to occur in the Operational Area, given the water depth, lack of seafloor features and distance from shore • the Operational Area is not extensively fished – commercially, traditionally, or recreationally • the presence of subsea infrastructure (e.g. XTs) is not expected to present a hazard to commercial fisherman, considering that no trawl fishing occurs within the Operational Area • stakeholder consultation and a review of recent shipping data did not raise any concerns regarding disruptions to commercial shipping or other oil and gas operators • other operators may have vessels traversing the region that will need to avoid the Operational Area to access exploration and development sites; any interaction would be temporary, and other operators' vessels can go around the Operational Area • naval vessels and Airforce may utilise the defined defence training area; however, the impacts are considered negligible • EP stakeholder consultation did not raise any concerns regarding potential impacts to cultural features including Sea Country.
Overall worst-case consequence	I – Negligible

6.5.5 Demonstration of ALARP

There are no viable alternatives to using an LWIV/MODU and vessels for the activity, and there is a 500 m PSZ around the well in accordance with the OPGGS Act. To assess the potential impacts associated with the LWIV/MODU, vessels, and the LWIV/MODU exclusion zone, a range of standard control measures are in place (Table 6-15).

Maritime notices will be issued to inform other marine users of the location and nature of the activity, reducing the likelihood of unintentional interaction. In addition, Santos' stakeholder consultation strategy has been implemented to ensure relevant stakeholders are aware of the proposed activities, exclusion zones, and the expected timing, allowing them to plan accordingly. The existing 500 m PSZ around the LWIV/MODU will isolate the activity and minimise the risk of vessel collisions, with support vessels also present to assist in the visual identification of third-party vessels.

The LWIV/MODU will utilise standard identification systems to maintain visibility to other marine users. Lighting will be used as required for safe working conditions and navigation, consistent with COLREGS and Marine Orders, ensuring the LWIV/MODU and support vessels are easily visible, thereby reducing collision risk. No fishing will be permitted from the LWIV/MODU or support vessels to minimise potential interaction with fisheries. Seafarer certification will be maintained to ensure that all personnel navigating the MODU and vessels are appropriately trained and competent, reducing the potential for human error. A constant bridge watch, including visual and radar monitoring, will be maintained on the LWIV/MODU and support vessels throughout the activity to promptly identify and respond to approaching third-party vessels.

Several additional control measures were considered but not adopted. Eliminating the use of vessels and MODU/LWIV was not feasible, as these are essential for conducting offshore activities. Managing the timing of the activity to avoid peak marine user periods was considered but rejected, as marine users are present year-round and the exclusion zone represents a small portion of the available marine area. Delaying operations would impose significant costs with minimal benefit. Deploying a dedicated guard vessel was not adopted due to the high cost and low likelihood of interaction, given the low usage of the area by commercial fishers and absence of tourism or

shipping lanes. Avoidance of other marine users by the MODU/LWIV was not feasible, as these vessels must remain stationary during operations. Reducing or removing the PSZ was not possible due to legislative requirements under the OPGGS Act.

The adopted control measures are considered to reduce risks to ALARP, with all reasonably practicable steps taken to minimise potential impacts to other marine users while maintaining operational feasibility.

6.5.6 Acceptability evaluation

Is the consequence ranked as I or II?	Yes – maximum interaction with other marine users, consequence is I (Negligible).
Is further information required in the consequence assessment?	No – potential impacts and risks are well understood through the information available.
Are risks and impacts consistent with the principles of ESD?	Yes – activity evaluated in accordance with Santos' Environmental Hazard Identification and Assessment Procedure (EA-91-IG-00004_6), which considers principles of ESD. The consequence against this aspect is I (Negligible) and therefore does not affect the outcomes of the principles of ESD as per Table 5-5.
Are risks and impacts consistent with relevant legislation, international agreements and conventions, guidelines and codes of practice (including species recovery plans, threat abatement plans, conservation advice and Australian Marine Park zoning objectives)?	Yes – management consistent with SOLAS 1974 and *Navigation Act 2012*.
Are risks and impacts consistent with Santos' Environment Policy?	Yes – aligns with Santos' Environment Policy.
Are risks and impacts consistent with stakeholder expectations?	Yes – no concerns raised.
Are performance standards such that the impact or risk is considered to be ALARP?	Yes – see ALARP above.

The presence of the MODU/LWIV and vessels is not expected to significantly affect other marine users, including commercial fishing operations, defence or shipping traffic, given the:

- short duration of the activity for the well (approximately 10 to 40 days)
- outcomes of stakeholder engagement did not identify any concerns by relevant stakeholders.
- small PSZ (500 m) in relation to the wider areas for shipping transit and navigation
- the PSZ around the well is required under maritime legislation, and the controls proposed will ensure other users are aware of its presence and readily able to navigate accordingly, such that potential impacts are ALARP and are considered to be acceptable.

6.6 Operational discharges

6.6.1 Description of event

Event	Potential impacts may occur in the Operational Area from the following operational discharges: • sewage and grey water • putrescible waste • deck drainage • cooling water • bilge water • brine • ballast water • swarf from subsea cutting activities • hydraulic fluid from BOP operation • marine growth removal acid wash. **Sewage and grey water** The volume of sewage, grey water and food waste is directly proportional to the number of persons on-board the MODU/LWIV and support vessels. Approximately 30-40 L of sewage/greywater will be generated per person per day (European Maritime Safety Agency, 2016). Treated sewage will be disposed of in accordance with Marine Order 96 (Marine pollution prevention – sewage) requirements. **Putrescible waste** Putrescible waste is estimated to consist of approximately 1 L of food waste per person per day. Putrescible waste will be disposed of in accordance with Marine Order 95 (Marine pollution prevention – garbage) requirements. **Deck drainage** Drainage water from the MODU/LWIV or vessels consists of rainwater and seawater spray and may potentially contain particulates and small, residual quantities of oil, grease and detergents, if present or used on the decks. Deck drainage from rainfall or washdown operations discharges directly to the marine environment, however, controls are in place to prevent, contain and clean up any spills that may contaminate deck drainage. Assessment of the spillage of hydrocarbons and other environmentally hazardous liquids is discussed in Section 7.4. **Cooling water** Seawater may be used by some vessels as a heat exchange medium for the cooling of machinery engines. Seawater is drawn from the ocean and flows counter-current through closed-circuit heat exchangers, transferring heat from the vessel engines and machinery to the seawater. The seawater is then discharged to the ocean (i.e. it is a once-through system). Cooling water temperatures may vary depending on the vessel's engines' workload and activity. **Bilge water** While in the Operational Area, the MODU/LWIV and vessels may discharge oily water after treatment to 15 ppm via a MARPOL-approved oily water filter system. Bilge water will be disposed of in accordance with Marine Order 91 (Marine pollution prevention – oil, as appropriate to class) requirements. **Brine** Brine generated from the water supply systems on board the MODU/LWIV and vessels will be discharged to the ocean at a salinity of approximately 10% higher than seawater. The volume of the discharge depends on the requirement for fresh (or potable) water and will vary between the MODU/vessels and the number of people on board. The effluent may contain scale inhibitors such as Alpacon that controls inorganic scale formation, such as the formation of calcium carbonate and magnesium hydroxide, in water-making plants. Other water purification chemicals such as chlorine may also be added to the potable water. Other water-making plant cleaning chemicals such as Ameroyal or Saf Acid may be used and discharged to sea after completion of the cleaning process. **Vessel ballast water** Ballast water could potentially be discharged to the marine environment from the MODU/LWIV or vessel ballast tanks. **Swarf from subsea cutting activities** Recovery of the subsea trees may require further disconnection of the subsea production control system, the flowline jumpers and well services lines. This severance will likely occur using an ROV mounted cutting tool such as diamond wire saw or similar, which will generate swarf in proximity to the seabed.

	Hydraulic fluid Once installed the BOP will be pressure tested prior to breaking into any of the established well barriers. Subsea BOPs are controlled using a hydraulic fluid that is vented to the marine environment when each component is functioned. The estimated volume of hydraulic fluid release during testing is approximately 10 L. Planned operational discharges will be treated in compliance with relevant legislation. Any fire-fighting foam resulting from system testing will be captured and retained onboard. **Marine growth removal acid washes** Marine growth removal may be required for safe operation of the subsea equipment. Estimates from subsea vendors are that we would consume approx. 0.5 m³ for the single wellhead plus a 50% contingency. The acids used depend on which vendor is awarded the scope, noting vendors may be different between pre MODU and MODU on location. The acids are usually a mix of citrus, formic, sulfamic, hydrochloric and/or acetic acids but will always be subject to the Santos Operations Chemical Selection, Evaluation and Approval Procedure (EA-91-II-10001). **Firefighting foam** Firefighting foam used on board the MODU and vessels, which may be discharged to sea during testing, has been risk assessed as per Santos' Drilling Fluid and Chemical Selection in Drilling Activities Procedure (EA-91-II-00007) and deemed ALARP and acceptable. Firefighting foam used on board the MODU and vessels will be free of per- and polyfluoroalkyl substances.
Extent	The small volumes of non-hazardous discharges may cause localised nutrient enrichment, organic and particulate loading, toxic impacts to marine fauna, thermal impacts and increased salinity in waters around discharge points and in the direction of the prevailing current. The environment that may be affected by operational discharges will likely be contained within the Operational Area and are predicted to be restricted to within approximately 100 m of the discharge point in the upper 5 m of the water column or on the seabed in the case of any swarf.
Duration	Localised impacts to water quality may occur for the duration of the activity. However, water quality conditions will return to normal within minutes to hours of cessation of discharges. With regards to swarf, localised sediment contamination may occur in the vicinity of the subsea equipment.

6.6.2 Nature and scale of environmental impacts

Potential receptors: Physical environment, threatened, migratory or local fauna, cultural receptors (totemic species).

The potential environmental impacts from routine operational discharges include:

- temporary and localised decline in water quality in the immediate vicinity of the discharge as a result of:
  - temporary and localised increase in biological oxygen demand (BOD)
  - temporary and localised increase in turbidity of surrounding waters
  - temporary and localised increase in sea surface water temperature
  - temporary and localised increase in sea surface salinity
  - temporary and localised contamination.

Planned discharges associated with the activity will be small and intermittent, with volumes dependent on a range of variables. The discharge point from the MODU/LWIV will remain consistent for the short-term duration of the activity (approximately 10 to 40 days), while the support vessels will be frequently moving and not be stationary for long periods. The discharge of non-hazardous wastes to the marine environment may result in a localised reduction in water quality in the vicinity of the release locations. Discharges will be temporary (minutes to hours), localised and limited to surface waters (less than 5 m depth). The discharges are expected to be dispersed and diluted rapidly, with concentrations of wastes significantly dropping with distance from the discharge point. Changes to ambient water quality outside of the Operational Area are considered unlikely to occur. Specifics of potential impacts to water quality from operational discharges are discussed further below.

6.6.2.1 Eutrophication impacts from sewage, grey water and putrescible wastes

Discharges of putrescible waste, treated sewage and grey water can result in localised increases in nutrient concentrations (e.g. ammonia, nitrite, nitrate and orthophosphate), organics (e.g. volatile and semi-volatile organic compounds, oil and grease, phenols and endocrine-disrupting compounds) and inorganics (e.g. hydrogen sulphide, metals and metalloids, surfactants, phthalates and residual chlorine). Increased biological oxygen demand on the receiving waters may promote localised elevated levels of phytoplankton due to nutrient inputs and bacteria activity due to organic carbon inputs. This could subsequently impact higher order predators.

However, dispersion and dilution of discharges is expected to be rapid, as the discharges are of low volume. The discharges are subject to biodegradation of organics through bacterial action, oxidation and evaporation, and the Operational Area are located in deep offshore waters dominated by high currents, resulting in short-term changes to surface water quality within the Operational Area.

In a study of sewage discharge in deep ocean waters, Friligos (1985) reported no appreciable differences in the inorganic nutrient levels between the outfall area and background concentrations suggesting rapid uptake of nutrients and/or rapid dispersion in the surrounding waters. Similar studies (Parnell, 2003) concluded similar results with rapid dispersion and dilution within hours of discharge.

The discharge of sewage, grey water and putrescible wastes is not expected to contact any offshore reefs, islands, shoals or banks or protected areas.

6.6.2.2 Salinity increases

The desalination of seawater results in a discharge of brine with a slightly elevated salinity (around 10% higher than seawater). On discharge to the sea, the desalination brine, being of greater density than seawater, is expected to sink and disperse in the currents. On average, seawater has a salt concentration of 35,000 ppm. The volume of the discharge depends on the requirement for fresh (or potable) water and the number of people on board.

Most marine species are able to tolerate short-term fluctuations in salinity in the order of 20 to 30% (Walker & McComb, 1990), and it is expected that most pelagic species would be able to tolerate short-term exposure to the slight increase in salinity caused by the discharged brine.

Given the relatively low volume of discharge, low salinity increase and deep, open water surrounding the MODU/LWIV and vessels, impact on water quality in the Operational Area is expected to be low.

The brine discharge is not expected to contact any offshore reefs, islands, shoals or banks or protected areas.

6.6.2.3 Changes in temperature

Cooling water will be discharged at a temperature above ambient seawater temperature. Upon discharge it will be subjected to turbulent mixing and transfer of heat to the surrounding waters.

Temperature dispersion modelling shows that the water temperature of discharged water will decrease rapidly as the discharge mixes with the receiving waters, with discharged waters being less than 1°C above background levels within less than 100 m (horizontally) of the discharge point. Vertically, the discharge will be within background levels within 10 m (Woodside, 2011).

Cooling water discharge points vary for the MODU/LWIV and each vessel. However, they all adopt the same discharge design, which permits cooling water to be discharged above the water line to facilitate cooling and oxygenation of this wastewater stream before mixing with the surrounding marine environment.

Cooling water discharge to the marine environment could result in a localised and temporary increase in the ambient water temperature. This may cause alteration of the physiological processes (particularly enzyme-mediated processes) in marine biota. Given the relatively low volume of cooling water, the low temperature differential, and the deep, open water surrounding the vessels, impact on water quality is expected to be low and short term.

The cooling water discharge is not expected to contact any offshore reefs, islands, shoals or banks, or protected areas.

6.6.2.4 Contamination from releases of bilge water and deck drainage

Discharges of oily bilge water could result in a localised reduction in water quality with impacts on protected marine fauna and plankton. However, oily water discharged from the MODU/LWIV and vessels will be treated to a concentration of less than 15 ppm before release, in accordance with the requirements of Marine Order 91 (Marine pollution prevention – oil), which will unlikely lead to any impacts to the receiving environment.

Modelling by Shell (2010) indicates that upon release, hydrocarbon and other chemical concentrations are rapidly diluted and expected to be below predicted no effect concentration (PNEC) within a relatively short period of time, within less than 100 m of the discharge. That is, the concentration of any bilge or deck drainage discharge will rapidly fall below levels which will adversely affect the marine environment and will most likely not occur during short or long term exposure.

The concentration and dosage within surface waters is expected to be very low and toxic impacts to water quality and benthic habitats would be on a negligible scale.

6.6.2.5 Toxicity

Discharges from vessel and MODU/LWIV systems may include chemicals within sewage systems, greywater, desalination and residues of those used for cleaning decks, in addition to hydraulic fluid release when testing BOP function.

On discharge to the marine environment, the low volumes of these types of chemicals and hydrocarbons are expected to rapidly disperse in the offshore marine environment. Hence, any potential impacts would be confined to a localised area immediately surrounding the discharge.

There may be a localised and temporary (hours) reduction in water quality in the immediate vicinity of the release. Toxicity impacts to marine fauna from the release of chemicals are unlikely to eventuate because:

- strong ocean currents result in the discharge being further diluted upon release to the marine environment, so the duration of exposure of chemicals to fauna will be minimal
- deck cleaning products planned to be released to sea will meet the criteria for not being harmful to the marine environment according to MARPOL Annex V
- other products with potential to be released to the sea meet the criteria for not being harmful to the marine environment according to MARPOL Annex V; or Gold/Silver/D or E rated through OCNS; or have a completed Santos ecotoxicological risk assessment so only environmentally acceptable products are used
- potential discharges will be intermittent and temporary within the Operational Area.

6.6.2.6 Acid wash

Inorganic or organic acids used for marine growth removal are expected to rapidly disperse in the offshore marine environment. Due to the small volumes discharged during marine growth removal, impacts to benthic fauna and water quality will be highly localised.

6.6.2.7 Contamination from swarf

Subsea cutting activities will generate minor volumes of metal (steel) swarf, which may settle on the seabed in the vicinity of the activity or disperse in the current. Steel is comprised predominantly of iron (approximately 98%) and as it corrodes will turn into iron hydroxides, which are inert forms of iron with very low toxicity. There are currently no trigger values for iron or its forms of hydroxide for marine water or sediment quality (DAWE, 2022a), is not considered a significant contaminant in the marine environment (OSPAR PLONOR) and is an abundant element in marine sedimentary systems (Taylor & Macquaker, 2011).

Steel may also include small amounts of carbon, manganese, chromium, silicon and phosphorus and these components will also corrode and degrade from the swarf over time. Swarf may also contain flakes from the epoxy paint coatings on cut subsea steel equipment, which is also expected to degrade over time and is likely to remain in the immediate area and be incorporated into sediments. This may result in the release of trace amounts of hydrocarbons to the surrounding sediments.

Filter and deposit feeding epifauna and infauna and demersal fishes may ingest corrosion and degradation by-products. Due to the low toxicity of iron, the minor qualities of other toxicants from steel and epoxy paint coatings and the slow release rate, any impacts to water and sediment quality and the associated benthic communities and demersal fishes are expected to be localised and negligible. The benthic communities in the Operational Area are widespread and are not considered to be of particular conservation significance.

6.6.2.8 Contamination from disconnection of subsea infrastructure

6.6.2.8.1 Treated seawater, monoethylene glycol, methanol, scale inhibitor and glycol

Treated seawater will contain a biocide, likely to be similar to CRW-24830, which is a common biocide used in the offshore oil and gas industry. Although biocides typically contain a substance (quaternary ammonium chloride) that is known to be very toxic to aquatic organisms, the concentration is typically very low (less than 30%) within the biocide itself as a whole. Maximum treated seawater volumes that could be released during subsea infrastructure removal activities during the decommissioning campaign is estimated to be approximately 500 m^3. This is comprised of multiple volumes (largest single volume estimated to be 65 m^3).

MEG and methanol both have low toxicity, are readily biodegradable, are rated as PLONOR and E (non-CHARM) in the OCNS rankings. Scale inhibitors are not expected to biodegrade when released to the marine environment. however, scale inhibitors are not known to bioaccumulate. Scale inhibitors and glycol both have low aquatic toxicity and the small volumes released will dilute rapidly when released to the marine environment. Scale inhibitor and glycol are rated as D (non-CHARM) in the OCNS rankings.

Therefore, it is likely that any impacts to benthic fauna and water quality will be highly localised, if occurring at all.

6.6.2.8.2 Toxicity

On discharge to the marine environment, the low volumes of chemicals including those used for marine growth removal, and residual hydrocarbons are expected to rapidly disperse in the offshore marine environment. Hence, any potential impacts would be confined to a localised area immediately surrounding the discharge.

There may be a localised and temporary (hours) reduction in water quality in the immediate vicinity of the release. Toxicity impacts to marine fauna from the release of chemicals are unlikely to eventuate because:

- the chemicals will have been risk assessed for their suitability for discharge using Operations Chemical Selection Evaluation and Approval Procedure (EA-91-II-10001)
- the sensitivity of the receiving environment is considered low
- volumes of discharges are small and will be over multiple events rather than simultaneously
- strong ocean currents mean the discharge will become further diluted upon discharge, so the duration of exposure of chemicals to fauna will be minimal
- potential discharges will be localised, intermittent and temporary within the Operational Area.

Santos does not anticipate any other contaminants (mercury).

6.6.2.9 Threatened or migratory fauna

As discussed in the sections above, the discharge extent for all planned discharges is localised and rapid dilution is predicted to occur within the offshore waters. Threatened or migratory marine fauna within the Operational Area are likely to be transient. If contact does occur with any protected species, it will be for a short duration due to the rapid dispersion of the plume and the transient fauna movement, such that any exposure is likely not of sufficient duration to cause a toxic effect.

Discharges may cause changes to behaviour in marine fauna (avoidance or attraction). Fish and oceanic seabirds may be attracted to the discharge of food scraps. However, such discharges would be isolated occurrences and not in any one location, so no prolonged influence on faunal behaviour is expected. Discharges of cooling water and brine may cause avoidance behaviour in marine fauna. Given the nature of the discharges (localised, rapid dilution, intermittent) any behavioural impacts are expected to be short term and minimal.

Given the nature of discharged chemicals, the small volumes that could be released to the marine environment and the nature of the marine environment within the vicinity of the Operational Area, the operational planned discharges are not predicted to have ecologically significant effects.

6.6.2.10 Cultural receptors

Totemic species of cultural value may pass through the Operational Area. However, during consultation Santos was not made aware of any other cultural receptors within the Operational Area. Mobile marine fauna are likely to move away from areas affected by wastewater discharges that could cause injury or mortality.

6.6.3 Environmental performance outcomes and control measures

The EPOs relating to this event include:

- No unplanned objects, emissions or discharges to sea or air [VGCN-EPO-03].
- No injury or mortality to Environment Protection and Biodiversity Conservation Act 1999 and the WA *Biodiversity Conservation Act 2016* listed fauna during activities [VGCN-EPO-01].
- Reduce impacts to air and water quality from planned discharges and emissions from the activities [VGCN-EPO-04].

The control measures considered for this event are shown in Table 6-16, and EPSs and measurement criteria for the EPOs are described in Section 8.

Table 6-16: Control measure evaluation for operational discharges

Control Measure Reference No.	Control Measure	Environmental Benefit	Potential Cost/Issues	Evaluation
Standard controls				
VGCN-CM-030	Waste (garbage) management procedure	Reduces probability of garbage being discharged to sea, reducing potential impacts to marine fauna. Stipulates putrescible waste disposal conditions and limitations. Provides compliance with Marine Order 95 (Marine pollution prevention – garbage).	Costs associated with pre-mobilisation audits and inspections and reporting discharge levels.	**Adopted** – Benefits of ensuring vessel is compliant outweigh the minimal costs of personnel time and it is a legislated requirement.
VGCN-CM-031	Deck cleaning and product selection	Improves water quality of discharge (reduced toxicity) to the marine environment. Deck cleaning products planned to be released to sea meet the criteria for not being harmful to the marine environment according to MARPOL Annex V.	Personnel costs of implementing the chemical review process, potential additional costs and delays associated with chemical substitution.	**Adopted** – Benefits of ensuring vessels are compliant and deck cleaning products planned to be released to sea meet MARPOL criteria.
VGCN-CM-032	General chemical management procedures	Reduces potential for inappropriate discharge of chemicals at sea through appropriate handling.	Personnel costs associated with vessel inspection and implementation of management procedures.	**Adopted** – Benefits of ensuring vessel is compliant outweigh the minimal costs of personnel time and it is a legislated requirement.
VGCN-CM-033	Chemical selection procedure	Improves water quality discharge (reduced toxicity) to the marine environment.	Personnel costs of implementing, potential additional cost and delays of chemical substitution.	**Adopted** – Benefits of ensuring MODU/LWIV and vessels are compliant outweighs the cost.
VGCN-CM-004	Marine assurance standard	MODU/LWIV and vessels selected and on-boarded in accordance with the Offshore Marine Assurance Procedure (SO-91-ZH-10001) to ensure contracted vessels are operated, maintained and manned in accordance with industry standards (for example, Marine Orders) and regulatory requirements (this EP) and the relevant Santos procedures mentioned in this EP.	No additional cost.	**Adopted** – Benefits of ensuring MODU/LWIV and vessels are compliant outweigh the minimal costs of personnel time.

Control Measure Reference No.	Control Measure	Environmental Benefit	Potential Cost/Issues	Evaluation
VGCN-CM-034	Sewage treatment system	Reduces potential impacts of inappropriate discharge of sewage. Provides compliance with Marine Order 96 (Marine pollution prevention – sewage).	Personnel costs associated with ensuring vessel certificates are in place during vessel contracting and in pre-mobilisation audits and inspections, and in reporting discharge levels.	**Adopted** – Benefits of ensuring vessel is compliant outweigh the minimal costs of personnel time and it is a legislated requirement.
VGCN-CM-035	Oily water treatment system	Reduces potential impacts from planned discharge of oily water to the environment. Provides compliance with Marine Order 91 (Marine pollution prevention – oil).	Time and personnel costs associated with maintaining oil record book.	**Adopted** – Benefits of ensuring MODU/LWIV and vessels are compliant outweigh the minimal costs of personnel time and it is a legislated requirement.
VGCN-CM-036	Radioactive Materials Management Plan	Reduces the potential for cross-contamination during the recovery activities and reduces the potential for indirect impacts during transport and disposal of contaminated waste.	Costs associated with implementing the requirements of the Management Plan.	**Adopted –** Environmental benefit gained outweighs the costs to Santos.
Additional controls				
N/A	Zero discharge of deck water	Would eliminate potential impacts of contaminants being discharged to sea.	Increased health and safety risks from wet deck not draining. Large amounts of water on a MODU/ LWIV or vessel's deck can also cause stability issues (free surface effect). Storage space required for containment of drained liquids, increase in transfers to vessels resulting in increased potential impacts and risks. Increased transfers results in increased fuel usage, increased safety risks to personnel during transfer (e.g. crushing between skips) and increase in crane movements.	**Not Adopted** – Safety considerations outweigh the benefit, given the small volumes of contaminants. Deck drainage is a permitted maritime practice and an important safety requirement.
N/A	Zero discharge of bilge water	Would eliminate potential impacts of contaminants being discharged to sea from oily water.	Costs associated with containment and onshore disposal, space required for additional containment on MODU/LWIV and vessels could create hazards for working on deck by limiting available space.	**Not Adopted** – Safety considerations regarding containment outweigh the environmental benefit given the small volumes of contaminants. Discharge of treated oily water to sea is permitted maritime practice.

Control Measure Reference No.	Control Measure	Environmental Benefit	Potential Cost/Issues	Evaluation
N/A	Zero discharge of sewage	Would eliminate potential impacts of contaminants being discharged to sea from sewage.	Costs associated with containment and onshore disposal, space required for additional containment on MODU/LWIV and vessels could create hazards for working on deck by limiting available space.	**Not Adopted** – Safety considerations regarding containment outweigh the environmental benefit given small volumes of contaminants. Discharge of treated sewage to sea is permitted maritime practice.
N/A	Zero discharge of putrescible waste	Would eliminate potential impacts from putrescible waste discharges by storing on-board for onshore disposal.	Cost associated with transporting putrescible waste to shore, space required for additional containment on MODU/LWIV and vessels could create hazards for working on deck by limiting available space. Health risks and costs associated with storage on-board and transport/ disposal onshore.	**Not Adopted** – Cost grossly disproportionate to environmental benefit. Limited benefit to be gained given low impact. Health risks associated with managing putrescible waste in hot weather conditions, putrescible waste discharge is a permitted maritime practice.
N/A	Zero discharge of cooling water	Would eliminate potential impacts of cooling water (elevated temperature) being discharged to sea.	Costs associated with containment and onshore disposal, space required for additional containment on MODU/LWIV and vessels could create hazards for working on deck by limiting available space.	**Not Adopted** – Cost grossly disproportionate to environmental benefit. Limited benefit to be gained given low impact. Discharge of cooling water permitted maritime practice.
N/A	Scupper plugs continuously in place to prevent deck drainage	Would eliminate potential impacts of contaminants being discharged to sea in rainwater.	Increased health and safety risks from wet deck not draining. Large amounts of water on a MODU/LWIV or vessel's deck can also cause stability issues (free-surface effect).	**Not Adopted** – Safety considerations outweigh the benefit, given small volumes of contaminants.
N/A	Zero discharge of brine water	Would eliminate potential impacts from brine discharges by storing on-board for onshore disposal.	Cost associated with transporting waste brine water, space required for additional containment on MODU/LWIV and vessels could create hazards for working on deck by limiting available space.	**Not Adopted** – Cost grossly disproportionate to environmental benefit. Limited benefit to be gained, given low impact. No detectable change in water quality expected. Water making and brine discharge permitted maritime practice.

Control Measure Reference No.	Control Measure	Environmental Benefit	Potential Cost/Issues	Evaluation
N/A	Restrict use of desalination plant	Would eliminate potential impacts from brine discharges by importing potable water.	Cost associated with transporting potable water. Health risks associated with limited supply of potable water.	**Not Adopted** – Cost grossly disproportionate to environmental benefit. Limited benefit to be gained given low impact. No detectable change in water quality expected. Water making and brine discharge permitted maritime practice.
N/A	Re-design desalination plant effluent discharge system	Limited benefit to be gained given desalination brine will be diluted.	High costs associated with modifications to MODU/LWIV and vessels. May not be feasible with some MODUs/LWIVs. Salinity difference would be minimal compared to significant cost of altering the desalination plant effluent discharge system.	**Not Adopted** – Cost grossly disproportionate to environmental benefit. Limited benefit to be gained given low impact. Minimal detectable change in water quality expected. Water making and brine discharge permitted maritime practice.

6.6.4 Environmental impact assessment

Receptor	Consequence Level
Operational discharges	
Threatened, migratory or local fauna Physical environment or habitat Socio-economic receptors	The overboard discharges of sewage and putrescible wastes will create a localised and temporary increase in particulates on or near the surface. This may in turn act as an attractant for scavenging fauna, such as fish, marine turtles, mammals and seabirds, whose numbers may temporarily increase. However, the open marine waters are typically influenced by regional wind and large-scale current patterns resulting in the rapid mixing of surface and near surface waters where sewage, greywater and food waste discharges will occur. Therefore, nutrients from these discharges will not accumulate or lead to eutrophication due to the highly dispersive environment. As such, the receptors with the greatest potential to be impacted are those in the immediate vicinity of the discharge. Impacts to local water quality will be experienced due to minor discharges of deck drainage, bilge water, marine growth removal and swarf. Additionally, local water quality effects may result from subsea cutting of infrastructure as discussed in Section 6.6.2.8. The discharge of chemicals, including those from marine growth removal, are anticipated to disperse rapidly in the offshore marine environment. Water quality impacts will be experienced in the discharge mixing zone, which will be localised and will occur only as long as the discharges occur. As such, no sustained impacts are expected, and recovery is anticipated within hours to days. Consequently, only short-term behavioural impacts are expected with no decrease in local population size, area of occupancy of species, loss or disruption of habitat critical or disruption to the breeding cycle and introduction of disease. EP stakeholder consultation did not raise any concerns regarding potential impacts to cultural features including Sea Country. Given the nature of the planned operational discharges, the small volumes that could be released to the marine environment, the high levels of dilution and the nature of the marine environment in the vicinity of the Operational Area, impacts to the physical environment and habitat are expected to be I (Negligible).
Threatened ecological communities	Not applicable – No threatened ecological communities identified in the area over which operational discharges are expected.

Receptor	Consequence Level
Protected areas	Not applicable – No protected areas identified in the area over which operational discharges are expected.
Overall worst-case consequence	I – Negligible

6.6.5 Demonstration of ALARP

The MODU/LWIV and support vessels are essential for undertaking the offshore activity, and while an alternative to discharging small volumes of treated liquid waste to the marine environment would be to store and transport waste to shore for disposal, this option presents greater environmental, safety and operational risks. Transporting waste to land would increase emissions through additional vessel movements, energy use and road transport impacts, and would also raise collision risks due to increased vessel traffic. Onboard containment of discharges without significant vessel modifications would reduce available deck space, pose safety hazards to personnel, and increase lifting operations. Therefore, the treatment and controlled discharge of waste in accordance with industry standards and regulatory frameworks, including the *Protection of the Sea (Prevention of Pollution from Ships) Act 1983* and MARPOL Annexes I, IV and V, is considered the most environmentally sound and practicable approach.

A number of standard control measures have been adopted to ensure waste management is (Table 6-16). These include the implementation of waste (garbage) management procedures aligned with Marine Order 95, which reduce the likelihood of garbage, including putrescible waste, being discharged to sea. Deck cleaning and chemical selection procedures ensure the products planned for release to the marine environment meet MARPOL Annex V criteria for non-harmfulness. General chemical handling and selection procedures are in place to prevent inappropriate discharge of chemicals and to ensure only approved substances are used. Marine assurance standards are applied to ensure all MODU, LWIV and support vessels are operated, maintained and crewed in accordance with Santos' Offshore Marine Assurance Procedure and relevant Marine Orders. Certified sewage and oily water treatment systems are used to manage discharges in compliance with Marine Orders 96 and 91 respectively, with appropriate monitoring and record-keeping in place. A Radioactive Materials Management Plan has also been adopted to reduce the potential for cross-contamination during recovery activities and to manage the safe transport and disposal of any contaminated waste. These controls ensure the discharges are appropriately treated to minimise environmental harm, and that the small volumes of waste released are within acceptable and legislated limits.

Several additional control measures were considered but not adopted, as the cost, technical feasibility or health and safety implications were grossly disproportionate to any minor environmental benefit. Measures such as achieving zero discharge of deck drainage, bilge water, sewage, brine, cooling water and putrescible waste were evaluated but not adopted. Containment of these waste streams onboard would require significant storage capacity, reduce available deck space, and increase safety risks to personnel, including slips, trips, falls and exposure to health hazards. In the case of deck drainage, preventing discharge could also compromise vessel stability due to the free surface effect. These discharges are permitted under maritime regulations when appropriately treated, and the environmental benefit of containment was considered negligible relative to the operational and safety risks.

Other measures, such as the continuous use of scupper plugs to prevent deck drainage, restricting the use of desalination plants, or redesigning desalination plant effluent discharge systems, were also not adopted. These options were deemed infeasible due to the minimal environmental benefit and the substantial cost or safety implications associated with implementation.

All practical control measures have been reviewed (Section 6.6.3), and those adopted are considered appropriate to manage the impacts such that the residual consequence is assessed to be negligible and cannot be reduced further (Table 6-16). The proposed management controls for planned operational discharges are consistent with Santos' risk management criteria and are considered sufficient to reduce environmental risks to ALARP.

6.6.6 Acceptability evaluation

Is the consequence ranked as I or II?	Yes – maximum planned operational discharge consequence is rated II (Minor).
Is further information required in the consequence assessment?	No – potential impacts and risks are well understood through the information available.
Are risks and impacts consistent with the principles of ESD?	Yes – activity evaluated in accordance with Santos' Environmental Hazard Identification and Assessment Procedure (EA-91-IG-00004_6), which considers principles of ecologically sustainable development. The consequence against this aspect is II (Minor) and therefore does not affect the outcomes of the principles of ecologically sustainable development as per Table 5-5.
Are risks and impacts consistent with relevant legislation, international agreements and conventions, guidelines and codes of practice (including species recovery plans, threat abatement plans, conservation advice and Australian Marine Park zoning objectives)?	Yes – management consistent with the *Protection of the Sea (Prevention of Pollution from Ships) Act 1983,* which in Australian waters is enacted by the Marine Orders. IUCN principles and strategic objectives of nearby reserves (Montebello and Dampier AMPs and the North-west MPNMP) are met. Controls implemented will minimise the potential impacts from the activity to species identified in recovery plans and conservation advices as having the potential to be impacted by operational discharges. Relevant species recovery plans, conservation management plans and management actions are detailed in Table 3-10.
Are risks and impacts consistent with Santos' Environment Policy?	Yes – aligns with Santos' Environment Policy.
Are risks and impacts consistent with stakeholder expectations?	Yes – no concerns raised.
Are performance standards such that the impact or risk is considered to be ALARP?	Yes – see ALARP above.

Release of non-hazardous discharges into the sea from vessels in Australian waters is permissible under the *Protection of the Sea (Prevention of Pollution from Ships) Act 1983*, which in Australian waters reflects Australian Marine Orders requirements respectively, and is enacted by:

- Marine Order 91 (Marine pollution prevention – oil)
- Marine Order 96 (Marine pollution prevention – sewage)
- Marine Order 95 (Marine pollution prevention – garbage).

The operational discharges are not expected to significantly impact the receiving environment with management controls proposed, including compliance with all MARPOL requirements. The MARPOL standard is considered to be the most appropriate standard for vessel discharges, given the nature and scale of the activities. These standards are internationally accepted and utilised industry wide. Therefore, compliance with the relevant and appropriate MARPOL requirements and standards is expected to reduce the potential for environmental impacts to a level that is considered environmentally acceptable.

Subsea discharges of swarf, acid wash used for marine growth removal during infrastructure removal and recovery are not expected to significantly impact the receiving environment with the proposed management controls in place, including the Santos Chemical Selection Procedure and the Radioactive Materials Management Plan.

Deteriorating water quality is identified as a potential threat to turtles in the Recovery Plan for Marine Turtles in Australia (CoA, 2017). However, given the closest BIA for marine turtles and reproduction BIA for the flatback turtle lies more than 8 km away, and with the management controls proposed, the operational discharges are not expected to significantly impact the receiving environment. This is because the discharges will be temporary and released into a dispersive open-ocean environment. Therefore, the activities will result in an acceptable level of impact, and therefore the activity is not inconsistent with identified Recovery Plans and conservation advice.

6.7 Drilling discharges

6.7.1 Description of event

Event	During MODU decommissioning or LWIV activities, various fluids and materials may be discharged to the marine environment. These discharges occur primarily at the sea surface, and are associated with drilling, milling, cementing, wellbore clean-up, and tank cleaning operations. The nature and volume of discharges vary depending on the activity type. Santos' Drilling Fluids and Chemical Selection in Drilling Activities Procedure (EA-91-II-00007) will ensure that only environmentally acceptable products are used. Table 6-17 lists the estimated and approximate drilling discharges to the marine environment expected from either MODU decommissioning or LWIV activities. Once the activity is finished, the unmixed bulk drilling fluid solid additives (barite and bentonite), dry cement, brine and drill water will be managed in accordance with the decision list in Table 6-18. **Discharges from MODU decommissioning operations** ***Milling and drilling fluids*** The WBM will be discharged from the MODU at sea surface from storage tanks/mud pits when no longer required. The WBM will be comprised of water or brine (>90% aqueous) as the major liquid phase. The remainder of the WBM will be made up of low toxicity drilling fluid solid additives (e.g. barite) and chemicals that are either completely inert or additives in such low concentrations they pose little or no risk to the environment. ***Drilling chemicals*** Chemicals required for drilling operations include, but are not limited to brines, clays (such as bentonite), density increasing additives, viscosity additives, alkalinity and hardness control additives, lost circulation materials as well as cement, cement additives and spacers. Tracer dyes may also be used for leak detection and cementing operations. ***Cement operations*** Cement is utilised during well decommissioning with the majority of cement remaining downhole but minor volumes may be discharged to the environment including: • when the cement system is flushed to prevent curing inside the cement unit and pipework after each cement job is completed • during setting of downhole cement plugs near the surface, hard cement may return to MODU where it will be treated through the shale shakers and discharged at the sea surface • should cement plugs be drilled out for the purposes of accessing the wellbore adjacent to/beneath them, hard cement may return to surface where it will be treated through the shale shakers and discharged at the sea surface • cement and/or cement additives mixed for use but not subsequently required due to unplanned interruptions (e.g. emergency shutdown or equipment malfunction requires recirculation of cement to the surface/cleaning of pumping system and tanks with disposal overboard to prevent system blockages). ***Section milling discharges*** Section milling discharges may involve backside materials flowing through the annulus and being recovered to the MODU. Swarf is removed, hydrocarbons skimmed and sent to shore, and the remaining fluid (e.g. brine with residual additives) is discharged overboard. ***Well bleed-off*** During well bleed-off, hydrocarbons and potentially formation water will be vented or circulated back to the MODU via a temporary process and handling facility installed on the MODU. Hydrocarbons will be flared (combusted) using burners or contained within appropriate tanks (Section 6.3). Marine discharges typically occur during well bleed-off, such as recovered formation water that has been treated to remove oil prior to discharge to the marine environment. The oil component will be recovered and retained for onshore disposal at a licenced facility. ***Tank cleaning*** At stages during the activity, tanks may need to be cleaned, including mud pits (i.e. tanks used to mix and hold brine, sweeps or WBM), cement mixing/holding tanks and bulk storage tanks. Cleaning may be required to remove or flush 'dead' or residual volumes of WBM or settled inert solid material. ***Bulk product disposal*** Bulk product disposal may occur if unused materials (e.g. bentonite /cement/barite) cannot be reused or on sold. These materials may be discharged in accordance with waste management procedures.. ***Emergency situations*** For MODU cyclone preparation vertical deck loading will be reduced to survival by emptying pits (milling/kill fluids).

	Discharges from LWIV well suspension activities ***Wellbore fluids*** Wellbore fluids such as WBM, inhibited seawater, packer fluid, brine, seawater, freshwater, and hi-vis pills. These are used during intervention activities and may be discharged at the sea surface following use or treatment. ***Tank cleaning wash*** Water is generated during cleaning of tanks and pits used to store or mix fluids. Residual volumes of WBM or additives may be flushed and discharged.
Extent	Discharges to the marine environment from MODU and LWIV activities are expected to result in temporary changes to water quality and localised increases in turbidity. These impacts are associated with the release of fluids such as water-based muds, brines, and wash water, as well as minor quantities of additives and residual materials. For MODU activities, discharges may include drilling fluids, cement, and associated solids. Hard cement particles are expected to settle directly around the MODU, while finer particles from drilling muds and cement additives may disperse with prevailing currents before settling on the seabed. These discharges may lead to short-term reductions in water clarity and localised sediment deposition. LWIV activities, which do not involve drilling or cementing, may result in turbidity due to the discharge of wellbore fluids, WBM, and tank cleaning wash water. These discharges are expected to affect water quality in the immediate vicinity of the LWIV, with suspended particles settling over time. The spatial extent of turbidity and sedimentation is generally limited to the area surrounding the MODU or LWIV, with impacts diminishing rapidly with distance from the discharge point.
Duration	Intermittent for the duration of the activity (10 to 40 days). Water quality changes are expected to recover within hours to days following cessation of drilling discharges. Sediment deposition will occur during the activity, with finer particles continuing to settle for approximately two weeks following the drilling activity, with ecological recovery of the benthic habitat expected within months to a year.

The estimated drilling discharges to the marine environment expected for the activity and the decision matrix for discharges are provided in Table 6-17 and Table 6-18, respectively.

Table 6-17: Estimated drilling discharges to the marine environment

Discharge Material	Purpose	Reason for Discharge	Maximum Potential Discharge Per Well
Existing wellbore fluid			
Packer fluid	Packer fluid currently in well	Unable to be reused	250 m^3
WBM/cuttings	Casing annulus fluid currently in well	Unable to be reused	300 m^3
Drilling fluids and additives			
Brine/seawater/freshwater (possibly inhibited)	Kill and circulating system	Cement contamination and excess to requirements	500 m^3
Water based drilling/milling fluids	Kill and circulating system	Cement contamination and excess to requirements	500 m^3
Hi-vis pills	Used for numerous purposes including setting cement plugs on, preventing losses and hole cleaning	Unable to be reused and excess to requirements	200 m^3
Other additives (i.e. density increasing additives, viscosity additives, alkalinity and hardness control additives, lost-circulation material and tracer dyes)	Used to prevent downhole losses	Unable to be reused and excess to requirements	50 m^3

Discharge Material	Purpose	Reason for Discharge	Maximum Potential Discharge Per Well
Tank cleaning wash water	Residue from mud pits (i.e. tanks used to mix and hold brine, sweeps or WBM), cement mixing/holding tanks and bulk storage tanks	Unable to be reused and impractical to return to shore for disposal	500 m^3
Drilling cements and additives			
Cement cuttings	Solids generated while drilling through cement plug	Unable to be reused	100 m^3
MODU wet cement discharges	Wet or set cement discharges to sea (i.e. cement spacer, flushing tanks and lines)	Unable to be reused and impractical to return to shore for disposal	<15 m^3
Off specification cement	100 m^3 of cement (wet) discharged at sea surface or 250 m^3 at the seabed in the event of a cement job not meeting technical and safety standards	Unable to be reused and impractical to return to shore for disposal	100–250 m^3
Mixed cement and/or cement additives	Mixed for use but not subsequently required due to unplanned interruptions	Unable to be reused and impractical to return to shore for disposal	100 m^3
Cement system flushing wash water	Residue from when the cement system is flushed to prevent curing inside the cement unit and pipework after each cement job is completed	Unable to be reused and impractical to return to shore for disposal	100 m^3
Well bleed-off			
Treated oil in water	Recovered formation water that has been treated to remove oil prior to discharged to the marine environment	Treated to <1% by volume oil in water for acceptable discharge	200 m^3
End-of-campaign discharges			
Cement/bentonite/barite/brine	Discharged as slurry at the end of well in the event stocks cannot be reused/sold	Excess to requirements	70 m^3
Dry cement or bentonite	Discharged in the event dead space volumes in silos cannot be mixed into a slurry	Excess to requirements	10–15 t

Table 6-18: Decision list for managing bulk powders[7] remaining on the MODU at the end of the well decommissioning campaign

Trigger	Fate of Stock	Reasoning
Well is not the last well in the MODU schedule and ongoing use of the product is anticipated.	**Retain stock** Stock will be retained on-board for use in the next well or may be sent for temporary storage on a supply vessel. This option eliminates overboard disposal.	These products are expensive. Santos' preferred option is to use all stock in subsequent wells in the MODU schedule to minimise activity costs and reduce discharges.
Well is the last well in the MODU schedule and the next operator is willing to buy the stock.	**Sell stock** Stock will be retained on-board or may be sent for temporary storage on a supply vessel for used by the next operator. This option eliminates overboard disposal.	It may be possible for Santos and the next operator using the MODU to transfer ownership of the unmixed stock. The implementation of this option is dependent on demand and commercial agreements.
Well is the last well in the MODU schedule and selling the stock to the next operator is not an option.	**Minimise stock** Santos will have measures in place to reduce the stock requiring disposal at the end of the activity. This option requires some overboard disposal.	Stock minimisation measures will be put in place without compromising the minimum bulk stock required for well control or dealing with lost circulation.
Well is the last well in the MODU schedule, selling the stock to the next operator is not an option but another Santos operated MODU is in proximity and can take on stock.	**Transfer stock to alternative MODU** This option eliminates overboard disposal.	Stock can be transported to an alternate MODU dependent on: • whether MODU is capable of transferring dry bulk products back to support vessel • whether Santos has another MODU operating in the region • alternative MODU can use the product • travel distance and cost associated with transporting the stock to the alternative MODU are not prohibitive • alternate MODU has the capacity to take on additional stock.
All other disposal options have been exhausted.	**Overboard disposal of stock** Stock will be discharged as wet slurry.	Disposal volumes will be minimal due to stock minimisation. A decision log will be prepared demonstrating that this disposal option is ALARP and acceptable.

6.7.2 Nature and scale of environmental impacts

Potential receptors: Water quality, sediment quality, benthic habitat, marine fauna, cultural receptors (totemic species).

Discharges to the marine environment will vary depending on whether the activity is conducted using a MODU or LWIV. MODU activities may involve intermittent discharges of drilling fluids, cement, and associated additives, while LWIV activities are limited to discharges of wellbore fluids, water-based muds, brines and tank cleaning fluids. The nature and scale of discharges are expected to result in localised water quality, typically around the discharge point. These impacts are expected to be temporary (minutes to hours) and spatially limited, with rapid dispersion and dilution reducing concentration significantly with distance from the source. Changes to water quality outside of the Operational Area are considered unlikely.

[7] *Bulk powders include any of the following: barite, bentonite and cement*

For the purposes of this assessment, the following sections focus on discharges and environmental impacts associated with MODU-based well decommissioning activities, which represent the worst case drilling and cement discharges for the activities. This approach ensures that the assessment captures the full extent of potential impacts under a worst-case discharge scenario and aligns with standard regulatory practice for evaluating environmental risks. Specifics of potential impacts to water quality from the discharge of drilling fluids, cement, solid additives (e.g. barite, bentonite), and treated seawater are discussed in the following sections.

6.7.2.1 Water quality

Drilling fluids, cements and solid additives (e.g. barite, bentonite) will be discharged during the activity. Discharges at the water surface or close to sea level will result in a reduction in water quality from an increase in turbidity.

Once discharged, large particles and flocculated solids form a plume that settles quickly on the seabed. Fine grained unflocculated clay-size particles and other soluble components form another plume in the water column that drifts with the prevailing currents away from the point source and is diluted rapidly in the receiving waters (Neff, 2005).

Any increases in suspended solids and subsequent decreases in available oxygen surrounding the discharge location may result in a localised impact to organisms present in the water column. Impacts may include obstructions to respiratory processes and other physiological processes as well as behavioural changes due to a reduction in available oxygen or avoidance of the turbidity plume. The increased particle load in the water column could adversely affect respiratory efficiency of small fish species that become entrained in the turbidity plumes. However, large pelagic fish species and megafauna (such as sharks and rays, marine turtles and cetaceans) are unlikely to be affected as these mobile species would avoid the area or simply pass unaffected through turbid waters.

In well-mixed ocean waters drilling fluids, cements and solid additives are diluted by 100-fold within 10 m of the discharge and by 1000-fold after a transport time of about 10 minutes at a distance of about 100 m. Because of the rapid dilution of the drilling fluid and cement discharges plume in the water column, impacts to water column fauna and flora (e.g. plankton, fish) is unlikely (Neff, 2005).

Given the nature of the discharges, and the nature of the marine environment within the vicinity of the Operational Area, the impact on water quality from drilling fluids, cements and solid additives from planned activities is expected to be low and short-term and is unlikely to have spatially or ecologically significant effects.

6.7.2.2 Sediment quality

Accumulation of solids from drilling discharges on seafloor sediments can cause changes in the physical properties and chemical composition of the seabed sediments. These include a change in the appearance of the sediment surface, increased sediment grain size and increase in concentrations of metals (relating to weighting agent use).

Barite is one of the main constituents used in WBM, and its use results in elevated levels of barium (Ba) in drilling solids. Other chemicals of concern in cuttings, either because of their potential toxicity and/or abundance in WBM are arsenic (As), chromium (Cr), cadmium (Cd), copper (Cu), iron (Fe), lead (Pb), mercury (Hg), nickel (Ni) and zinc (Zn) (Breuer et al., 2004).

Although discharges of WBM will be associated with non-cuttings related drilling solids, reference can be made to studies on cuttings when assessing impacts:

- Dissolved barium and any heavy metal contaminants present in the barite may slowly leach out of an anoxic cuttings pile (Neff. et al., 2005). Breuer et al. (2008) has also observed that metals in cuttings, migrate either upward to the overlying water (Ba, Mn, and Fe), or diffuse downward (Cr, Cu and Pb) where they become incorporated into Fe monosulfides. The exposure of these Fe monosulfides to oxygen as a result of transport of oxygen into the cuttings via bioturbation or advection and/or pile resuspension may then lead to the release of the associated metals into the water column (Saulnier and Mucci, 2000; Huerta-Diaz et al., 1998).
- In a stable cuttings pile with little physical disturbance or bioturbation, it is probable that the fraction of the total cuttings pile metals that is in the dissolved, bioavailable fraction remains low. It is probable that some dissolved metals diffuse into the overlying water column and escape from the pile as identified by Neff et al. (2005). However, this efflux is not sufficient to raise the concentration of metals above natural background levels to an ecologically significant extent (Hartley et al., 2003). There is no indication that the levels of trace metals in fish and shellfish collected close to offshore installations are significantly above natural background concentrations (Bakke et al., 2013).
- Marine fauna that are exposed in the laboratory or field to cuttings in sediments do not bioaccumulate significant quantities of metals (Hartley et al., 2003). There is some evidence of a limited bioavailability of a

few metals, such as Pb and Zn, which are present in cuttings piles. However, doubt remains that metal bioaccumulation in marine fauna from cuttings piles is sufficient to cause harmful effects in marine fauna living on or near cuttings piles (OSPAR, 2019). Barite selected for the drilling is manufactured in accordance with American Petroleum Institute (API) standards, which have limitations on all contaminant concentrations.

- Modelling of cuttings pile relocation (disturbance and re-deposition) has confirmed that potential impacts of metals are minimal and disturbance of cuttings drilled with WBM is not expected to result in any significant impact (OSPAR, 2019). Generally, impacts from disturbed cuttings drilled with WBM are expected to be minor and resemble the impacts from currently consented cuttings discharges, and any concern is more likely to focus on cuttings drilled with non-aqueous drilling fluids (NADF) (OSPAR, 2019).

Given there will be no cuttings discharged during activities, and that the volume of drilling solids and WBM discharged will be limited in comparison to cuttings discharges, the risk to the marine environment is expected to be significantly less than that from cuttings, which is considered minor. Considering the widespread representation of the benthic communities present in the Operational Area, and the localised and limited sedimentation expected as a result of activities, no long-term or significant impacts to habitat values or ecosystem function are expected.

6.7.2.3 Toxicity

Cementing discharges (cement, cement slurry, additives and spacers, etc) and formation water have the potential to result in toxicity effects. Discharge of cement at the sea surface has not demonstrated significant harm to water column flora and fauna (Neff, 2005).

Components of WBM with potential toxicity to marine flora and fauna include metals associated with inorganic salt components, organic polymers and additional organic additives as well as barite/bentonite weighting agents. Metals present in drilling fluids generally resemble that of marine sediments, albeit with concentrations of some metals higher than clean marine sediments (Neff, 2005). Metals associated with WBM drill cuttings have been shown to have a low bioavailability as they tend to remain in a non-ionic form and remain bound to other compounds, presenting a low toxicity risk to marine fauna (Neff, 2005). In general, the acute toxicity of WBM is low (Neff, 2005).

During well clean out, fluids circulated from the well that cannot be sent though the bleed-off package will use the MODU's mud system. This mud system contains mud pits (tanks) which can contain and handle WBM and brine. Any contents of the mud pit greater than 1% by volume oil will be sent onshore for disposal.

Toxic impacts from the oil content in formation water are expected to be highly localised following treatment by filtration to less than 1% by volume. Any potential toxic effects would likely be restricted to small organisms such as plankton, larvae and potentially small fish that become entrained in discharged water resulting in relatively high exposure periods. The period of which formation water may be discharged is short; i.e. nominally 6 – 12 hours per well bleed-off. Given the very short duration of each well bleed-off, the depth of waters and the high degree of dispersal and dilution expected seabed loadings of contaminants are not predicted to reach levels of concern.

Bioaccumulation is the uptake and retention of xenobiotics (substances that are not natural components of the environment) by organisms from their environment. This process can have significant ecological consequences as pollutants move up the food chain to higher order species. Numerous studies have been carried out in the Gulf of Mexico to test and evaluate a range of biological, biochemical and chemical methodologies to detect and assess chronic sub-lethal biological impacts in the vicinity of long duration activities associated with oil and gas exploration and production. Contaminant concentrations at most locations studied were below levels thought to induce biological responses (Kennicutt et al., 1996). Therefore, discharges associated with this activity are not expected to have long-term effects due to bioaccumulation.

6.7.2.4 Benthic habitats

Drilling related discharges may result in burial or smothering of benthic habitats adjacent to the MODU. Smothering may occur as the suspended solids from the drilling discharges released at the water's surface settle to the seabed. As there are no cuttings during activities the formation of solids piles on the seabed is significantly less likely and depends upon the depth of water, method of disposal of drilling solids, physical structure of the solids pile and the energy of the receiving waters (e.g. strength of tidal currents). The depth of any accumulated sediments will be greatest close to the MODU discharge location where the heavier particles are deposited and decrease with increase in distance from the source point.

The effects of drilling discharges on the benthic environment are related to the total mass and type of drilling solids discharged, the relative energy of the water column and benthic habitat at the discharge location (Neff, 2005). The effects of drilling solids on seabed communities are caused mainly by burial and low sediment oxygen concentrations caused by organic enrichment (Neff, 2005). With increasing thickness of drilling solids, the number

of taxa, abundance, biomass and diversity of macrofauna has been found to significantly reduce (Trannum et al., 2010).

The potential drilling and cement discharges on benthic habitats are not considered likely to cause a significant environmental impact as follows:

- No known sensitive seabed features (e.g. reefs, canyons, shipwrecks) or benthic primary producer habitat (e.g. areas of hard corals, seagrass, macroalgae or mangroves) are present in the Operational Area. As described in Section 3.2.4, benthic habitats surrounding the Operational Area are largely bare sediments with associated sparse assemblages of filter and deposit feeders. This habitat type and associated biota are very widely represented in the region and not of conservation significance. The field is in >300 m water depth and insufficient light reaches the seabed to support photosynthetic organisms such as zooxanthellate corals, seagrasses and macroalgae.
- There are no cuttings discharged during activities. The volume of solids discharged will be limited to cement related wastes. Discharge of bulk products at the end of campaign is a possibility, however, as per Table 6-18 all other disposal options will be exhausted first. Due to the water depth and currents in the Operational Area, cement related wastes are not likely to create significant piles on the seafloor as the ocean currents will carry the sediment load before it reaches the seabed, likely resulting in an elongated and thin distribution of solids.
- Although the Continental Slope Demersal Fish Communities KEF overlaps with the Operational Area (Section 3.2.5.2), no seabed assets overlap with the KEF and drilling solids discharges are not expected to materially impact this feature.

Therefore, while it is expected that sediment physical and chemical composition (e.g. barium concentration) will be altered in the vicinity of the MODU, as discussed further in Section 6.7.2.2, negligible to minor environmental impacts associated with these changes are expected. Impacts would likely be temporary, with rapid recolonisation of benthic infauna within any solids layer deposited, given the low toxicity of the material. Epifauna is likely to recolonise within weeks to months.

6.7.2.5 Threatened or migratory fauna

As discussed in the sections above, the discharge extent for the drilling fluid and cement discharges is localised and temporary. Marine fauna within the Operational Area is likely to be transient. If contact does occur with any marine fauna, it will be for a short duration due to the rapid dispersion of the plume and the transient fauna movement, such that exposure time may not be of sufficient duration to cause a toxic effect. Given the nature of the marine environment within the vicinity of the Operational Area, the drilling fluid and cement discharges are not predicted to have ecologically significant effects.

Three BIAs occur within the Operational Area; humpback whale migration, pygmy blue whale migration and wedge-tailed shearwater reproduction. Habitat modification is identified as a potential threat to a number of marine fauna species in relevant recovery plans and conservation advices (Table 3-10). Disturbance of the seabed is not anticipated to significantly affect mobile marine fauna, such as marine mammals, marine reptiles, fish, sharks and rays, given the sparse benthic and epi-benthic communities expected in the Operational Area. Impacts to benthic fauna is likely be temporary, with rapid recolonisation. Impacts to water quality will be localised and while a decrease in local population size may occur, no loss or disruption of habitat critical to the survival of a species or disruption to the breeding cycle of any of these protected matters is expected.

Fish, sharks and rays may also forage in the soft sediments for marine invertebrates. However, given the small scale of the activity and the regional availability of habitat, seabed and benthic habitat disturbance from drilling fluid and cement discharges is not expected to affect these species.

6.7.2.6 Protected and significant areas

The Continental Slope Demersal Fish Communities KEF overlaps the Operational Area (Section 3.2.5.2), however drilling fluid and cement discharges are not expected to materially impact this feature. No other protected areas are present within the Operational Area. Subsequently, no impacts are expected from drilling fluid and cement discharges.

6.7.2.7 Socio-economic

Tourism activities are not expected to occur in the Operational Area, given the water depth, lack of seafloor features and distance from shore. The Operational Area is not extensively fished – commercially, traditionally or recreationally. FishCube data did not identify any recent active fishing effort from any Commonwealth or state managed fisheries. Therefore, any temporary decrease in water quality from drilling and cement discharges is not likely to affect fisheries or tourism.

Table 6-18 details the decision process for managing bulk powders and brines remaining on the MODU at the end of the decommissioning campaign – and will be followed to reduce overboard disposal where possible.

6.7.2.8 Chemicals

The Santos Drilling Fluid and Chemical Selection in Drilling Activities Procedure (EA-91-II-00007) applies to drilling, completion and cement chemicals used downhole during the planned operations as well as chemicals previously used downhole that may be released to the environment during activities. The procedure defines the requirement for chemicals to meet the following criterion at the time of use to reduce environmental risk and impact:

- certified Gold, Silver, E or D through the OCNS, or
- Pose Little or No Risk to the Environment (PLONOR) as listed by the Oslo and Paris Convention for the Protection of the Marine Environment of the Northeast Atlantic (OSPAR), or
- risk assessed by Santos and deemed environmentally acceptable using Santos' Santos Drilling Fluid and Chemical Selection in Drilling Activities Procedure (EA-91-II-00007).

6.7.2.9 Cultural receptors

Totemic species of cultural value may pass through the Operational Area. However, during consultation, Santos was not made aware of any other cultural receptors within the Operational Area. Any totemic species (e.g. marine fauna and reptiles) found in the water column are expected to actively avoid discharge plumes and associated turbidity and toxicity within the water column.

6.7.3 Environmental performance outcomes and control measures

The EPOs relating to this event include:

- No unplanned objects, emissions or discharges to sea or air [VGCN-EPO-03].
- Reduce impacts to air and water quality from planned discharges and emissions from the activities [VGCN-EPO-04].
- Seabed disturbance is limited to planned activities and defined locations within the Operational Area [VGCN-EPO-05].

The control measures considered for this event are shown in Table 6-19, and EPSs and measurement criteria for the EPOs are described in Section 8.

Table 6-19: Control measure evaluation for drilling and cement discharges

Control Measure Reference No.	Control Measure	Environmental Benefit	Potential Cost/Issues	Evaluation
Standard controls				
VGCN-CM-033	Chemical selection procedure	Aids in the process of chemical management that reduces the impact of drilling discharges to sea. Only environmentally acceptable products are used.	Cost associated with implementation of procedure. Range of chemicals reduced with potentially higher costs for alternative products.	**Adopted** – Environmental benefit of using lower toxicity chemicals outweigh procedural implementation costs.
VGCN-CM-037	Cuttings management system	Reduces the concentration of drilling mud on cuttings prior to discharge while drilling with a closed circulating system, thereby reducing the total volume of mud lost to sea.	High cost associated with implementing procedure.	**Adopted –** Benefits of implementing procedure and measures implemented outweigh costs.
VGCN-CM-038	Inventory control procedure	Restricts the type and volume of drilling discharges and includes a decision-making framework for managing left-over bulk products (refer to Table 6-19).	High cost associated with implementing procedure.	**Adopted** – Benefits of ensuring procedures are followed and measures implemented outweigh costs.

Control Measure Reference No.	Control Measure	Environmental Benefit	Potential Cost/Issues	Evaluation
VGCN-CM-039	Oil content measurement procedure	Accounts for potential for oil contamination from reservoir.	Cost associated with implementing procedure.	**Adopted** – Benefits of ensuring procedures are followed and measures implemented outweigh costs.
VGCN-CM-040	Lost-circulation material procedures	Reduces hydrocarbon based lost-circulation material that may be released to the environment.	Cost associated with implementing procedure.	**Adopted** – Benefits of ensuring procedures are followed and measures implemented outweigh costs.
VGCN-CM-059	Decision list for managing bulk powders and brines remaining on the MODU at the end of the decommissioning campaign	Optimise resource recovery and reuse where possible as per Table 6-18. Barite is an essential product for use in both drilling operations and as contingency for well control activities. The Minamata Convention requires best available techniques be adopted when considering discharge of wastes that contain any mercury content. Stock barite is known to contain low levels of naturally occurring mercury and barite stocks are tested to ensure they meet the limits prescribed by API standards (Mercury (Hg): max 1 mg/kg (<1 ppm) dry weight in stock barite). Barite mercury content is managed via VGCN-CM-041. This limit supports the use of barite as a necessary drilling operations material and the associated operational discharges. Trace heavy metals in barite, including mercury, are present as primary inorganic, insoluble sulphide materials that have low bioavailability and environmental mobility (Neff, 2008).	Administrative cost in identifying and assessing options. The cost involved in transporting the remaining stock, as well as the additional GHG emissions and increased landfill associated with transport and disposal of this material outweighs the limited environmental benefit gained through avoiding overboard discharge (as a slurry).	**Adopted** – Environmental benefits of ensuring procedures are followed outweigh administrative costs
VGCN-CM-012	Well test procedures	Ensures well fluids are appropriately managed and that oil-water content in drilling fluids discharges is 1%.	Cost associated with implementation of procedure.	**Adopted** – Benefits of ensuring procedures are followed and measures implemented outweigh costs.
VGCN-CM-041	Quality control limits for barite	Contaminant concentration limits in barite meet API specifications to minimise the risk of seabed contamination.	Cost associated with implementation of procedure.	**Adopted** – Environmental benefit of using a barite with lower contaminant concentrations outweigh the implementation costs.

Control Measure Reference No.	Control Measure	Environmental Benefit	Potential Cost/Issues	Evaluation
VGCN-CM-042	Fluids received to the MODU/LWIV vessel during well kill will be treated by bleed off package before discharged	Reduces the potential for discharge of untreated fluids to the marine environment, thereby lowering contamination risk.	Cost associated with treatment equipment and operational time.	**Adopted** – Environmental benefit of treating fluids prior to discharge outweighs operational and equipment costs.
VGCN-CM-043	Mud pit wash residue will be measured for oil content prior to discharge. If discharge specification not met (<1% oil by volume), the fluid will be returned to shore.	Prevents discharge of oil-contaminated fluids to the marine environment, ensuring compliance with discharge specifications.	Additional cost and logistics associated with returning fluids to shore.	**Adopted** – Ensures compliance with discharge standards and minimises environmental risk.
VGCN-CM-044	Cement and swarf cuttings returned to MODU will be discharged below the water line to reduce carriage of solids by surface currents	Minimises dispersion of solids in surface waters, reducing potential impacts to pelagic species and surface ecosystems.	Minor operational adjustments required to discharge below water line.	**Adopted** – Simple operational change with clear environmental benefit justifies implementation.
Additional controls				
N/A	Skip and ship to shore of drilling/cement waste and bulk product	Would eliminate discharges to sea, reducing potential impacts to marine environment.	Storage space required for containment of waste, increase in transfers to vessels resulting in increased potential impacts and risks. Increased transfers results in increased fuel usage, increased safety risks to personnel during transfer (e.g. crushing between skips), increase in crane movements, high cost to transport and dispose onshore.	**Not Adopted** – Cost outweighs the benefit given the low impact expected from drilling and cement discharges and increase in safety risks and additional costs.
N/A	Use solids control equipment to remove WBM from swarf	Reduces the average oil on cuttings (OOC) discharged; however, swarf will only be discharged in small quantities.	The steel swarf within the milled fluids is hard and sharp, would damage or excessively wear the equipment.	**Not Adopted** – Cost outweighs the benefit given the low impact expected from drilling and cement discharges.

Control Measure Reference No.	Control Measure	Environmental Benefit	Potential Cost/Issues	Evaluation
N/A	Water quality and/or sediment monitoring of drilling fluids and cement/formation cuttings discharged to sea surface to verify impact during activity	No benefit during this well decommissioning campaign would be realised. Could inform additional control measures for future drilling activities; however, there is a considerable body of literature regarding the potential impacts of drilling discharges and the impacts are well understood. Discharge volumes are also small and may not be possible to monitor meaningfully.	Costs associated with monitoring personnel and equipment (e.g. ROV/survey operators and equipment, marine scientists).	**Not Adopted** – Cost outweighs the benefit given the low impact expected from drilling and cement discharges.
N/A	No bulk discharge of cement, barite or bentonite at the end of campaign	The discharge of up to 70 m^3 of bulk cement, barite or bentonite into the marine environment may result in localised and temporary changes in water chemistry and seabed composition. However, the discharge is inert once hydrated and, in controlled quantities, poses low toxicity to marine life when released in deep water away from sensitive habitats. No discharge at the end of the campaign would eliminate any potential for localised environmental impacts, such as seabed smothering or changes in water chemistry, thereby further reducing the already low risk to marine ecosystems.	Implementing this control would require full recovery of residual cement, barite or bentonite from storage tanks, which has proven to be operationally complex and hazardous, introducing significant health and safety risks including exposure to dust, heat stress, and confined space hazards.	**Not Adopted** – Given the low environmental risk associated with controlled discharge of cement, barite or bentonite offshore, and the disproportionate safety and operational risks involved in full recovery, this control is not considered reasonably practicable. The discharge of a limited volume of bulk cement, barite or bentonite under controlled conditions is therefore considered to reduce risk to ALARP and is the preferred option.

6.7.4 Environmental impact assessment

Receptor	Consequence Level
Cement and drilling discharges	
Threatened, migratory or local fauna	No sensitive seabed features are known to occur within the Operational Area or in the area predicted to be contacted (directly or indirectly) by drilling discharges. The benthic habitats within the Operational Area and the area predicted to be contacted by drilling discharges are broadly homogenous and widely represented in the region. Marine invertebrates may inhabit soft sediments and can contribute to the diet of some fauna. Non-coral benthic invertebrates may be present in the Operational Area and surrounds, including filter feeders such as sponges, soft corals, gorgonians, anemones and crinoids. However, there is not expected to be any significant areas of these within the Operational Area or the area predicted to be contacted by drilling discharges. Furthermore, the area of soft sediment habitat that is potentially impacted is small compared to the amount of habitat available and therefore the disturbance is not expected to affect prey availability, or protected fauna species. Recovery of benthic communities from burial and organic enrichment occurs by recruitment of new colonists from planktonic larvae and immigration from adjacent undisturbed sediments. Ecological recovery usually begins shortly after the end of drilling and often is well advanced within a year. Full recovery may be delayed until concentrations of biodegradable organic matter decrease through microbial biodegradation to the point where surface layers of sediment are oxygenated.

Receptor	Consequence Level
	Habitat modification is identified as a potential threat to a number of marine fauna species in relevant recovery plans and conservation advice (Table 3-10). Impacts to threatened or migratory species will be temporary and the area potentially impacted is small compared to the size of the areas used by these species. Therefore, no long-term impacts to these species are expected. No decrease in local population size, area of occupancy of species, loss or disruption of critical habitat or disruption to the breeding cycle of any of these protected matters is expected. The BIAs overlapping the Operational Area have been identified in Table 3-9. While the marine fauna may transit through the Operational Area, contact with drilling discharges are unlikely to result in impacts greater than a short-term behavioural change, limited to one or a few individual species. Mobile marine species are expected either to avoid turbid stretches of water or pass through with no significant impacts. The toxicity of WBM, formation water and cement is considered low and the potential for bioaccumulation of any toxic compounds is negligible. As with all chemicals selected for use in drilling operations by Santos, the chemicals chosen for the activity will be either CHARM rated Gold or Silver (or E or D OCNS) or risk assessed through the Chemical Risk Assessment process as being environmentally acceptable, reducing the likelihood of any impacts. The increased particle load in the water column could adversely affect respiratory efficiency of fish, although most visual orientated fish species would likely avoid the affected area. The Operational Area and surrounds are in a high-energy, well mixed open water environment and significant discharge plumes are not expected to occur outside of the areas directly adjacent to the Operational Area. The consequence level is assessed as II – Minor, given the low toxicity of the drilling and cement discharges and given there are no significant impacts expected to threatened and migratory fauna.
Physical environment or habitat	Local changes to soft sediment habitat will result from drilling discharges deposition near the MODU. Effects to benthic infauna communities from sedimentation and reduction in sediment quality resulting from drilling discharges have been determined to most likely be a result of smothering and a change in sediment texture as opposed to any toxicological effects, with increased clays and larger particles altering the habitat suitability for some species. Given the low toxicity of the materials to be discharged and the relatively small area predicted to be significantly smothered or have a reduction in sediment quality, overall impacts are considered to be minor to this habitat type and due to the loss of epifauna and infauna expected through smothering and release of drilling and cement discharges. The impacts are considered recoverable within months to years. For cement discharges, geomorphology of the habitat would be altered, with cement hardening over time and blanketing the existing habitat. Although impacts on the form of the seabed and sediment quality in the immediate vicinity of the MODU will be longer term, the impacts are low in magnitude owing to the small area that would be affected. Impact is anticipated to be detectable but insignificant to local population. The consequence level is assessed as II – Minor.
Threatened ecological communities	Not applicable – No threatened ecological communities are identified in the area where discharge effects could occur.
Protected areas	The Operational Area does not intercept any marine parks or heritage areas. However, the Continental Slope Demersal Fish Communities KEF overlaps the Operational Area (Section 3.2.5.2). No known sensitive seabed features (e.g. reefs, canyons, shipwrecks) or benthic primary producer habitat (e.g. areas of hard corals, seagrass, macroalgae or mangroves) are present in the Operational Area. Drilling and cement discharges are not expected to impact on the KEF.
Socio-economic receptors	Impacts to commercial fishing are likely to be negligible, with important commercial species unlikely to be affected by drilling discharges due to the temporary nature of the discharges, rapid dilution of the plume and lack of significant seabed features in the area. Impacts to tourism and recreation are unlikely, given these activities occur in shallower water, closer to shore and distant from the potential area of impact from drilling discharges. EP stakeholder consultation did not raise any concerns regarding potential impacts to cultural features including Sea Country. Impacts to totemic species have been addressed under local fauna. No stakeholder concerns have been raised regarding this event. Overall, the consequence to socio-economic receptors from drilling and cement discharges is assessed as II – Minor.
Overall worst-case consequence	II – Minor

6.7.5 Demonstration of ALARP

Use of drilling fluids, cement and cement additives are a requirement of the activity, and the resultant fluid and solid by-products cannot be eliminated or avoided. With the control measures adopted to minimise the environmental impact of drilling discharges, the consequence was assessed as Minor (II). In particular, the application of Santos' Drilling Fluid and Chemical Selection in Drilling Activities Procedure (EA-91-II-00007) requires that only environmentally acceptable products are used, ensuring the impacts to the environment will not be significant. Any chemicals that are not OCNS CHARM or non-CHARM-able rated are risk assessed through the procedure (EA-91-II-00007) to provide for a product that is environmentally acceptable for discharge to the marine environment. Only WBM will be used for drilling, due to its lower toxicity compared to other systems.

A number of standard control measures have been adopted to ensure drilling and cement discharges are managed responsibly and in a manner that reduces environmental risk (Table 6-19). A chemical selection procedure is in place to ensure only environmentally acceptable products are used, reducing the toxicity of discharges. Inventory control procedures are implemented to manage the type and volume of discharges and to guide decisions on the handling of leftover bulk products. Oil content measurement procedures are applied to account for potential contamination from reservoir fluids and lost-circulation material procedures are in place to reduce the release of hydrocarbon-based materials.

Well test procedures ensure oil-water content in drilling fluid discharges remains below 1% by volume, and quality control limits for barite are enforced to reduce the presence of contaminants in discharged cuttings. Fluids received to the MODU or LWIV during well bleed off are treated using a bleed-off package before discharge, reducing the risk of untreated fluids entering the marine environment. Mud pit wash residues are tested for oil content prior to discharge, and any fluids exceeding the specification (<1% oil by volume) are returned to shore. Cement and swarf cuttings returned to the MODU are discharged below the waterline to reduce the dispersion of solids in surface waters, thereby limiting potential impacts to pelagic species and surface ecosystems. These measures are considered appropriate and effective in reducing the environmental impact of drilling and cement discharges to ALARP.

Several additional control measures were considered but not adopted. The option to skip and ship all drilling and cement waste to shore was rejected due to the high cost and increased safety risks associated with containment, handling and transport. The use of solids control equipment to remove WBM from swarf was also not adopted, as the abrasive nature of steel swarf would damage the equipment, and the quantities involved are small. Water quality or sediment monitoring during the activity was considered but not adopted, as the impacts of drilling discharges are well understood and the small discharge volumes would make meaningful monitoring difficult. The cost of deploying monitoring personnel and equipment was not considered proportionate to the limited benefit.

The option to prohibit bulk discharge of cement at the end of the campaign was also evaluated. While this would eliminate the potential for localised changes in water chemistry or seabed composition, the discharge of up to 100 m^3 of hydrated cement (refer Table 6-17) is considered to pose low toxicity to marine life when released in deep water. Full recovery of residual cement would require complex and hazardous operations, including confined space entry and exposure to dust, and was therefore not considered reasonably practicable. Controlled discharge of inert cement under these conditions is considered to reduce risk to ALARP. Santos will follow the decision matrix in Table 6-18 for managing all bulk powder products. Bulk barite will not be discharged overboard during the activity.

All practical control measures have been reviewed, and those adopted are considered appropriate to manage the impacts such that the residual consequence is assessed to be Minor (II) and cannot be reduced further. The proposed management controls for drilling and cement discharges are consistent with Santos' risk management criteria and are considered sufficient to reduce environmental risks to ALARP.

6.7.6 Acceptability evaluation

Is the consequence ranked as I (Negligible) or II (Minor)	Yes – maximum consequence from planned drilling discharges is II (Minor).
Is further information required in the consequence assessment?	No – potential impacts and risks are well understood through the information available.
Are risks and impacts consistent with the principles of ecological sustainable development?	Yes – activity evaluated in accordance with Santos' Environmental Hazard Identification and Assessment Procedure (EA-91-IG-00004_6), which considers principles of ESD (Table 5-5).
Are risks and impacts consistent with relevant legislation, international agreements and conventions, guidelines and codes of practice (including species recovery plans, threat abatement plans, conservation advice and Australian Marine Park zoning objectives)?	Yes – no contact with sensitive habitats predicted. Control measures implemented will reduce the potential impacts from drilling discharges to species identified in the relevant species recovery plans, conservation advice, wildlife conservation plans and other management plans/guidelines set out in Table 3-10. Habitat degradation or modification is identified in a number of conservation advices and within the Recovery Plan for Marine Turtles in Australia 2017–2027 (CoA, 2017), however the nature of drilling discharges and scale of impacts will not result in habitat degradation. Pollution is identified in a number of plans but pertains to more toxic discharges and therefore is not considered applicable here given the discharges are allowable in accordance with legislation and/or are of low toxicity. For the identified plans, the objectives of those plans are achieved through the adoption of performance outcomes and the control measures outlined in Section 8. Santos considers that the level of impact from drilling discharges is not inconsistent with these plans.
Are risks and impacts consistent with Santos' Environment Policy?	Yes – aligns with Santos' Environment Policy.
Are risks and impacts consistent with stakeholder expectations?	Yes – no concerns raised.
Are performance standards such that the impact or risk is considered to be ALARP?	Yes – see ALARP above.

With control measures in place to minimise the environmental impact of cement and drilling discharges, the consequence was assessed as II – Minor and ALARP. The managed discharges will not reduce the habitat values of the area potentially affected as described in relevant Recovery Plans, Approved Conservation Advice or be inconsistent with the strategies of these documents. No concerns have been raised regarding this event by stakeholders. Therefore, the minor impacts expected from proposed drilling discharges are considered to be environmentally acceptable.

6.8 Spill response operations

The spill response strategies that may be adopted in the event of a hydrocarbon spill have been identified in the Van Gogh Coniston Novara VGA-4H GI ST1 Oil Pollution Emergency Plan 7745-236-EMP-0002 –] for worst-credible LOWC and vessel marine diesel spills. Potential impacts arising from the implementation of the following spill response operations or actions were assessed.

Santos' environmental assessment identified seven potential sources of environmental impacts associated with contingency spill response operations for this activity. The results of the environmental assessment are summarised in Table 6-1. A comprehensive risk and impact assessment for each of the contingency spill response operations, and subsequent control measures proposed by Santos to reduce the risk and impacts to ALARP and acceptable levels, are detailed in the following subsections.

6.8.1 Description of event

Event	In the event of a hydrocarbon spill, response strategies will be implemented where possible to reduce environmental impacts to ALARP. The selection of strategies will be undertaken through the net environmental benefit analysis (NEBA) process and evaluation of response strategies outlined in this EP and the OPEP. Spill response will be under the direction of the relevant Controlling Agency, as defined in Section 4 of the OPEP, which may be Santos, another agency or both. In all instances, Santos will undertake a 'first-strike' spill response and will act as the Controlling Agency until the designated Controlling Agency assumes control. The response strategies considered to be appropriate for the worst-case oil spill scenarios identified for the activity are provided in Section 6 of the OPEP and comprise: • source control • monitor and evaluate • mechanical dispersion • chemical dispersant (surface) • offshore containment and recovery • shoreline protection and deflection • shoreline clean-up • oiled wildlife response • scientific monitoring • waste management. While response strategies are intended to reduce the environmental consequences of a hydrocarbon spill, poorly planned and coordinated response activities can result in a lack of or inadequate information being available upon which poor decisions can be made, exacerbating, or causing further environmental harm. An inadequate level of training and guidance during the implementation of spill response strategies can also result in environmental harm over and above that already caused by the spill. The greatest potential for impacts additional to those described for routine operations is from shoreline clean-up and oiled wildlife response operations where coastal and shoreline habitat damage and fauna disturbance may occur.
Extent	Extent of spill. Spill response could occur anywhere within the EMBA for the worst-case spill scenarios. Some strategies will be concentrated in the vicinity of sensitive receptors in coastal waters and along shorelines.
Duration	The spill response effort as a whole will exceed the duration of the worst-case spill, due to persistence of the oil in the environment and the requirement to remove this oil and/or monitor impacts and recovery to sensitive receptors. The OPEP provides further detail on the duration of specific response strategies.

6.8.2 Nature and scale of environmental impacts and risks for the activities

Light emissions	
Spill response activities will involve the use of vessels, which are required, at a minimum, to display navigational lighting. Vessels may operate in close proximity to shoreline areas during spill response activities. Spill response activities will also involve onshore operations, including the use of vehicles and temporary camps, which may require lighting.	
Potential receptors:	• Fauna (including threatened, migratory or local fauna) • Protected areas
Lighting may cause behavioural changes to fish, mammals, birds, and marine turtles that can have a heightened consequence during key lifecycle activities, such as turtle nesting and hatching. Turtles and birds, which include threatened and migratory fauna (Table 3-8), have been identified as key fauna susceptible to lighting impacts. Section 6.2 provides further detail on the nature of impacts to fish, birds, and marine turtles. Spill response activities that require lighting may take place in protected areas important to turtle and birds, such as shoreline locations of the Ningaloo Coast, Barrow Island, the Muiron Islands, and Montebello Islands, which are seasonally important for turtles and include BIAs and critical habitats. This could result in indirect impacts on the values of the protected areas. During nesting and hatching season (primarily over summer months), lighting may cause behavioural impacts to turtles, including aborted nesting attempts and disorientation of newly hatched turtles, which may increase the hatchling mortality rate. Spill response activities may also occur on shorelines used by nesting and feeding birds, including seabirds and shorebirds. Lighting can cause disorientation in flying birds, disrupt nesting and breeding behaviours and impact on the ability of birds to forage. Disturbance to feeding migratory shorebirds may reduce their ability to replenish energy reserves and alter the timing and success of migratory flights. Lighting impacts to fauna are not considered to have the potential to impact supported industries such as tourism.	

Light emissions	
Noise emissions	
Spill response activities will involve the use of aircraft and vessels, which will generate noise both offshore and in proximity to sensitive receptors in coastal areas. Spill response activities will also involve the use of equipment on coastal areas during clean-up of shorelines (e.g. pumps and vehicles), for accessing shoreline areas (e.g. vehicles) and for supporting temporary camps (e.g. diesel generators).	
Potential receptors:	• Fauna (including threatened, migratory, or local fauna) • Protected areas • Socio-economic receptors
Underwater noise from the use of vessels may impact marine fauna, such as fish (including commercial species), marine reptiles and marine mammals, in the worst instance causing physical injury to hearing organs but more likely causing short-term behavioural changes, such as temporary avoidance of the area, which may impact key lifecycle processes (e.g. spawning, breeding, calving). Underwater noise can also mask communication or echolocation used by cetaceans. Section 6.1 provides further detail on these impacts from vessels and helicopters. Cetaceans have been identified as the key concern for vessel noise within the EMBA. There are numerous BIAs for cetaceans within the EMBA as listed in Table 3-9. Spill response activities using vessels have the potential to impact fauna in protected areas, which may impact on the conservation values of protected areas. There are numerous Australian and state marine parks within the EMBA as listed in Table 3-5. Noise and vibration from terrestrial activities on shorelines has the potential to cause behavioural disturbance to coastal fauna, including protected seabirds and turtles. Shoreline activities involving the use of noise-generating equipment may take place in important nesting areas for turtles and roosting and feeding areas for shorebirds. As a consequence of impacts to fauna (including shorebirds, marine mammals, fish, and sharks), noise has the potential to impact supported industries such as tourism and commercial fishing and recreational values of marine parks.	
Atmospheric emissions	
The use of fuels to power vessel engines, generators and mobile equipment used during spill response activities will result in emissions of GHGs, such as carbon dioxide (CO_2), methane (CH_4) and nitrous oxide (N_2O), along with non-GHGs such as sulphur oxides (SO_X) and nitrogen oxides (NOx). Emissions will result in a localised decrease in air quality.	
Potential receptors:	• Fauna (including threatened, migratory, or local fauna) • Physical environment or habitat (air quality) • Socio-economic receptors
Atmospheric emissions from spill response equipment will be localised, and the use of mobile equipment, vessels and vehicles is not considered to create emissions on a scale where noticeable impacts would be predicted. Emissions may occur in protected areas and/or areas where tourism is important; however, the scale of the impact relative to potential oil spill impacts is not considered great.	
Operational discharges and waste	
Operational discharges include those routine discharges from vessels used during spill response, which may include: • deck drainage • putrescible waste and sewage • cooling water from operation of engines • bilge water • ballast water • brine discharge. In addition, there are specific spill response discharges and waste creation that may occur, including: • cleaning of oily equipment, vessels and vehicles • flushing water for the cleaning of shoreline habitats • sewage and putrescible and municipal waste at camp areas • creation, storage, transport and disposal of oily waste and contaminated organics.	
Potential receptors:	• Fauna (including threatened, migratory, or local fauna) • Physical environment or habitat • Protected areas • Socio-economic receptors

Light emissions
Operational discharges from vessels may create a localised and temporary reduction in marine water quality. Effects include nutrient enrichment, toxicity, turbidity, and temperature and salinity increases, as detailed in Section 6.6. Vessel discharges may occur in shallower coastal waters during spill response activities than that described in Section 6.6. Discharge could potentially occur adjacent to marine habitats, such as corals, seagrass and macroalgae, and in protected areas (i.e. receptors anywhere within the EMBA), which support a more diverse faunal community; however, discharges are still expected to be localised and temporary. Cleaning of oil-contaminated equipment, vehicles and vessels has the potential to spread oil from contaminated areas to areas not impacted by a spill, potentially spreading the impact area, and moving oil into a more sensitive environment. Flushing of oil from shoreline habitats is a clean-up technique designed to remove oil from the receptor that has been oiled and remobilise it back into the marine environment. It results in further dispersion of the oil. The process of flushing has the potential to physically damage shoreline receptors such as mangroves and rocky shoreline communities, increase levels of erosion, and create an additional and potentially higher level of impact than if the habitat was left to bioremediate. Sewage and putrescible and municipal waste will be generated from onshore activities at temporary camps, which may include toilet and washing facilities. These wastes have the potential to attract fauna, impact habitats, flora, and fauna, and reduce the aesthetic value of the environment, which may be within protected areas. Disturbance may also impact cultural values of an area. The creation, storage, transport and disposal of oily waste and contaminated organics has the potential to spread impacts of oil to areas, habitats, and fauna not previously contaminated. Sewage and putrescible and municipal waste generated onshore will be stored and disposed of at approved locations.
Chemical dispersant application
The application of chemical dispersants has the aim of enhancing oil dispersion and entrainment into the water column, thereby avoiding, or reducing the volume of oil that could reach the shoreline. By entraining oil into the water column, chemical dispersants can aid the natural processes of biodegradation but can also increase impacts to subsea receptors through an increase in concentration and exposure of entrained oil and dissolved oil components.

Potential receptors:	• Fauna (including threatened, migratory, and local fauna) • Physical environment or habitat • Protected areas • Socio-economic receptors

The application of dispersants will increase the amount of oil that is entrained and dissolved in the water column, reducing exposure of coastal ecosystems to floating weathered oil, as well as reducing the risk of exposure of seabird and marine mammal populations to floating oil (Bock et al., 2018; French-McCay et al., 2018; National Research Council (NRC), 2005). It changes the distribution of the oil by removing it from the sea surface and dispersing it into the water column. This can increase the risk of toxic effects on planktonic, pelagic, demersal, and benthic organisms.

The toxicity of dispersants and the toxicity of dispersed oil are dependent on a range of factors including oil type, dispersant composition and concentration, sensitivity of receptor species and their life history, making generalisations difficult.

For the most studied dispersant formulations the increased risk for most taxa appears to come from the increased solubility (hence bioavailability) of the toxic components of the oil, not the dispersant itself (Negri et al., 2018). Adams et al. (1999), Brakstad et al. (2018), Clark et al. (2001), Fingas (2011, 2002), Hansen et al. (2014) and Mitchell & Holdway (2000) found current dispersants to be significantly less toxic than the oil alone or the dispersed oil. Gardiner et al. (2013) suggest the chemical dispersant does not alter the toxicity of the oil or the underlying mechanism of toxicity in the spiked exposures but rather enhances the absolute concentration of the dissolved hydrocarbons that contribute to toxicity. Adams et al. (2014) found chemically enhanced water-accommodated fractions (CEWAFs) to be more toxic to Atlantic herring than the water accommodated fractions (WAF); possibly reflecting the more effective dispersion due to chemicals. Contrary to this, Bejarano et al. (2014) reviewed dispersant toxicity studies and found that for Corexit 9500, the CEWAF was less toxic than the WAF. The NRC (2005) drew similar conclusions to Bejarano et al. (2014), reporting that evidence suggests CEWAF is similar or less toxic than the WAF, depending on the basis of the study (measured total petroleum hydrocarbon or nominal oil concentrations) (King & Dethier, 2017).

Following application of chemical dispersants sub-sea or at the sea surface, the chemicals themselves are rapidly dispersed and diluted by oceanic water currents and buoyancy mixing.

Therefore, while the aim of chemical dispersants is to provide a net benefit to the environment, the use of dispersants has the potential increase the impact to receptors under the sea surface, including coral, seagrass and macroalgae, by increasing entrained oil and dissolved aromatic hydrocarbon concentration. These sensitive receptors are generally located in shallow coastal areas of the mainland and offshore islands.

Increased entrained and aromatic hydrocarbon concentrations may also impact on marine fauna either directly or through impacts to subsea habitats. Direct impacts are most likely to be encountered by filter feeding invertebrates, fish, and sharks. Fish and sharks include threatened/migratory species, which may ingest oil or uptake toxic compounds across gill structures. As a result of increased impact to marine fauna and subtidal habitats, including those that represent values of protected areas, socio-economic impacts may be felt through industries such as tourism and commercial fishing.

Chemical dispersants listed as approved in the National Plan for Maritime Environmental Emergencies Register of Oil Spill Control Agents are to be prioritised for use. The AMSA Efficacy Test Protocol for the Register (AMSA, 2012) lists the toxicity testing requirements that ensure products meet the requirements of acceptable practice for the National Plan, and products with a high acute toxicity (LC_{50} <10 ppm, 96 hours) (NRC, 1989) or containing prohibited substances are not permitted. If

Light emissions
dispersant types additional to those on the Register of Oil Spill Control Agents are required, Santos will use its Offshore Division Operations Chemical Selection, Evaluation and Approval Procedure (EA-91-II-10001) prior to application. As such, impacts to the environment from the use of dispersants are acceptable and on application at the recommended dosage, dilution and dispersion will significantly reduce the concentrations to levels considered unlikely to have significant effects on protected species or marine biota and habitats. A detailed description of the impacts from entrained and dissolved oil, which may be exacerbated by the application of chemical dispersants, is provided in Table 7-14.
Physical presence and disturbance
The movement and operation of vessels, vehicles, personnel and equipment, the undertaking of clean-up activities, and the set-up of temporary camp areas during spill response activities have the potential to disturb the physical environment and marine and coastal habitats and fauna, which may occur within protected areas. Disturbance may also impact cultural values of an area. Vessel movement and transportation could potentially introduce to nearshore areas invasive marine species attached as biofouling, while vehicle and equipment movement could spread non-indigenous flora and fauna. Oiled wildlife response activities may involve deliberate disturbance (hazing), capture, handling, cleaning, rehabilitation, transportation, and release of wildlife, which could lead to additional impacts to wildlife.
Potential receptors: • Fauna (including threatened, migratory, and local fauna) • Physical environment or habitat • Protected areas • Socio-economic receptors
The use of vessels may disturb benthic habitats in coastal waters, including corals, seagrass, macroalgae and mangroves. Impacts to habitats from vessels include damage through the deployment of anchors, chains, and nearshore booms and from grounding. Vessel uses in shallow coastal waters also increases the chance of contact with or physical disturbance of marine megafauna such as turtles and dugongs. Booms create a physical barrier on the surface waters that has the potential to injure or entangle passing marine fauna that are either surface breathing or feeding. Vehicles, equipment, personnel, and cleaning activities during shoreline response activities have the potential to damage coastal habitats, such as dune vegetation, mangroves, and habitats important to threatened and migratory fauna, including nests of turtles and birds and bird roosting and feeding areas. Shoreline clean-up may involve the physical removal of substrates that could cause impact to habitats and coastal hydrodynamics and alter erosion or accretion rates. The presence of camp areas, although relatively short term, may disrupt normal behaviour of coastal species, such as shorebirds and turtles, and could potentially interfere with nesting and feeding behaviours. Oiled wildlife response may include the hazing, capture, handling, cleaning, rehabilitation, transportation, cleaning, and release of wildlife susceptible to oiling, such as birds and marine turtles. While oiled wildlife response is aimed at having a net benefit, poor responses can potentially create additional stress and exacerbate impacts from oiling, interfere with lifecycle processes, hamper recovery and, in the worst instance, increase levels of mortality. Impacts and risks from invasive marine species are described in Section 7.2 and are not described further in this section. Impacts from invasive terrestrial species are similar in that the invasive species (e.g. weeds) can outcompete local species and interfere with ecosystem processes. Non-native species may be transported attached to equipment, vehicles, and clothing. Such an introduction would be especially detrimental to wilderness areas or protected terrestrial reserves, which may have a relatively undisturbed flora and fauna community. The disturbance to marine and coastal natural habitat, as well as the potential for disruption to culturally sensitive areas, may occur in specially protected areas and may have flow on impacts to socio-economic values and industry (e.g. tourism, fisheries).
Disruption to Other Users of Marine and Coastal Areas and Townships
Spill response activities may involve the use of vessels, equipment and vehicles and the establishment of temporary camps in areas used by the general public or industry. The mobilisation of spill response personnel into an affected area may also place increased demands on local accommodation and other businesses.
Potential receptors: • Socio-economic receptors
The use of vessels in the nearshore and offshore environment and the undertaking of spill response activities at shoreline locations may exclude the general public and industry use of the affected environment. As well as impacting leisure activities of the general public, this may impact on revenue with respect to industries such as tourism and commercial fishing. The mobilisation of personnel to small communities has the potential to affect the local community through demands on local accommodation and business, reducing the availability of services to members of the public.

6.8.3 Environmental performance outcomes and control measures

The control measures considered for this activity are shown in Table 6-20. However, EPOs, EPSs and measurement criteria for these spill response control measures are provided within the relevant strategy sections of the OPEP.

Table 6-20: Control measures evaluation – spill response operations

Control Measure	Environmental Benefit	Potential Cost/Issues	Evaluation
Competent Incident Management Team (IMT) and oil spill responder personnel	Ensures that spill response strategy selection and operational activities consider the potential for additional environmental impacts.	Personnel and operational costs associated with maintaining competent Incident Management Team and responder personnel.	**Adopted** – Considered a standard spill response control.
Use of competent vessel crew and personnel	Reduces potential for environmental impacts from vessel usage.	Personnel and operational costs associated with maintaining contracts with competent vessel crew and personnel.	**Adopted** – Considered a standard spill response control.
Spill response activities selected on basis of a NEBA	Provides a systematic and repeatable process for evaluating strategies with net least environmental impact.	No cost/issue associated with this control measure.	**Adopted** – Considered a standard spill response control.
Noise and atmospheric emissions			
Vessels and aircraft compliant with Santos' Protected Marine Fauna Interaction and Sighting Procedure (EA-91-11-00003)	Reduces potential for behavioural disturbance to cetaceans.	No cost/issue associated with this control measure.	**Adopted** – Ensures compliance with Part 8 of the EPBC Regulations 2000, which is considered a standard spill response control (regulatory requirement).
International Air Pollution Prevention Certificate	Reduces level of air quality impacts.	Personnel and operational costs associated with maintaining Air Pollution Certificate.	**Adopted** – Considered a standard spill response control (regulatory requirement).
Operational discharges and waste			
Vessels meet applicable sewage disposal requirements	Reduces potential for water quality impacts.	No cost/issue associated with this control measure.	**Adopted –** Considered a standard spill response control (regulatory requirement).
Vessel meets applicable requirements for oily water (bilge) discharges	Reduces potential for water quality impacts.	No cost/issue associated with this control measure.	**Adopted –** Considered a standard spill response control (regulatory requirement).
Ballast Water Management Plan	Improve quality of water discharged to marine environment to ALARP. Reduce risk of introduced marine species.	No cost/issue associated with this control measure.	**Adopted –** Considered a standard spill response control (regulatory requirement).
Compliance with controlled waste, unauthorised discharge and landfill regulations	Ensures correct handling and disposal of oily wastes.	No cost/issue associated with this control measure.	**Adopted –** Considered a standard spill response control (regulatory requirement).
Chemical dispersant application			
Chemical Dispersant Plan	Additional impacts from dispersant application are reduced to ALARP.	No cost/issue associated with this control measure.	**Adopted** – A standard control adopted by industry.

Control Measure	Environmental Benefit	Potential Cost/Issues	Evaluation
Physical presence and disturbance			
Vessels and aircraft compliant with Santos' Protected Marine Fauna Interaction and Sighting Procedure (EA-91-11-00003)	Reduces potential for behavioural disturbance to cetaceans.	No cost/issue associated with this control measure.	**Adopted** – Ensures compliance with Part 8 of the EPBC Regulations 2000, which is considered a standard spill response control (regulatory requirement).
Use of shallow draft vessels for shoreline and nearshore operations	Reduce seabed and shoreline disturbance.	Operational costs associated with operating shallow draft vessels for shoreline and nearshore operations.	**Adopted** – Considered a standard control.
Oil Spill Response Team Leader assesses and selects vehicles appropriate to shoreline conditions	Reduce coastal habitat and fauna disturbance.	No cost/issue associated with this control measure.	**Adopted** – Considered a standard control.
Conduct shoreline, nearshore habitat, bathymetry assessment	Reduce shoreline habitat disturbance.	Operational costs associated with conducting shoreline nearshore habitat assessment.	**Adopted** – Considered a standard control.
Establish demarcation zones for vehicle and personnel movement considering sensitive vegetation, bird nesting and roosting areas and turtle nesting habitat	Reduce coastal habitat and fauna disturbance.	No cost/issue associated with this control measure.	**Adopted** – Considered a standard control.
Operational restriction of vehicle and personnel movement to limit erosion and compaction	Reduce coastal habitat erosion and compaction.	No cost/issue associated with this control measure.	**Adopted** – Considered a standard control.
Prioritise use of existing roads and tracks	Reduce coastal habitat and fauna disturbance.	No cost/issue associated with this control measure.	**Adopted** – Considered a standard control.
Select temporary base camps in consultation with DTMI) and DBCA	Reduce coastal habitat and fauna disturbance.	No cost/issue associated with this control measure.	**Adopted** – Considered a standard control to be adopted by the relevant Control Agency.
Soil profile assessment prior to earthworks	Reduce habitat disruption and erosion.	Operational costs associated with soil profile assessment.	**Adopted** – Considered a standard control.
Pre-cleaning and inspection of equipment (quarantine)	Prevent introduction of invasive species.	Operational costs associated with response plan.	**Adopted** – Considered a standard control.
Use of Heritage Advisor if spill response activities overlap with potential areas of cultural significance	Reduce disturbance to culturally significant sites.	No cost/issue associated with this control measure.	**Adopted** – Considered a standard control to be adopted by the relevant Control Agency.
Adhere to WA Oiled Wildlife Response Plan and Pilbara Regional Oiled Wildlife Response Plan	Oiled wildlife hazing, capture, handling, and rehabilitation meet minimum standards as outlined within the WA Oiled Wildlife Response Plan.	Operational costs associated with response plan.	**Adopted** – Considered a standard control to be adopted by the relevant Control Agency.

Control Measure	Environmental Benefit	Potential Cost/Issues	Evaluation
Disruption to other users of marine and coastal areas and townships			
Stakeholder consultation	Promotes awareness and reduces potential impacts from response to socio-economic activities.	Minimal cost in relation to overall effort/costs in managing incident.	**Adopted** – Considered a standard control for incident management.
Utility resource assessment and support to be conducted if activity is of significant size in comparison to the size of the coastal community	Reduces potential impact due to higher utility demands causing disruptions to local community.	No cost/issue associated with this control measure.	**Adopted** – Considered a standard control.
Accommodation assessment	Reduces strain on accommodation.	No cost/issue associated with this control measure.	**Adopted** – Considered a standard control.
Transport Management Plan	Reduces potential for traffic disruptions.	No cost/issue associated with this control measure.	**Adopted** – Considered a standard control for large scale deployment in highly populated areas.

6.8.4 Environmental impact assessment

Receptor	Consequence Level
Spill response operations – light emissions	
Threatened, migratory or local fauna	The receptors considered most sensitive to lighting from vessel and shoreline operations are seabirds, shorebirds, and marine turtles, particularly over summer months with respect to marine turtles where emerging hatchlings are sensitive to light spill onto beaches. Following restrictions on night-time operations by spill response vessels, which will demobilise to mooring areas offshore with safety lighting only, impacts from vessels are considered to be Negligible (I). Temporary camps will be positioned at the direction of DTMI or DBCA and control measures on lighting colour and direction will be followed, therefore, the consequence of shoreline lighting is considered Negligible (I). These species are likely to be values of the protected area they occur in (e.g. Ningaloo Coast, Muiron Islands, Barrow Island, Montebello Islands, Dampier Archipelago), and the impact to the protected area from light is also considered Negligible (I). As a consequence of impacts to fauna, lighting has the potential to impact supported industries, such as tourism; however, as impacts to fauna are considered negligible, any indirect impacts on tourism will also be Negligible (I).
Physical environment or habitat	
Threatened ecological communities	
Protected areas	
Socio-economic receptors	
Overall worst-case consequence level	I – Negligible
Spill response operations – noise emissions	
Threatened, migratory or local fauna	The receptors considered most sensitive to vessel noise disturbance is the pygmy blue whale and humpback whale during migration season, when these whales come close to the Operational Area during their peak migration (July to October), as well as populations of marine turtles, whale sharks and blue whales. However, following the adoption of control measures to limit close interaction with protected fauna (i.e. Protected Marine Fauna Interaction and Sighting Procedure (EA-91-II-00003)), a temporary behavioural disturbance is expected only with a consequence of Negligible (I). With respect to noise from onshore operations (mobile equipment and vehicles), nesting, roosting, or feeding birds are considered to be the most sensitive to noise, in particular shorebirds that may be aggregating at Ningaloo Coast, Muiron Islands, Montebello Islands. The equipment used is not considered to have excessive sound levels and, following direction by DTMI and DBCA on the location of temporary camp areas, the consequence to birds from noise is expected to be Negligible (I). Shorebirds may be official values of the protected area they occur in, and the impact to the protected area from noise is also considered Negligible (I).
Physical environment or habitat	
Threatened ecological communities	
Protected areas	
Socio-economic receptors	
Overall worst-case consequence level	I – Negligible

Receptor	Consequence Level
Spill response operations – atmospheric emissions	
Threatened, migratory or local fauna	Atmospheric emissions from spill response equipment will be localised, and impacts to even the most sensitive fauna, such as birds, are expected to be Negligible (I). Because of the emissions will be localised and low level, impacts to protected area values, physical environment and socio-economic receptors are predicted to be Negligible (I).
Physical environment or habitat	
Threatened ecological communities	
Protected areas	
Socio-economic receptors	
Overall worst-case consequence level	I – Negligible
Spill response operations – operational discharges and waste	
Threatened, migratory or local fauna	Operational discharges from vessels may create a localised and temporary reduction in marine water quality, which has the potential to impact shallow coastal habitats in particular. However, following the adoption of regulatory requirements for vessel discharges, which prevent discharges close to shorelines, discharges will have a negligible impact to habitats, fauna, or protected area values. Furthermore, washing of vessels and equipment will take place only in defined offshore hot zones preventing impacts to shallow coastal habitats. As a consequence of impacts to fauna, operational discharges from vessels has the potential to impact supported industries, such as tourism and commercial fishing; however, as impacts to fauna are considered Negligible (I), any indirect impacts on socio-economic receptors will also be Negligible (I). Onshore, the use of flushing water has the potential to damage sensitive shoreline and intertidal habitats, e.g. mangroves. However, low-pressure flushing only will be used, preventing further damage to habitats or erosion of sediments. For sensitive habitats, the deployment of booms will be considered to retain flushed hydrocarbons, if this presents a net benefit. Following these control measures, the use of flushing to clean shorelines and intertidal habitats is seen to have a Negligible (I) additional impact to habitats, fauna, or protected area values. The cleaning of contaminated vehicles and equipment onshore has the potential to spread oily waste and damage habitats if not contained. Decontamination units will be in used during the spill response, thus containing waste, and preventing any secondary contamination. The consequence of cleaning discharges is therefore ranked as Negligible (I) in terms of impacts to habitats, fauna, or protected area values. Sewage, putrescible waste, and municipal waste generated onshore will be stored and disposed of at approved locations. The storage, transport and disposal of hydrocarbon-contaminated waste arising from spill response operation actions, such as containment and recovery and shoreline clean up, will be managed by Santos' appointed waste management contractor, and dedicated waste containment areas will prevent the spreading or leaching of hydrocarbon contamination. The consequence of sewerage discharges is therefore ranked as Negligible (I) in terms of impacts to habitats, fauna, or protected area values.
Physical environment or habitat	
Threatened ecological communities	
Protected areas	
Socio-economic receptors	
Overall worst-case consequence level	I – Negligible
Spill response operations – chemical dispersant application	
Threatened, migratory or local fauna	Use of chemical dispersants has the potential to increase the distribution and concentration of entrained oil and dissolved aromatic hydrocarbons within the water column. Entrained oil and dissolved aromatic hydrocarbons are expected to be elevated adjacent to the dispersant release site with the potential for increased impacts to benthic and pelagic fishes, sharks, and invertebrates. The effect of increased entrained oil and dissolved aromatic hydrocarbon concentration from surface dispersant application is likely to be most noticeable within approximately 100 km of the release site.
Physical environment or habitat	
Threatened ecological communities	
Protected areas	

Receptor	Consequence Level
Socio-economic receptors	The generic impacts to receptors from entrained oil and dissolved aromatic hydrocarbons described in Table 7-14 are considered to apply. For impacts to the benthic habitat around the well location from surface dispersant application, the additional consequence is considered to be Minor (II), that is, there could be a detectable increase in impact from subsea chemical dispersant operations, but a significant additional increase is not expected. Similarly, the additional consequence to plankton, benthic invertebrates, fish, and sharks in the vicinity of dispersant operations is expected to be minor with a significant reduction in population size, attributable to dispersant use, not expected. The primary controls for reducing impacts to these receptors from dispersant use is in the selection of approved or environmentally risk assessed chemical dispersants and through the careful assessment of application areas such that sensitive receptor impacts are reduced to ALARP. It is important to note that dispersants will only be applied if the response is seen as having a net environmental benefit as per the overarching NEBA analysis of spill response strategies. In the event dispersants are used there is the potential for a Minor (II) additional impact, noting that even in the absence of dispersant use, a greater volume of hydrocarbons may load onto shorelines adding to the level of impact on shoreline receptors. The above assessment has considered only the potential negative effects of chemical dispersants on marine fauna and habitats from entrained oil and dissolved aromatic hydrocarbons. Chemical dispersant may lead to a reduction in the spatial extent of floating oil above 10 g/m², a reduction in the maximum concentration of floating oil arriving at shorelines, and a reduction in the volume of oil stranded on shorelines. These widespread positive effects to shoreline habitats and marine and coastal fauna are considered to outweigh the potential localised negative impacts outlined above. Thus, from an overall environment perspective, the surface dispersant strategy is predicted to have a net benefit based on the available evidence, noting that this would be confirmed or otherwise prior to and during any dispersant operations by a NEBA using situational data.
Overall worst-case consequence level	II – Minor
Spill response operations – physical presence and disturbance	
Threatened, migratory or local fauna	The use of vessels and nearshore booms has the potential to disturb benthic habitats, including sensitive habitats in coastal waters, such as corals, seagrass, macroalgae and mangroves. A review of shoreline and shallow water habitats and of bathymetry and the establishment of demarcated areas for access and anchoring will reduce the level of impact to Negligible (I). The use and movement of vehicles, equipment and personnel during shoreline response activities has the potential to disturb coastal habitats, such as dune vegetation, samphire and mangroves, and important habitats of threatened and migratory fauna, including nests of turtles and birds and bird roosting areas. Furthermore, clean-up can involve physical removal of substrates that could impact habitats and fauna and alter coastal hydrodynamics. As with vessel use, an assessment of appropriate vehicles and equipment to reduce habitat damage, along with the establishment of access routes, demarcation zones, and operational restrictions on equipment and vehicle use, will limit sensitive habitat damage and damage to important fauna areas. The establishment of temporary camp areas will be done under direction of DTMI and DBCA with suitable advice sought if access is needed to culturally significant areas. Following these and other control measures, the resultant consequence to the physical environment and habitat is assessed as Minor (II), indicating that there may be a detectable reduction in habitat area from response activities (as separate from spill impacts), but recovery will be relatively rapid once spill response activities cease. As with all spill response activities, this disturbance will only occur if there is a net benefit to accessing and cleaning shoreline areas.
Physical environment or habitat	
Threatened ecological communities	
Protected areas	
Socio-economic receptors	
Overall worst-case consequence level	II – Minor
Spill response operations – disruption to other users of marine and coastal areas and townships	
Socio-economic receptors	The use of vessels in the nearshore and offshore environment and spill response activities at shoreline locations and within townships may exclude general public and industry use. Note that this is distinct from the socio-economic impact of a spill itself, which would have a far greater detrimental impact to industry and recreation. Following the application of control measures, it is considered that the additional impact of spill response activities on affected industries would be Minor (II).
Overall worst-case consequence level	II – Minor

6.8.5 Demonstration of As Low As Reasonably Practicable

With the controls in place, as detailed in Section 6.8.3, potential impacts to from spill response operations are ALARP as demonstrated below:

A NEBA is the primary tool used during spill response to evaluate response strategies and has the goal of selecting strategies that result in the least net impact to key environmental sensitivities. The NEBA process will identify and compare net environmental benefits of alternative spill response options. The NEBA will effectively determine whether an environmental benefit will be achieved through implementing a response strategy or by undertaking no response. The NEBA will be undertaken by the relevant Controlling Agency for the activity. For those activities under the control of Santos, the IMT Environmental Team Leader will be responsible for reviewing the priority receptors and selected response strategies identified in this EP and coordinating the NEBA for each operational period. This will demonstrate that, at the strategy level, the response operations reduce additional environmental impacts to ALARP.

Spill response activities will be conducted in offshore and coastal waters using vessels and aircraft. The greatest potential for additional impacts from implementing spill response is considered to be on wildlife in offshore waters from oiled wildlife response activities and to shoreline habitats and fauna receptors within shallow waters or on shorelines from nearshore booming and shoreline clean-up activities.

Given the types of activities considered appropriate for responding to a worse-case spill and the scale of operations, standard control measures adopted by Santos for spill response to reduce the level of additional impacts are considered to reduce these impacts to ALARP. This includes working with the relevant Controlling Agency for spill response and applying the appropriate processes and standards, e.g. for oiled wildlife response as included within the WA Oiled Wildlife Response Plan and Pilbara Regional Oiled Wildlife Response Plan.

Santos considers the actions prescribed in the Recovery Plan for Marine Turtles in Australia 2017 to 2027 and approved conservation advice for other threatened fauna (Table 3-10) relevant to spill responses for the activities to minimise noise and light impacts on cetaceans, sharks, marine turtles, seabirds, and shorebirds. The proposed event will not result in significant impacts on these species, and implementation of identified control measures is in line with the relevant conservation advice and recovery plans. Pollution events (such as hydrocarbon spills) could impact on fauna (as described in Section 7), and the use of vessels and equipment during the spill response could result in potential impacts as described in this EP. Control measures in place for vessel and helicopter use will reduce potential impacts to marine fauna, and these are consistent with current conservation advice. The assessed residual consequence for this impact is minor and cannot be reduced further without disproportionate costs. It is considered therefore that the impact of the activities conducted are acceptable and ALARP.

6.8.6 Acceptability evaluation

Is the consequence ranked as I or II?	Yes – maximum consequence is II (Minor) from planned events.
Is further information required in the consequence assessment?	No – potential impacts and risks are well understood through the information available.
Are risks and impacts consistent with the principles of ESD?	Yes – activity evaluated in accordance with Santos' Environmental Hazard Identification and Assessment Procedure (EA-91-IG-00004_6), which considers principles of ESD. The consequence against this aspect is II (Minor) and therefore does not affect the outcomes of the principles of ESD as per Table 5-5.
Are risks and impacts consistent with relevant legislation, international agreements and conventions, guidelines, and codes of practice (including species recovery plans, threat abatement plans, conservation advice and Australian Marine Park zoning objectives)?	Yes – IUCN principles and strategic objectives of nearby reserves (Montebello and Dampier AMPs and the North-west MPNMP) are met. Controls implemented will minimise the potential impacts from the activity to species identified in recovery plans and conservation advice as having the potential to be impacted by spill response operations. Relevant species recovery plans, conservation management plans and management actions are detailed in Table 3-10. Management is also consistent with the zoning of the Australian marine parks, in that risks have been reduced to ALARP, e.g. implementation of spill response activities will limit impacts, thereby conserving the marine park values. Management consistent with EPBC Act Regulations (Part 8), Marine Orders (91, 96 and 97) and Australian Ballast Water Requirements.
Are risks and impacts consistent with Santos' Environment Policy?	Yes – aligns with Santos' Environment Policy.
Are risks and impacts consistent with stakeholder expectations?	Yes – no concerns raised.
Are performance standards such that the impact or risk is considered to be ALARP?	Yes – see ALARP above.

The implementation of spill response activities to reduce the potential impacts from a spill are required by legislation. The spill response options selected have been demonstrated to show a net environmental benefit, are standard industry practice and are consistent with relevant standards and guidelines, including the National Plan for Maritime Environmental Emergencies (AMSA, 2019). No concerns from stakeholders have been raised regarding response activities, and the controls proposed reduce the consequences of the potential impacts to Minor (II) and ALARP. The controls used during spill response activities are therefore considered to reduce additional impacts to an acceptable level.

7. Unplanned events environmental assessment

OPGGS(E)R 2023 Requirements
Section 21. Environmental assessment.
Evaluation of environmental impacts and risks 21(5) The environment plan must include: (a) details of the environmental impacts and risks for the activity (b) an evaluation of all the impacts and risks, appropriate to the nature and scale of each impact or risk (c) details of the control measures that will be used to reduce the impacts and risks of the activity to as low as reasonably practicable and an acceptable level. 21(6) To avoid doubt, the evaluation mentioned in paragraph (5)(b) must evaluate all the environmental impacts and risks arising directly or indirectly from: (a) all operations of the activity (b) potential emergency conditions, whether resulting from accident or any other reason. **Environmental performance outcomes and standards** 21(7) The environment plan must: (a) set environmental performance standards for the control measures identified under paragraph (5)(c) (b) set out the environmental performance outcomes against which the performance of the titleholder in protecting the environment is to be measured (c) include measurement criteria that the titleholder will use to determine whether each environmental performance outcome and environmental performance standard is being met.

An ENVID workshop for unplanned events was held on 3 July 2025. A source control workshop was also held to assess the options for source control in the event of a LOWC, this is discussed further in Section 9 and Appendix B of the OPEP. These workshops identified six potential sources of environmental risks associated with unplanned events for this activity. The results of the environmental assessment are summarised in Table 7-1. A comprehensive risk and impact assessment for each of the unplanned events and subsequent control measures proposed by Santos to reduce the risk and impacts to ALARP are detailed in the following subsections.

Table 7-1: Summary of risk assessment ranking for unplanned events

EP Section Reference	Event	Consequence	Likelihood	Residual Risk Level
7.1	Release of solid objects	II (Minor)	C (Possible)	Low
7.2	Introduction of invasive marine species	IV (Major)	A (Remote)	Low
7.3	Marine fauna interaction	II (Minor)	C (Possible)	Low
7.4	Non-hydrocarbon and chemical spills	I (Negligible)	C (Possible)	Very Low
7.6	Hydrocarbon release (surface) from LOWC	IV (Major)	A (Remote)	Low
7.7	Hydrocarbon release (vessel marine diesel oil)	II (Minor)	B (Unlikely)	Very Low
7.8	Minor Hydrocarbon Release	I (Negligible)	C (Possible)	Very Low

7.1 Release of solid objects

7.1.1 Description of event

Event	Solid objects, such as those listed below, can be accidentally released to the marine environment, and potentially impact on sensitive receptors: • non-hazardous solid wastes, such as paper and packaging • hazardous solid wastes, such as batteries, fluorescent tubes, and aerosol cans • equipment and materials, such as hard hats, tools, or infrastructure parts (e.g. XT). Release of these objects may occur as a result of overfull and/or uncovered bins, incorrectly disposed items or spills during transfers of waste, or dropped objects/lost equipment.
Extent	The event will only occur within the Operational Area, and all non-buoyant material or dropped objects are expected to remain within the Operational Area. Buoyant objects could potentially move beyond the Operational Area.
Duration	An unplanned release of solids may occur during operational activities and impacts may occur until the solid degrades.

7.1.2 Nature and scale of environmental impacts

Potential receptors: Physical environment (benthic habitat and water quality), marine fauna (cetaceans, turtles, sharks, fish, rays, seabirds), cultural receptors (totemic species).

7.1.2.1 Physical environment

Objects can be accidentally dropped to the seabed during activities such as the transfer and lifting of objects and equipment. Factors such as crane failure, adverse weather, human error, rigging failure, and vessel motions can result in equipment and other items being lost at sea. This can potentially lead to changes or loss of benthic habitats. In the event of a non-buoyant dropped object, the disturbance would be limited to the area where it was dropped. If the dropped object or equipment being recovered reaches the seabed, it would cause disturbance to the benthic habitat, but this disturbance would be confined to the footprint of the equipment.

The Operational Area primarily consists of soft sediments with minimal epifauna, and while the soft sediment benthic habitats will not be destroyed, the communities on and within them (epifauna) will experience disturbance in the case of a dropped object. Depressions on the seabed may remain even after the removal of the object as they gradually fill over time. Although the Operational Area includes the Continental Slope Demersal Fish Communities KEF, no sensitive features associated with the KEF have been observed within the Operational Area, therefore impacts to the KEF are unlikely.

Small buoyant dropped objects have the potential to be transported by marine currents and may impact on reefs, islands, shoals, and banks within the region. Accidentally dropped objects, such as plastics, have the potential to smother benthic environments, and the release of hazardous solids (e.g. wastes such as batteries) could also impact water quality through pollution of the immediate receiving environment.

Impacts from accidentally released liquids (non-hydrocarbon and chemical) are discussed in Section 7.4.

7.1.2.2 Threatened, migratory or local fauna

Plastics and other solid objects have the potential to harm marine fauna through entanglement or ingestion. The Operational Area overlaps the BIA of three species (humpback whale, pygmy blue whale and wedge-tailed shearwater, Section 3.2.6.1).

Marine turtles and seabirds are at risk of entanglement and may mistake plastic for jellyfish when feeding (Mrosovsky et al., 2009). The Recovery Plan for Marine Turtles in Australia 2017–2027 highlights ingestion of marine debris as a threat to all turtle species. Seabirds foraging on plankton at the sea surface may consume floating plastic, causing internal damage, and potentially leading to fatality (Derraik, 2002). Marine debris has been identified as a threat to marine turtles, humpback whales, and whale sharks in the relevant recovery plans and approved conservation advice. The Threat Abatement Plan for the Impacts of Marine Debris on the Vertebrate Wildlife of Australia's Coasts and Oceans (DoEE, 2018) also addresses this issue and provides recovery actions to combat the threat. It is important to adhere to legislation for the prevention of garbage disposal from vessels to mitigate this risk.

Release of hazardous solid objects (e.g. wastes such as batteries) may result in the pollution of the immediate receiving environment, leading to very localised detrimental health impacts to marine flora and fauna. Physiological damage through ingestion or absorption may occur to individual fish, cetaceans, marine reptiles, or seabirds.

The Recovery Plans and Approved Conservation Advice have specified a number of recovery actions to help combat this threat. Of relevance to this activity is the legislation for the prevention of garbage disposal from vessels, which Santos implements through adherence to MARPOL.

7.1.2.3 Socio-economic receptors

Tourism activities, such as snorkelling, diving, surfing and recreational fishing are not expected to occur in the Operational Area, given the water depth, lack of seafloor features and distance from shore. Although dropped solid objects have potential to float to nearby areas used for tourism or recreational purposes solid non-hydrocarbon releases are not expected to occur frequently or to a scale that may cause significant pollution that would impact the socio-economic values of these areas. Impacts to socioeconomic receptors could occur should debris interfere with other marine users or their equipment (for example, fishing nets).

7.1.2.4 Cultural receptors

Totemic species of cultural value may pass through the Operational Area. However, during consultation, Santos has not been made aware of any other cultural receptors within the Operational Area. Impacts to local fauna have been considered in Section 7.1.2.2.

7.1.3 Environmental performance outcomes and control measures

The EPOs relating to this event include:

- No unplanned objects, emissions or discharges to sea or air [VGCN-EPO-03].

The control measures for this event are shown in Table 7-2, and the EPSs and measurement criteria for the EPOs are described in Section 8.

Table 7-2: Control measure evaluation for the unplanned release of solid objects

Control Measure Reference No.	Control Measure	Environmental Benefit	Potential Cost/Issues	Evaluation
Standard controls				
VGCN-CM-045	Dropped object prevention procedures	Impacts to environment are reduced by preventing dropped objects and by retrieving dropped objects unless the environmental consequences are negligible or there are risks to safety. Minimises drop risk during lifting operations. Ensures lifting equipment certified and inspected.	Personnel costs involved in implementing procedures and in incident reporting.	**Adopted** – Benefits of ensuring procedures are followed and measures implemented outweigh cost to Santos.
VGCN-CM-030	Waste (Garbage) Management Plan	Reduces probability of garbage being lost to sea and the associated potential impacts to marine fauna. Stipulates putrescible waste disposal conditions and limitations. Marine Order 95 (Marine pollution prevention – garbage).	Personnel cost of conducting pre-mobilisation audits and waste management inspections during operations. Costs associated with implementing the plan.	**Adopted** – Benefits of ensuring MODU/LWIV and vessels are compliant outweighs the minimal costs of personnel time and it is a legislated requirement.
VGCN-CM-004	Marine assurance standard	Reduces the probability of release of solid objects due to vessel failure.	Cost associated with implementing procedures.	**Adopted** – Benefit of implementing procedure outweighs the minimal costs.

Control Measure Reference No.	Control Measure	Environmental Benefit	Potential Cost/Issues	Evaluation
Additional controls				
N/A	Eliminate lifting in field	Reduces the risk release of non-hydrocarbon solid to the marine environment due to dropped object.	Eliminating lifting would require MODU/LWIV/ vessels storing more equipment and supplies on-board, and/or additional trips to shore. MODU/LWIV/vessels will not have enough deck space to store all required equipment, materials, supplies needed for the duration of the activity.	**Not Adopted** – Not feasible to eliminate lifting in the field. Not feasible for anchored MODU to be towed to port to resupply.

7.1.4 Environmental impact assessment

Description	
Receptors	Physical environment (benthic habitats) Threatened, migratory or local fauna (marine mammals, marine reptiles, sharks and rays, fish and birds) Socio-economic receptors (tourism and recreation) Cultural receptors
Consequence	II – Minor
Physical environment Non-buoyant dropped objects are expected to impact the seabed and be limited to the size of the dropped object and given the size of standard materials transferred, any impact is expected to be very small and limited to within the Operational Area in which it was dropped. Any area of the seabed impacted through dropped objects would be expected to recover. Buoyant dropped objects have the potential to wash up on island beaches. It is considered that the application of management measures will effectively prevent this impact occurring on a significant scale. Therefore, impacts will result in a Minor (II) reduction in habitat area or function. **Threatened or migratory fauna (marine mammals, marine reptiles, sharks and rays, fish and birds)** In the event of a dropped object, the quantities would be limited. The release could cause localised impacts to water quality and the benthic environment if the solid can degrade, leading to localised impacts on flora and fauna. Ingestion of solid wastes by marine fauna could occur in small quantities. Only small volumes of non-hydrocarbon solids would be generated during the activity, as a result, any accidental loss to the environment would be small in size. Any impacts would be restricted to a small number of individuals, if any. Relevant recovery plans and conservation advice have identified marine debris as a potential threat. There is a Threat Abatement Plan for the Impacts of Marine Debris on the Vertebrate Wildlife of Australia's Coasts and Oceans (DoEE, 2018). As such there is the potential for impacts only to a small proportion of a local population with no consequences for conservation status or reproductive success of cetaceans, marine turtles or fish species that may occur in the area. The limited quantities associated with this unplanned event indicate that even in a worst-case release of solid waste, the number of fauna fatalities would be limited to individuals and is not expected to result in a decrease of the local population size. Therefore, the consequence is Minor (II). **Socio-economic receptors (tourism and recreation)** Impacts to tourism and recreation have the potential to occur through buoyant objects floating into areas used for these activities, adversely impacting tourism and recreation values and creating poor aesthetics. Given the limited quantities associated with this unplanned event, even a worst-case release of solid waste is unlikely to have flow-on effects significant enough to impact the tourism and recreation industries. EP stakeholder consultation did not raise any concerns regarding potential impacts from dropped objects to cultural features including Sea Country. Therefore, the consequence is Negligible (I).	
Likelihood	C – Possible
Control measures proposed ensure the risk of dropped objects, lost equipment or release of non-hydrocarbon solid waste to the environment has been minimised. Given the controls in place, the likelihood of releasing non-hydrocarbon solids to the environment resulting in a minor consequence is considered possible.	
Residual risk	Low

7.1.5 Demonstration of ALARP

Solid waste will be generated throughout the activity from vessel and LWIV/MODU operations, including during routine lifting and transfer activities. The primary environmental risk from these operations relates to accidental releases of non-hydrocarbon solids, such as dropped objects or bulk material losses.

Several standard control measures (Table 7-2) have been adopted to manage these risks and reduce potential environmental harm to ALARP. These include implementation of a dropped object prevention procedure, which ensures lifting equipment is certified, maintained, and inspected, and that appropriate lifting techniques are followed to minimise drop risks. It also requires that dropped objects are retrieved unless environmental consequences are negligible or recovery poses a safety hazard.

Waste (garbage) management procedures, aligned with Marine Order 95, are in place to prevent accidental discharge of general solid waste, with controls on disposal conditions and limitations for putrescible waste. Coupled with standard recovery procedures, these measures, collectively, ensure that the risk of non-hydrocarbon solid waste entering the marine environment remains low and within acceptable limits.

Additional control measures (Table 7-2) were considered but not adopted since the cost, operational feasibility, or associated safety risks were disproportionate to the limited environmental benefit. Eliminating lifting operations within the field was assessed but not adopted. Removing the need for offshore lifting would require all equipment, materials, and supplies to be stored on vessels for the full duration of the activity. This is not feasible due to limited deck space and would result in increased trips to and from port, leading to greater fuel consumption, atmospheric emissions, and operational risk. Given these constraints, the measure was deemed not reasonably practicable.

With the adopted controls in place and no further feasible controls identified, the residual risk of non-hydrocarbon solid releases is assessed as Low, and the impact is considered reduced to ALARP.

7.1.6 Acceptability evaluation

Is the risk ranked between Very Low to Medium?	Yes – residual risk is ranked Low.
Is further information required in the consequence assessment?	No – potential impacts and risks are well understood through the information available.
Are risks and impacts consistent with the principles of ESD?	Yes – activity evaluated in accordance with Santos' Environmental Hazard Identification and Assessment Procedure (EA-91-IG-00004_6), which considers principles of ESD. The residual risk is Very Low and therefore does not affect the outcomes of the principles of ESD as per Table 5-5.
Are risks and impacts consistent with relevant legislation, international agreements and conventions, guidelines and codes of practice (including species recovery plans, threat abatement plans, conservation advice and Australian Marine Park zoning objectives)?	Yes – management consistent with Marine Order 95. Controls implemented will minimise the potential impacts from the activity to species identified in recovery plans and approved conservation advices as having the potential to be impacted by solid objects. Specific actions that contribute to the long-term prevention of marine debris (Objective 1 of the Threat Abatement Plan for the Impacts of Marine Debris on the Vertebrate Wildlife of Australia's Coasts and Oceans (DoEE, 2018) have been adopted, including compliance with applicable legislation in relation to the improvement of waste management practices. Consistent with relevant species recovery plans, conservation management plans and management actions set out in Table 3-10.
Are risks and impacts consistent with Santos' Environment Policy?	Yes – aligns with Santos' Environment Policy.
Are risks and impacts consistent with stakeholder expectations?	Yes – no concerns raised.
Are performance standards such that the impact or risk is considered to be ALARP?	Yes – see ALARP above.

The handling and use of non-hydrocarbon solid materials is standard industry practice and the potential impacts well understood. This aspect will be managed consistent with relevant legislation, regulations and guidelines and the residual risks are low and ALARP.

The control measures proposed are consistent with applicable actions described in the relevant recovery plans and approved conservation advice and no stakeholder concerns have been raised regarding this event.

With the control measures in place to prevent accidental releases and the minor impacts predicted from these types of solids, the low risk of a non-hydrocarbon solid release to the environment is considered environmentally acceptable.

7.2 Introduction of invasive marine species

7.2.1 Description of event

Event	Introduction of invasive marine species may occur due to: • MODU/LWIV or support vessels and external/internal (e.g. sea chests, seawater systems) niches • biofouling on equipment that is routinely submerged in water (e.g. mooring lines, ROVs) • discharge of high-risk ballast water • cross contamination between vessels MODU/vessel marine growth removal (on deck or subsea) Once established, invasive marine species (IMS) have the potential to out-compete indigenous species and affect overall native ecosystem function.
Extent	Localised (seabed within the Operational Area) to widespread if successfully translocated to new areas via ocean currents or project equipment transit.
Duration	Temporary to long-term (in the event of successful translocation and establishment).

7.2.2 Nature and scale of environmental impacts

Potential receptors: Physical environment (benthic habitats), threatened/migratory fauna (marine mammals, marine reptiles, sharks, fish, and rays), protected areas, socio-economic receptors (fisheries, tourism, and recreation) and cultural receptors (totemic species).

IMS are marine plants, animals and algae that have been introduced into a region beyond their natural range but have the ability to survive and potentially thrive. The majority of IMS compatible with the NWSW are found in countries in southeast Asia. Some IMS impose a significant risk to the environment, biodiversity, ecosystem health, human health, fisheries, aquaculture, shipping, ports, and tourism (Wells et al., 2009). IMS can cause various adverse impacts in the receiving environment, including:

- over predation of native flora and fauna
- displacement of native marine species
- outcompeting of native flora and fauna for food
- depletion of viable fishing areas and aquaculture stock
- reduction of coastal aesthetics
- the above impacts can result in flow-on detrimental effects to fisheries, tourism, and recreation.

IMS of concern are those that are not native to the region, are likely to survive and establish in the region, and are able to spread by human mediated or natural means. Species of concern vary from one region to another depending on various environmental factors, such as water temperature, salinity, nutrient levels, and habitat type. These factors dictate their survival and invasive capabilities.

It is recognised that artificial, disturbed and/or polluted habitats in tropical regions are susceptible to invasive marine species introductions, which is why ports are often areas of higher IMS risk (Neil et al., 2005). However, in Australia there are limited records of detrimental impact from IMS compared to other tropical regions (such as the Caribbean). Following their establishment, eradication of IMS populations is difficult, limiting management options to ongoing control or impact minimisation. Case studies in Australia indicate that, from detection to eradication, this can take approximately four weeks (Bax et al., 2003). However, this depends on the environmental conditions and species. For this reason, increased management requirements have been implemented in recent years by Commonwealth and State regulatory agencies. Ballast water is responsible for 20 to 30% of all marine pest incursions into Australian waters. However, research indicates that biofouling (the accumulation of aquatic micro-organisms, algae, plants and animals on vessel hulls and submerged surfaces) has been responsible for more foreign marine introductions than ballast water (DAFF, 2003). The potential biofouling risk presented by vessels will relate to:

- the length of time that these vessels have already been operating in Australian waters or, if they have been operating outside Australian waters
- the locations of the operations they have been undertaking
- the length of time spent at these locations

- whether the vessels have undergone hull inspections, cleaning and application of new anti-foulant coating prior to returning to operate in Australia.

The risk of introducing IMS is limited by the Operational Area occurring in relatively deep, offshore waters that are not directly adjacent to any shoals or banks. IMS are generally unable to establish in deep-water ecosystems (Geiling, 2014), most likely due to a lack of light or suitable habitat to sustain their growth and survival. Most IMS are found in tidal and subtidal zones, with only a few species known to extend into deeper waters of the continental shelf (Bax et al., 2003). Further, it is known that highly disturbed environments (such as marinas and jetties) are more susceptible to colonisation than open-water environments where the number of dilutions and the degree of dispersal are high (Paulay et al., 2002).

Subsea infrastructure proposed for removal during the activity includes only the XT, located in approximately 360 to 380 metres of water. The XT has remained in situ since installation and has not come into contact with any vessels. At these depths, environmental conditions such as low light availability and low temperatures are not conducive to the colonisation or persistence of IMS. Prior to recovery, the XT will undergo marine growth removal to minimise safety risk during recovery. Given the prolonged isolation of the infrastructure from vessel activity since installation, combined with its location at depths unsuitable for IMS colonisation, there is no credible pathway for the presence or translocation of invasive marine species.

7.2.3 Environmental performance outcomes and control measures

The EPO relating to this event is:

- No introduction of marine pest species [VGCN-EPO-07].

The control measures for this event are shown in Table 7-3, and the EPSs and measurement criteria for this EPO are described in Section 8.

Table 7-3: Control measure evaluation for the introduction of invasive marine species

Control Measure Reference No.	Control Measure	Environmental Benefit	Potential Cost/Issues	Evaluation
Standard controls				
VGCN-CM-047	Implementation of the management controls in the Santos Invasive Marine Species Management Plan (IMSMP)	The risk of introducing IMS is reduced due to assessment procedure and management of ballast water.	Personnel costs involved in risk assessing vessels in accordance with the Invasive Marine Species Management Plan. Costs associating with reducing the vessel risk to 'low' (for example, dry docking, hull cleaning or additional costs due to inspections). Could lead to potential delays and therefore costs in vessel contracting process due to unavailability of vessels.	**Adopted** – Minimal personnel costs and potential delays or costs to project are considered outweighed by the benefits of reducing the risk of IMS. Legislative requirement.
VGCN-CM-048	Anti-foulant system	The risk of introducing IMS is reduced due to anti-foulant systems.	Could lead to potential delays and therefore costs, in vessel contracting process due to availability of vessels with appropriate anti-foulant systems.	**Adopted** – Minimal potential delays or costs to project are considered outweighed by the benefits of reducing the risk of IMS.
Additional controls				
N/A	Contract MODU/LWIV/vessels only operating in local, State or Commonwealth waters to reduce potential for IMS	Reduce potential for IMS to be transported into area since vessels would not have originated elsewhere.	MODU/LWIV/vessels and equipment suitable for the activity may not be available in State/Commonwealth waters. Potential significant costs and delay in activity schedule by only contracting MODU/LWIV/ vessels working in State/ Commonwealth waters.	**Not Adopted** – Not feasible.

Control Measure Reference No.	Control Measure	Environmental Benefit	Potential Cost/Issues	Evaluation
N/A	Mandatory dry docking of vessels prior to entering field to clean vessel and/or equipment and remove biofouling	Ensure that no IMS are present on vessel or associated equipment.	Significant cost (grossly disproportionate to the risk) would lead to scheduling delays.	**Not Adopted** – Costs disproportionately high compared to environmental benefit given other controls in place already reduce the risk.
N/A	Utilise an alternative ballast system to avoid uptake and discharge of water in vessels	Eliminate need for ballast water exchange, therefore decreasing risk of introducing IMS through ballast water.	MODU/LWIV/vessels suitable for the activity may not have options for alternative ballast, therefore would require modification at significant cost.	**Not Adopted** – Cost disproportionately high compared to environment benefit.
N/A	Zero discharge of ballast water	Would reduce the potential for IMS by implementation of no ballast water exchange policy on MODU/LWIV and vessels.	Ballast water exchange required on the MODU/LWIV and vessels for stability.	**Not Adopted** – On the basis that ballast water exchange is a safety-critical activity for marine operations.

7.2.4 Environmental impact assessment

Description	
Receptors	Physical environment (benthic habitats) Threatened, migratory and local fauna (marine mammals, marine reptiles, sharks, fish and rays) Socio-economic receptors (fisheries, tourism and recreation) Cultural aspects (Sea Country, potential for totemic species)
Consequence	IV – Major

Ballast water is responsible for up to 30% of all marine pest incursions into Australian waters. However, research indicates biofouling (the accumulation of aquatic micro-organisms, algae, plants and animals on vessel hulls and submerged surfaces) has been responsible for more foreign marine introductions than ballast water (DAFF, 2003). IMS, if successfully established, can outcompete native species for food or space, prey on native species or change the nature of the environment and can subsequently impact on fisheries or aquaculture.

If an IMS is introduced, the species has been known to colonise areas outside of the areas to which it is introduced. In the event an invasive marine species is introduced into the Operational Area, given the lack of diversity and extensiveness of similar benthic habitat in the region, there would only be a minor reduction in the physical environment. No threatened ecological communities are present in the area that could be affected. The overall consequence level was assessed as Major, This also takes into consideration the distance of the activity to protected areas and the requirements of the North-west MPNMP which applies adjacent to the Operational Area which requires that vessel ballast water exchange is completed in accordance with the Australian Ballast Water Management Requirements.

EP stakeholder consultation did not raise any concerns regarding potential impacts to cultural features including Sea Country.

Description	
Likelihood	A – Remote
The pathways for IMS introduction are well known, consequently, standard preventive measures are proposed. While the removal of subsea infrastructure presents a potential vector for invasive marine species, the risk is significantly reduced through the application of marine growth removal prior to recovery. This control measure aligns with findings from Department of Agriculture, Fisheries and Forestry (DAFF, 2003), which highlight that biofouling on submerged surfaces has been responsible for more foreign marine introductions than ballast water. Additionally, the infrastructure has remained isolated from vessel contact since installation, eliminating a key pathway for IMS introduction. The Operational Area, located at depths of 360 to 380 metres, presents an inhospitable environment for IMS colonisation due to low light availability, low habitat complexity, and sparse epibiotic communities. Research also indicates that disturbed environments such as marinas are more susceptible to colonisation than open ocean settings, where high dilution and dispersal rates limit the survival and establishment of non-native species (Paulay et al., 2002). Given the deepwater, dispersive nature of the Operational Area and the controls in place, the likelihood of IMS surviving translocation and successfully establishing in surrounding shallower habitats is considered Remote (A).	
Residual risk	Low

7.2.5 Demonstration of ALARP

There are no alternatives to the use of a MODU/LWIV and support vessels in order to undertake the activity. The risks from IMS are well understood and, with the proposed control measures, the activity will comply with relevant regulations and guidelines. The proposed management controls are considered appropriate to manage the risk of introduction of IMS to ALARP.

Ballast water exchange will be managed through Ballast Water Management actions consistent with the Australian Ballast Water Management Requirements, and a vessel biosecurity risk assessment in accordance with the Invasive Marine Species Management Plan (EA-00-RI-10172) will be undertaken to demonstrate that the MODU/LWIV and vessels are low risk so that IMS are not introduced.

Santos has adopted a risk-based approach to managing biofouling given it is not practicable or reasonable to inspect and/or clean every vessel before each voyage. Such an approach is consistent with other petroleum operators on the North West Shelf and is beyond that enforced on the majority of commercial and recreation vessels that regularly transit the same bioregion. International vessels are given the highest priority to prevent the introduction of IMS into Australian waters. However, domestic vessels (interstate and locally sourced) are also risk-assessed to reduce the likelihood of spreading marine pest species already established in Australian waters. The biofouling risk assessment approach adopted by Santos will ensure the *Aquatic Resources Management Act 2016* and associated regulations prohibiting the introduction of non-endemic fish species will be met.

Additional control measures (Table 7-3) were considered but not adopted where the cost, feasibility, or environmental trade-offs were grossly disproportionate to any potential benefit. This included heat or chemical treatment of ballast water, which may reduce IMS risk but could introduce new environmental hazards or cause mortality in native species and were therefore considered counterproductive. Contracting only MODUs and vessels already operating in Australian waters was also not adopted, as it could result in limited vessel availability, significant delays, and higher costs. Similarly, mandatory dry docking of vessels prior to field entry was deemed unfeasible due to substantial cost and schedule implications, especially given that standard controls already manage the risk effectively. Prohibiting ballast water discharge and using alternative ballast systems were also assessed but not adopted as impractical or incompatible with marine operations; ballast water exchange is a safety-critical function for vessel and MODU stability and cannot be eliminated.

With adherence to the proposed management controls, the residual risk of IMS introduction is considered Low and the impact is reduced to ALARP.

7.2.6 Acceptability evaluation

Is the risk ranked between Very Low to Medium?	Yes – introduction of IMS residual risk ranking is Low.
Is further information required in the consequence assessment?	No – potential impacts and risks well understood through the information available.
Are risks and impacts consistent with the principles of ESD?	Yes – activity evaluated in accordance with Santos' Environmental Hazard Identification and Assessment Procedure (EA-91-IG-00004_6), which considers principles of ESD. The residual risk is Low and therefore does not affect the outcomes of the principles of ESD as per Table 5-5.
Are risks and impacts consistent with relevant legislation, international agreements and conventions, guidelines and codes of practice (including species recovery plans, threat abatement plans, conservation advice and Australian Marine Park zoning objectives)?	Yes – management consistent with *Biosecurity Act 2015 and associated regulations*, National Biofouling Management Guidance for the Petroleum Production and Exploration Industry (Marine Pest Sectoral Committee, 2018) and the *Aquatic Resources Management Act 2016*.
Are risks and impacts consistent with Santos' Environment Policy?	Yes – aligns with Santos' Environment Policy.
Are risks and impacts consistent with stakeholder expectations?	Yes – Santos will follow advice of DAFF to ensure vessels and MODU/LWIV present low level biosecurity risk.
Are performance standards such that the impact or risk is considered to be ALARP?	Yes – see ALARP above.

The mobilisation of MODU/LWIV and vessels and equipment to undertake offshore petroleum activities is industry standard practice, and the IMS risks are well understood and subject to regulation. The vessels and equipment that are internationally mobilised will meet Australian biosecurity requirements, and proposed management is consistent with National Biofouling Management Guidance for the petroleum Production and Exploration Industry (Marine Pest Sectoral Committee, 2018) and Australian Biofouling Management Requirements (DAFF, 2023).

Application of the proposed control measures and adherence to legislation and regulations reduce the likelihood of introducing IMS into the Operational Area, and the dispersive offshore location in the Operational Area reduces the probability of successful establishment in the unlikely event of introduction.

No stakeholder concerns have been raised regarding this aspect, and the proposed controls will reduce the residual level of risk to Low and ALARP. Therefore, the residual risk associated with IMS is considered by Santos to be environmentally acceptable.

7.3 Marine fauna interaction

7.3.1 Description of event

Event	There is the potential for MODU/LWIV and vessels or equipment from the vessels involved in operational activities to interact with marine fauna, including potential strike or collision, potentially resulting in severe injury or mortality. Seabird strike may also occur from helicopters during take-off and landing.
Extent	Within the Operational Area, in the immediate vicinity of the MODU/LWIV and vessels, or helicopters, while moving.
Duration	For the duration of the activity.

7.3.2 Nature and scale of environmental impacts

Potential receptors: Threatened or migratory fauna (marine mammals, marine turtles, sharks and rays, fish and birds) and cultural receptors (totemic species).

Movement of the MODU/LWIV and vessels in the Operational Area introduces the potential for interaction with marine fauna present at the same location during the activity. Although up to three support vessels and a MODU may be present in the Operational Area at any one time, typically only two vessels will be within the Operational Area – the MODU/LWIV and the support vessel. All vessels will either be stationary or slow moving, thereby reducing potential for marine fauna interaction with vessels. Vessels will adhere to Santos' procedures for interacting with marine fauna (Section 7.3.3). Santos has routinely carried out operational activities involving multiple vessels within the Operational Area since Ningaloo Vision operations began (2010), with no marine fauna interaction incidents reported or recorded involving activity vessels during this time. However, Santos acknowledges that there is potential for marine fauna interactions with activity vessels, as described below.

Marine fauna in surface waters that could be most at risk from vessel collision include marine mammals, marine turtles and whale sharks. As summarised in Table 3-9 the Operational Area overlaps BIAs for humpback whale migration, pygmy blue whale migration and wedge-tailed shearwater reproduction.

Vessel strike and vessel disturbance are identified as potential threats to a number of marine fauna species in relevant recovery plans and conservation advice (Table 3-10). Incidents with marine fauna are recorded and reported by Santos as described in Section 8.8.

7.3.2.1 Marine mammals

The Conservation Management Plan for the blue whale (CoA, 2015b) recognises vessel strike as a threat to their recovery. The Operational Area overlaps the migration BIA for the pygmy blue whale. The northern migration for pygmy blue whales off Northwest Cape occurs coast between May and August, and the south bound migration in November and December. Pygmy blue whales are at risk from vessel strikes when feeding near the surface or coming to the surface to breathe. The Operational Area overlaps the eastern (nearshore) edge of the migration BIA and therefore individuals may be encountered during operational activities in the Operational Area. However, Thums et al. (2022) suggest that the pygmy blue whale migration corridor may extend much further west from the shelf edge, into waters deeper than the migration BIA established by DCCEEW and deeper than those of the Operational Area. Consequently, pygmy blue whales are unlikely to occur in the Operational Area in significant numbers, with observed and modelled distributions of pygmy blue whales occurring further offshore in deeper water (Double et al., 2014; Thums et al., 2022). Their presence is not expected to be significant as there is no main aggregation area. The Operational Area does not have any constraints that would prevent pygmy blue whales from moving away from vessels.

Humpback whales are seasonally present in the NWS region during their annual migrations to and from breeding areas in northern Western Australia. The migration BIA for humpback whales overlaps the Operational Area. Aerial surveys and tagging studies of humpback whales indicate that most migrating humpbacks occur in shallower water than the Operational Area, but considerable numbers of humpback whales have been observed in the region in water depths similar to the Operational Area (Double et al., 2012). However, their presence within the Operational Area is not expected to be significant as there is no main aggregation area. The Operational Area does not have any constraints that would prevent humpback whales from moving away from vessels.

The worst potential impact from vessel collision would be mortality or serious injury of an individual. Collisions between vessels and cetaceans are most frequent on continental shelf areas where high vessel traffic and cetacean habitat occur simultaneously (WDCS, 2006). Instances of cetacean deaths as a result of vessel collisions in Australian waters have been recorded (e.g. a Bryde's whale in Bass Strait in 1992) (WDCS, 2006), although the data indicates this is likely to be associated with container ships and fast ferries. The Whale and Dolphin

Conservation Society also indicates that some cetacean species, such as humpback whales, can detect and change course to avoid a vessel (WDCS, 2006). The reaction of whales to the approach of a ship is quite variable. Some species remain motionless when in the vicinity of a ship while others are known to be curious and often approach ships that have stopped or are slow-moving, although they generally do not approach and sometimes avoid faster-moving ships (Richardson et al., 1995).

Vessel speed has been demonstrated to be a key factor in relation to collision with marine fauna, particularly cetaceans, with faster-moving vessels posing a greater collision risk than slower vessels (Laist et al., 2001; Jensen & Silber, 2003; Hazel, 2009). Laist et al. (2001) suggest the most severe and lethal injuries to cetaceans are caused by vessels travelling at 14 knots or faster.

7.3.2.2 Sharks, rays and fish

The Approved Conservation Advice for *Rhincodon typus* (whale shark) (TSSC, 2015a) recognises vessel strike as one of the threats to the recovery of whale sharks. Whale sharks aggregate at the Ningaloo coast between March and June each year. Whale sharks are at risk from vessel strikes when feeding at the surface or in shallow waters (where options to dive are limited). The Operational Area is in close proximity (approximately 10 km) to the whale shark foraging BIA (Figure 3-8, Table 3-9); therefore, individuals may be encountered during operational activities. However, the whale shark presence within the Operational Area is not expected to comprise significant numbers, given no main aggregation area exists within the Operational Area; therefore, their presence would be transitory and of a short duration. No constraints within the Operational Area (e.g. shallow water or shorelines) would prevent whale sharks from moving away from vessels.

7.3.2.3 Marine turtles

Increased vessel traffic is recognised as a key threat to marine turtles in the Recovery Plan for marine turtles (CoA, 2017). It is expected that only a small number of turtles may pass through the Operational Area given the water depth (360 m to 400 m) and distance to the nearest internesting turtle BIA (approximately 8 km).

Vessel strike has been identified as an issue for marine turtles in Queensland waters (CoA, 2017), primarily in areas with high urban population and pleasure craft activity. The lower human population density along the NWS coastline suggests that WA turtle populations are not as affected by vessel strikes.

Turtles will generally dive to avoid vessels, but their ability to respond depends on the speed of the vessel. Turtles are also sensitive to sound underwater (Popper et.al., 2014) and will typically move away from noise-generating sources like vessels within their detection range.

7.3.2.4 Seabirds

A number of protected species of marine birds have potential habitats or migratory routes in and around the Operational Area (Section 3.2.6) and a BIA for wedge-tailed shearwater (reproduction) is located within the Operational Area.

The number of helicopter flights needed for the activities is minimal, and they occur during daylight hours, reducing the potential for bird interactions. The risk of helicopter strikes is low because birds will typically avoid collision in response to helicopter noise, and helicopters will be flying at relatively low speeds during take-off or landing.

7.3.2.5 Cultural receptors

Totemic species of cultural value may pass through the Operational Area. However, during consultation Santos was not made aware of any other cultural receptors within the Operational Area. Impacts to marine fauna and seabirds have been considered in Sections 7.3.2.1 to 7.3.2.4.

7.3.3 Environmental performance outcomes and control measures

The EPO relating to this event is:

- No injury or mortality to *Environment Protection and Biodiversity Conservation Act 1999* and the WA *Biodiversity Conservation Act 2016* listed fauna during activities [VGCN-EPO-01].

The control measures for this event are shown in Table 7-4 and the EPSs and measurement criteria for this EPO are described in Section 8.

Table 7-4: Control measure evaluation for marine fauna interaction

Control Measure Reference No.	Control Measure	Environmental Benefit	Potential Cost/Issues	Evaluation
Standard controls				
VGCN-CM-001	Procedure for interacting with marine fauna	Reduces risk of physical and behavioural impacts to marine fauna from vessels and helicopters. If marine fauna is sighted, then vessels can slow down or move away, and helicopters can increase distances from sighted fauna if required.	Operational costs to adhere to marine fauna interaction restrictions, such as vessel and helicopter speed and direction, are based on legislated requirements and must be accepted.	**Adopted** – Benefits in reducing impacts to marine fauna outweigh the costs incurred by Santos. Control measure ensures compliance with Part 8 of the EPBC Regulations.
VGCN-CM-028	Constant bridge watch	Monitoring of surrounding marine environment to identify potential collision risks (and reducing harm) to cetaceans and other marine fauna.	No additional cost for constant bridge watch as it is industry practice and regulated by AMSA.	**Adopted** – No additional cost, Industry practice.
VGCN-CM-005	Vessel bridge crew receive induction in marine fauna observations, marine fauna interaction procedure requirements	Reduces risk of physical and behavioural impacts to marine fauna from a vessel, because if they are sighted, then the vessel can slow down or move away.	Minor additional costs associated with induction/training material and time.	**Adopted –** Benefits in reducing noise impacts.
Additional controls				
N/A	Restrict the timing of activities to operate outside of sensitive periods only	Reduce risk of collisions during environmentally sensitive periods for listed marine fauna.	High cost in moving or delaying schedule while the risk to all listed marine fauna cannot be reduced due to variability in timing of migration periods and unpredictable presence of some species.	**Not Adopted** – Grossly disproportionate to low incremental environmental benefit given existing low level of risk.
N/A	Dedicated MMO on vessels (EPBC Policy Statement 2.1 Part B)	Improved ability to spot and identify marine fauna at risk of collision (that may cause harm).	Additional cost of contracting MMO.	**Not Adopted** – Cost disproportionate to increase in environmental benefit given the low number of incidences of fauna strikes and would severely limit operations, which are required to occur 24 hours a day, seven days a week.

Control Measure Reference No.	Control Measure	Environmental Benefit	Potential Cost/Issues	Evaluation
N/A	Activities will only occur during daylight hours	Reduced potential for a vessel-fauna collision occurring as activities only undertaken during daylight hours when visibility is highest.	Lengthens duration of the activity as operations only continue for approximately ten hours per day. Increased cost due to increased activity time (more than double the cost). Lengthened schedule results in increased impacts and risks (e.g. planned emissions and discharges, interference with other marine users).	**Not Adopted** – Substantial additional cost due to doubling of activity duration. No overall environmental benefit as results in increased impacts and risks.
N/A	Adopt further measures to those outlined in 'EPBC Regulations 2000 – Part 8 Division 8.1 during peak periods of ecological sensitivity, for example, additional management considerations for vessels outlined in the Australian National Guidelines for Whale and Dolphin Watching (DoEE, 2017c)	Potentially provide an additional level of protection of marine fauna.	Administrative costs to update existing procedure. Operational costs through interruption to activities through implementation of controls developed for an industry trying to get close to marine fauna, when Santos' activities aim to avoid fauna.	**Not Adopted** – The existing control '*procedure for interacting with marine fauna*' has been written in accordance with the EPBC Act and other relevant guidelines. A review of this procedure against the Australian National Guidelines for Whale and Dolphin Watching (DoEE, 2017c) found that there are no additional relevant controls in the Australian National Guidelines for Whale and Dolphin Watching and therefore adopting this control is not ALARP.

7.3.4 Environmental impact assessment

Description	
Receptors	Threatened or migratory fauna (marine mammals, marine turtles, sharks and rays, fish and birds) Cultural receptors (totemic species)
Consequence	II – Minor

In the event of a collision or entanglement with marine fauna, there is the potential for injury or death to an individual. The number of receptors present in the Operational Area during the short duration of the activity is expected to be limited to a small number of transient individuals. Given the presence of the four marine fauna BIAs, there may be more threatened species in the vicinity, however significant numbers are not expected.

Boat strikes and vessel disturbance are identified as potential threats to a number of marine fauna species in relevant Recovery Plan and Conservation Advice (Table 3-10). The above information demonstrates that with control measures in place the activity will be conducted in a manner that reduces potential impacts to ALARP and of acceptable level.

There is the potential for death or injury of EPBC Act listed individual species. However, as they would represent a small proportion of the local population it is not expected that it would result in a decreased population size over what would usually occur due to natural variation, at a local or regional scale, it is expected that the loss of an individual would be a minor consequence.

EP stakeholder consultation did not raise any concern regarding potential impacts to cultural features including Sea Country.

Description	
Likelihood	C – Possible
Marine turtles, marine mammals and birds are expected to be present in the Operational Area at various times of the year. No known aggregation areas (breeding, resting or calving) occur within the Operational Area and therefore concentrations of milling individuals are unlikely. Support vessels will be moving very slowly whilst inside the Operational Area, posing a low risk of collision with marine fauna. In addition, the noise generated from vessel operations will deter marine fauna from coming in close proximity to vessels. With controls in place ensuring the vessels are compliant with EPBC Regulations, the likelihood of a collision with marine fauna resulting in a very low/negligible consequence is considered to be Possible (C).	
Residual risk	Low

7.3.5 Demonstration of ALARP

The use of vessels is critical to carrying out the planned activities. There are no alternatives to the use of the MODU/LWIV and support vessels to undertake the activity. The inherent likelihood of encountering EPBC Act-listed marine fauna in the Operational Area is low due to the short duration of operations, low density of surface fauna in these areas offshore, and the distance from recognised high-use habitats.

Several standard control measures (Table 7-4) have been adopted to manage the risk of vessel interactions with marine fauna and reduce potential impacts to ALARP. This includes the implementation of a procedure for interacting with marine fauna, consistent with Part 8 of the EPBC Regulations 2000. This procedure requires vessel crews to modify their operations (e.g. reduce speed or alter course) when marine fauna such as cetaceans or whale sharks are sighted, and ensures helicopters maintain appropriate distances if fauna are observed. Vessel bridge crew will receive an induction that includes information on marine fauna observations and marine fauna interaction requirements. These measures reduce the risk of both physical injury and behavioural disturbance to marine fauna.

Additional control measures were considered but not adopted where the cost, feasibility, or operational consequences were grossly disproportionate to any potential benefit (Table 7-4). Restricting activities to operate outside of sensitive periods was not adopted, as marine fauna presence is highly variable and not reliably predictable, therefore shifting activity timing would result in substantial scheduling delays without delivering measurable environmental benefit. Similarly, restricting operations to daylight hours only was not adopted because it would more than double the campaign duration, increasing vessel movements, emissions, discharges, and potential interference with other marine users. The use of dedicated MMOs was assessed but not adopted, as the cost and logistical burden of continuous coverage would be disproportionate to the low likelihood of fauna presence, particularly given existing controls. Adopting further measures from the Australian National Guidelines for Whale and Dolphin Watching (DoEE, 2017c) was deemed unnecessary, as these guidelines are intended for activities aiming to observe fauna, whereas Santos' operations are designed to avoid them. A review confirmed that Santos' current fauna interaction procedures already meet or exceed the relevant elements of these guidelines.

With the adopted controls in place and no additional reasonable or practicable measures identified, the residual risk of vessel interactions with marine fauna is considered Low, and the impact is deemed reduced to ALARP.

7.3.6 Acceptability evaluation

Is the risk ranked between Very Low to Medium?	Yes – marine fauna interaction residual risk ranking is Low.
Is further information required in the consequence assessment?	No – potential impacts and risks are well understood through the information available.
Are risks and impacts consistent with the principles of ESD?	Yes – activity evaluated in accordance with Santos' Environmental Hazard Identification and Assessment Procedure (EA-91-IG-00004_6), which considers principles of ESD. The residual risk is Very Low and therefore does not affect the outcomes of the principles of ESD as per Table 5-5.
Are risks and impacts consistent with relevant legislation, international agreements and conventions, guidelines and codes of practice (including species recovery plans, threat abatement plans, conservation advice and Australian Marine Park zoning objectives)?	Consistent with relevant species recovery plans, conservation management plans and management actions set out in Table 3-10.
Are risks and impacts consistent with Santos' Environment Policy?	Yes – aligns with Santos' Environment Policy.
Are risks and impacts consistent with stakeholder expectations?	Yes – no concerns raised.
Are performance standards such that the impact or risk is considered to be ALARP?	Yes – see ALARP above.

Movement of the MODU/LWIV and support vessels is unavoidable to undertake the activity. The possibility of vessel strike is a well understood risk for maritime operations, including for commercial shipping and fishing.

Vessel movements will comply with all relevant maritime standards and regulations, including EPBC Regulations to minimise risks to marine fauna. Application of the proposed management controls and adherence to Commonwealth regulations reduces the likelihood of vessel interactions with marine fauna. While the potential exists for a collision to occur, it is considered a possible (C) scenario. As part of Santos' reporting requirements for the activity, in the unlikely event that an impact did occur in the Operational Area, it will be reported in the National Ship Strike Database (refer to Table 8-4).

With application of the proposed control measures, the potential impacts and risks to threatened fauna will be managed consistent with relevant recovery plans and approved conservation advice. No stakeholder concerns have been raised regarding this event. Therefore, the impact is considered to be ALARP and environmentally acceptable.

7.4 Non-hydrocarbon and chemical releases

7.4.1 Description of event

Event	Non-hydrocarbon liquids including miscellaneous chemicals and waste streams (brine, mixed cement, cleaning and cooling agents, stored or spent chemicals and leftover paint materials) are used or stored on-board the LWIV/MODU and support vessels during the activities. An accidental release of chemicals and other non-hydrocarbons liquids into the marine environment can occur from: • LWIV/MODU activities (including drilling fluids) • transferring, storing or using bulk products (e.g. wet/mixed cement) • mechanical failure of equipment • handling and storage spills and leak • hose or hose connection failure or leak • lifting – dropped objects damaging liquid vessels (containers). The presence of non-hydrocarbons liquids and chemicals represents a potential spill risk during chemical storage and handling, e.g. due to tank damage, or human error. Another credible spill is due to a hose that parts when loading/offloading brine. Rupture of the pumping hose used to transfer these chemicals may occur due to dropped object, vessel motion, or hose failure.
Extent	The relative low volumes (limited to the volume of individual containers) are expected to rapidly disperse into the marine environment. Dilution into the marine environment is expected to be rapid. Below toxic/harmful threshold concentrations are expected to occur at short distances from the hydrocarbon release point. In the event of a worst-case spill, potential impacts beyond the Operational Area are not expected.
Duration	Potentially toxic/harmful threshold concentrations limited to a very short period immediately following release.

7.4.2 Nature and scale of environmental impacts

Potential receptors: Physical environment (water quality) threatened migratory or local fauna (cetaceans, turtles, sharks, fish, rays, seabirds and shorebirds, benthic fauna, plankton), socio-economic receptors, cultural receptors (totemic species).

7.4.2.1 Physical environment

The release of non-hydrocarbon liquids or chemicals into the marine environment may contaminate the water in the area where the release occurs. However, these impacts are expected to be limited to the immediate surrounding area and will disperse quickly to concentrations below the level of concern in the open ocean.

Due to the small volumes and expected rapid dispersal to concentrations below impact thresholds, impacts to water quality are not expected to cause flow-on effects to sediment quality or benthic habitats, including reefs, and offshore islands. There is no emergent or intertidal habitat that could be impacted by a surface or subsea spill. Owing to the water depth and location offshore, any spilled material is unlikely to reach land or affect any of benthic habitats.

7.4.2.2 Threatened or migratory species

Changes in water quality could potentially have short-term effects on marine animals such as pelagic fish, sharks, marine mammals, marine reptiles, and seabirds. The Operational Area overlaps with BIAs for humpback whales (migration), pygmy blue whale (migration), and wedge-tailed shearwater (reproduction).

Recovery plans and conservation advice for numerous bird species identify marine pollution and contamination impacts as a threat to the species. In addition, the Recovery Plan for Marine Turtles in Australia 2017–2027 (CoA, 2017) identifies deteriorating water quality as a threat to all species of marine turtles in Australia. These species have been identified as potentially transiting through the Operational Area from time to time. However, the small volumes and nature of the chemicals on board, along with the open-ocean environment, make widespread ecological effects on these threatened or migratory species unlikely. The physical coating of marine fauna, especially those at the sea surface like seabirds, by hazardous liquids and the toxic effects of chemicals are also unlikely due to the low concentrations and short exposure times.

7.4.2.3 Socio-economic receptors

The localised and temporary impacts of an unplanned spill of hazardous liquids make it unlikely to have a significant impact on commercial fishing, tourism, and recreational activities. Additionally, there are no cultural receptors within the Operational Area.

7.4.2.4 Cultural receptors

Totemic species (marine fauna and seabirds) are likely to move through the Operational Area. Chemical spills are unlikely to cause widespread ecological harm to fauna due to the nature of the chemicals on board, the small volumes that could be released, and the open-ocean environment. The risk of physical coating of marine fauna, particularly those at the sea surface (e.g. seabirds), by hazardous liquids, or sublethal or lethal effects from toxic chemicals, is considered low, given the anticipated low concentrations and short exposure times.

7.4.3 Environmental performance outcomes and control measures

The EPO relating to this event is:

- No unplanned objects, emissions or discharges to sea or air [VGCN-EPO-03].

The control measures considered for this event are shown in Table 7-5, and EPSs and measurement criteria for the EPOs are described in Section 8.

Table 7-5: Control measure evaluation for non-hydrocarbon and chemical release

Control Measure Reference No.	Control Measure	Environmental Benefit	Potential Cost/Issues	Evaluation
Standard controls				
VGCN-CM-045	Dropped object prevention procedures	Impacts to the environment are reduced by preventing dropped objects (e.g. chemical containers) and by retrieving dropped objects where possible. Minimises drop risk during MODU/LWIV lifting operations. Ensures lifting equipment certified and inspected.	Personnel costs involved in implementing procedures and in incident reporting.	**Adopted** – Benefits of ensuring procedures are followed and measures implemented outweigh costs.
VGCN-CM-049	Hazardous chemical management procedures	Reduces the risk of spills and leaks (discharges) to sea by controlling the storage, handling and clean-up.	Personnel cost associated with implementation of procedures and permanent or temporary storage areas.	**Adopted** – Benefits of ensuring procedures are followed and measures implemented outweigh costs.
VGCN-CM-031	Deck cleaning and product selection	Improves water quality discharge (reduced toxicity) to the marine environment. Those deck cleaning products planned to be released to sea meet the criteria for not being harmful to the marine environment according to MARPOL Annex V.	Personnel costs of implementing, potential additional cost, and delays of chemical substitution.	**Adopted –** Benefits of ensuring vessels are compliant and those deck cleaning products planned to be released to sea meet MARPOL criteria.
VGCN-CM-033	Chemical selection procedure	Reduced toxicity to marine environment through ensuring only environmentally acceptable chemicals discharged to sea.	Potential additional cost and delays of chemical substitution.	**Adopted** – Benefits of ensuring procedures are followed outweighs costs.

Control Measure Reference No.	Control Measure	Environmental Benefit	Potential Cost/Issues	Evaluation
VGCN-CM-032	General chemical management procedures	Potential impacts to the environment are reduced through following correct procedures for the safe handling and storage of chemicals.	Personnel costs associated with ensuring procedures are in place and implemented during inspections.	**Adopted** – Benefits of ensuring procedures are followed and measures implemented outweigh the costs of personnel time.
VGCN-CM-050	MODU/LWIV spill response plans (SOPEP/SMPEP)	Effective management of an accidental spill (discharge to sea) to reduce impact to the environment.	Personnel cost associated with ongoing management (spill response exercises) and implementation of plans.	**Adopted** – Benefits of ensuring response plans in place, are followed and measures implemented and that the vessels are compliant outweighs costs.
VGCN-CM-051	Maritime Dangerous Goods Code	Dangerous goods managed in accordance with IMDG Code to reduce the risk of an environmental incident, such as an accidental release to sea or unintended chemical reaction.	Cost associated with implementation of code/procedure.	**Adopted** – Benefits of ensuring procedures are followed and measures implemented outweigh costs.
VGCN-CM-004	Marine assurance standard	Ensures MODU/LWIV and vessels meet marine assurance standards to reduce the likelihood of unplanned discharge.	No additional cost.	**Adopted** – Benefits of ensuring MODU/LWIV and vessels are compliant outweigh the minimal costs of personnel time.
VGCN-CM-052	Bulk liquid transfer procedure	Bulk liquid transferred in accordance with bulk transfer procedures to reduce the risk of an unintentional release to the sea.	Cost to implement ongoing procedure. Cost of purchasing and maintaining equipment (e.g. bulk hoses and connections).	**Adopted** – Benefits of ensuring procedures are followed and measures implemented outweighs costs.
VGCN-CM-053	Bulk solid transfer procedure	Bulk solids transferred in accordance with bulk transfer procedures to reduce the risk of an unintentional release to the sea.	Cost to implement ongoing procedure. Cost of purchasing and maintaining equipment (e.g. bulk hoses and connections).	**Adopted** – Benefits of ensuring procedures are followed and measures implemented outweighs costs.
VGCN-CM-002	Vessel planned maintenance system (PMS) to maintain vessel DP, engines and machinery	Reduces risk of spills from vessels by ensuring that equipment is maintained appropriately.	Costs are standard for routine PMS.	**Adopted** – Benefits in reducing risk of spills.
VGCN-CM-003	MODU planned maintenance system (PMS) to maintain vessel DP, engines and machinery	Reduces risk of spills from MODU/LWIV by ensuring that equipment is maintained appropriately.	Costs are standard for routine PMS.	**Adopted** – Benefits in reducing risk of spills.
VGCN-CM-054	Remotely operated vehicle (ROV) inspection and maintenance procedures	Maintenance and pre-deployment inspection on ROV completed as scheduled to reduce the risk of hydraulic fluid releases to the marine environment.	Costs associated with ROV inspection and maintenance.	**Adopted** – Benefits of ensuring procedures are followed outweigh costs.

Control Measure Reference No.	Control Measure	Environmental Benefit	Potential Cost/Issues	Evaluation
Additional controls				
N/A	Scupper plugs continuously in place to prevent deck drainage	Would eliminate potential impacts of contaminants being discharged to sea in rainwater.	Increased health and safety risks from wet deck not draining. Large amounts of water on a vessel's deck can also cause stability issues (free-surface effect).	**Not Adopted** – Safety considerations outweigh the benefit, given small volumes of contaminants.

7.4.4 Environmental impact assessment

Description	
Receptors	Physical environment (water and sediment quality, benthic habitats) Threatened, migratory or local fauna (marine mammals, marine reptiles, sharks, fish, rays and birds) Socio-economic receptors (tourism and recreation)
Consequence	I – Negligible
The small volumes, dilution and dispersion from natural weathering processes such as ocean currents are such that spills will be limited in area and duration. The number of receptors present at the activity location are expected to be limited to a small number of transient individuals. The susceptibility of marine fauna to non-hydrocarbons and chemicals is dependent on the type and exposure duration; however, given that exposures would be limited in extent and duration, exposure to marine fauna from this hazard is considered to be low. The small volumes of worst-case discharges are such that, the impacts to receptors will decline rapidly with time and distance at the sea surface. Rapid dilution at depth would also result in the impacts to receptors declining rapidly with time and distance. Deteriorating water quality and marine pollution are identified as potential threats to a number of marine fauna species in relevant recovery plans and conservation advice (Table 3-10) and to MNES (DoE, 2013). With control measures in place, the activity will be conducted in a manner that reduces potential impacts to ALARP and an acceptable level. Toxic impacts are not expected to the benthic community due to the water depths. EP stakeholder consultation did not raise any concerns regarding potential impacts to cultural features including Sea Country. Given that non-hydrocarbon or chemical spill would not result in a decreased population size at a local or regional scale or long term reduction to water and sediment quality it is expected that a spill of this nature would result in a Negligible (I) consequence.	
Likelihood	C – Possible
A small release of non-hydrocarbon liquids is unlikely to have widespread ecological effects due to the nature of the chemicals on board, the small potential release volume, the depth and transient presence of marine fauna in the area, and the effective prevention and management procedures for spill response. Santos has reviewed historical non-hydrocarbon liquid spills and leaks from equipment and machinery, such as those caused by split hoses, minor leaks, or handling errors. Most reported incidents occurred within bunded areas, involved volumes less than 100 litres, did not enter the marine environment, and were cleaned up immediately. The likelihood of a small hazardous liquids release occurring is limited given the set of mitigation and management controls in place for this program. Consequently, the likelihood of releasing hazardous liquids to the environment, which results in a negligible consequence, is considered Possible (C).	
Residual risk	Very Low

7.4.5 Demonstration of ALARP

Non-hydrocarbon liquids and chemicals will be required to undertake the activities, so their removal is not viable. These substances are required for safe and effective drilling, maintenance, and vessel operations. Several standard control measures (Table 7-5) have been adopted to manage the risk associated with the storage, handling, and potential release of hazardous liquids and to reduce the likelihood and consequence of any unplanned discharges to ALARP. Dangerous chemicals will be managed in accordance with the International Maritime Dangerous Goods Code, and procedures for the transfer of bulk liquids are in place to minimise the risk of accidental releases resulting from equipment failure, overfilling, or operational error.

Comprehensive administrative controls have been implemented, including solid bulk transfer procedure, hazardous and general chemical management procedures, which govern safe storage, handling, and clean-up practices. The

chemical selection procedure ensures that only environmentally acceptable products are used, thereby reducing the potential impact to marine water quality in the event of an accidental release. Dropped object prevention procedures are also applied to reduce the risk of spills resulting from equipment movement or transfer between vessels. In the event of a spill, LWIV/MODU and support vessel spill response plans are in place to ensure a rapid and effective response to minimise environmental harm.

Other management controls that have been implemented include vessel maintenance systems, chemical management procedures, spill clean-up equipment and Shipboard Marine Pollution Emergency Plan (SMPEP)/OPEPs not only to minimise the risk of an accidental release, but also to reduce the impact in the event a release does occur.

Engineering controls further reduce risks through the use of bunding and onboard containment systems, as outlined in each vessel's SMPEP, and through the implementation of PMS for both the MODU/LWIV and support vessels. These systems ensure the relevant equipment is inspected, maintained, and operating within its design limits to minimise the likelihood of failure and associated releases. Regular inspections of bunding, drainage systems, and spill kits provide assurance that these controls remain effective.

One additional control measure was considered but not adopted (Table 7-5), as it was found to be impractical and disproportionate to the level of environmental risk. The use of continuously installed scupper plugs to prevent deck drainage was assessed as a means to eliminate the potential for contaminants to be discharged to sea via rainwater. However, this measure was not adopted due to increased health and safety risks associated with water accumulation on deck, including slip hazards and potential vessel stability issues (free-surface effect). Given the small volumes of potential contaminants and the effectiveness of existing spill prevention and response measures, the environmental benefit of this control was not considered sufficient to justify the operational risk.

A thorough set of controls has been proposed to ensure the risks of minor hazardous liquid spills and leaks occurring and subsequent impacts are minimised. The resulting impacts to marine fauna that could potentially result from a spill of this size would be negligible, with impacts restricted to a small number of individuals within a localised area.

The controls proposed are consistent with applicable legislative requirements, relevant conservation advice, and Santos' internal risk management criteria. With the adopted measures in place and no additional feasible controls identified, the residual risk associated with non-hydrocarbon hazardous liquids and chemicals is considered Very Low, and the impact is reduced to ALARP.

7.4.6 Acceptability evaluation

Is the risk ranked between Very Low and Medium?	Yes – maximum minor spill residual risk is ranked as Very Low.
Is further information required in the consequence assessment?	No – potential impacts and risks are well understood through the information available.
Are risks and impacts consistent with the principles of ESD?	Yes – activity evaluated in accordance with Santos' Environmental Hazard Identification and Assessment Procedure (EA-91-IG-00004_6), which considers principles of ESD. The residual risk is Low and therefore does not affect the outcomes of the principles of ESD as per Table 5-5.
Are risks and impacts consistent with relevant legislation, international agreements and conventions, guidelines and codes of practice (including species recovery plans, threat abatement plans, conservation advice and Australian Marine Park zoning objectives)?	Yes – management consistent with SOLAS 1974 and *Navigation Act 2012*, Marine Order 91 (Marine pollution prevention – oil), Marine Order 94 (Marine pollution prevention – packaged harmful substances) and with relevant recovery plans, conservation advices and actions for species that may occur in the Operational Area (Table 3-10).
Are risks and impacts consistent with Santos' Environment Policy?	Yes – aligns with Santos' Environment Policy.
Are risks and impacts consistent with stakeholder expectations?	Yes – no concerns raised.
Are performance standards such that the impact or risk is considered to be ALARP?	Yes – see ALARP above.

With the controls in place to prevent an accidental release of small volumes of non-hydrocarbon liquids and chemicals and the negligible impacts predicted from an unplanned release of such material, the risk to the marine environment is considered very low. Potential risks are unlikely to be greater than those caused by other commercial marine vessels or offshore petroleum activities in deep water.

The materials will be managed in accordance with relevant legislation and standards and Santos' procedures. The small volumes negate the need for any further contingencies to be in place that are included for some of the larger spill scenarios associated with the activity.

With the controls in place to prevent accidental spills and the low impacts predicted from a spill of this size, the environmental risk of using and handling the required chemicals is considered ALARP and environmentally acceptable.

7.5 Overview of unplanned release of hydrocarbons

There is potential for loss of well control (surface) resulting in a loss of crude oil (assessed in detail in Section 7.6):

- loss of containment of MDO due to a vessel collision event or refuelling activities within the Operational Area (assessed in detail in Section 7.7)
- minor spills for control fluids, lubricant oils, waste oils, etc (assessed in detail in Section 7.8).

Hydrocarbon trajectory modelling was used to predict the potential extent of a worst-case spill event for both the MDO spill and LOWC scenarios.

7.5.1 Spill scenario selection

7.5.1.1 Loss of well control

Santos has identified a loss of well control as the worst-case type of credible oil release scenario that could potentially occur during the activity. The worst-case LOWC scenario was considered to be a surface release of 8,073 m³ of Van Gogh crude across 77 days due to a surface LOWC.

7.5.1.2 Vessel collision

It is considered credible that a release of MDO to the marine environment could occur from a collision between the activity vessels and an errant third party vessel. Such events could have sufficient impact to result in the rupture of a diesel tank leading to a loss of integrity. This is considered credible given the diesel tanks may not be protected or double-hulled and fuel tank ruptures resulting in a hydrocarbon release have occurred before within the maritime industry.

The AMSA (2015) Technical Guidelines for Preparing Contingency Plans for Marine and Coastal Facilities recommend that the spill scenario for modelling and impact assessment should be based on the largest single fuel tank volume. The specific vessel to undertake the activity is yet to be confirmed; however, a review of available vessels indicated that the largest single fuel tank is likely to be up to 325 m³ in capacity.

The worst-case vessel collision scenario was considered to be a surface release of 325 m³ of MDO over one hour.

7.5.1.3 Refuelling

A minor spill (approximately 37.5 m³) of MDO could occur during vessel to MODU/LWIV refuelling, resulting in a discharge of hydrocarbons to the marine environment at the sea surface. Spills during refuelling can occur through several pathways, including fuel hose breaks, coupling failure or tank overfilling.

Spills resulting from overfilling will be contained within the vessel drains and slops tank system. In the event that the refuelling hose is ruptured, the fuel bunkering activity will cease by turning off the pump, the fuel remaining in the transfer line will escape to the environment as well as fuel released prior to the transfer operation being stopped. The AMSA (2015) Technical Guidelines for Preparing Contingency Plans for Marine and Coastal Facilities provides guidance for calculating a maximum credible spill volume for a refuelling spill. The guidance provided by AMSA (2015) for a refuelling spill under continuous supervision is considered appropriate given refuelling will be constantly supervised. The maximum credible spill volume during refuelling is calculated as: transfer rate (150 m³/hr) × 15 minutes of flow. The detection time of 15 minutes is seen as conservative but applicable after failure of multiple barriers, followed by manual detection and isolation of the fuel supply.

7.5.2 Spill modelling overview

To determine the spatial extent of impacts from potential hydrocarbon spills, modelling was completed for the vessel collision (RPS, 2024) and LOWC scenarios (RPS, 2025).

7.5.2.1 Loss of well control spill modelling

The spill modelling was performed using an advanced three-dimensional trajectory and fates model referred to as the Spill Impact Model Application Package (SIMAP). The SIMAP model calculates the transport, spreading, entrainment and evaporation of spilled hydrocarbons over time, based on the prevailing wind and current conditions and the physical and chemical properties (RPS, 2025).

The model was configured in stochastic mode to simulate a range of environmental conditions. Wind and current data spanning 10 years (2010 to 2019) were utilised in the stochastic modelling. Three hundred spill simulations were modelled, comprising of 100 simulations per season (summer (December to February), winter (April to

August) and transitional (March and September to November)). Each simulation had the same spill information (spill volume, duration and crude composition) but different start times to ensure a range of wind and current conditions were assessed.

For each of the 300 simulations, the surface oil, total submerged oil in the water column, dissolved oil and oil on shorelines was spatially tracked. The outputs of this modelling showed a number of different possible outcomes of a spill, which were then analysed to determine the concentrations of hydrocarbon at each grid cell of the model, providing information about the probability of contact and concentration at contact of hydrocarbons across the EMBA.

Deterministic modelling was also performed to understand the potential area of influence that could be expected from a single spill event. The worst-case deterministic scenario (highest mass of oil ashore) resulted from run #11 (Appendix H).

Key parameters for the maximum credible spill scenario modelled are given in Table 7-6.

7.5.2.2 Marine diesel oil spill modelling

Modelling of a surface release of 325 m³ of MDO was undertaken by RPS (2024) to support the Ningaloo Vision Cessation of Production and Floating Asset Removal EP (7750-650-EIS-0007). The modelled release location for this scenario is situated approximately 37 km north of the VGA-4H GI ST1 well. Due to its position within the VGCN Operational Area, minimal spatial separation from the well site, and the similarity in prevailing oceanographic and meteorological conditions, the modelling location is considered environmentally and oceanographically representative of the activity site. As such, the existing spill modelling scenario has been adopted for this EP, and no additional MDO spill modelling has been deemed necessary.

A surface spill of MDO during refuelling is considered relatively small in comparison to a surface spill of MDO during a vessel collision. It is therefore assumed that the extent of a hydrocarbon spill during refuelling would remain within the extent of the worst-case spill trajectory of diesel from a vessel collision, subsequently, modelling of a smaller spill was not conducted.

Stochastic modelling was undertaken using SIMAP, with a total of 300 simulations (100 per season (summer, winter, transition)). Each simulation spanned 30 days following release, with start dates spaced approximately fortnightly over a five year period. A summary of the modelled maximum credible spill scenarios is provided in Table 7-6.

Table 7-6: Summary of maximum credible spill scenarios

Worst-Case Credible Spill Scenario	Location of Release	Approx. Depth of Spill	Hydrocarbon Type	Maximum Credible Volume Released (m³)	Release Duration	Time of Year
LOWC-surface release	21° 23’ 52.19” S 114° 04’ 4.15” E	Surface	Van Gogh crude	8,073 m³	77 days	All
Surface diesel release	21°24’12.39”S 114°05’17.22”E	Surface	MDO	325 m³	1 hour	All

7.5.3 Hydrocarbon characteristics

7.5.3.1 Van Gogh crude

The physical properties and boiling point distributions of Van Gogh crude are presented in Table 7-7 and Table 7-8. A series of weathering tests were conducted to illustrate the potential behaviour following a 50 m³ instantaneous surface release. The mass balance expected for Van Gogh crude under the two weathering tests are shown in Figure 7-1 and Figure 7-2. The two weathering curves show only subtle differences despite the different wind conditions. The oil is forecast to be highly persistent with the majority of the volume remaining as surface oil irrespective of the environmental conditions. The mass on the surface is predicted to drop to approximately 74% after seven days, and the decrease evenly balanced between evaporation and decay.

Table 7-7: Properties of Van Gogh crude and marine diesel oil

Parameter	Van Gogh Crude	MDO
API gravity	15.7	36.4
Density at 15°C	961.0	843.0
Wax content (%)	<5	0.05
Pour point (°C)	-15	-36
Dynamic viscosity	662.9 (at 20°C)	3.9 (at 20°C)

Table 7-8: Boiling point ranges for Van Gogh crude and marine diesel oil

Name	Volatiles (%)	Semi-volatiles (%)	Low Volatiles (%)	Residual (%)
Boiling point (°C)	<180	180–265	265–380	>380
	Non persistent			Persistent
Van Gogh crude	3.8	6.6	27.9	61.7
MDO	4.0	32.0	54.0	10.0

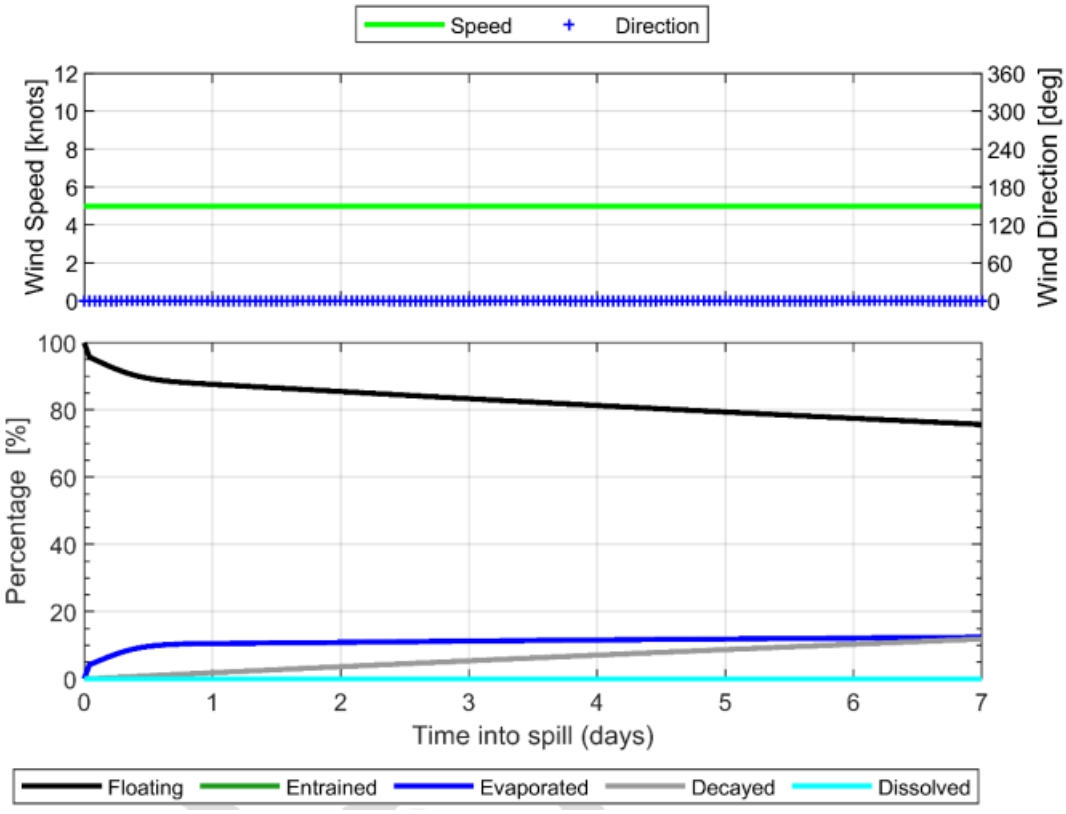

Figure 7-1: Mass balance plot for an instantaneous 50 m³ surface release of Van Gogh crude subjected to a constant 5-knot (2.6 m/s) wind, currents and 27°C water temperature

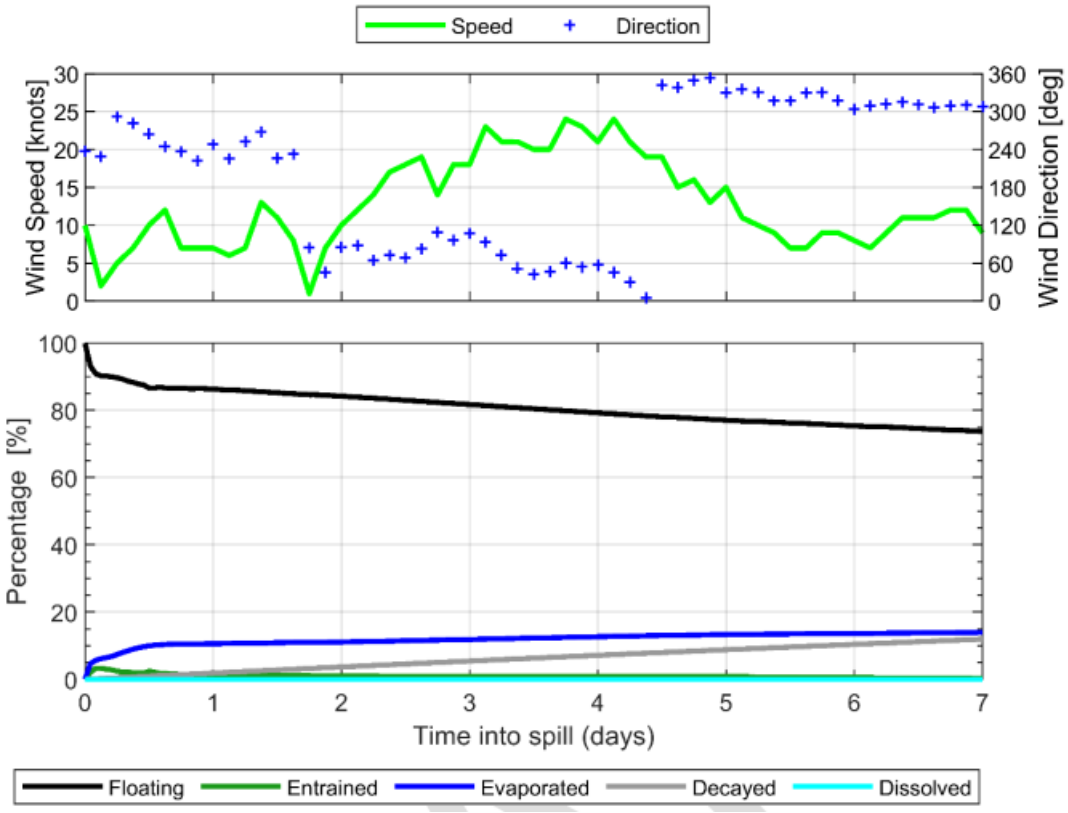

Figure 7-2: Mass balance plot for an instantaneous 50 m³ surface release of Van Gogh crude subjected to variable wind speeds of 2 to 24 knots (1 to 12 m/s), currents and 27°C water temperature

7.5.3.2 Marine diesel oil

MDO is categorised as a group II oil (light-persistent) according to the International Tankers Owners Pollution Federation (ITOPF, 2020) and US Environmental Protection Agency/US Coast Guard classifications. The low viscosity (14.0 cP at 25°C) indicates this oil will spread quickly when released and will form a thin to low thickness film on the sea surface, increasing the rate of evaporation.

MDO is characterised by a high percentage of non-persistent components (90%), which will evaporate when on the sea surface. It also contains 10% persistent hydrocarbons, which will not evaporate though will decay over time.

The physical properties and boiling point distributions of MDO are presented in Table 7-7 and Table 7-8. A series of weathering tests were conducted to illustrate the potential behaviour following a 50 m³ instantaneous surface release of MDO (Figure 7-3; Figure 7-4).

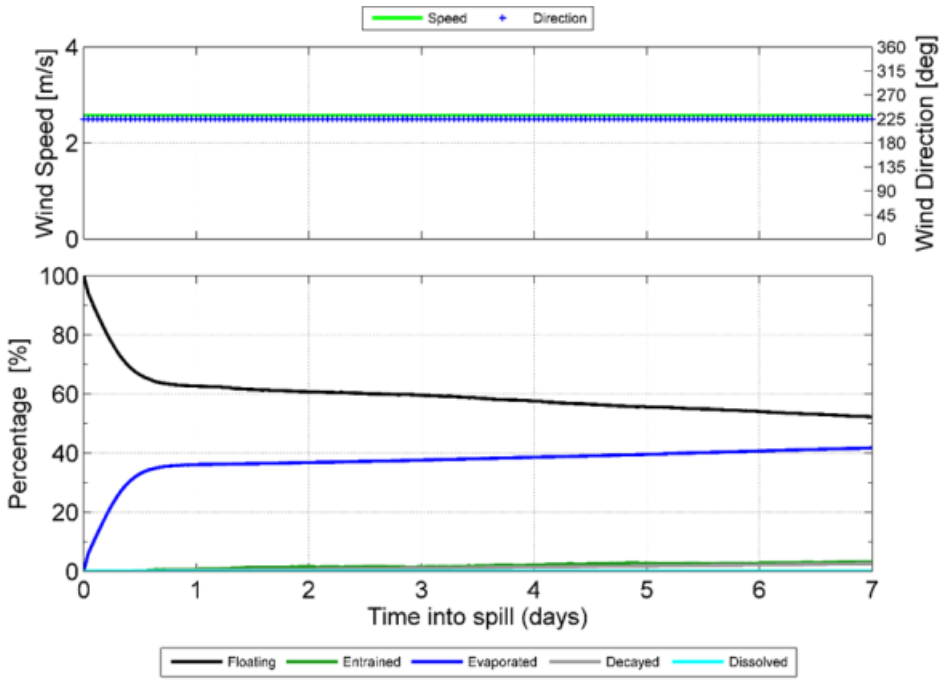

Figure 7-3: Mass balance plot for an instantaneous 50 m³ surface release of marine diesel oil subjected to a constant 5-knot wind, currents and 27°C water temperature

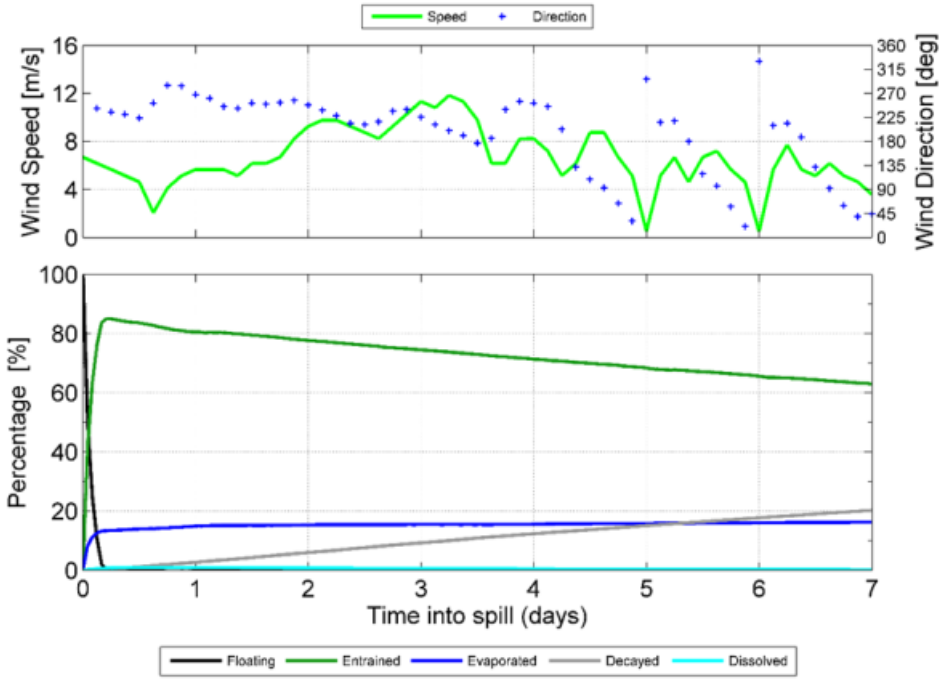

Figure 7-4: Mass balance plot for an instantaneous 50 m³ surface release of marine diesel oil subjected to variable wind speeds (1 to 24 knots), currents and 27°C water temperature

7.5.4 Hydrocarbon exposure values

To inform the impact assessment it is important to understand the profile of the concentrations of hydrocarbons after a spill. To do this NOPSEMA recommends identifying hydrocarbon exposure values that broadly reflect the range of consequences that could occur at certain concentrations (NOPSEMA,2025a). The exposure values that have been applied to this EP are described below.

The socio-economic EMBA (Figure 3-1) was developed using low exposure values. These exposure values are not considered to be representative of a biological impact, but they are adequate for identifying the full range of socio-economic receptors that might be contacted by surface and/or subsurface hydrocarbons (NOPSEMA,2025a) and a visible sheen.

To inform impact assessment, moderate exposure values that may be representative of biological impact, used to develop the ecological EMBA have also been identified.

Determining exposure values that may be representative of biological impact is complex since the degree of impact will depend on the sensitivity of the receptors contacted, the duration of the exposure and the toxicity of the hydrocarbon type making the contact. The toxicity of a hydrocarbon will also change over time, due to weathering processes altering the composition of the hydrocarbon. To identify appropriate exposure values Santos has considered the advice provided by NOPSEMAs *Application of oil spill modelling in Environment Plans- Information Paper,* (NOPSEMA, 2025a) and scientific literature. The selected hydrocarbon exposure values are discussed in Table 7-9 to Table 7-12. These tables explain how the exposure value is relevant to the risk evaluation and provides context on how the exposure value is used to inform response planning (which is addressed further in the OPEP).

Table 7-9: Floating hydrocarbons exposure values

Surface Oil Concentration (g/m²)	Exposure Value	Description
1	Low	**Risk evaluation** It is recognised that a lower floating oil concentration of 1 g/m² (equivalent to a thickness of 0.001 mm or 1 ml of oil per m²) is visible as a rainbow sheen on the sea surface. This represents a wider area where a visible sheen may be present on the surface and, therefore, the concentration at which socio-cultural impacts to the visual amenity of the marine environment may occur. **Response planning** Contact at 1 g/m² (as predicted by oil spill trajectory modelling) is used as a conservative trigger for activating scientific monitoring plans as detailed in the OPEP.
10	Moderate	**Risk evaluation** There is a paucity of data on floating oil concentrations with respect to impacts to marine organisms. Hydrocarbon concentrations for registering biological impacts resulting from contact of surface slicks have been estimated by different researchers at about 10 to 25 g/m² (French et al., 1999; Koops et al., 2004). The impact of floating oil on birds is better understood than on other receptors. A conservative exposure value of 10 g/m² has been applied to impacts from surface hydrocarbons (floating oil) in this EP. Although based on birds, this hydrocarbon exposure value is also considered appropriate for turtles, sea snakes and marine mammals (Natural Resource Damage Assessment Model for Coastal and Marine Environments, 1996). **Response planning** Contact at 10 g/m² is not specifically used for spill response planning.
50	High	**Risk evaluation** At greater thicknesses the potential for impact of surface oil to wildlife increases. All other things being equal, contact to wildlife by surface oil at 50 g/m² is expected to result in a greater impact. **Response planning** Containment and recovery effectiveness drops significantly with reduced oil thickness (McKinney et al., 2017; NOAA, 2014). McKinney et al. (2017) tested the effectiveness of various oil skimmers at various oil thicknesses. Their results showed that the oil recovery rate of skimmers dropped significantly when oil thickness was <50 g/m² (less than Bonn Agreement Code 4). Hence, 50 g/m² has been set as a guide for planning effective containment and recovery operations. Similarly, surface oil >50 g/m² (Bonn Agreement Code 4/5 and equivalent to oil observed as discontinuous or continuous true colour) is considered to be a lower limit for effective dispersant operations and is therefore considered for planning.

Table 7-10:Shoreline hydrocarbons accumulation exposure values

Shoreline Oil Concentration (g/m²)	Exposure Value	Description
10	Low	**Risk evaluation** 10 g/m² shoreline accumulation represents a lower concentration for identifying social, economic and cultural features of the environment that may be affected by shoreline oil, and for assessing the potential consequences on these features. For example, reduction in visual amenity of shorelines. This value has been used in previous studies to represent a low contact value for interpreting shoreline accumulation modelling results (French-McCay, 2005a, 2005b). **Response planning** Not specifically used for response planning because below the limit that can be effectively cleaned.
100	Moderate	**Risk evaluation** The impact exposure value for exposure to hydrocarbons stranded on shorelines is derived from levels likely to cause adverse impacts to marine or coastal fauna and habitats. These habitats and marine fauna known to use shorelines are most at risk of exposure to shoreline accumulations of oil, due to smothering of intertidal habitats (such as mangroves and emergent coral reefs) and coating of marine fauna. Environmental risk assessment studies (French-McCay, 2009) report that an oil thickness of 0.1 mm (100 g/m²) on shorelines is assumed as the lethal exposure value for invertebrates on hard substrates (rocky, artificial or man-made) and sediments (mud, silt, sand or gravel) in intertidal habitats. Therefore, a conservative exposure value for impacts of 100 g/m² has been applied to impacts from shoreline accumulation of hydrocarbons. **Response planning** A shoreline concentration of 100 g/m², or above, is likely to be representative of the minimum limit that the oil can be effectively cleaned according (AMSA, 2015; NOPSEMA,2025a) and is therefore used as a guide for shoreline clean-up planning. This exposure value equates to approximately half a cup of oil per square metre of shoreline contacted.
1,000	High	**Risk evaluation** At greater thicknesses, the potential for impact of accumulated oil to shoreline receptors increases. All other things being equal, accumulation of oil above 1,000 g/m² is expected to result in a greater impact. **Response planning** As oil increases in thickness the effectiveness of oil recovery techniques increases. This value can therefore be used to prioritise oil recovery efforts, assuming oil recovery is deemed to have an environmental benefit.

Table 7-11: Dissolved hydrocarbon exposure values

Dissolved Hydrocarbons (ppb)	Exposure Value	Description
10	Low	**Risk evaluation** Dissolved aromatic hydrocarbons (DAH) include the monoaromatic hydrocarbons (compounds with a single benzene ring such as benzene, toluene, ethyl benzene, and xylenes) and polycyclic aromatic hydrocarbons [PAHs] (compounds with multiple benzene rings such as naphthalenes and phenanthrenes). These compounds have a greater bioavailability than other components of oil and are considered to be the main contributors to oil toxicity. Acute toxicity studies (French-McCay, 2025; Negri et al., 2021; Bejarano et al., 2017) demonstrate that the 10 ppb dissolved exposure value is protective of >95% of species for acute exposures. The toxicity of DAHs is a function of the concentration and the duration of exposure by sensitive receptors, with greater concentration and exposure time causing more severe impacts. Typically tests of toxicity done under laboratory conditions measure toxicity as a proportion of test organisms affected (for example, 50% mortality or LC_{50}) at the end of a set time period, often 48 or 96 hours. French-McCay (2002) in a review of literature, reported LC_{50} for dissolved PAHs with 96-hour exposure, range between 30 ppb for sensitive species (2.5th percentile species) and 2,260 ppb for insensitive species (97.5th percentile species), with an average of about 250 ppb. The range of LC50s for PAHs obtained under turbulent conditions (this includes fine oil droplets) was 6 to 410 ppb with an average of 50 ppb (French-McCay, 2002). 10 ppb dissolved also represents a conservatively low concentration that can cause toxic effects to sensitive species (French-McCay, 2025, Bejarano et al., 2014; McGrath et al., 2018). Dissolved hydrocarbons have a greater bioavailability than other components of the oil and are considered to exert the most toxic effects on aquatic biota as reviewed in detail by Carls et al. (2008), Nordtug et al. (2011), Redman (2017), Gobas et al. (2018) and French-McCay (2022). Dissolved compounds are taken up into organisms directly through external surfaces and gills, as well as through the digestive tract. Thus, soluble and semi-soluble hydrocarbons and related compounds in oil are bioavailable, whereas insoluble compounds in oil (which remain in entrained droplets when in the water column) are not bioavailable to aquatic organisms. The low dissolved exposure value (10 ppb) was adopted to reduce the risk associated with bioavailability. The dissolved hydrocarbon 10 ppb exposure value has been used to inform the socio-economic and ecological EMBAs within Section 3. **Response planning** Contact at 10 ppb (as predicted by oil spill trajectory modelling) is used as a trigger for activating scientific monitoring plans as detailed in the OPEP. Establishes planning area for scientific monitoring based on potential for exceedance of water quality triggers (NOPSEMA,2025a).

Table 7-12: Entrained hydrocarbon exposure values

Entrained Oil Concentration (g/m²)	Exposure Value	Description
10	Low	**Risk evaluation** At this concentration consequences on ecological, social, economic and cultural features of the environment are generally not expected (NOPSEMA, 2025a). Hence this exposure value is considered too conservative for risk evaluation. **Response planning** The 10 ppb exposure value has been used to inform the scientific monitoring planning area based on potential for exceedance of water quality triggers (NOPSEMA, 2025a). The adoption of the thresholds recommended in NOPSEMA's *Application of Oil Spil Modelling in Environmental Plans – Information Paper* (NOPSEMA, 2025a) for the scientific monitoring planning area ensures adequate arrangements will be in place for responding and to and monitoring oil pollution. Entrained hydrocarbons, as opposed to DAHs, are hydrocarbon droplets suspended in the water column and insoluble. Entrained hydrocarbons are not as bioavailable to marine organisms compared with DAHs and on that basis are considered to be less toxic, especially over shorter exposure timeframes. The more bioavailable components evaporate and dissolve (and potentially cause acute toxicity in water column), leaving residual (entrained) oil with much lower potential for causing adverse effects. Toxicity decreases (and effects levels increase) as the oil weathers since the bioavailable components are lost over time (French-McCay et al., 2023). Entrained hydrocarbons still have potential effects on marine organisms through direct contact with exposed tissues and ingestion (NRC, 2005). However, the level of exposure causing effects is considerably higher than for DAHs. Much of the published scientific literature does not provide sufficient information to determine if toxicity is caused by entrained hydrocarbons, but rather the toxicity of total hydrocarbons, which includes both dissolved and entrained components. Variations in the methodology of the total water-accommodated fraction (entrained and dissolved) may account for much of the observed wide variation in reported exposure values, which also depend on the test organism types, duration of exposure, hydrocarbon type and the initial hydrocarbon concentration. Total hydrocarbon toxicity acute effects of total hydrocarbon as LC50 for molluscs range from 500 to 2,000 ppb (Clark et al., 2001; Long & Holdway, 2002). A wider range of LC_{50} values have been reported for species of crustacea and fish from 100 to 258,000,000 ppb (Gulec et al., 1997; Gulec & Holdway, 2000; Clark et al., 2001) and 45 to 465,000,000 ppb (Gulec & Holdway, 2000; Barron et al., 2004), respectively. The 10 ppb exposure value has been used to inform the scientific monitoring planning area based on potential for exceedance of water quality triggers (NOPSEMA, 2025a).
1,000	High	**Risk evaluation** Entrained hydrocarbons, as opposed to DAHs, are oil droplets suspended in the water column. Factors including bioavailability of constituents in the oil, changing composition of the oil as it weathers, and likelihood and duration of exposure all contribute to the dynamic nature of entrained and dissolved oil aquatic toxicity at any given time in an oil spill scenario. The toxicity of an oil hydrocarbon mixture is strongly related to the chemical composition of the oil. Oil weathering leads to a preferential loss of the toxic components of the oil (e.g. PAHs) because those components are volatile or semi-volatile and taken up by micro-organisms. The more bioavailable components evaporate and dissolve (and potentially cause acute toxicity in water column), leaving residual (entrained) oil with much lower potential for causing adverse effects. Toxicity decreases (and effects levels increase) as the oil weathers since the bioavailable components are lost over time (French-McCay et al., 2023). Therefore, effects levels for the bioavailable, soluble and semi-soluble components should not be applied to whole oil entrained droplets, particularly for weathered entrained oil droplets. Entrained hydrocarbons still have potential effects on marine organisms through direct contact with exposed tissues and ingestion (NRC, 2005). However, research has not definitively demonstrated direct effects of whole-oil droplets as separable from the effects of toxic components dissolved from the oil (Parkerton et al., 2023), and the level of exposure causing effects is considered to be significantly higher than for DAHs (National Academies of Sciences, Engineering, and Medicine, 2020; French-McCay 2016, 2025).

Entrained Oil Concentration (g/m²)	Exposure Value	Description
		A review by French-McCay (2025) on considerations for the development of entrained oil thresholds for oil spill risk assessments, recommends entrained thresholds based on total hydrocarbon content (THC) and related compounds. However, given the variable composition of entrained oil as it weathers, the development of effects levels or thresholds based on THC is acknowledged to be problematic (French-McCay, 2025). Crude oils typically contain about 1% PAHs by mass (French-McCay, 2002; Forth et al., 2017), therefore the sublethal concentration threshold (predicted no-effect concentration) expressed as THC based on the most toxic components would be approximately 100 ppb (100 µg/L) for fresh oil (French-McCay, 2016). However, as oil weathers, PAHs are lost to volatisation, dissolution and biodegradation, thus making application of this threshold to entrained oil droplets overly conservative (as described above). In addition, exposure durations in the sea are brief, order of minutes to hours, not days or longer as used in most bioassay studies (Bejarano et al., 2017). Effects levels are orders of magnitude higher for exposure durations of <24 hours (French-McCay, 2002). Given these considerations,(French-McCay, 2025) suggests 1,000 ppb to be sufficiently conservative for entrained oil droplets of all oil types and all weathering states. This is supported by a number of toxicity studies, including a review by Bejarano et al. (2017) that identified THC lethal effects levels of 3 to 28 mg/L (3,000 to 28,000 ppb) for a range of oils and states of weathering for aquatic species from all geographical areas globally. An exposure concentration of 1,000 ppb of measurable total petroleum hydrocarbon was deemed a low level of concern for sensitive life stages in marine organisms by Kraly et al. (2001). In reviews by NRC (2005) and National Academies of Sciences, Engineering, and Medicine (2020), 1,000 ppb was similarly found to be at the low end of the range where sub-lethal impacts from acute exposure have been observed. French-McCay (2025) when referring to 'open ocean' refers to any oceanic environment including coastal and offshore environments, as opposed to shallow waters and enclosed embayments, such as ponds and inland waterways. It is acknowledged that embayment's in coastal areas can act as low-energy, low-mixing environments where hydrocarbons may accumulate or persist. However, to accumulate the entrained oil would need to surface, come ashore or settle to sediments in these areas. While entrained in the water, the concentrations do not physically concentrate, rather they dilute by turbulent diffusion. However, the model does in fact evaluate entrained oil surfacing and accumulation of oil at the surface and in sediments such as in nearshore areas (which occurs along shorelines). Thresholds for floating and shoreline oil address these potential exposures and would identify areas where there would be potential for impacting sensitive species and their life stages. Negri et al. (2025) reviewed the paper written by French-McCay (2025) and consider the 1,000 ppb THC to be a conservative threshold for defining an area that may be affected by entrained oil, particularly given short open ocean exposure durations and the reduction in oil droplet toxicity through weathering. **Response Planning** Entrained at 1000 ppb is not specifically used for response planning.

7.5.5 Spill risk assessment approach

The spill risk assessment approach is adopted based on Santos' Oil Spill Risk Assessment and Response Planning Procedure (SO-91-II-20003).

The Santos spill risk assessment approach provides a comprehensive risk assessment of all environmental values potentially contacted by an oil spill. In addition, it also considers environmental values combined with the severity of the spill impact to identify receptors for a more focussed risk assessment. The spill risk assessment process is as below and illustrated in Figure 7-5:

1. Identify the spatial extent of the environment that may be affected (the EMBA). This has been completed for this EP as part of the assessment of the existing environment and receptors that are known to occur or may occur within the EMBA are described in Section 3.2 and Appendix C.
2. Identify and priority rank the environmental values (EV) of the receptor areas within the EMBA.
3. Identify areas of high environmental value (HEV) within the EMBA (Priority ranks 1 to 3). HEVs are described in Section 7.5.5.2.

4. Identify and risk assess the hotspots. Hotspots are effectively a subset of the HEVs, and their determination is described in Section 7.5.5.3.
5. Identify protection priority areas based on the hotspots (refer Section 7.5.5.4) for spill response strategies.

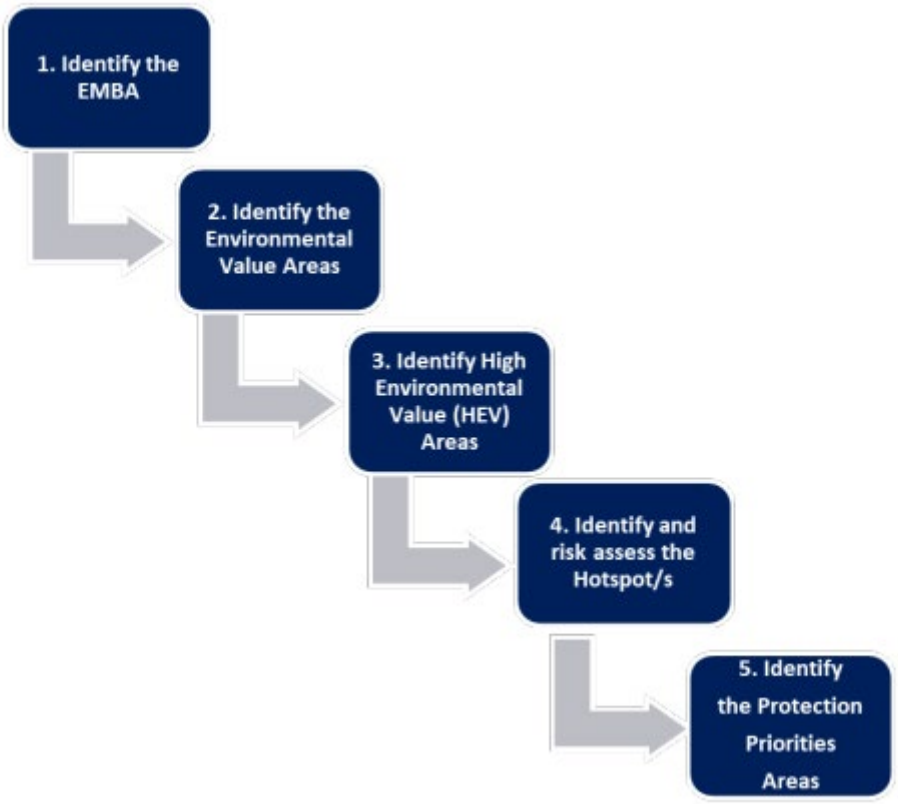

Figure 7-5: Santos oil spill risk assessment approach

7.5.5.1 Spill EMBA

Defining the EMBA by an oil spill is the first step in oil spill risk and impact assessment. For activities where there is the potential for multiple spill scenarios, the spill scenario, or combination of spill scenarios, resulting in the greatest spatial extent is used to define the socio-economic EMBA for the activity. The socio-economic EMBA is further described in Section 3.1. To determine the extent of ecological impacts to the marine environment, the ecological EMBA is used as described in Section 3.1.

7.5.5.2 Areas of high environmental value

Santos has predetermined areas of HEV along the Western Australian coastline by ranking these areas based on:

- Protected area status – This is used as an indicator of the biodiversity values contained within that area, where a World Heritage area, Ramsar Wetland and Marine Protected Area will score higher than areas with no protection assigned.
- BIAs of listed threatened species – These are spatially defined areas where aggregations of individuals of a species are known to display biologically important behaviours, such as breeding, feeding, resting or migration. Each one of these within the predefined areas contributes to the score.

Further input to determine areas of HEV included:

- sensitivity of habitats to impact from hydrocarbons in accordance with the Sensitivity Mapping for Oil Spill Response guidance document produced by Ipieca, the International Maritime Organisation, and International Association of Oil and Gas Producers
- sensitivities of receptors with respect to hydrocarbon-impact pathways
- status of zones within protected areas (IUCN (1A) and sanctuary zones compared to IUCN (VI) and multiple use zones) listed species status and predominant habitat (surface versus subsurface)
- social values, socio-economic and heritage features (such as commercial fishing, recreational fishing, amenities, aquaculture).

Tallied scores for each predefined area along the Western Australian coastline were then ranked from 1 to 5, with an assignment of 1 representing areas of the highest environmental value and those with 5 representing the areas of the lowest environmental value. HEVs for the worst-case oil spill socio-economic EMBA and ecological EMBA are shown in Figure 7-6.

7.5.5.3 Hotspots

While the entire EMBA will be considered during risk assessment and spill response planning, it is best practice to concentrate greatest effort and level of detail on those parts of the EMBA that have the:

- greatest intrinsic environmental value – considered by Santos to be HEV areas ranked 1 to 3
- highest probability of contact by oil (either floating, entrained, or dissolved aromatic)
- greatest potential concentration or volume of oil arriving at the area.

These areas are termed hotspots. Defining hotspots is typically the first step in undertaking detailed spill risk assessment and spill response planning. Hotspots are a subset of HEV areas that:

- have the highest probability of contact (at least higher than 5%) above the impact assessment exposure value for surface hydrocarbons and shoreline accumulation based on modelling results
- receive the greatest concentration or volume of oil, either floating or stranded oil, entrained oil or DAH above contact exposure values described in Section 7.5.4. During the workshop, additional hotspots may be included through discretion of workshop attendees where they do not strictly meet all of the above criteria. For example, an HEV ranked 1 to 3 with <5% probability, or an HEV ranked 4 or 5, with >5% probability, depending on the concentrations and volumes presented in the modelling report.

A workshop was held on the 19 August 2025 to review the hotspots for the worst-case oil spill scenarios. During the workshop, additional hotspots may be included through discretion of workshop attendees where they do not strictly meet all of the above criteria. For example, an HEV ranked 1 to 3 with <5% probability, or an HEV ranked 4 or 5 with >5% probability, depending on the concentrations and volumes presented in the modelling report.

During the hotspot workshop, an environment consequence assessment is conducted against each of the hotspots identified using the Santos risk assessment process identified in Section 5. The outcome of this is provided in the oil spill modelling results and hotspot analysis (Appendix H).

7.5.5.4 Priorities for protection

For the purposes of a spill response preparedness strategy, it is not necessary for all hotspots to have detailed planning. For example, wholly submerged hotspots may only be contacted by entrained oil, and the response would be largely to implement scientific monitoring to determine impact and recovery. Hotspots with features that are not wholly submerged (emergent features) should have specific spill response planning conducted. This final determination of ‘Priority for Protection’ sites, for the oil spill response strategy, is based on the worst-case estimate of floating oil concentration, shoreline loading and minimum contact time at exposure value concentrations.

Further detail on selection of Protection Priority Areas process is detailed in the Oil Spill Risk Assessment and Response Planning Procedure (SO-91-II-20003).

The following hotspot locations have been identified as Priorities for Protection areas for oil spill response planning and are based on the worst-case estimate of surface oil concentration, shoreline loading and minimum contact time at exposure value concentrations:

- Barrow Island
- Lowendal Islands
- Montebello Islands
- Muiron Islands
- Ningaloo Coast North
- Northern Islands Coast.

The oil spill response strategies for Priority for Protection areas are undertaken within the activity OPEP.

Each protection priority will be assessed to determine the most appropriate spill response strategies based on the type of oil and the values of the protection priority area. This can be done through a strategic NEBA approach.

7.5.5.5 Potential hydrocarbon impact pathways

To help inform the hydrocarbon spill risk assessment receptors within the EMBA and potential impact pathways have been defined (Table 7-13). The potential impact pathways consider physical and chemical pathways. Physical pathways include contact from floating oil, accumulated shoreline oil, or entrained oil droplets. Chemical pathways include ingestion, inhalation or contact from any hydrocarbon phase. These are summarised in Table 7-13 and the information is drawn upon within the hydrocarbon risk assessment for the spill scenario. Table 7-14 further describes the potential impacts from hydrocarbon spills from this activity on marine fauna and socio-economic receptors.

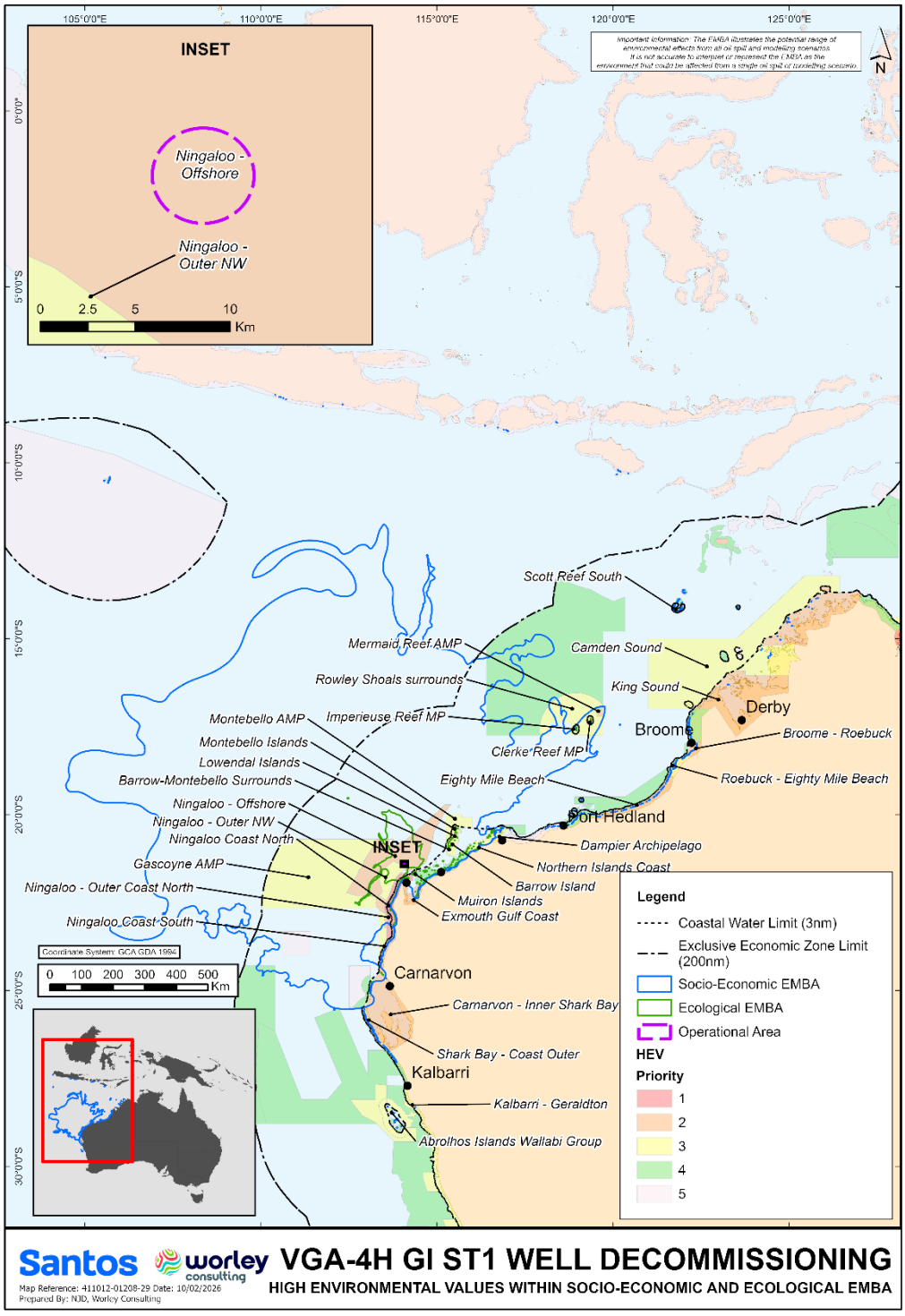

Figure 7-6: High ecological value areas within the environment that may be affected

Table 7-13: Physical and chemical pathways for hydrocarbon exposure and potential impacts to receptors

Receptor	Physical Pathway	Potential Impacts	Chemical Pathway	Potential Impacts
Rocky shorelines	Shoreline loading and attachment may result in thin and sporadic coating of hydrocarbon residues. Degree of oil coating is dependent upon the energy of the shoreline area, the type of the rock formation and continual biodegradation of the oil.	Impacts to flora (mangroves) and fauna further described below.	Chemical pathway to fauna and flora via adsorption through cellular membranes and soft tissue, ingestion, irritation/burning on contact and inhalation.	Impacts to flora (mangroves) and fauna further described below.
Sandy beaches	Shoreline loading and water movement may allow hydrocarbon residue to filter down into sediments, continue to biodegrade on the surface or remobilise into surf zone. Degree of loading is dependent upon the energy and tidal reach of the shoreline, the type of the sandy shore and continual weathering of the oil.	Indirect impacts to nesting and foraging habitats for birds and turtles. Direct impacts to infauna.	Chemical pathway to fauna and flora via adsorption through cellular membranes and soft tissue, ingestion, irritation/burning on contact and inhalation.	Indirect impacts to nesting and foraging habitats for birds and turtles. Direct impacts (mortality) to infauna through toxic effects and smothering.
Intertidal platforms	Shoreline loading and water movement may allow hydrocarbon residue to filter down into sediments (e.g. within wetlands) or continue to biodegrade on the surface or remobilise into surf zone. Degree of loading is dependent upon the energy and tidal reach of the shoreline, the type of the substrate and continual weathering of the oil.	Indirect impacts to foraging habitats for birds and turtles. Direct impacts to infauna.	Chemical pathway to fauna and flora via adsorption through cellular membranes and soft tissue, ingestion, irritation/burning on contact and inhalation.	Indirect impacts to foraging habitats for birds. Direct impacts (mortality) to infauna through toxic effects and smothering.
Shallow sub-tidal soft sediments	Hydrocarbon residue in the shallow waters adjacent to shorelines may settle to filter down into sediments. Degree of loading is dependent upon the energy and tidal reach of the shoreline, the type of the substrate and continual weathering of the oil.	Indirect impacts to foraging habitats for turtles and fish. Direct impacts to infauna.	Adsorption via cellular membranes and soft tissue, ingestion, irritation/burning on contact and inhalation.	Indirect impacts to foraging habitats for turtles and fish. Direct impacts (mortality) to infauna through toxic effects and smothering.
Mangroves	Coating of root system reducing air and salt exchange. Degree of coating is dependent upon the energy and tidal reach of the shoreline, the type of the substrate and continual weathering of the oil.	Yellowing of leaves. Defoliation. Increased sensitivity to stressors. Tree death. Reduced growth. Reduced reproductive output. Reduced seed viability.	External contact by oil and adsorption across cellular membranes.	Yellowing of leaves. Defoliation. Increased sensitivity to stressors. Tree death. Reduced growth. Reduced reproductive output. Reduced seed viability. Growth abnormalities.

Receptor	Physical Pathway	Potential Impacts	Chemical Pathway	Potential Impacts
Seagrasses and macroalgae	Coating of leaves/thalli reducing light availability and gas exchange. Degree of coating depends upon the energy and tidal reach of the shoreline, the type of the receptor and continual weathering of the oil.	Bleaching or blackening of leaves. Defoliation. Reduced growth.	External contact by oil and adsorption across cellular membranes.	Mortality. Bleaching or blackening of leaves. Defoliation. Disease. Reduced growth. Reduced reproductive output. Reduced seed/propagule viability.
Hard corals (coral reefs)	Coating of polyps, shading resulting in reduction on light availability. Degree of coating is dependent upon the metocean conditions, dilution, if corals are emergent at all and continual weathering of the oil.	Bleaching. Increased mucous production. Reduced growth.	External contact by oil and adsorption across cellular membranes.	Mortality. Cell damage. Reduced metabolic capacity. Reduced immune response. Disease. Reduced growth. Reduced reproductive output. Reduced egg/larval success. Growth abnormalities.
Non-coral benthic invertebrates	Coating of adults, eggs, and larvae. Degree of coating is dependent upon the energy and tidal reach of the shoreline, the type of the receptor and continual weathering of the oil.	Mortality. Behavioural disruption. Impaired growth.	Ingestion and inhalation. External contact and adsorption across exposed skin and cellular membranes. Uptake of DAH across cellular membranes. Reduced mobility and capacity for oxygen exchange.	Mortality. Cell damage. Reduced metabolic capacity. Reduced immune response. Disease. Reduced growth. Reduced reproductive output. Reduced egg/larval success. Growth abnormalities. Behavioural disruption.

Receptor	Physical Pathway	Potential Impacts	Chemical Pathway	Potential Impacts
Sharks, rays, and fish	Coating of adults but primarily eggs and larvae – reduced mobility and capacity for oxygen exchange.	Mortality. Oxygen debt. Starvation. Dehydration. Increased predation. Behavioural disruption.	Ingestion. External contact and adsorption across exposed skin and cellular membranes. Uptake of DAH across cellular membranes (for example, gills).	Mortality. Cell damage. Flesh taint. Reduced metabolic capacity. Reduced immune response. Disease. Reduced growth. Reduced reproductive output. Reduced egg/larval success.
Birds (seabirds and shorebirds)	Degree of coating is dependent upon the energy and tidal reach of the shoreline, the type of the receptor and continual weathering of the oil.	Feather and skin irritation and damage, with the potential to cause secondary impacts such as: • physical restriction of flight and swimming movement. • mortality. • hypothermia/impairing the waterproofing of feathers. • disruption to feeding/starvation. • disruption to breeding. • disruption to migration.	Ingestion (during feeding or preening). External contact and adsorption across exposed skin and membranes.	Mortality. Cell damage, lesions. Secondary infections. Reduced metabolic capacity. Reduced immune response. Disease. Reduced growth. Reduced reproductive output. Growth abnormalities. Behavioural disruption.
Marine reptiles	Degree of coating is dependent upon the energy and tidal reach of the shoreline, the type of the receptor and continual weathering of the oil.	Irritation of eyes/mouth and potential illness, which may cause secondary impacts such as: • mortality. • disruption to feeding/starvation. • physical restriction. • behavioural disruption.	Inhalation. Ingestion. External contact and adsorption across exposed skin and membranes.	Mortality. Cell damage, lesions. Secondary infections. Reduced metabolic capacity. Reduced immune response. Disease. Reduced growth. Reduced hatchling success. Reduced reproductive output.

Receptor	Physical Pathway	Potential Impacts	Chemical Pathway	Potential Impacts
Marine mammals	Fur damage and matting, reduced mobility, and buoyancy (for applicable species).	Irritation of eyes/mouth, damage to fur and potential illness, which may cause secondary impacts such as: • mortality • disruption to feeding/starvation • physical restriction • behavioural disruption.	Inhalation. Ingestion. External contact and adsorption across exposed skin and membranes.	Mortality. Cell damage, lesions. Secondary infections. Reduced metabolic capacity. Reduced immune response. Disease. Reduced growth. Reduced reproductive output. Growth abnormalities. Behavioural disruption.
Plankton	Coating of feeding apparatus. Reduced mobility and capacity for oxygen exchange.	Mortality. Behavioural disruption (for example, reduced mobility).	Inhalation. Ingestion. External contact.	Mortality. Impairment of biological activities (for example, feeding, respiration). Reduced mobility.
Water quality and sediment quality	Presence of hydrocarbon residue in the water, which may filter down to sediments or continue to biodegrade on the surface. Degree of loading in the water column is dependent upon the influence of wave energy and tidal range.	Impacts to flora and fauna, as discussed in rows above.	Adsorption via cellular membranes and soft tissue, ingestion, irritation/burning on contact and inhalation. Impacts to flora and fauna, as discussed in rows above.	Impacts to flora and fauna, as discussed in rows above.
Protected areas	Coating of benthic habitats, shoreline habitats and marine fauna/flora within protected areas as discussed in rows above.	Mortality, injury, or behavioural disruption to marine fauna. Death or impairment of habitats within protected areas. Reduction in the quality of the marine environment within protected areas. Environmental value of protected areas is degraded.	Impacts to flora and fauna, as discussed in rows above.	Mortality, injury, or behavioural disruption to marine fauna. Death or impairment of habitats within protected areas. Reduced growth of benthic habitats. Reduction in the quality of the marine environment within protected areas. Environmental value of protected areas is degraded.

Receptor	Physical Pathway	Potential Impacts	Chemical Pathway	Potential Impacts
Socio-economic environment (fisheries, tourism, shipping, defence, shipwrecks, Indigenous users, oil, and gas)	Presence of hydrocarbon residue in the water, which may filter down to sediments or continue to biodegrade on the surface. Coating of benthic habitats, shoreline habitats and marine fauna/flora within protected areas as discussed in rows above.	Degradation of cultural or maritime heritage sites. Disruption to tourism, recreation, or shipping activities. Reduction in resource available for commercial and recreational fisheries. EP stakeholder consultation did not raise any concerns regarding potential impacts to cultural features including Sea Country. However, Indigenous users and cultural features may be impacted in the event of an unplanned hydrocarbon release.	Impacts to flora, fauna and the physical environment as discussed in rows above. Commercial/recreational fish species – refer to 'fish' as discussed above.	Degradation of cultural or maritime heritage sites. Disruption to tourism, recreation, or shipping activities. Reduction in resource available for commercial and recreational fisheries.

Table 7-14: Potential impacts of hydrocarbon spills on ecological and socio-economic receptors

Receptor	Impacts of Hydrocarbon Spill	
	Entrained and Dissolved Aromatic Hydrocarbons	Surface Hydrocarbons
Fauna (including threatened/migratory fauna)		
Plankton (including zooplankton, fish, and coral larvae)	Direct exposure of plankton to hydrocarbons may result in lethal or sublethal impacts to plankton and impact mobility, feeding and respiration. Plankton could include the eggs and larvae of marine invertebrates and fish; therefore, entrained hydrocarbon could have secondary impacts on recruitment of invertebrate and fish species. Some studies have shown no obvious influence of hydrocarbon spills on plankton community structure (Varela et al., 2006), which could be a result of rapid replacement of stocks from adjacent areas due to water circulation (Batten et al., 1998). Other studies, however, have found the concentrations of phytoplankton reduced in the short term, and in the medium term, as outbreaks of algal blooms occurring where the Chlorophyll-a concentration increased (Tang et al., 2019; Sheng et al., 2011), particularly under warmer weather conditions (Tang et al., 2019) and in low energy environments such as coastal coves (Zhou et al., 2014). Once water quality returns to background levels, it is anticipated plankton communities can return to normal densities and community structures due to their ability to produce large numbers of eggs and juveniles, their wide distribution, and rapid water exchange.	Plankton utilising the sea surface layer could be impacted by floating oil.

Receptor	Impacts of Hydrocarbon Spill	
	Entrained and Dissolved Aromatic Hydrocarbons	**Surface Hydrocarbons**
	There is the potential for hydrocarbons overlap with spawning of some fish species given the year-round spawning of some species. Some impacted spawn may be of commercial interest (refer socio-economic receptors below). The typical mass over-production of eggs and larvae that occurs in the lifecycle of most fish species provides a buffer for recruitment, which further reduces the likelihood that a spill would have a significant detectable impact on adult fish populations (ITOPF, 2014). Exposure to entrained oils and DAHs may result in lethal or sub-lethal impacts to plankton or pelagic invertebrates through a direct contact pathway. Such contact could impair the mobility, feeding and respiration of these fauna and exchange of chemicals could occur. Entrained oil concentrations above the low exposure value were only predicted to contact the Ningaloo – Offshore environmental economic value (EVA). Based on the modelling results (RPS, 2025) plankton will be exposed to hydrocarbons in the top 20 m of the water column, with the highest concentrations in the upper 10 m of the water column and areas close to the spill source. Plankton utilising the sea surface layer, as well as pelagic invertebrates, could be impacted from floating oil. Following a hydrocarbon release a portion of the slick will rapidly evaporate and disperse in the offshore environment, reducing the concentration and toxicity of the spill.	
Marine mammals	There is potential for sublethal or lethal impacts to marine mammals and impacts to reproduction and behaviour from an accidental release of hydrocarbons. A wide range of effects from hydrocarbons have been reported in cetaceans including poor body condition, calcium imbalance, inflammation, reproductive failure, lung and adrenal gland damage, altered hepatobiliary function, immune changes and increased susceptibility to infections, impaired stress response, and death (Godard-Codding & Collier, 2018).	Marine mammals are at risk of direct contact with floating when surfacing within slick. Effects include irritation of eyes or mouth and potential illness. Surface respiration could lead to accidental inhalation of hydrocarbons or result in the coating of sensitive epidermal surfaces. Accidental ingestion could also occur through the ingestion of hydrocarbon during feeding or the ingestion of contaminated prey. Both Van Gogh crude and MDO are expected to spread quickly when released and will form a thin to low thickness film on the sea surface, increasing the rate of evaporation (refer to Section 7.5.3).Inhalation of vapours or the ingestion of hydrocarbons can potentially have lethal effects due to damage to the whale's respiratory and nervous systems.
	Fourteen threatened or migratory marine mammal species were identified by the PMST as occurring within the ecological EMBA. Of these, two are listed as endangered (blue whale and southern right whale) and four as vulnerable (sei whale, fin whale, Australian snubfin dolphin, Australian humpback dolphin). The Operational Area and ecological EMBA overlaps with the pygmy blue whale migration BIA and the humpback whale migration BIA (Section 3.2.6.1). Table 7-13 provides further information on environmental impact pathways to marine mammals from hydrocarbon exposure. Other migratory marine mammals, including dugongs, may encounter either surface or water column hydrocarbons in the ecological EMBA. Dugongs may be particularly susceptible to surface slicks, a reduction of seagrass habitat for foraging and/or ingestion of seagrass coated with oil. Dugongs occur throughout the shallow waters between the Pilbara offshore islands and the mainland and have been observed in the shallow waters along the east coast of Barrow Island and over the Lowendal Shelf. The ecological EMBA overlaps the reproduction and foraging BIA for dugongs (Figure 3-12). Aerial surveys of dugong distribution have found that the animals occur around Barrow Island, Airlie Island, Lowendal Islands, and the Montebello Islands further offshore (Prince, 2001).	
Marine reptiles	There is potential for sublethal or lethal impacts to marine reptiles from an accidental release of hydrocarbons. Exposure can alter biochemical and haematological parameters, weight, skin function, metabolism, immune responses, diving patterns, and respiration (Ruberg et al., 2021). The Recovery Plan for Marine Turtles in Australia 2017–2027 (CoA, 2017) highlights acute chemical discharge as one of several threats to marine turtles.	Marine turtles are at risk of direct contact with floating hydrocarbons when surfacing within slick. Effects include irritation of eyes or mouth and potential illness as adults can suffer mucus membrane inflammation, increasing susceptibility to infection (ITOPF, 2011). Surface respiration could lead to accidental ingestion of hydrocarbons or result in the coating of sensitive epidermal surfaces. Breathing and inhalation of toxic vapours may occur from exposure to hydrocarbons in surface waters. Physical coating of marine turtles also occurs upon contact of contaminated shorelines. Eggs may also become contaminated during laying, either from the laying female or the contaminated sand.

Receptor	Impacts of Hydrocarbon Spill	
	Entrained and Dissolved Aromatic Hydrocarbons	**Surface Hydrocarbons**
	Ten species of threatened or migratory marine reptiles, including turtles and sea snakes, were identified as potentially occurring within the ecological EMBA, where they could potentially be impacted by an oil spill. Loggerhead, green, leatherback, hawksbill and flatback turtles are widely dispersed across the NWS and in the unlikely event of a hydrocarbon spill occurring, individuals traversing open water may come into contact with water column or surface hydrocarbons. The ecological EMBA overlaps with BIAs and critical habitat for four turtle species (flatback, green, hawksbill and loggerhead) as shown in Figure 3-13 to Figure 3-16. Critical habitat including internesting habitat offshore from important nesting beaches for turtle species are present within the ecological EMBA. Population level impacts are considered unlikely as the hydrocarbons are not predicted to contact the entire BIAs or areas of habitat critical to the survival of these species. In the event of a worst case spill, a number of EVAs associated with turtle nesting were identified as having the potential for the accumulation of shoreline oil above the moderate exposure value (≥100 g/m²). Any accumulated hydrocarbons interacting with the nesting beaches is likely to represent the persistent fraction as the hydrocarbon weathers. In the event of a spill, the presence of hydrocarbons on beaches would disrupt behaviour and potentially threaten turtle populations. Adult and juvenile turtles during nesting seasons may become coated in the hydrocarbon as they move to and from shore and may also ingest hydrocarbons as they pass through the affected area. Marine turtles rely on nesting beaches seasonally to reproduce, which makes them vulnerable to impacts from hydrocarbon accumulated on shorelines, through oiling of nesting females and emergent hatchlings (Lauritsen et al., 2017). Potential impacts would be greatest during the peak nesting periods. Sea snakes may occur, particularly at shoals, banks and reefs within the ecological EMBA. While little is known about their sensitivity to hydrocarbons, impacts from direct contact with surface hydrocarbons are likely to be similar to those experienced by marine turtles; for example, potential skin damage and irritation of mucous membranes of the eyes, nose and throat. For further detailed environmental impacts to marine reptiles from hydrocarbon exposure and increased toxicity, refer to Table 7-13.	
Birds (seabirds and shorebirds)	There is potential for injury or mortality to seabirds and shorebirds and a change in their behaviour from an accidental release of hydrocarbons. Seabirds may encounter entrained hydrocarbons while diving and foraging. Seabirds and shorebirds encounter hydrocarbon contaminated materials when feeding at intertidal areas. Lethal or sub-lethal physical and toxic effects include those such as such as irritation of eyes or mouth and potential illness.	Seabirds are particularly vulnerable to floating hydrocarbons. As most fish survive beneath floating slicks, they will continue to attract feeding seabirds, which typically do not exhibit avoidance behaviour. Smothering can lead to reduced water-proofing of feathers and ingestion while preening. In addition, direct contact with hydrocarbons can erode feathers, causing chemical damage to the feather structure that subsequently affects ability to thermoregulate and maintain buoyancy on water. Physical coating may also occur on contact of contaminated shorelines.
	Sixty nine threatened or migratory species of seabirds and shorebirds were identified within the ecological EMBA by the PMST (Table 3-8). Of these, ten were identified within the Operational Area. The BIA for wedge-tailed shearwater reproduction overlaps the Operational Area, and a number of additional migratory seabird BIAs for reproduction and foraging overlap with the ecological EMBA. Therefore, species may be impacted by surface and entrained hydrocarbons while foraging (dive and skim feeding) with higher numbers expected during the breeding periods. Birds (seabirds and shorebirds) are highly susceptible to hydrocarbon spills, with impacts primarily attributed to oiling of birds at the sea surface from slicks and oil on shorelines. Floating oil above the moderate exposure value (10 g/m²) has the potential to travel up to 266 km from the source of the spill with a high probability of surface hydrocarbons at this exposure level reaching the Ningaloo – Offshore EVA (99.9%). The probability of surface hydrocarbons at the moderate exposure value reaching Ningaloo – Outer North West (NW) EVA was only 24.31%. Impacts to birds may include coating by oil when floating in open water, diving into open and coastal waters to feed on fish, wading and foraging on shallow intertidal mud/sand flats and wetlands or roosting on oil affected sandy beaches. Other impacts could include behavioural impacts whereby birds avoid important nesting and migratory stop-over areas including Ramsar wetlands or reduced food availability if important foraging areas are impacted. For further information about environmental impacts to seabirds/shorebirds through hydrocarbon exposure and toxicity effects, refer to Table 7-13.	

Receptor	Impacts of Hydrocarbon Spill	
	Entrained and Dissolved Aromatic Hydrocarbons	**Surface Hydrocarbons**
Sharks, rays, and fish	There is potential injury or mortality to sharks, rays and fish and a change in their behaviour from an accidental release of hydrocarbons. As fish dwell in the water column, impacts are most likely from exposure to entrained or dissolved hydrocarbons, through the pathways of ingestion or the coating of gill structures, resulting in reduced oxygen exchange and incidence of irritation and infection. Fish may also ingest hydrocarbon droplets or contaminated food, leading to reduced growth. There is potential for localised mortality of fish eggs and larva due to reduced water quality and toxicity. Based on the modelling results (RPS, 2024), fish eggs and larva will be exposed to hydrocarbons in the top 30 m of the water column, with the highest concentrations in the upper 10 m of the water column and areas close to the spill source. Demersal fish in deeper offshore waters are highly unlikely to be impacted by the hydrocarbon releases, as they generally inhabit waters near the seabed. For further information about environmental impacts to fish/sharks/rays from hydrocarbon exposure and toxicity effects, refer to Table 7-13.	While fish, sharks and rays do not generally break the sea surface, individuals may feed at the surface. Prolonged exposure to floating hydrocarbons by fish, shark and ray species is unlikely. Due to the filter-feeding nature of whale sharks, they may be susceptible to ingesting floating and entrained hydrocarbons, particularly if foraging at or near the sea surface.
	Threatened or migratory species of sharks, rays, and fish and the potential of them occurring within the ecological EMBA are presented in Section 3.2.6. The whale shark foraging and foraging – high density BIAs are presented in Figure 3-8 and overlaps the ecological EMBA. Whale sharks are oceanic, but also come into shallower, coastal waters to feeds in surface waters which often coincide with specific productivity events that are a focus of feeding for the animals. Whale sharks may be present in the ecological EMBA, particularly between March and June. In the event of a worst case oil spill, entrained oil at the 1,000 ppb threshold is only predicted to extend 7 km from the source location, where it had a 93.57% chance of reaching the Ningaloo – Offshore EVA. It is therefore possible that surface and/or entrained hydrocarbon and/or dissolved aromatic hydrocarbon could come in contact with or be ingested by whale sharks migrating or aggregating in the area at the time of release. For further information about environmental impacts to fish/sharks/rays from hydrocarbon exposure and toxicity effects, refer to Section 7.6.2 and 7.7.2.	
Socio-economic		
Commercial, recreational and traditional fisheries	Hydrocarbons in the water column can have toxic effects on fish (as outlined above) potentially reducing catch rates and rendering fish unsafe for human consumption. Impacts on spawning fish can also result in impacts to commercial fisheries.	In addition to the effects of entrained and DAHs, exclusion zones surrounding a spill can directly impact fisheries by restricting access for fishermen. Weathered slicks may form tar balls, which may result in oiling of nets and fishing infrastructure.

Receptor	Impacts of Hydrocarbon Spill	
	Entrained and Dissolved Aromatic Hydrocarbons	**Surface Hydrocarbons**
	Several commonwealth and state fisheries are found within the EMBA (Section 3.2.7.3). Impacts to these fisheries from a spill may range from disruption of fishing activities caused by the physical presence of the slick, loss of (or loss of function of) coastal intertidal habitat (for example, seagrass meadows, mangrove communities, intertidal mudflats) which may provide nursery habitat for fishery species (for example, fish and crustaceans) and contact of surface and entrained hydrocarbons with the eggs and larvae of commercially important species. Exposure to entrained and DAHs could result in the accumulation of oil in fish tissues to the extent that could result in hydrocarbon taint of fish flesh. Connell and Miller (1981) compiled a summary of studies listing the exposure value concentrations at which tainting occurred for hydrocarbons. The results contained in their review indicate that tainting of fish occurs when fish are exposed to ambient concentrations of 4 to 300 ppm (4,000 to 300,000 ppb) of hydrocarbons in the water, for durations of 24 hours or more, with response to phenols and naphthenic acids being the strongest. According to the spill modelling, only one EVA (Ningaloo – Offshore) was identified as having the potential to be contacted by entrained oil above the low exposure threshold (1,000 ppb), with entrained oil concentrations >4, 000 ppb not predicted. Dissolved hydrocarbons were not predicted at any concentration. Therefore, even in the event of a worst case spill, hydrocarbon taint is not expected in fish flesh. While it is possible that impacts could be detected to fisheries on a stock level although it is more likely that natural variation in fish abundance would be on a greater scale than any impacts attributable to a hydrocarbon spill. The same negative impacts could also occur to important recreational fish species and the recreational fisheries they support although impacts to commercial fisheries could result in the additional impact of loss of income for commercial fishers.	
Recreation and tourism	There is the potential for surface, entrained and/or dissolved aromatic hydrocarbon to temporarily disrupt tourism activities which rely on the presence of marine fauna and/or the use of vessels (e.g. snorkelling/scuba diving, whale/whale shark watching/swimming and recreational fishing) via displacement from an exclusion zone or a reduction in fauna abundance due to avoidance of the area. Impacts to recreational fishing may also occur due to impacts to fish as described for Fisheries above. Given the water depths and distance from the nearest mainland, impacts to recreational and tourism related activities are unlikely.	
Shipping	Multiple shipping fairways intersect the EMBA (Figure 3-25). Hydrocarbons in the water column will have no effect on shipping.	In the event of a hydrocarbon spill shipping activities may be impacted by exclusion zones surrounding a spill. Exclusion zones could reduce access for shipping vessels for the duration of the response undertaken for spill clean-up (if applicable) meaning vessels may have to take detours leading to potential delays and increased costs.
Defence	Military exercise areas are located at Exmouth associated with the RAAF Base Learmonth. A defence practice area overlaps the Operational Area and a training zone overlaps the EMBA, however, they have been for aerial training are unlikely to be impacted by a hydrocarbon spill.	
Shipwrecks	There are a number of historic (more than 75 years old) shipwrecks within the EMBA. Shipwrecks may be of important heritage value and/or act as dive sites. Surface hydrocarbons will have no impact on shipwrecks. The potential for in-water hydrocarbons to impact on shipwrecks is poorly documented. However, it has been proposed that exposure to oil may alter bacterial community composition (biofilms) inhabiting shipwrecks possibly altering corrosion potential (Salerno et al., 2018).	
Indigenous users	Marine resource use by Indigenous people is generally restricted to coastal waters. Fishing, hunting and the maintenance of maritime culture and heritage through ritual, stories and traditional knowledge continue as important uses of the nearshore region and adjacent areas. Indigenous users may be impacted by surface hydrocarbons, exclusion zones around spill sites during spill response and fishing and hunting stocks may be impacted by entrained and dissolved hydrocarbons.	
Existing oil and gas activity	A number of oil and gas operators operate within the EMBA with existing projects and infrastructure in place as well as continuing drilling and exploration programs (Figure 3-24). A surface or subsea hydrocarbon spill has the potential to disrupt activity with associated economic impact. Exclusion zones surrounding spills will restrict access in the event of spill response and clean-up activities (if applicable), potentially resulting in delays to work schedules with possible subsequent financial implications.	

Receptor	Impacts of Hydrocarbon Spill	
	Entrained and Dissolved Aromatic Hydrocarbons	Surface Hydrocarbons
Protected areas		
Marine parks and commonwealth heritage areas	Protected areas are described in Section 3.2.5. These protected areas support all the habitats and faunal groups described above and support unique/protected habitats/marine fauna or ecological features. Impacts to the habitat/fauna receptors described above therefore have an impact on the values of these reserves, which could have flow-on effects to tourism revenue for coastal communities that provide access to these marine reserves. The protected areas may also support nursery/feeding/aggregation areas for fisheries species and therefore may assist in maintaining healthy fish stocks and commercial/recreational fisheries.	
Ramsar wetlands	One Ramsar wetland overlaps the ecological EMBA (Table 3-5). These wetlands act as important environments for migratory shorebirds, which have been described above.	
KEFs	KEFs overlapping the ecological EMBA are identified in Table 3-5. While some features associated with the KEFs are subtidal or submerged and would not be directly contacted by a surface slick, they all may support increased productivity or abundance of marine fauna that use surface waters above the features (including plankton, pelagic invertebrates and fish, marine mammals, marine reptiles, and seabirds) which may be impacted by floating oil. Impacts to these marine fauna are described above.	
Threatened ecological communities	No threatened ecological communities are located within the ecological EMBA.	

7.5.6 Spill response strategies

Numerous spill response strategies are available to be implemented in the event of a spill. These are generally strategies that have been implemented in the past or are considered good industry practice. Section 6 of the OPEP provides a detailed description of the applicable response strategies for this activity, which include, depending on the type and size of the spill:

- source control
- monitor and evaluate
- mechanical dispersion
- chemical dispersion (surface)
- offshore containment and recovery
- protection and deflection
- shoreline clean up
- oiled wildlife response
- scientific monitoring.

7.6 Hydrocarbon spill – loss of well control

7.6.1 Description of event

Event	**Worst case credible LOWC** A loss of well control during LWIV/MODU activities may occur due to: • failure of well equipment or well management processes • loss of primary well control (tripping/swabbing, failure to keep the correct mud density, etc) • loss of secondary well control (BOP failure, vessel collision to MODU/LWIV). In the event of a LOWC, crude oil may be released to the marine environment with the most likely release point at the MODU/LWIV floor. The worst-case credible spill scenario was predicted by selecting the most likely hydrocarbon flow parameters from the well to yield the credible maximum blowout volume and rate (i.e. environmentally credible worst-case volume and rate) from an unplanned surface (MODU/LWIV floor) release. Key parameters for input to this 'worst-case' blowout were taken from key Santos well design documents and Well Design Automation System, suitable analogues, latest reservoir models, historical production data or Santos best estimates where information was unavailable. The worst-case credible spill volume is 8,073 m³ over 77 days of Van Gogh crude. **Oil spill modelling** Quantitative hydrocarbon spill modelling was undertaken for the worst-case scenario. The LOWC worst-case discharge volumes that were used for the hydrocarbon spill modelling were based on Santos' Van Gogh VGA-4H GI ST1 Abandonment Worst Case Discharge Technical File Note (7750-375-REP-0001). Outputs from the modelling were used to inform the environmental impact assessment and to assist with emergency planning. The environmental consequences of a LOWC are highly variable, dependent on the characteristics of the hydrocarbon released, the dynamics of the receiving environment and the proximity of the release point to sensitive environmental receptors.
Extent	The EMBA for the worst-case hydrocarbon spill from a LOWC was defined in Section 3.1. For information about the extent of potential impact associated with a LOWC, refer to Section 7.6.2.
Duration	The worst-case duration of a LOWC is predicted as 77 days (refer to the OPEP). This is the estimated time required to drill a relief well. Hydrocarbons would persist within the environment for a longer period of time.

7.6.1.1 Stochastic spill modelling – summary of results for exposure thresholds

The spill modelling results for the surface loss of well integrity is as summarised below. Spill modelling results for the worst case LOWC scenario are presented in Appendix H.

Further parameters required to inform spill response strategies are described in the OPEP.

7.6.1.1.1 Floating oil

Exposure at, or above the high (≥50 g/m²) threshold could extend up to 3 km from the release location. The greatest probability of exposure for concentrations exceeding ≥50 g/m² is predicted at the Ningaloo – Offshore submerged feature (5.66%) and the minimum time before exposure was 58 days and 10 hours following the spill commencement.

Exposure at, or above the moderate (≥10 g/m²) threshold could extend up to 266 km from the release location. The greatest probability of exposure for concentrations exceeding ≥10 g/m² is predicted at the Ningaloo – Offshore submerged feature (99.9%) and the minimum time before exposure was 24 days and 6 hours following the spill commencement.

Floating oil concentrations at the low exposure threshold ≥1 g/m²) could extend up to 1,052 km from the release location. The greatest probability of exposure for concentrations exceeding ≥1 g/m² is predicted at the Ningaloo – Offshore submerged feature (100%) and the minimum time before exposure was 13 days and 18 hours following the spill commencement.

7.6.1.1.2 Shoreline oil accumulation

Accumulated shoreline oil at the high exposure threshold (≥1,000 g/m²) was predicted to have contact probabilities of 3.66% (Ningaloo Coast North), 2.66% (Barrow Island; Southern Islands Coast), 1% (Montebello Islands), 0.67% (Dampier Archipelago), and 0.33% (Exmouth Gulf Coast; Shark Bay Coast – Outer; Thevenard Island) were predicted.

Ningaloo Coast North (13.65%) was the receptor predicted to have the highest probability of contact with shoreline hydrocarbons above the moderate exposure threshold (≥100 g/m²). The Muiron Islands and Montebello Islands had probabilities of 9.99% and 9.66%, respectively.

The receptor with the highest predicted probability low exposure (≥10 g/m²) shoreline hydrocarbons was Ningaloo Coast North (28.31%). The Montebello Islands and Muiron Islands had probabilities of 20.65% and 19.65%, respectively.

The worst case volume of hydrocarbon ashore (≥100 g/m²) from a single model run was 1,012 m³ for Ningaloo Coast North. Ningaloo Coast was also predicted to have the greatest length of shoreline oiled (160 km).

7.6.1.1.3 Entrained hydrocarbons

At the low exposure threshold (1,000 ppb), entrained hydrocarbons could extend up to 7 km from the release location. Entrained hydrocarbons at this threshold are only predicted to contact the Ningaloo – Offshore submerged feature (93.57%), with the minimum time before exposure 34 days 14 hours. The worst-case concentration was predicted to be 3,457 ppb at this location.

7.6.1.1.4 Dissolved hydrocarbons

No dissolved hydrocarbon exposure was predicted to occur at or above the low exposure threshold of 10 ppb.

7.6.2 Nature and scale of environmental impacts

Potential receptors: Physical environment (water and sediment quality, shoals and banks, benthic habitats), threatened or migratory fauna (marine mammals, marine reptiles, sharks, fish, rays, and birds), protected and significant areas (KEFs, marine parks), socio-economic receptors (fisheries, tourism, recreation, and other third-party operators), cultural receptors and Sea Country.

Hydrocarbon spills will cause a decline in water quality and may cause chemical (e.g. toxic) and physical (e.g. coating of emergent habitats, oiling of wildlife at sea surface) impacts to marine species. The severity of the impact of a hydrocarbon spill depends on the magnitude of the spill (i.e. extent, duration) and sensitivity of the receptor.

The magnitude of potential environmental impact from a crude oil release depends on multiple factors including hydrocarbon type, release volume and rate, and ocean and weather conditions.

An assessment of the sensitive environmental receptors at risk from a crude oil release has been determined based on a literature review and trajectory and fate modelling described above. Section 3.2 includes a description of biological environment present in the Operational Area and/or EMBA.

A LOWC release to the marine environment would result in reductions in water quality. The results of the LOWC scenario are summarised in Section 7.6.1.1 and provided in Appendix H.

The potential impact pathways (physical and chemical) of hydrocarbon exposure to relevant habitat and marine fauna receptors are summarised in Table 7-13 and an impact assessment completed for receptors within the EMBA in Table 7-14.

7.6.3 Net environmental benefit analysis

NEBA is a structured approach used by the response community and stakeholders to select spill response strategies that will effectively remove oil, are feasible to use safely in particular conditions, and will reduce the impact of an oil spill on the environment.

The NEBA process is used during pre-spill planning (strategic NEBA) and during a response (operational NEBA). A strategic NEBA is an integral part of the contingency planning process and is used to ensure response strategies for scenarios are well informed. An operational NEBA is used to ensure evolving conditions are understood, so response strategies can be adjusted as necessary to manage individual response actions and end points.

Balancing trade-offs may involve differing and conflicting priorities, values, and perceptions of the importance of sensitive receptors. There is no universally accepted way to assign perceived value or importance, and it is not a quantitative process. Overall, the NEBA process provides an estimate of potential environmental effects that are sufficient to allow the parties to compare and select preferred combinations of response strategies to reduce environmental impacts to ALARP.

A strategic NEBA has been developed for all response strategies identified as applicable to credible spills identified in the OPEP related to an unplanned release of condensate, with the potential environmental benefit or potential impact to each protection priority area. This will provide information that will help to select response strategies tailored to the key environmental values within the areas of highest priority. A summary of spill response strategies

is available for each of the priorities for protection and the potential impact that a response strategy has on the area's environmental values.

This information is to be considered in the NEBA process that takes place during a spill response (i.e. an operational NEBA). An operational NEBA will also consider real-time monitoring of the effectiveness and potential impacts of a response and will also consider accessibility, feasibility, and safety of responders (refer to Section 6 of the OPEP).

7.6.4 Environmental impact assessment

The below environmental impact assessment follows the risk assessment approach detailed in Section 7.5.5.

7.6.4.1 Identification of hotspots for consequence assessment

As described in Section 7.5.5.3 all HEVs within the EMBA for the LOWC scenario identified in Section 7.5.1 are listed in Table 7-15. The values and sensitivities associated with these HEVs have been described in Appendix C. Additionally, Table 7-15 filters the HEV to identify the hotspots where they meet the criteria.

Table 7-15: Hotspot analysis for 'loss of well control' scenario

Receptor	HEV Ranking	Hotspot	Protection Priority Area	Hotspot Selection Rationale
Abrolhos Islands Easter Group	4	N	N	Not contacted by hydrocarbons at or above ecological thresholds.
Abrolhos Islands Pelsaert Group	4	N	N	Not contacted by hydrocarbons at or above ecological thresholds.
Abrolhos Islands Wallabi Group	3	N	N	Not contacted by hydrocarbons at or above ecological thresholds.
Barrow-Montebello Surrounds	3	N	N	Not contacted by hydrocarbons at or above ecological thresholds.
Barrow Island	3	Y	Y	HEV=3 with probability >5% for shoreline accumulation (≥100 g/m²) from day 29.
Bedout Island	4	N	N	Not contacted by hydrocarbons at or above ecological thresholds.
Brewis Reef	5	N	N	Not contacted by hydrocarbons at or above ecological thresholds.
Broome – Roebuck	2	N	N	HEV=2 with probability <5% for shoreline accumulation (≥100 g/m²) from day 76.
Broome North Coast	4	N	N	HEV=4 with probability <5% for shoreline accumulation (≥100 g/m²) from day 90.
Browse Island	4	N	N	Not contacted by hydrocarbons at or above ecological thresholds.
Camden Sound	3	N	N	Not contacted by hydrocarbons at or above ecological thresholds.
Carnarvon – Inner Shark Bay	2	N	N	HEV=2 with probability <5% for shoreline accumulation (≥100 g/m²) from day 69.
Carnarvon Canyon AMP	5	N	N	Not contacted by hydrocarbons at or above ecological thresholds.
Christmas Island	4	N	N	HEV=4 with probability <5% for shoreline accumulation (≥100 g/m²) from day 86.
Clerke Reef Marine Park	3	N	N	HEV=3 with probability <5% for shoreline accumulation (≥100 g/m²) from day 77.
Cod Bank	5	N	N	Not contacted by hydrocarbons at or above ecological thresholds.
Dampier Archipelago	3	N	N	HEV=3 with probability <5% for shoreline accumulation (≥100 g/m²) from day 43.

Receptor	HEV Ranking	Hotspot	Protection Priority Area	Hotspot Selection Rationale
Eighty Mile Beach	2	N	N	HEV=2 with probability <5% for shoreline accumulation (≥100 g/m²) from day 74.
Exmouth Gulf Coast	2	N	N	HEV=2 with probability <5% for shoreline accumulation (≥100 g/m²) from day 38.
Exmouth Reef	5	N	N	Not contacted by hydrocarbons at or above ecological thresholds.
Gascoyne AMP	3	N	N	HEV=3 with probability <5% for floating oil (10 g/m²) from day 55.
Glomar Shoals	5	N	N	Not contacted by hydrocarbons at or above ecological thresholds.
Imperieuse Reef Marine Park	3	N	N	HEV=3 with probability <5% for shoreline accumulation (≥100 g/m²) from day 56.
Indonesia East and Timor Leste	5	N	N	Not contacted by hydrocarbons at or above ecological thresholds.
Indonesia – West	5	N	N	Not contacted by hydrocarbons at or above ecological thresholds.
Kalbarri-Geraldton	3	N	N	Not contacted by hydrocarbons at or above ecological thresholds.
Karratha-Port Hedland	5	N	N	Not contacted by hydrocarbons at or above ecological thresholds.
Kimberley Coast Population Management Zone	2	N	N	Not contacted by hydrocarbons at or above ecological thresholds.
King Sound	2	N	N	Not contacted by hydrocarbons at or above ecological thresholds.
Lowendal Islands	3	Y	Y	HEV=3 with probability >5% for shoreline accumulation (≥100 g/m²) from day 31.
Middle Islands Coast	4	N	N	HEV=4 with probability <5% for shoreline accumulation (≥100 g/m²) from day 47.
Montebello AMP	3	N	N	Not contacted by hydrocarbons at or above ecological thresholds.
Montebello Islands	3	Y	Y	HEV=3 with probability >5% for shoreline accumulation (≥100 g/m²) from day 30.
Muiron Islands	2	Y	Y	HEV=2 with probability >5% for shoreline accumulation (≥100 g/m²) from day 31.
Ningaloo – Offshore	2	Y	N	HEV=2 with probability >5% for floating oil (10 g/m²) from day 24.
Ningaloo – Outer Coast North	1	N	N	HEV=1 with probability <5% for floating oil (10 g/m²) from day 45.
Ningaloo – Outer NW	3	Y	N	HEV=3 with probability >5% for floating oil (10 g/m²) from day 38.
Ningaloo Coast North	1	Y	Y	HEV=1 with probability >5% for shoreline accumulation (≥100 g/m²) from day 23. Low probability (<5%) for floating oil (10 g/m²) from day 42.
Ningaloo Coast South	2	N	N	HEV=2 with probability <5% for shoreline accumulation (≥100 g/m²) from day 70.
Northern Islands Coast	3	Y	Y	HEV=3 with probability >5% for shoreline accumulation (≥100 g/m²) from day 31.
Outer Argo-Rowley Terrace AMP	4	N	N	Not contacted by hydrocarbons at or above ecological thresholds.

Receptor	HEV Ranking	Hotspot	Protection Priority Area	Hotspot Selection Rationale
Penguin Bank	5	N	N	Not contacted by hydrocarbons at or above ecological thresholds.
Poivre Reef	5	N	N	Not contacted by hydrocarbons at or above ecological thresholds.
Port Hedland-Eighty Mile Beach	4	N	N	HEV=4 with probability <5% for shoreline accumulation (≥100 g/m²) from day 67.
Rankin Bank	5	N	N	Not contacted by hydrocarbons at or above ecological thresholds.
Ripple Shoals	5	N	N	Not contacted by hydrocarbons at or above ecological thresholds.
Roebuck-Eighty Mile Beach	3	N	N	HEV=3 with probability <5% for shoreline accumulation (≥100 g/m²) from day 74.
Roebuck AMP	4	N	N	Not contacted by hydrocarbons at or above ecological thresholds.
Rosily Shoals	5	N	N	Not contacted by hydrocarbons at or above ecological thresholds.
Rowley Shoals surrounds	3	N	N	Not contacted by hydrocarbons at or above ecological thresholds.
Scott Reef South	3	N	N	Not contacted by hydrocarbons at or above ecological thresholds.
Shark Bay – Coast Outer	3	N	N	HEV=3 with probability <5% for shoreline accumulation (≥100 g/m²) from day 65.
Shark Bay AMP	4	N	N	Not contacted by hydrocarbons at or above ecological thresholds.
Southern Islands Coast	4	Y	N	HEV=4 with probability >5% for shoreline accumulation (≥100 g/m²) from day 32.
Sultan Reef	5	N	N	Not contacted by hydrocarbons at or above ecological thresholds.
Thevenard Island	4	Y	N	HEV=4 with probability >5% for shoreline accumulation (≥100 g/m²) from day 37.
Trap Reef	5	N	N	Not contacted by hydrocarbons at or above ecological thresholds.
Western Abrolhos AMP	4	N	N	Not contacted by hydrocarbons at or above ecological thresholds.
Western Shark Bay AMP	5	N	N	Not contacted by hydrocarbons at or above ecological thresholds.
Zuytdorp Cliffs – Kalbarri	4	N	N	Not contacted by hydrocarbons at or above ecological thresholds.

Based on the assessment, the following have been identified as hotspots:

- Barrow Island
- Lowendal Islands
- Montebello Islands
- Muiron Islands
- Ningaloo – Offshore
- Ningaloo – Outer NW
- Ningaloo Coast North
- Northern Islands Coast

- Southern Islands
- Thevenard Island.

Appendix G provides a simplified summary of the consequence assessment results for each of the hotspot areas. A summary of hydrocarbon modelling results is provided in Appendix H.

Description	
Receptors	• Physical environment (water quality) • Threatened or migratory fauna (marine mammals, marine reptiles, sharks, fish, rays and birds) • Protected and significant areas (KEFs, marine parks) • Socio-economic receptors (fisheries, tourism, recreation, and other third-party operators) • Cultural receptors and Sea Country
Consequence	IV – Major

The detailed consequence assessment for each hotspot is provided in Appendix H. A summary of the consequence assessment for each category is presented below:

Physical environment

In the highly unlikely event of a LOWC, hydrocarbons will likely reach a range of marine habitats above ecological impact thresholds. Hydrocarbons that reach nearshore environments have the potential to impact benthic coral reefs and mangrove areas, which may result in a long-term decrease in ecological values given the toxicity impacts associated with hydrocarbon exposure.

The worst case consequence assessment for physical environment at any identified hotspot was IV – Major at all hotspot locations.

Threatened or migratory fauna

In the highly unlikely event of a LOWC, the volume of hydrocarbons released would result in a reduction in water quality with the potential to impact marine fauna. Marine fauna present in the area may be potentially impacted by a spill through exposure to shoreline accumulated oil, floating oil, entrained oil, or dissolved aromatic hydrocarbons. A description of impacts to marine fauna from exposure to condensate is provided in Table 7-14.

The EMBA overlaps a number of BIAs for sharks, marine mammals, marine reptiles and marine birds (Table 3-9). There is potential for behavioural disruption to the local population as individuals traverse the area affected. The effects of a LOWC release would be greatest within a few kilometres of the spill, where the concentration of toxic aromatic hydrocarbons is highest, and the hydrocarbon layer is thickest on the water's surface. Once in the marine environment, the condensate's toxicity will diminish rapidly over time, thinning on the surface due to evaporation or dispersing into the water column.

Habitat modification, degradation, disruption, or loss, deteriorating water quality and marine pollution are identified as potential threats to a number of marine fauna species in relevant recovery plans and conservation advice (Table 3-10). With controls in place that align with relevant actions described in various recovery plans, the activity will be conducted in a manner that reduces potential impacts to ALARP and an acceptable level.

Protected areas

The EMBA intersects several AMPs, state protected areas, heritage areas and wetlands (Table 3-5). Combined, these areas support all the habitats and faunal groups described above. Impacts to the habitat/fauna receptors described above therefore have an impact on the values of these reserves, which could have flow-on effects to tourism revenue of coastal communities that provide access to these marine reserves.

Socio-economic receptors

There is the potential for surface oil to temporarily disrupt fishing activities if the surface oil moves through fishing areas. Entrained oil at or above 1,000 ppb could reach the fisheries and impact them. Fisheries contacted by floating oil at or above the low threshold (1 g/m²) may be temporarily closed, which would have an impact on fishermen through loss of income. Entrained oil concentrations >4, 000 ppb were not predicted by the spill modelling, and therefore market value/demand for fish is not expected to be impacted due to actual or perceived tainting of catches. Fisheries within the EMBA are as listed in Table 3-14.

Tourism could be affected by spilled condensate, either from reduced water quality or shoreline oiling preventing recreational activities, reducing aesthetic appeal or from impacts to habitats and marine fauna.

There are oil and gas operators operating within the EMBA with existing projects and infrastructure in place as well as continuing drilling and exploration programs. A LOWC in the Operational Area has the potential to disrupt these activities, with associated economic impact, albeit on a temporary basis.

On the basis of the above assessment, a LOWC has the potential to impact an array of receptors. Given the extent and the presence of protected areas within the EMBA, the worst-case consequence is considered to be Major (IV).

Description	
Likelihood	A – Remote
In accordance with the Santos Risk Matrix, a worst-case surface release of crude as a result of LOWC has been defined as an 'Remote' event as it 'requires exceptional circumstances and is unlikely even in the long-term'. The likelihood of a LOWC event occurring is based on industry statistics, Santos' statistics, and the standard preventive control measures in place. Wells are designed with essential engineering and safety control measures to prevent a loss of containment occurring. For Offshore Operations of North Sea Standard, the frequency of well blowout for a production well (includes shut in production wells) from external causes was found to be 2.7 × 10-5 per well year. There were no records of well releases caused by external factors in the database. Frequency is based on 8 blowouts in UK, Norway, and US Gulf of Mexico between 1980 and 2014 (International Association of Oil & Gas Producers, 2019). Management controls are in place to control the flow of hydrocarbons include construction design and regular inspection and maintenance. Additional industry-standard and activity-specific control measures to reduce the chance of a loss of containment event have also been implemented, including (but not limited to) procedures such as a NOPSEMA accepted WOMP, Safety Case, and a spill response plan (OPEP). These control measures are considered to reduce the risk of a loss of containment (and minimise impacts) occurring to a level that is acceptable. In accordance with the Santos Risk Matrix, given the control measures in place, the likelihood of worst-case seabed release of crude as a result of LOWC resulting in a Moderate (III) consequence is considered to be Remote.	
Residual risk	Low

7.6.5 Environmental performance outcomes and control measures

The EPOs relating to this event include:

- No loss of containment of hydrocarbon [VGCN-EPO-08].
- No injury or mortality to *Environment Protection and Biodiversity Conservation Act 1999* and the WA *Biodiversity Conservation Act 2016* listed fauna during activities [VGCN-EPO-01].

The control measures considered for this event are shown in Table 7-16, and EPSs and measurement criteria for the EPOs are described in Section 8.

Table 7-16: Control measure evaluation for loss of well control

Control Measure Reference No.	Control Measure	Environmental Benefit	Potential Cost/Issues	Evaluation
Standard controls				
VGCN-CM-055	Well Operations Management Plan (WOMP) and Source Control Plan	Includes control measures for well integrity and well control in an accepted WOMP, that reduce the risk of unplanned discharges to the marine environment.	Costs associated with personnel time in writing, reviewing, and implementing the WOMP and Safety Case.	**Adopted** –Regulatory requirement.
VGCN-CM-021	Santos' stakeholder consultation strategy	Santos will notify all relevant stakeholders listed, or as revised, in Section 4.5.3, of FAR activity details prior to commencement, including activity timing, vessel movements, proposed cessation date and vessel details. Minimises risk of collision from third parties.	Personnel cost and administrative costs associated with preparing material and liaising with stakeholders.	**Adopted** – Benefits considered to outweigh costs.

Control Measure Reference No.	Control Measure	Environmental Benefit	Potential Cost/Issues	Evaluation
VGCN-CM-056	Accepted OPEP	Implements response strategies to manage unplanned hydrocarbon spills quickly and efficiently in order to reduce impacts to the marine environment.	Personnel and administrative costs associated with preparing documents, ongoing management (spill response exercises) and implementation of OPEP.	**Adopted –** Regulatory requirement.
VGCN-CM-025	Support vessels	Minimises risk of collision of third party vessels with MODU/LWIV through visual identification and avoidance of other vessels.	Negligible costs as vessels are required to be in area for safety reasons.	**Adopted –** Benefits considered to outweigh negligible costs.
VGCN-CM-022	Existing (gazetted) PSZ around the well.	Reduces potential for collision or interference with other marine user activities.	Negligible costs, requirement under the OPGGS Act	Adopted – Benefits considered to outweigh negligible costs to Santos.
VGCN-CM-023	MODU/LWIV identification system	Reduces potential for interaction with other users during MODU/LWIV moves.	Negligible costs, standard equipment on MODU/LWIV.	**Adopted –** Benefits considered to outweigh negligible costs to Santos.
VGCN-CM-026	Seafarer certification	Requires appropriately trained and competent personnel, in accordance with Marine Order 70, to navigate vessels to reduce interaction with other marine users.	Costs associated with personnel time in obtaining qualifications.	**Adopted –** Benefits considered to outweigh costs.
VGCN-CM-051	MODU/LWIV spill response plans (SOPEP/SMPEP)	Effective management of an accidental spill to reduce impact to the environment.	Costs associated with development, implementation and testing of plans.	**Adopted –** Benefits considered to outweigh costs.
VGCN-CM-004	Marine assurance standard	Ensures MODU/LWIV and vessels meet marine assurance standards to reduce the likelihood of unplanned discharge.	No additional cost.	**Adopted** – Benefits of ensuring MODU/LWIV and vessels are compliant outweigh the minimal costs of personnel time.

Control Measure Reference No.	Control Measure	Environmental Benefit	Potential Cost/Issues	Evaluation
Additional controls				
N/A	Manage the timing of the activity to avoid sensitive periods (e.g. spawning, whale and whale shark migration, bird and turtle nesting)	Reduce risk of impacts from highly unlikely LOWC during environmentally sensitive periods for listed marine fauna (e.g. spawning, whale and whale shark migration, bird and turtles nesting).	High cost in moving or delaying activity schedule. Would double duration of activity; increase impacts or potential impacts in other areas, including increase in waste, air emissions, and risk of vessel collisions. The risk to all listed marine fauna cannot be reduced due to variability in timing of environmentally sensitive periods and unpredictable presence of some species.	**Not Adopted** – Given the minimal risk of impacts to listed marine species (e.g. turtles, cetaceans) occurring, the financial and environmental costs of extending activity duration deemed grossly disproportionate to low environmental benefits.
N/A	A dedicated second MODU on standby at location for the purpose of relief well drilling	Could reduce the length of time taken to drill a relief well and may reduce the timeframe for stopping a blowout by up to two weeks, although planning, approval and set-up requirements mean the reduction would likely be less.	The cost of having a MODU and personnel/equipment on standby (at a rate of ca. at a rate of US$650,000 to $850,000 per day) would double the cost of the activity.	**Not Adopted** – Considered grossly disproportionate to the environmental benefit (reduction of two weeks of release), considering the rare likelihood of a LOWC, the existing preventative control measures in place to prevent a well blowout and the additional safety and environmental risks of having another MODU and support equipment/ personnel on standby.
N/A	Dedicated resources (e.g. dedicated spill response facilities on location) in the event of loss of hydrocarbons to allow rapid response	May allow for quicker response to a spill as resources will be within close proximity.	Large costs associated with a dedicated resources on location. Modelling shows shoreline contact albeit with low maximum volumes. Light crude oil has low persistence in the environment and therefore prolonged loading on shorelines is not expected.	**Not Adopted** – Large cost associated with dedicated resources on location deemed grossly disproportionate to very low risk of LOWC.

7.6.6 Demonstration of ALARP

The use of industry standard safe drilling methodologies, including the inherently safe well design and its operations with primary and secondary well barriers, reduces the probability of a loss of containment occurring to a very low level. All safety options have been considered in well design and equipment choice for the activity, with no additional safety options possible, it is considered that the risk of a loss of containment occurring has been reduced to ALARP.

The combination of the standard prevention control measures (Section 7.6.5) (which reduce the likelihood of the event happening), and the spill response strategies (which may reduce the consequence) together reduce the hydrocarbon spill risk.

Standard control measures are in place to manage the risk to ALARP (Table 7-16). These measures include regulatory requirements such as the implementation of an accepted WOMP and Source Control Plan, which integrate well integrity and source control strategies into the planning and execution of the activity. These

documents ensure the well design, operational procedures and emergency response capabilities are robust and aligned with industry standards.

Operational safety is further supported by vessel lighting and navigational systems, stakeholder consultation to reduce third-party interaction risks, and the presence of support vessels to assist with visual identification and avoidance. A 500 m PSZ around the MODU/LWIV, combined with vessel identification systems and certified personnel, ensures that risks of collision and procedural error are minimised. Spill response plans (SOPEP/SMPEP) and marine assurance standards are in place to manage any accidental releases and ensure vessel compliance.

Further control measures were evaluated but not adopted where they were determined to be grossly disproportionate to the potential benefit or not technically feasible. A second MODU positioned on standby in the vicinity of the activity during the drilling activity was considered as an additional control that could reduce the length of time taken to drill a relief well. This would involve hiring an additional rig for the duration of the activity every time a well is drilled under this EP. If adopted, this may reduce the timeframe for stopping a blowout by up to two weeks, although planning/approval/set-up requirements mean the reduction would likely be less. The cost of having a MODU and personnel/equipment on standby (at a rate of US$650,000 to $850,000 per day) would double the cost of the activity and introduce additional safety and environmental risks, due to the presence of an additional MODU and support vessels/equipment being on standby. This is considered grossly disproportionate to the environmental benefit (a potential reduction of two weeks to stop the LOWC), particularly considering the likelihood of a LOWC and the existing preventative control measures in place to prevent a well blowout. Having a dedicated second MODU on standby for the purpose of relief well drilling was therefore rejected as a control measure.

Rescheduling the activity to avoid sensitive biological periods was also not adopted, as the presence of fauna is unpredictable, the Operational Area lies outside critical habitats, and extending the activity duration would increase emissions, waste, and other risks.

All practical control measures have been reviewed, and those adopted are considered appropriate to manage the impacts such that the residual consequence is assessed to be minor and cannot be reduced further. The proposed management controls for LOWC are consistent with Santos' risk management criteria and are considered sufficient to reduce environmental risks to ALARP.

Based on the stochastic spill modelling, Santos has determined applicable source control response measures to limit the spill volume from a LOWC event to ALARP. Further details are provided below.

7.6.6.1 Source control

A number of source control options have been evaluated for the activity (refer to OPEP). Of these source control options; the drilling of a relief well is considered the primary means of controlling the source in the event of an unplanned well release. Spill response and impact assessment for this activity has been based on the relief well taking 77 days (11 weeks) to execute. A breakdown of the key tasks and their timeframe to drill a relief well in 11 weeks have been included in Section 9.2 of the OPEP.

Supporting controls to allow the relief well schedule to be met include:

- "Assurance Review 4: Readiness to Spud" is conducted under the Drilling & Completions Management Process (DCMP)
- rig capability register is maintained and updated monthly.

A well-specific Source Control Plan (SCP) is prepared in accordance with the Santos Source Control Planning and Response Guidelines. The SCP contains information and considerations for relief well operations including but not limited to:

- relief well surface locations (primary and secondary)
- relief well trajectory and interception target point
- dynamic well kill modelling calculations for controlling a worst-case discharge (e.g. kill mud weight, kill pump rate/pressure and kill mud volume required)
- status of relief well tangible equipment
- assumptions for relief well MODU availability and verification that a suitable MODU to execute a relief well is either in Australian waters or there is a suitably robust mobilisation plan for one outside of Australia; the activity will not proceed if there is not at least one relief well MODU option that could execute a relief well within the timeframes committed to in this EP

- in addition, during the activity, if the preferred relief well MODU(s) become unavailable, the SCP will be updated and a suitable replacement identified
- Australian Energy Producers (AEP) Memorandum of Understanding (MoU) provides for access to other operators' rigs
- contracts and MoUs for third party independent well control specialist personnel are in place.

The implementation timeframe of this control is key to its effectiveness. A second MODU positioned on standby in the vicinity of the activity during the drilling activity was considered as an additional control that could reduce the length of time taken to drill a relief well. This would involve hiring an additional rig for the duration of the activity every time a well is drilled under this EP. If adopted, this may reduce the timeframe for stopping a blowout by up to two weeks, although planning/approval/set-up requirements mean the reduction would likely be less. The cost of having a MODU and personnel/equipment on standby (at a rate of US$650,000 to $850,000 per day) would double the cost of the activity and introduce additional safety and environmental risks due to presence of an additional MODU and support vessels/equipment being on standby. This is considered grossly disproportionate to the environmental benefit (a potential reduction of two weeks to stop the LOWC, particularly considering the likelihood of a LOWC and the existing preventative control measures in place to prevent a well blowout. Having a dedicated second MODU on standby for the purpose of relief well drilling was therefore rejected as a control measure.

In order to minimise lead times a rig with a NOPSEMA approved Safety Case will be preferred. These rigs are tracked on the Rig Capability Register and access is covered under the AEP MoU. The well-specific Source Control Plan written prior to the activity commencing will specifically look at what MODUs are available when the activity commences and ensures there will be at least one technically suitable unit available to drill a relief well.

Santos has access to a subsea first response toolkit (SFRT) and deployment personnel through contract to Australian Marine Oil Spill Centre and Oceaneering respectively. In the unlikely event SFRT was required, SFRT equipment can be mobilised to Dampier from the Jandakot storage yard in two days, under existing arrangements. Locating this equipment in Dampier could potentially reduce deployment time by two days providing a suitable vessel was on standby for immediate mobilisation. However, the equipment is a shared resource across Australian Marine Oil Spill Centre SFRT subscription members so relocating for a drilling campaign is not considered viable. Providing a vessel on standby for SFRT deployment could reduce deployment time but given SFRT deployment may not be suitable or feasible a potential reduction in deployment time due to a vessel being on standby is not seen to offer sufficient environmental benefit given crewed vessel standby costs would be tens of thousands of dollars each day over the drilling period.

7.6.6.2 Spill mitigation controls

Santos considers that through the selection of appropriate spill response strategies, development of spill response controls and maintenance of preparedness arrangements and resources to implement these controls, spill risk is mitigated to ALARP. Preparedness spill response controls are outlined in Table 7-16 while those that would be implemented in the event of a spill are outlined within the OPEP.

7.6.7 Acceptability evaluation

Is the risk ranked between Very Low to Medium?	Yes – residual risk is ranked Low.
Is further information required in the consequence assessment?	No – potential impacts and risks are well understood through the information available.
Are risks and impacts consistent with the principles of ESD?	Yes – activity evaluated in accordance with Santos' Environmental Hazard Identification and Assessment Procedure (EA-91-IG-00004_6), which considers principles of ESD. The residual risk for this aspect is Low and therefore does not affect the outcomes of the principles of ESD as per Table 5-5.
Are risks and impacts consistent with relevant legislation, international agreements and conventions, guidelines, and codes of practice (including species recovery plans, threat abatement plans, conservation advice and Australian Marine Park zoning objectives)?	Yes – management consistent with OPGGS(E)R 2009 Regulations, including Safety Case and WOMP. Consistent with relevant species recovery plans, conservation management plans and management actions set out in Table 3-10.
Are risks and impacts consistent with Santos' Environment Policy**?**	Yes – aligns with Santos' Environment Policy.
Are risks and impacts consistent with stakeholder expectations?	Yes – no concerns raised.
Are performance standards such that the impact or risk is considered to be ALARP?	Yes – see ALARP above.

The probability of a LOWC event occurring during the activity is low when factoring in industry data, Santos' own statistics, and the preventative controls in place. Wells are engineered with essential safety and engineering controls to prevent a LOWC incident. Additionally, industry-standard and activity-specific measures have been applied to further reduce the likelihood of such an event and minimise potential impacts. These measures include procedures such as the Safety Case, WOMP, personnel training and awareness, and a spill response plan (OPEP). According to Santos' risk assessment, the residual risk is considered ALARP. The control measures proposed are expected to reduce the risk of impacts from a LOWC to an acceptable level.

7.7 Hydrocarbon spill – marine diesel oil

7.7.1 Description of event

Event	**Worst credible MDO spill – vessel collision** The worst-case environmental incident resulting from a vessel collision is the rupturing of a vessel fuel tank resulting in the release of MDO to the environment. Vessel collision could occur due to factors such as human error, poor navigation, vessel equipment failure or poor weather. It is considered credible that a release of MDO to the marine environment could occur between the support vessels, between a support vessel and the MODU/LWIV, or between a passing third party vessel and the MODU/LWIV or a support vessel. A maximum credible spill volume has been determined based on technical guidance provided by AMSA (2015). This guidance states that for a vessel other than an oil tanker, the maximum credible spill from a collision can be determined from the volume of the largest single fuel tank. In reviewing the general arrangements and fuel tank capacities of typical vessels likely to be utilised for the drilling activities, the largest single fuel tank capacity identified was no greater than approximately 325 m³ of MDO for support vessels. This scenario would result in a spill of diesel at the sea surface. **Refuelling incident** There will be no helicopter refuelling on the MODU/LWIV, however vessel to vessel refuelling within the Operational Area may occur during the activity. The second most significant MDO spill scenario identified is a MODU/LWIV refuelling incident (fuel hose failure or rupture, coupling failure or tank overfilling) where fuel bunkering would need to be stopped manually. Fuel released prior to the cessation of pumping as well as fuel remaining in the transfer line may escape to the environment. The AMSA (2015) Technical Guidelines for Preparing Contingency Plans for Marine and Coastal Facilities provides guidance for calculating a maximum credible spill volume for a refuelling spill. The guidance provided by AMSA (2015) for a refuelling spill under continuous supervision is considered appropriate given refuelling will be constantly supervised. The maximum credible spill volume during refuelling is calculated as: transfer rate (150 m³/hr) x 15 minutes of flow giving a volume of 37.5 m³. The detection time of 15 minutes is seen as conservative but applicable after failure of multiple barriers followed by manual detection and isolation of the fuel supply. For the purpose of the EP the impacts of a MDO spill of 325 m³ has been assessed as this is the largest credible MDO spill associated with the activity.
Extent	Diesel spill trajectory modelling (RPS, 2024) indicated there was some probability of a 325 m³ MDO spill extending as follows, based on a summary from the modelling location: • No oil accumulation on any shorelines was predicted to occur at, or above, the low threshold of 10 g/m². • Floating oil concentrations exceeding ≥1 g/m² were forecast up to 88 km from the release location, and as the thresholds increase to 10 g/m² and 50 g/m², these distances gradually reduce to 58 km and 20 km, respectively. Ningaloo – Outer NW was the only EVA predicted to experience floating oil exposure with probability of 6.3% for concentrations at, or above, 1 g/m², Surface oil above 10 g/m² was predicted to occur within around 300 km. • Entrained hydrocarbon concentrations exceeding 1,000 ppb may potentially occur up to 47 km from the release location. Ningaloo – Outer NW was the only EVA predicted to exposed with a probability of 12.0%. • Dissolved hydrocarbon concentrations exceeding 10 ppb may potential occur up to 261 km from the release location and decreases to 111 km as the threshold increased to 50 ppb.
Duration	A 325 m³ release of MDO was modelled for a release over one hour, replicating the potential duration of a spill arising from a significant collision.

7.7.1.1 Stochastic spill modelling – Summary of results

The modelling results for the fate of the hydrocarbon from vessel collision at the exposure values defined in Section 7.5.4 are summarised below:

7.7.1.1.1 Floating oil

Floating oil concentrations ≥1 g/m² could extend up to 88 km from the release location with the distances reducing to 58 km and 20 km as the thresholds increase to ≥10 g/m² and ≥50 g/m², respectively.

Ningaloo – Outer NW was the only EVA predicted to experience floating oil exposure with a probability of 6.3% for concentrations at, or above, 1 g/m². The probability of exposure decreases to 3.3% and 1.0% for the same receptor as the threshold increased to ≥10 g/m² and ≥50 g/m², respectively. Floating oil exposure at, or above, 1 g/m² for the Ningaloo – Outer NW EVA first occurred four hours following the spill commencement.

7.7.1.1.2 Shoreline accumulation

No oil accumulation on any shorelines was predicted to occur at, or above, the low threshold of ≥10 g/m² from the 300 spill simulations, and consequently, no results are reported.

7.7.1.1.3 Entrained oil

Entrained oil at ≥1,000 ppb was predicted to extend a maximum distance of 47 km northeast from the release location.

Ningaloo – Outer NW was the only EVA predicted to experience entrained hydrocarbon exposure at ≥1,000 ppb with a probability of 12.0%. Entrained hydrocarbons exposure first occurred four hours following the spill commencement.

7.7.1.1.4 Dissolved hydrocarbons

Dissolved hydrocarbon concentrations exceeding 10 ppb may potentially occur up to 261 km from the release location with the distance decreasing to 111 km as the threshold increased to 50 ppb. There were no dissolved hydrocarbon concentrations predicted at, or above, 400 ppb.

The greatest probability of exposure for concentrations exceeding 10 ppb is predicted at Ningaloo – Outer NW (16.67%), with the minimum time of exposure occurring within four hours following the spill. Probability of exposure at this same location decreased to 2.3% at 50 ppb.

Spill modelling results for the MDO scenario are presented in Appendix H.

7.7.2 Nature and scale of environmental impacts

Potential receptors: Physical environment (water quality and benthic habitats), marine fauna (cetaceans, turtles, sharks, fish (pelagic), rays, seabirds, benthic fauna, plankton), marine flora, socio economic receptors (commercial and recreational fishing, tourism, shipping, defence, heritage, Indigenous heritage such as totemic species, cultural heritage sites, Sea Country and spiritual values), other petroleum activities, state marine reserves and AMPs.

Hydrocarbon spills will cause a decline in water quality and may cause chemical (e.g. toxic) and physical (e.g. coating of emergent habitats, oiling of wildlife at sea surface) impacts to marine species. The severity of the impact of a hydrocarbon spill depends on the magnitude of the spill (i.e. extent, duration) and sensitivity of the receptor. The nature and scale of a hydrocarbon spill is described throughout this chapter for a vessel collision scenario, given smaller hydrocarbon spills (from refuelling) will impact a smaller area than a vessel collision.

As a light persistent hydrocarbon, MDO undergoes rapid spreading and evaporative loss in warm waters, indicating that a surface slick will be temporary, with around 36% of the released volume evaporating within 24 hours. Under strong wind and wave conditions, the majority of the MDO is expected to be entrained into the water column (80.5%), with an additional 15% evaporating. This results in less than 1% of floating oil remaining at the surface, indicating that the surface slick will be short-lived. The entrained oil is forecast to degrade biologically and photochemically at a rate of approximately 3% per day, leading to gradual decal over several weeks. A surface release of MDO to the marine environment would result in a localised reduction in water quality in the upper surface waters of the water column near the location of the spill. Potential impact pathways (physical and chemical) of hydrocarbon exposure for receptors are summarised in Table 7-13.

7.7.3 Net environmental benefit analysis

Refer to Section 7.6.3 for details on the NEBA.

7.7.4 Environmental performance outcomes and control measures

The EPOs relating to this event include:

- No loss of containment of hydrocarbon to the marine environment [VGCN-EPO-08].
- No injury or mortality to Environment Protection and Biodiversity Conservation Act 1999 and the WA *Biodiversity Conservation Act 2016* listed fauna during activities [VGCN-EPO-01].

The control measures considered for this event are shown in Table 7-17, and EPSs and measurement criteria for the EPOs are described in Section 8.

Selection of oil spill response strategies and associated performance outcomes, control measures and performance standards, including those required to maintain preparedness and for response, are detailed within the OPEP. The OPEP contains an evaluation of oil spill preparedness arrangements to demonstrate that oil spills will be mitigated to ALARP.

Table 7-17: Control measure evaluation for the surface release of marine diesel oil (vessel collision/bunkering)

Control Measure Reference No.	Control Measure	Environmental Benefit	Potential Cost/Issues	Evaluation
Standard controls				
VGCN-CM-020	Maritime notices	Ensures the presence of the MODU/LWIV and activities is available on the AHO notifications to maritime users, reducing the likelihood of interactions.	Negligible costs.	**Adopted –** Benefits considered to outweigh negligible costs. Maritime requirement to issue marine notices.
VGCN-CM-006	Lighting will be used as required for safe work conditions and navigational purposes	Ensures vessels meet minimum safety standards therefore reducing potential for vessel collision events with associated diesel spill to the environment. Marine Order Part 30: Prevention of collisions, and with Marine Order Part 21: Safety of navigation and emergency procedures requires vessels to have navigational equipment to avoid collisions. Requirement of the *Navigation Act 2012*.	Costs associated with personnel time in checking vessel certifications are in place. Negligible costs of operating navigational equipment.	**Adopted –** Benefits considered to outweigh costs.
VGCN-CM-021	Santos' stakeholder consultation strategy	Ensures other marine users, such as commercial fishers, are aware of upcoming operations so they can plan their business accordingly.	Limited additional costs to Santos. Stakeholders' time required to review consultation material and communicate with Santos.	**Adopted** – Benefits considered to outweigh negligible costs. Important control to ensure other marine users are aware of upcoming operations and potential business disruptions.
VGCN-CM-057	Dynamic positioning system	Ensure vessel is running efficiently and routine maintenance endeavours to ensure risk of collision from vessel system failure is reduced.	No additional cost.	**Adopted** – Benefits considered to outweigh costs.
VGCN-CM-056	Accepted OPEP	Implements response strategies to manage unplanned hydrocarbon spills quickly and efficiently in order to reduce impacts to the marine environment.	Personnel and administrative costs associated with preparing documents, ongoing management (spill response exercises) and implementation of OPEP.	**Adopted –** Regulatory requirement.
VGCN-CM-022	Existing (gazetted) PSZ around the well	Reduces potential for collision or interference with other marine user activities.	Negligible costs, requirement under the OPGGS Act	Adopted – Benefits considered to outweigh negligible costs to Santos.

Control Measure Reference No.	Control Measure	Environmental Benefit	Potential Cost/Issues	Evaluation
VGCN-CM-023	MODU/LWIV identification system	Reduces potential for interaction with other users during MODU/LWIV moves.	Negligible costs, standard equipment on MODU/LWIV.	**Adopted –** Benefits considered to outweigh negligible costs to Santos.
VGCN-CM-026	Seafarer certification	Requires appropriately trained and competent personnel, in accordance with Marine Order 70, to navigate vessels to reduce interaction with other marine users.	Costs associated with personnel time in obtaining qualifications.	**Adopted –** Benefits considered to outweigh costs.
VGCN-CM-050	MODU/LWIV spill response plans (SOPEP/SMPEP)	Effective management of an accidental spill (discharge to sea) to reduce impact to the environment.	Costs associated with development, implementation and testing of plans.	**Adopted –** Benefits of considered to outweigh costs.
VGCN-CM-002	Vessel planned maintenance system (PMS) to maintain vessel DP, engines and machinery	Reduces risk of spills from vessels by ensuring that equipment is maintained appropriately.	Costs are standard for routine PMS.	**Adopted –** Benefits in reducing risk of spills.
VGCN-CM-003	MODU planned maintenance system (PMS) to maintain vessel DP, engines and machinery	Reduces risk of spills from MODU/LWIV by ensuring that equipment is maintained appropriately.	Costs are standard for routine PMS.	**Adopted –** Benefits in reducing risk of spills.
VGCN-CM-058	Santos Refuelling and Chemical Transfer Standard	Minimises risk of pollution to ALARP during hydrocarbon transfers/ vessel refuelling.	Personnel costs associated with ensuring procedures are in place and implemented during refuelling and chemical transfers.	**Adopted** – Benefits of ensuring procedures are followed and measures implemented outweigh the costs.
VGCN-CM-004	Marine assurance standard	Ensures MODU/LWIV and vessels meet marine assurance standards to reduce the likelihood of unplanned discharge.	No additional cost.	**Adopted** – Benefits of ensuring MODU/LWIV and vessels are compliant outweigh the minimal costs of personnel time.
Additional controls				
N/A	Zero fuel bunkering via hose	Removes spill risk from hose operations.	Cost associated with transfer of MDO via drums or containers. Not possible to modify vessels to allow additional fuel storage.	**Not Adopted** – Storage of fuel on vessels would result in unacceptable transfer of environmental risks to occupational health and safety/operational risks and would not eliminate risk of MDO spills to sea. Costs associated with implementing control is deemed grossly disproportionate to environmental benefit and low risk activity with standard controls in place.

Control Measure Reference No.	Control Measure	Environmental Benefit	Potential Cost/Issues	Evaluation
N/A	Require vessels to be double hulled	Reduces the likelihood of a loss of hydrocarbon inventory, minimising potential environmental impact.	Vessels are subject to availability and are required to meet Santos' standards during activities; requirement of a double hull on vessels would limit the number available to Santos; requiring vessels to be refitted to ensure double hulls would also be of high cost.	**Not Adopted** – Large costs associated with vessel selection and by having an activity schedule determined by vessel availability considered to be grossly disproportionate compared to low risk of a vessel collision and low risk of a large diesel spill.
N/A	Dedicated standby vessel in field 24 hours	Reduces potential for collision or interference with other marine users.	Large costs associated with a dedicated standby vessel.	**Not Adopted** – Large cost associated with dedicated standby vessel, which outweighs any benefits.
N/A	Dedicated resources (e.g. dedicated spill response facilities on location) in the event of loss of hydrocarbons to allow rapid response	May allow for quicker response to a spill as resources will be within close proximity.	Large costs associated with a dedicated resources on location. Modelling shows shoreline contact albeit with low maximum volumes. Light crude oil has low persistence in the environment and therefore prolonged loading on shorelines is not expected.	**Not Adopted** – Large cost associated with dedicated resources on location deemed grossly disproportionate to very low risk of LOWC.

7.7.5 Environmental impact assessment

The impact assessment follows the risk assessment approach as detailed in Section 7.5.5.

7.7.5.1 Identification of hotspots for consequence assessment

Hotspot analysis was not undertaken for MDO spill scenario, as no high environmental value (HEV) areas within the EMBA were predicted to be contacted by floating oil or shoreline accumulation. The only receptor identified as potentially exposed to dissolved hydrocarbons above the moderate exposure threshold was Ningaloo – Outer NW, with a low probability of contact predicted (2.33%).

Description	
Receptors	Physical environment (water quality and benthic habitats) Marine fauna (cetaceans, turtles, sharks, fish (pelagic), rays, seabirds, benthic fauna, plankton) Protected areas – KEFs and marine parks Socio economic receptors (commercial and recreational fishing, tourism, shipping, defence, heritage, Indigenous heritage such as totemic species, cultural heritage sites, Sea Country and spiritual values, other petroleum activities).
Consequence	II – Minor
A summary of the consequence assessment for each receptor category is presented below. Potential impact pathways (physical and chemical) of hydrocarbon exposure for receptors are summarised in Table 7-13 and potential impacts to receptors within the EMBA are described in Table 7-14. **Threatened/migratory fauna** A surface release of MDO to the marine environment would result in a localised reduction in water quality in the upper surface waters of the water column. 36.1% of MDO is predicted to evaporate within 24 hours under constant wind conditions. Under stronger wind and breaking wave conditions, approximately 80.5 % of the MDO will have entrained and additional 15% is expected to have evaporated within 24 hours of the spill. Therefore, only <1% of floating oil will remain on the water surface indicating that surface slick will be temporary. Surface oil, and entrained hydrocarbon in the sea surface layer, could have the physical effect of coating fauna interacting within and under the surface, including plankton, pelagic invertebrates	

Description
and fishes, marine reptiles, marine mammals, and seabirds, and may also affect some species through ingestion of oiled fish (as described in Table 7-14). The MDO EMBA overlaps breeding BIAs for number of seabirds, including reproduction BIAs for the fairy tern, lesser crested tern, roseate tern, and wedge-tailed shearwater. An unplanned release of MDO is not expected to interfere with their breeding activity, but could cause slight secondary effects through ingestion after preening or ingestion of oiled fish (as described in Table 7-13 and Table 7-14). The dugong (breeding/calving/foraging/nursing), whale shark (foraging), pygmy blue whale (foraging/migration) and humpback whale (migration) BIAs overlap the EMBA. There is the potential for behavioural disruption to the local population as individuals traverse the area affected with potential for coating of cetaceans and dugong and ingestion of oiled prey (plankton/fish) as described in Table 7-13 and Table 7-14. The EMBA overlaps BIAs for a number of turtle species. Nesting and/or mating occurs at turtle nesting beaches and rookeries approximately 35 km from the Operational Area (Muiron Islands, Ningaloo Coast). Therefore, turtle behaviour could be disrupted with the potential to threaten turtle populations (as described in Table 7-14), particularly those at significant rookeries on Muiron Islands and Ningaloo Coast. Deteriorating water quality/chemical and terrestrial discharge is identified as a potential threat to turtles in the marine turtle recovery plan, and some bird and shark species. Habitat modification, degradation and disruption, pollution and/or loss of habitat are also identified as threats to sharks, birds, cetaceans and turtles in conservation management and recovery plans. Given the offshore location of the release, and volume of potential hydrocarbon release there is little potential for modification to or a decrease in the availability of quality habitat. **Physical environment and habitats** In the event of MDO release, hydrocarbons that reach nearshore environments have the potential to impact benthic coral reefs and mangrove areas, which may result in a decrease in ecological values, given toxicity impacts associated with hydrocarbon exposure. The quality of habitat may be reduced for a period with recovery over the short term (up to two years). Entrained hydrocarbon could contact sandy beaches at high tide. Such impacts would be most likely to nesting female turtles as they move up and down beaches or to turtle hatchlings as they emerge from nests six to eight weeks following nesting. The quality of habitat available to the turtles may be reduced, however, recovery is expected over the short term (up to two years). **Protected areas** The EMBA intersects several state marine parks, AMPs, Commonwealth Heritage areas, and marine management areas (Section 3.2). Combined, these areas support all the habitats and faunal groups described above. Impacts to the habitat/fauna receptors described above therefore have an impact on the values of these reserves, which could have flow-on effects to tourism revenue of coastal communities that provide access to these marine reserves. **Socio-economic receptors** There is the potential for hydrocarbons to temporarily disrupt fishing activities if the surface or entrained hydrocarbon moves through fishing areas. However, the high rate of evaporation means little MDO will become entrained, and few aromatic hydrocarbons are predicted to become dissolved. It is possible there could be accumulation of oil in fish tissues to the extent that could result in hydrocarbon tainting of fish flesh. Connell & Miller (1981) compiled a summary of studies listing the exposure value concentrations at which tainting occurred for hydrocarbons. The results contained in their review indicate tainting of fish occurs when fish are exposed to ambient concentrations of 4 to 300 ppm (4,000 to 300,000 ppb) of hydrocarbons in the water, for durations of 24 hours or more, with response to phenols and naphthenic acids being the strongest. Given the volume of oil that could be potentially released and minimal fishing efforts, the impacts to fisheries on a stock level will not lead to significant reduction of population supporting the local activity. Tourism could also be affected by a spill, either from reduced water quality/shoreline oiling preventing recreational activities or reducing aesthetic appeal or from impacts to habitats and marine fauna. However, considering the characteristics of MDO, the impact will be short term and temporary. A number of oil and gas operators operate within the EMBA with existing projects and infrastructure in place as well as continuing drilling and exploration programs. An unplanned hydrocarbon release has the potential to disrupt these activities, with associated economic impact, albeit on a temporary basis. **Cultural heritage and features** Shoreline accumulation or contact by floating oil to an emergent receptor is not expected. However, potential impacts to cultural features from a hydrocarbon spill may include decline in traditional food sources and /or mortality of fauna with cultural significance. EP stakeholder consultation did not raise any concerns regarding potential impacts to cultural features including Sea Country.

Description	
Likelihood	B – Unlikely
A worst-case hydrocarbon release resulting from a vessel collision could result in disruption and short-term effects on the receiving environment. Impacts could result in detectable but insignificant decrease in local population size and habitats. However, recovery would be expected within two years. With the proposed control measures in place to prevent releases, any decline in local populations or degradation of habitats is considered unlikely and therefore the activity will be conducted in a manner that is considered acceptable. The likelihood of a hydrocarbon release occurring due to a vessel collision/bunkering is limited, given the set of mitigation and management controls in place. Subsequently the likelihood of a vessel collision releasing hydrocarbons to the environment resulting in a minor consequence is considered to be Unlikely (b).	
Residual risk	Very Low

7.7.6 Demonstration of ALARP

The use of vessels is integral to activity and therefore vessels and associated risks of unplanned hydrocarbon releases, cannot completely be eliminated.

Offshore refuelling is standard industry practice and oil pollution legislation (*Protection of the Sea (Prevention of Pollution from Ships) Act 1983* and MARPOL Annex I) has been developed to safeguard against the risk of a hydrocarbon spill occurring during refuelling. Other hydrocarbon types such as heavy fuel oil or intermediate fuel oil have specifically not been selected for this activity (only diesel will be used in the Operational Area) to ensure potential environmental impacts are reduced to ALARP.

Standard control measures (Table 7-17) are in place to minimise the likelihood and consequence of a hydrocarbon release. These include the implementation of a bulk liquid transfer procedure, which ensures that bulk liquids, including fuel, are transferred in accordance with standardised protocols to reduce the risk of unintentional releases to the marine environment. The procedure requires appropriate equipment (e.g. hoses and connectors) to be maintained and used during all transfers, with operational checks and procedures enforced to manage risk. Vessel-specific spill response plans (SOPEP/SMPEP) are in place to ensure a rapid and effective response to any release.

A combination of administrative controls, such as Santos' marine assurance standard, pre-campaign assurance checks, and the requirement for certified seafarers (Marine Order 70), ensures vessels are operated and manned to recognised industry and regulatory standards. Engineering controls including support vessel presence, MODU identification systems, and certified navigational lighting (per Marine Orders 21 and 30) reduce collision risks. Vessel and MODU planned maintenance systems ensure engines, dynamic positioning, and fuel-handling systems remain within operational tolerances to reduce the risk of failure or leaks.

The accepted OPEP provides a framework for coordinated response actions in the event of a hydrocarbon spill, and stakeholder consultation ensures that marine users are made aware of the activity and can avoid potential interference. Collectively, these measures reduce the risk of an unplanned release to ALARP.

Additional control measures (Table 7-17) were considered but not adopted where they were found to be impractical or the cost grossly disproportionate to the potential environmental benefit. Zero fuel bunkering via hose was not adopted due to the impracticality of transferring MDO via drums or containers, limited MODU storage capacity, and increased health and safety risks associated with additional port calls. Requiring double-hulled support vessels was not adopted due to vessel availability constraints, high retrofitting costs, and the already low likelihood of vessel collision. Similarly, rescheduling the activity to avoid all sensitive fauna periods was deemed impractical due to the variability and unpredictability of species presence and the short duration and low-risk nature of the activity. The deployment of dedicated spill response resources at the activity location was not adopted based on high mobilisation costs and low likelihood of a large spill event, supported by modelling that predicts no shoreline contact. An option to add an extra support vessel to identify errant third-party vessels was also not adopted due to limited benefit and the increased collision risk associated with adding more traffic to the Operational Area.

With the implementation of these controls, which span prevention, preparedness, and rapid response, and with no further reasonably practicable measures identified, the residual risk of a hydrocarbon spill from vessels is considered Low and the impact is reduced to ALARP.

7.7.7 Acceptability evaluation

Is the risk ranked between Very Low to Medium?	Yes – residual risk is ranked as Very Low.
Is further information required in the consequence assessment?	No – potential impacts and risks are well understood through the information available.
Are risks and impacts consistent with the principles of ESD?	Yes – activity evaluated in accordance with Santos' Environmental Hazard Identification and Assessment Procedure (EA-91-IG-00004_6), which considers principles of ESD. The residual risk for this aspect is Low and therefore does not affect the outcomes of the principles of ESD as per Table 5-5.
Are risks and impacts consistent with relevant legislation, international agreements and conventions, guidelines, and codes of practice (including species recovery plans, threat abatement plans, conservation advice and Australian Marine Park zoning objectives)?	Yes – management consistent with OPGGS(E)R 2023 including Safety Case and WOMP. Santos has considered the values and sensitivities of the receiving environment, including, but not limited to conservation values of the identified protection priorities (Section 3.2), relevant species recovery plans, conservation management plans and management actions (Table 3-10).
Are risks and impacts consistent with Santos' Environment Policy?	Yes – aligns with Santos' Environment Policy.
Are risks and impacts consistent with stakeholder expectations?	Yes – no concerns raised.
Are performance standards such that the impact or risk is considered to be ALARP?	Yes – see ALARP above.

Given the control measures in place to prevent vessel collision and refuelling incidents, and the low frequency of significant volume diesel spills that occur in the industry, the likelihood of a loss of containment event during the activity is unlikely. The risks from diesel spills are well understood and the activities will be managed in accordance with relevant legislation and standards. The control measures proposed are consistent with applicable actions described in the relevant recovery plans and approved conservation advice and no stakeholder concerns have been raised regarding this aspect.

With the implementation of industry standard and activity-specific control measures to reduce the chance of a diesel spill event (and minimise impacts), the residual risk is assessed to be Very Low and ALARP. Control measures will reduce the risk of impact from MDO spill to a level that is acceptable.

7.8 Minor hydrocarbon release

7.8.1 Description of event

Event	Minor hydrocarbon releases to the sea surface may occur from the following unplanned events: • loss of primary containment (drums, tanks, intermediate bulk containers (IBCs), etc) due to handling, storage, or dropped objects (e.g. swinging loads during lifting activities) • vessel pipework failure or rupture, or inadequate bunding • dropped objects damaging MDO infrastructure (hoses, pipes, tanks, etc) • hydrocarbon fallout to sea during flaring or accidental release of flowback cushioning fluids during well testing or bleed-off/circulating operations. These events may result in small spills of hydrocarbons such as MDO, lubricating oils, or other hydrocarbon-based liquids. The most credible spill scenario is the loss of an IBC (1 m³) during vessel-to-vessel transfer. Minor accidental loss of other hydrocarbon-based liquids (e.g. hydraulic oil) as discussed in Section 7.4.
Extent	Due to the relatively low volumes and the open ocean setting, hydrocarbons are expected to disperse rapidly. A 1 in 1,000 dilution typically occurs within 30 minutes (Costello & Read, 1994), and concentrations are expected to fall below toxic thresholds within short distances from the release point. Impacts beyond the Operational Area are not anticipated.
Duration	Potentially toxic/harmful threshold concentrations limited to a very short period immediately following release, i.e. in the order of hours.

7.8.2 Nature and scale of environmental impacts

Potential receptors: Physical environment (water quality and benthic habitats), threatened migratory or local fauna (cetaceans, turtles, sharks, fish (pelagic), rays, seabirds), socio economic receptors (commercial and recreational fishing, shipping) and cultural receptors.

7.8.2.1 Physical environment

Minor hydrocarbon releases to the sea surface, such as MDO, lubricating oils, and other hydrocarbon-based liquids, can temporarily reduce water quality in the immediate vicinity of the spill. These releases may occur due to loss of containment from storage units (e.g. IBCs, drums), pipework failures, or hydrocarbon fallout during flaring and bleed-off operations. While these substances can be toxic to marine organisms at high concentrations, the volumes involved in credible scenarios are small and typically limited to individual containers or operational discharges.

In open ocean conditions, rapid dilution and dispersion significantly reduce the potential for environmental harm. Studies (e.g. Costello & Read, 1994) indicate a 1 in 1,000 dilution can occur within 30 minutes, meaning harmful concentrations are likely to fall below toxic thresholds within short distances from the release point. These conditions, combined with the dynamic nature of offshore waters, help ensure the impacts are localised and short-lived.

Importantly, these minor spills are not expected to affect sediment quality or benthic habitats due to their limited volume and lack of persistence. Sensitive receptors such as the Ningaloo Coast World Heritage area, marine parks, and shorelines are located well outside the Operational Area and are not expected to be impacted. No emergent or intertidal habitats are present within the vicinity of the release, further reducing the risk of long-term environmental degradation.

7.8.2.2 Threatened migratory or local fauna

The minor and temporary changes in water quality resulting from the spill are not predicted to harm marine fauna, including cetaceans, turtles, pelagic fish, sharks, marine mammals, seabirds. The Operational Area overlaps with BIAs for humpback whales (migration), pygmy blue whales (migration) and wedge-tailed shearwaters (reproduction) (refer to Section 3.2.6.1) and therefore may be present in the Operational Area. Several recovery plans and conservation advices for threatened and migratory species that may be present in the Operational Area identify marine pollution and deteriorating water quality from chemical discharge as threats to these species (Table 3-10).

Small hydrocarbon releases are unlikely to have an ecological effect on threatened or migratory fauna, given the small volumes that could be released, and the open ocean environment. While marine pollution and deteriorating

water quality are identified as threats in various recovery plans and conservation advice documents, the nature of these minor spills does not meet the scale or persistence typically associated with such threats.

Furthermore, the open ocean setting and transient nature of the releases mean that fauna are unlikely to experience prolonged exposure. Behavioural disturbance, if any, would be temporary and limited to the immediate vicinity of the spill. Given the low concentrations and short duration of potential exposure, lethal or sub-lethal toxicity effects are considered highly unlikely.

7.8.2.3 Socio-economic receptors

The potential for minor hydrocarbon spills to impact socio-economic receptors is considered very low. The Operational Area is not known to support significant levels of tourism or recreational fishing, and recent catch data from state and Commonwealth-managed commercial fisheries indicate minimal fishing activity within the area. As such, the likelihood of disruption to fishing operations or tourism-based activities is negligible.

Shipping routes may intersect the broader region, but the localised and short-term nature of minor spills means that navigation and vessel operations are unlikely to be affected. Hydrocarbon releases are expected to disperse quickly and remain confined to the immediate area of the spill, posing no significant hazard to maritime traffic. Additionally, there are no cultural receptors within the Operational Area.

7.8.2.4 Cultural receptors

Totemic species of cultural value may pass through the Operational Area. However, during consultation, Santos has not been made aware of any other cultural receptors within the Operational Area. Impacts to local fauna have been considered in Section 7.8.2.2.

7.8.3 Environmental performance outcomes and control measures

The EPO relating to this event is:

- No loss of containment of hydrocarbon to the marine environment [VGCN-EPO-08].

The control measures considered for this event are shown in Table 7-18 and EPSs and measurement criteria for the EPOs are described in Section 8.4.

Table 7-18: Control measure evaluation for minor surface release of hydrocarbons

Control Measure Reference No.	Control Measure	Environmental Benefit	Potential Cost/Issues	Evaluation
Standard controls				
VGCN-CM-032	General chemical management procedures	Potential impacts to the environment are reduced through following correct procedures for the safe handling and storage of chemicals.	Personnel costs associated with ensuring procedures are in place and implemented during inspections.	**Adopted** – Benefits of ensuring procedures are followed and measures implemented outweigh the costs of personnel time.
VGCN-CM-049	Hazardous chemical management procedures	Reduces the risk of spills and leaks (discharges) to sea by controlling the storage, handling and clean-up.	Personnel cost associated with implementation of procedures and permanent or temporary storage areas.	**Adopted** – Benefits of ensuring procedures are followed and measures implemented outweigh costs.
VGCN-CM-033	Chemical selection procedure	Reduced toxicity to marine environment through ensuring only environmentally acceptable chemicals discharged to sea.	Potential additional cost and delays of chemical substitution.	**Adopted** – Benefits of ensuring procedures are followed outweighs costs.
VGCN-CM-056	Accepted OPEP	Implements response strategies to manage unplanned hydrocarbon spills quickly and efficiently in order to reduce impacts to the marine environment.	Personnel and administrative costs associated with preparing documents, ongoing management (spill response exercises) and implementation of OPEP.	**Adopted –** Regulatory requirement.

Control Measure Reference No.	Control Measure	Environmental Benefit	Potential Cost/Issues	Evaluation
VGCN-CM-050	MODU/LWIV spill response plans (SOPEP/SMPEP).	Effective management of an accidental spill (discharge to sea) to reduce impact to the environment.	Costs associated with development, implementation and testing of plans.	**Adopted –** Benefits considered to outweigh costs.
VGCN-CM-051	Maritime Dangerous Goods Code	Dangerous goods managed in accordance with the International Maritime Dangerous Goods Code to reduce the risk of an environmental incident, such as an accidental release to sea or unintended chemical reaction.	Cost associated with implementation of code/procedure.	**Adopted** – Benefits of ensuring procedures are followed and measures implemented outweigh costs.
VGCN-CM-012	Well test procedures	Reduces the potential for unplanned release of minor hydrocarbons by ensuring that subsea systems integrity is maintained.	Cost associated with implementation of the plan.	**Adopted** – Benefits outweigh associated costs.
VGCN-CM-045	Dropped object prevention procedure	Impacts to the environment are reduced by preventing dropped objects (e.g. chemical containers) and by retrieving dropped objects where possible. Minimises drop risk during MODU/LWIV lifting operations. Ensures lifting equipment certified and inspected.	Personnel costs involved in implementing procedures and in incident reporting.	**Adopted** – Benefits of ensuring procedures are followed and measures implemented outweigh costs.
Additional controls				
N/A	Scupper plugs continuously in place to prevent deck drainage	Would eliminate potential impacts of contaminants being discharged to sea in rainwater.	Increased health and safety risks from wet deck not draining. Large amounts of water on a vessel's deck can also cause stability issues (free-surface effect).	**Not Adopted** – Safety considerations outweigh the benefit, given small volumes of contaminants.

7.8.4 Environmental impact assessment

Description	
Receptors	Physical environment (water and sediment quality, benthic habitats) Threatened, migratory or local fauna (marine mammals, marine reptiles, sharks, fish, rays and birds) Socio-economic receptors (tourism and recreation)
Consequence	I – Negligible
In the event of a minor hydrocarbon loss, the volumes are likely to be small and rapidly disperse into the marine environment. The small volumes, dilution, and dispersion from natural weathering processes such as ocean currents are such that spills will be localised and for a short duration. The number of receptors present at the activity location are expected to be limited to a small number of transient individuals. The susceptibility of marine fauna to hydrocarbons is determined by the type of hydrocarbon and the length of exposure. However, since the extent and duration of exposures would be limited, the risk of exposure to marine fauna from this hazard is considered to be very low. The small amounts of hydrocarbons released in worst-case scenarios will diminish quickly in both time and distance at the sea surface, thus reducing the impact on organisms. Additionally, rapid dilution at deeper depths would also lead to a rapid decrease in the impact on organisms over time and distance. Deteriorating water quality and marine pollution are identified as potential threats to a number of marine fauna species in relevant recovery plans and conservation advice and to MNES (Table 3-10). With control measures in place, the activity will be conducted in a manner that reduces potential impacts to ALARP and an acceptable level. Toxic impacts to the benthic communities would be limited to a highly localised area around the release location for a subsea release. Impacts from surface spills to benthic communities are not expected due to the water depths (>300 m). Near the sea surface, fish are able to detect and avoid contact with surface slicks and as a result, fish mortalities rarely occur in open waters from surface spills (Kennish, 1997; Scholz et al., 1992). Pelagic fish species are therefore generally not highly susceptible to impacts from hydrocarbon spills. In offshore waters near to the release point, pelagic fish are at risk of exposure to the more toxic aromatic components of the hydrocarbons. Pelagic fish in offshore waters are highly mobile and comprise species such as tunas, sharks, and mackerel. Due to their mobility, it is unlikely pelagic fish would be exposed to toxic components for long periods in this spill scenario. The more toxic components would also rapidly evaporate, and concentrations would significantly diminish with distance from the spill site, limiting the potential area of impact. The potential minor hydrocarbon releases are not expected to significantly impact the receiving environment with control measures proposed to prevent releases; therefore, the activity will be conducted in a manner that is considered acceptable. EP stakeholder consultation did not raise any concerns regarding potential impacts to cultural features including Sea Country. Given a small hydrocarbon spill would not result in a decreased population size at a local or regional scale or long-term reduction to water and sediment quality, it is expected a spill of this nature would result in a Negligible (I) consequence.	
Likelihood	C – Possible
A small hydrocarbon liquid release has reduced likelihood due to a number of controls being in place, which include: • the control measures in place to prevent spills • the procedures in place to clean up a spill. Consequently, the likelihood of releasing minor volumes of hydrocarbons to the environment is considered Possible.	
Residual risk	Very Low

7.8.5 Demonstration of ALARP

The activity requires the storage and use of hydraulic and lubricating oils for the operation of equipment and machinery, including ROV systems. Additionally, well testing may be required to evaluate reservoir performance. As these substances are essential to the activity, their removal is not viable. Several standard control measures have been adopted to minimise the risk of unplanned releases and to manage the consequences should a spill occur. These include comprehensive hazardous chemical management procedures, adherence to the International Maritime Dangerous Goods Code, and the implementation of bulk liquid transfer procedures, all of which ensure proper handling, storage, and transfer of hydrocarbons and hazardous liquids to reduce spill likelihood.

Operational integrity is further maintained through the LWIV/MODU and support vessel planned maintenance systems, which ensure the equipment remains within performance limits to avoid failure. In addition, ROV inspection and maintenance procedures are implemented prior to deployment to reduce the risk of hydraulic fluid releases. Dropped object prevention procedures mitigate secondary spill risks during lifting operations. Chemical selection procedures (Table 7-18) ensure only environmentally acceptable substances are used, thereby reducing toxicity and environmental consequences in the event of a release.

Preparedness for unplanned releases is supported through implementation of vessel-specific spill response plans and an accepted OPEP, which includes response strategies tailored to minor hydrocarbon spill scenarios. These plans are supported by crew training and periodic spill response exercises.

Well test procedures incorporate controls that manage hydrocarbon handling and minimise the risk of marine discharge during testing operations. When implemented in combination, these measures reduce both the likelihood and consequence of minor hydrocarbon releases, such as from ROV leaks or hydraulic systems.

Additional control measures (Table 7-18) were considered but not adopted. In particular, eliminating vessel-to-vessel lifting in the field was assessed as a way to reduce the potential for equipment drops that could lead to secondary spills. However, this was found to be operationally unfeasible, as it would require vessels and the LWIV/MODU to store all necessary equipment and supplies onboard for the full duration of the activity, which is impractical due to space and logistical constraints. It would also require more frequent return trips to port, increasing fuel consumption and operational risk.

Given the minor, localised nature of any potential spill and the effectiveness of the adopted control measures, the residual risk of minor hydrocarbon releases is considered Low and reduced to ALARP. No additional controls have been identified that would further reduce the risk in a practicable or proportionate way.

7.8.6 Acceptability evaluation

Is the risk ranked between Very Low and Medium?	Yes – maximum minor spill residual risk is ranked as Very Low.
Is further information required in the consequence assessment?	No – potential impacts and risks are well understood through the information available.
Are risks and impacts consistent with the principles of ESD?	Yes – activity evaluated in accordance with Santos' Environmental Hazard Identification and Assessment Procedure (EA-91-IG-00004_6), which considers principles of ESD. The residual risk is Very Low and therefore does not affect the outcomes of the principles of ESD as per Table 5-5.
Are risks and impacts consistent with relevant legislation, international agreements and conventions, guidelines and codes of practice (including species recovery plans, threat abatement plans, conservation advice and Australian Marine Park zoning objectives)?	Yes – management consistent with SOLAS 1974 and *Navigation Act 2012*, Marine Order 91 (Marine pollution prevention – oil), Marine Order 94 (Marine pollution prevention – packaged harmful substances) and with relevant recovery plans, conservation advices and actions for species that may occur in the Operational Area (Table 3-10).
Are risks and impacts consistent with Santos' Environment Policy?	Yes – aligns with Santos' Environment Policy.
Are risks and impacts consistent with stakeholder expectations?	Yes – no concerns raised.
Are performance standards such that the impact or risk is considered to be ALARP?	Yes – see ALARP above.

With the control measures in place to prevent the accidental release of minor volumes of hydrocarbons, and potential social and environmental impacts and risk well understood and considered very low, the environmental risk associated with a minor hydrocarbon release is considered acceptable.

8. Implementation strategy

OPGGS(E)R 2023 Requirements
Section 22(1). Implementation strategy for environment plan
The environment plan must contain an implementation strategy for the activity.

The specific measures and arrangements that will be implemented in the event of an oil pollution emergency are detailed within the OPEP.

Stakeholder engagement is assessed separately for the requirements of the activities. Ongoing stakeholder management strategies are discussed in Section 8.12.

8.1 Environmental management system

OPGGS(E)R 2023 Requirements
Section 22(2)
The implementation strategy must contain a description of the environmental management system for the activity, including specific measures to be used to ensure that, for the duration of the activity: (a) the environmental impacts and risks of the activity continue to be identified and reduced to a level that is as low as reasonably practicable (b) control measures detailed in the environment plan are effective in reducing the environmental impacts and risks of the activity to as low as reasonably practicable and an acceptable level (c) environmental performance outcomes and standards set out in the environment plan are being met.

The Santos Management System exists to support its ethical, professional, and legal obligations to undertake work in a manner that does not cause harm to people or the environment. The Santos Management System is a framework of policies, standards, processes, procedures, tools, and control measures that, when used together by a properly resourced and competent organisation, result in these outcomes:

- a common HSE approach is followed across the organisation
- HSE is proactively managed and maintained
- the mandatory requirements of HSE management are implemented and are auditable
- HSE management performance is measured, and corrective actions are taken
- opportunities for improvement are recognised and implemented
- workforce commitments are understood and demonstrated.

This implementation strategy is designed to meet the requirements of the EP to require that:

- environmental impacts and risks continue to be identified for the duration of the activity and reduced to ALARP
- control measures are effective in reducing environmental impacts and risks to ALARP and acceptable levels
- environmental performance outcomes and standards set out in this EP are met
- stakeholder consultation is maintained throughout the activity as appropriate.

8.2 Environment Policy

Santos' Environment Policy (Appendix A) clearly sets out Santos' strategic environmental objectives and the commitment of the management team to continuous environmental performance improvement. This EP has been prepared in accordance with the fundamentals of this policy. By accepting employment with Santos, each employee and contractor is made aware during the recruitment process that he or she is responsible for the application of this policy.

8.3 Hazard identification, risk and impact assessment and controls

Hazards and associated environmental risks and impacts for the proposed activities have been systematically identified and assessed in this EP (refer to Sections 6 and 7). The control measures and environmental performance standards that will be implemented to manage the identified risks and impacts, and the environmental performance outcomes that will be achieved, are detailed below.

To ensure environmental risks and impacts remain acceptable and ALARP during the activity and for the duration of this EP, hazards will continue to be identified, assessed and controlled as described in Sections 8.10 and 8.11.

Any new, or proposed amendment to a control measure, EPS or EPO will be managed in accordance with the Environment Management of Change Procedure (EA-91-IQ-10001) (Section 8.10.2).

Oil spill response control measures and environmental performance standards and outcomes are listed in Van Gogh Coniston Novara VGA-4H GI ST1 Well Decommissioning OPEP (7745-236-EMP-0002).

8.4 Environmental performance outcomes

OPGGS(E)R 2023 Requirements
Section21(2). Environmental performance outcomes and standards
The environment plan must: (a) set environmental performance standards for the control measures identified under paragraph (5)(c), and (b) set out the environmental performance outcomes against which the performance of the titleholder in protecting the environment is to be measured, and (c) include measurement criteria that the titleholder will use to determine whether each environmental performance outcome and environmental performance standard is being met.

To ensure environmental risks and impacts will be of an acceptable level, environmental performance outcomes for this EP have been defined and are listed in Table 8-1 for planned activities and unplanned events, those relating to oil spill response are listed in the Van Gogh Coniston Novara VGA-4H GI ST1 Well Decommissioning OPEP (7745-236-EMP-0002). These outcomes will be achieved by implementing the identified control measures to the defined EPSs.

Table 8-1: Environmental performance outcomes

Reference	Environmental Performance Outcome
VGCN-EPO-01	No injury or mortality to Environment Protection and Biodiversity Conservation Act 1999 and the *WA Biodiversity Conservation Act 2016* listed fauna during activities
VGCN-EPO-02	Reduce impacts to marine fauna from lighting on vessels through limiting lighting to that required by safety and navigational lighting requirements
VGCN-EPO-03	No unplanned objects, emissions or discharges to sea or air.
VGCN-EPO-04	Reduce impacts to air and water quality from planned discharges and emissions from the activities.
VGCN-EPO-05	Seabed disturbance is limited to planned activities and defined locations within the Operational Area.
VGCN-EPO-06	Reduce impacts on other marine users through the provision of information to relevant stakeholders such that they are able to plan for their activities and avoid unexpected interference.
VGCN-EPO-07	No introduction of marine pest species.
VGCN-EPO-08	No loss of containment of hydrocarbon to the marine environment.

8.4.1 Control measures and performance standards

The CMs that will be used to manage identified environmental impacts and risks and the associated statements of performance required of the control measures (i.e. EPSs) are listed in Table 8-2. Measurement criteria (MC) outlining how compliance with the control measure and environmental performance standard could be evidenced are also listed.

Table 8-2: Control measures and environmental performance standards for the proposed activity (Environment Plan)

Control Measure	CM Reference	Environmental Performance Standard	EPS Reference No.	Measurement Criteria	EPO Reference No.
Santos' procedure for interacting with marine fauna	VGCN-CM-001	Vessels comply with Santos' Protected Marine Fauna Interaction and Sighting Procedure (EA-91-11-00003), which ensures compliance with Part 8 of the *Environment Protection and Biodiversity* Regulations 2000 and includes controls for minimising the risk of collision with marine fauna.	VGCN-CM-001-EPS-01	Conformance checked on receipt of marine fauna sighting datasheets or register Completed vessel statement of conformance	VGCN-EPO-01
		Any vessel strikes with cetaceans will be reported in the National Ship Strike Database.	VGCN-CM-001-EPS-02	Conformance checked on Santos' receipt of incident report	
		Helicopter(s) contractor procedures comply with Santos' Protected Marine Fauna Interaction and Sighting Procedure (EA-91-11-00003), which ensures compliance with Part 8 of Environment Protection and Biodiversity Regulations 2000, which includes controls for minimising interaction with marine fauna.	VGCN-CM-001-EPS-03	Helicopter contractor procedures align with Santos' Protected Marine Fauna Interaction and Sighting Procedure	
Vessel planned maintenance system (PMS) to maintain vessel DP, engines and machinery	VGCN-CM-002	Documented maintenance program is in place for equipment on vessels that provides a status on the maintenance of equipment.	VGCN-CM-002-EPS-01	Vessel daily/weekly records IMCA Common Marine Inspection Document (CMID) Vessel contractor written verification demonstrates compliance with PMS CMMS records	VGCN-EPO-01 VGCN-EPO-03 VGCN-EPO-04
MODU planned maintenance system (PMS) to maintain vessel DP, engines and machinery	VGCN-CM-003	Documented maintenance program is in place for equipment on MODU/LWIV that provides a status on the maintenance of equipment.	VGCN-CM-003-EPS-01	MODU/LWIV daily/weekly records IMCA Common Marine Inspection Document (CMID) CMMS records MODU/LWIV contractor written verification demonstrates compliance with PMS	VGCN-EPO-01 VGCN-EPO-03 VGCN-EPO-04 VGCN-EPO-08
Marine assurance standard	VGCN-CM-004	Vessels selected and on-boarded in accordance with the Offshore Marine Assurance Procedure (SO-91-ZH-10001) to ensure contracted vessels are operated, maintained and manned in accordance with industry standards (for example, Marine Orders) and regulatory requirements (this EP) and the relevant Santos procedures mentioned in this EP.	VGCN-CM-004-EPS-01	Marine Assurance Checklist	VGCN-EPO-01 VGCN-EPO-03 VGCN-EPO-04 VGCN-EPO-08
Vessel bridge crew receive induction in marine fauna observations, marine fauna interaction procedure requirements	VGCN-CM-005	All vessel bridge crew complete project specific HSE induction that includes information and requirements relating to marine fauna observations and reporting requirements, such that vessel crew will be competent to: • observe marine fauna that are potentially approaching the vessel • complete marine fauna observation reporting requirements as required by the Santos procedure for interacting with marine fauna, Part 8 of the *Environment Protection and Biodiversity* Regulations 2000 and the National Ship Strike Database.	VGCN-CM-005-EPS-01	Induction records demonstrate that bridge crew were inducted on the requirements of the Santos Protected Marine Fauna Interaction and Sighting Procedure (EA91-11-00003)	VGCN-EPO-01
Lighting will be used as required for safe working conditions and navigational purposes	VGCN-CM-006	Vessel navigation lighting and equipment is compliant with COLREGS/Marine Orders 30: Prevention of collisions and with Marine Orders 21: safety of navigation and emergency procedures.	VGCN-CM-006-EPS-01	Offshore Vessel Inspection Database (OVID) or equivalent confirms vessel certification compliance with applicable regulations	VGCN-EPO-02 VGCN-EPO-06 VGCN-EPO-08
Premobilisation review and planning of lighting on vessels is undertaken prior to vessel based activities	VGCN-CM-007	Where the well decommissioning/LWIV activity may require 24-hour lighting, a project execution plan, planning and inductions, will include a requirement to minimise external lighting where practicable during the activity.	VGCN-CM-007-EPS-01	Where the well decommissioning/LWIV activity may require 24-hour lighting, a project execution plan, planning and inductions, will include a requirement to minimise external lighting where practicable during the activity	VGCN-EPO-02
Waste incineration	VGCN-CM-008	Waste incineration managed in accordance with MARPOL Annex VI, except incineration within the 500 m exclusion zone shall not occur.	VGCN-CM-008-EPS-01	Completed waste record book or recording system	VGCN-EPO-04
Fuel oil quality	VGCN-CM-009	MARPOL-compliant (Marine Order 97) fuel oil (diesel) will be used during the activity.	VGCN-CM-009-EPS-01	Fuel bunkering records and/or relevant purchase records	VGCN-EPO-04
International air pollution prevention certification	VGCN-CM-010	Pursuant to MARPOL Annex VI primary vessels and support vessels(s) will maintain a current International Air Pollution Prevention Certificate as relevant to vessel class that certifies the measures to prevent ODS emissions, and reduce nitrogen oxides, sulphur oxides and incineration emissions during the activity are in place.	VGCN-CM-010-EPS-01	OVID or equivalent confirms current international air pollution prevention certificate	VGCN-EPO-04
Ozone-depleting substance (ODS) handling procedure	VGCN-CM-011	ODS managed in accordance with MARPOL Annex VI to reduce the risk of an accidental release of ODS to air.	VGCN-CM-011-EPS-01	OVID or equivalent confirms completed ODS record book or recording system	VGCN-EPO-04
Well test procedures	VGCN-CM-012	Regulator accepted MODU Safety Case Revision for a bleed-off package, including control measures that reduce the risk of hydrocarbons from entering the marine environment (where applicable).	VGCN-CM-0012-EPS-01	Regulator accepted Safety Case revision for well testing	VGCN-EPO-04 VGCN-EPO-03 VGCN-EPO-05
		Santos Abandonment Program checklists completed to ensure safety and environmental control measures are implemented for the bleed-off package.	VGCN-CM-012-EPS-02	Completed well test program checklist	VGCN-EPO-08

Control Measure	CM Reference	Environmental Performance Standard	EPS Reference No.	Measurement Criteria	EPO Reference No.
		Burner pilots to remain ignited during burning/flaring to reduce the risk of hydrocarbons being released to sea and air.	VGCN-CM-012-EPS-03	Incident report of flare drop-out	
		Burner monitored by a dedicated flare watcher during burning/flaring to identity and communicate an unplanned flare drop-out.	VGCN-CM-012-EPS-04	Incident report of flare drop-out	
		In the event of a flare drop-out or hydrocarbon being observed on the sea surface then liquid flaring, burning/flaring shall cease and the event investigated and corrected before proceeding, if practicable to do so.	VGCN-CM-001-EPS-05	Incident report of flare drop-out or unplanned hydrocarbon release	
		During bleed-off events, formation water and completion fluids containing hydrocarbons must be: • flared with hydrocarbons • stored in tanks on-board and shipped ashore for disposal • treated through an oil-water filtration system before being disposed to sea.	VGCN-CM-001-EPS-06	Completed operational reports	
		Oil-water filtration equipment will be: • designed to reduce oil-in-water to <1% by volume • calibrated prior to use • oil-in-water content monitored to assess the performance of the filtration equipment.	VGCN-CM-001-EPS-07	Completed operational reports	
Wet parking positioning	VGCN-CM-013	Any equipment that has been temporarily wet parked during the activity is surveyed to record its position. Xmas tree (XT) may be parked within 100 m of well for recovery in future decommissioning campaign.	VGCN-CM-013-EPS-01	Record of wet parked equipment position	VGCN-EPO-05
MODU move procedure	VGCN-CM-014	MODU move procedure contains a passage plan. No accidental contact with the seabed and subsea infrastructure during the MODU move.	VGCN-CM-014-EPS-01	MODU move procedure Details contained in incident documents	VGCN-EPO-05
No planned anchoring of support vessels	VGCN-CM-015	No planned anchoring of support vessel(s) within the Operational Area.	VGCN-CM-0150EPS-01	Daily Vessel Reports	VGCN-EPO-05
MODU/LWIV station keeping system	VGCN-CM-016	MODU/LWIV station keeping system maintains the MODU/LWIV at the desired location.	VGCN-CM-016-EPS-01	No station keeping incidence recorded	VGCN-EPO-05
		For an anchored MODU, anchors positioned and maintained at locations defined in the rig mooring analysis to reduce risks to seabed habitat and petroleum infrastructure.	VGCN-CM-016-EPS-02	Completed mooring report	
Recovery of all deployed equipment (such as ROV baskets) during campaign	VGCN-CM-018	All equipment deployed during any activity will be recovered.	VGCN-CM-018-EPS-01	Survey records	VGCN-EPO-05
Post activity ROV survey	VGCN-CM-019	An as-left survey will be undertaken in the vicinity of the MODU/LWIV by an ROV. The survey will document the seabed condition at departure and any equipment identified would either be recovered by an ROV (if small/light enough) or identified for recovery during a future campaign.	VGCN-CM-019-EPS-01	Survey records	VGCN-EPO-05
Maritime Notices	VGCN-CM-020	Information provided to either AMSA, Department of Defence, AHO and/or nearest port authority on MODU/LWIV arrival and departure so that the maritime industry is aware of petroleum activities.	VGCN-CM-20-EPS-01	Transmittal records demonstrate notification of activity prior to the activity commencing	VGCN-EPO-06 VGCN-EPO-08 VGCN-EPO-01
Santos' stakeholder consultation strategy	VGCN-CM-021	Santos will notify all relevant stakeholders of relevant activity details prior to commencement, including activity timing, vessel movements, proposed cessation date and vessel details.	VGCN-CM-021-EPS-01	Santos' correspondence to relevant stakeholders	VGCN-EPO-06 VGCN-EPO-08 VGCN-EPO-01
		If the MODU/LWIV departs and returns from an Operational Area, relevant maritime notices will be updated.	VGCN-CM-021-EPS-02	Santos' correspondence to relevant stakeholders	
		All correspondence with external stakeholders is recorded.	VGCN-CM-021-EPS-03	Consultation records	
		Santos' Consultation Coordinator is contactable before, during and after completion of the planned activity to ensure stakeholder feedback is evaluated and considered during the operational activity phases.	VGCN-CM-021-EPS-04	Consultation coordination contact details made available to all relevant people in all correspondence	
		Santos will not restrict commercial fishing access to the Operational Area and is committed to concurrent operations where safety of either vessel is not compromised.	VGCN-CM-021-EPS-05	Incident records show nil incidents of complaints of restrictions to commercial fishing access to the Operational Area, and show nil incidents of vessel safety being compromised by concurrent operations	
Existing (gazetted) PSZ around the well	VGCN-CM-022	A 500 m PSZ is defined around the well.	VGCN-CM-022-EPS-01	Notice to Mariners placed with AHO outlining PSZ and timeframes of the activity	VGCN-EPO-06

Control Measure	CM Reference	Environmental Performance Standard	EPS Reference No.	Measurement Criteria	EPO Reference No.
MODU/LWIV identification system	VGCN-CM-023	MODU/LWIV has an automatic identification system (AIS) to aid in its detection at sea.	VGCN-CM-023-EPS-01	Completed inspection report or statement of conformance supplied by MODU/LWIV contractor	VGCN-EPO-06 VGCN-EPO-08 VGCN-EPO-01
No fishing from MODU/LWIV or support vessels	VGCN-CM-024	Personnel are prohibited from recreational fishing activities on vessels.	VGCN-CM-024-EPS-01	Induction records confirm the fishing prohibition is communicated to all personnel	VGCN-EPO-06
Support vessel	VGCN-CM-025	At least one support vessel is available at all times to monitor the MODU/LWIV 500 m exclusion zone to identify and communicate with any approaching third-party vessels.	VGCN-CM-025-EPS-01	Daily vessel report	VGCN-EPO-06 VGCN-EPO-08 VGCN-EPO-01
Seafarer certification	VGCN-CM-026	Vessel crews are trained and competent, in accordance with Flag State regulations, to navigate vessels and reduce interaction with other marine users.	VGCN-CM-026-EPS-01	Training records/Marine Assurance Checklist	VGCN-EPO-06 VGCN-EPO-08 VGCN-EPO-01
Support Vessel Identification System	VGCN-CM-027	Support vessels have an automatic identification system and radar to aid in their detection at sea.	VGCN-CM-027-EPS-01	Completed inspection report or statement of conformance supplied by support vessel contractors	VGCN-EPO-06 VGCN-EPO-08 VGCN-EPO-01
Constant bridge watch	VGCN-CM-028	Competent crew shall maintain constant bridge-watch.	VGCN-CM-028-EPS-01	Vessel log of times and persons on watch and/or crew training matrix and completed vessel statement of conformance verified by Santos Offshore Representative	VGCN-EPO-06
Personnel inductions	VGCN-CM-029	Induction materials reinforce to the Vessel Master the importance of marine communications in the event of any potential interactions with active marine users.	VGCN-CM-029-EPS-01	Induction records	VGCN-EPO-06 VGCN-EPO-01
Waste (garbage) management procedure	VGCN-CM-030	Waste management procedure implemented to reduce the risk of unplanned release of waste to sea. The procedure includes standards for: • bin types • lids and covers • waste segregation • bin storage.	VGCN-CM-030-EPS-01	Completed inspection checklist	VGCN-EPO-03 VGCN-EPO-01 VGCN EPO-04
		No waste (garbage) discharged to sea, unless the waste is food waste disposed in accordance with MARPOL Annex V.	VGCN-CM-030-EPS-02	Completed garbage disposal record book or recording system verified by Santos Offshore Representative	
		Pursuant to MARPOL Annex V, placards displayed to notify personnel of waste disposal restrictions.	VGCN-CM-030-EPS-03	Completed Santos Offshore Representative inspection checklist	
Deck cleaning product selection	VGCN-CM-031	Deck cleaning products planned to be released to sea meet the criteria for not being harmful to the marine environment according to MARPOL Annex V.	VGCN-CM-031-EPS-01	SDS and product supplier supplementary data as required Completed inspection checklist	VGCN-EPO-03 VGCN-EPO-01 VGCN-EPO-04
General chemical management procedures	VGCN-CM-032	Safety datasheet (SDS) available for all chemicals to aid in the process of hazard identification and chemical management.	VGCN-CM-032-EPS-01	Contractor's routine inspection of the chemical storage/SDSs verified by onsite inspection – by either Santos Offshore Representative or Marine Assurance Inspection	VGCN-EPO-03 VGCN-EPO-01 VGCN-EPO-04 VGCN-EPO-08
		Chemicals managed in accordance with SDS in relation to safe handling and storage, spill-response and emergency procedures, and disposal considerations.	VGCN-CM-032-EPS-02	Contractor's chemical management procedures verified by onsite inspection – by either Santos Offshore Representative or Marine Assurance Inspection	
Chemical selection procedure	VGCN-CM-033	Chemicals planned for discharge to sea from the MODU/LWIV are risk assessed as per the Drilling Fluid and Chemical Selection in Drilling Activities Procedure (EA-91-II-00007). This includes chemicals used in potable water systems.	VGCN-CM-033-EPS-01	Completed Santos risk assessments show chemicals selected are acceptable	VGCN-EPO-03 VGCN-EPO-01 VGCN-EPO-04 VGCN-EPO-05 VGCN-EPO-08
		Firefighting foam on board the MODU/LWIV and vessels will not be discharged to sea during testing of the firefighting system.	VGCN-CM-033-EPS-02	Test records of fire systems	
		Drilling, completions and cement chemicals potentially discharged to sea are assessed in accordance with Santos' Offshore Division Drilling Chemical Selection and Approval Process (EA-91-II-00007) to be Gold/Silver/D or E rated through OCNS, PLONOR substances listed by OSPAR, or have a complete risk assessment prior to use.	VGCN-CM-033-EPS-03	Completed Santos risk assessments show chemicals selected are acceptable	
Sewage treatment system	VGCN-CM-034	Pursuant to MARPOL Annex VI, vessel(s) have a current International Sewage Pollution Prevention Certificate that certifies the required measures to reduce impacts from sewage disposal are in place (as applicable to vessel class).	VGCN-CM-034-EPS-01	OVID or equivalent confirms current International Sewage Pollution Prevention Certificate	VGCN-EPO-03 VGCN-EPO-01

Control Measure	CM Reference	Environmental Performance Standard	EPS Reference No.	Measurement Criteria	EPO Reference No.
		Sewage discharged in accordance with MARPOL Annex IV.	VGCN-CM-034-EPS-02	Completed Santos Offshore Representative inspection checklist Sewage discharge records	VGCN-EPO-04
		Preventive maintenance on sewage treatment equipment is completed as scheduled.	VGCN-CM-034-EPS-03	OVID or equivalent confirms current International Sewage Pollution Prevention Certificate	
Oily water treatment system	VGCN-CM-035	Oily mixtures (bilge water) only discharged to sea in accordance with MARPOL Annex I.	VGCN-CM-035-EPS-01	Completed Santos Offshore Representative inspection checklist Oil record book or log where available	VGCN-EPO-03 VGCN-EPO-01 VGCN-EPO-04
		Preventative maintenance on oil filtering equipment completed as scheduled.	VGCN-CM-035-EPS-02	Maintenance records or evidence of maintenance in operational reports where available	
		Pursuant to MARPOL Annex I, vessel(s) will have an International Oil Pollution Prevention Certificate that certifies the required measures to reduce impacts of planned oil discharges are in place.	VGCN-CM-035-EPS-03	OVID or equivalent confirms current International Oil Pollution Prevention Certificate	
Radioactive Materials Management Plan	VGCN-CM-036	A Radioactive Materials Management Plan will provide radiation testing/detection requirements, and the quarantine/isolation of any potentially contaminated materials. If radioactive materials or NORM contamination on recovered infrastructure are detected, the affected equipment will be managed by the Radioactive Materials Management Plan and in a manner consistent with THE Australian Radiation Protection and Nuclear Safety Agency Code for the Safe Transport of Radioactive Material (2019), including: • correct and clear placarding or labelling of contaminated equipment • contaminated equipment is segregated from non-contaminated equipment, personnel and work areas • contaminated equipment remains segregated and is stored securely until disposed of at a licenced facility.	VGCN-CM-036-EPS-01	Records confirm testing was conducted and that infrastructure was quarantined/isolated if required Records show that all radioactive material/NORM identified equipment is stored, transported and disposed in accordance with the Radioactive Materials Management Plan	VGCN-EPO-03 VGCN-EPO-01 VGCN-EPO-04
Cuttings management system	VGCN-CM-037	All well returns to the MODU with suspected cuttings are diverted to shale shakers, except if circulating riserless. The recovered fluid is recycled to the mud pits and separated drilled cuttings/solids diverted overboard. If circulating riserless, cuttings/solids returned to the seabed.	VGCN-CM-037-EPS-01	Daily Mud Report	VGCN-EPO-03 VGCN-EPO-04 VGCN-EPO-05
		The shale shakers are fitted with screens that meet API standards for solids removal particle size cut points.	VGCN-CM-037-EPS-02	Inspection records	
		Centrifuges are used as required to remove additional finer drilled cuttings/solids that are too small for the shale shakers to remove.	VGCN-CM-037-EPS-03	Daily Mud Report	
		Shale shakers are inspected by a dedicated shale shaker hand while drilling to ensure: • shakers are running and screens vibrating • shaker screens are not damaged or blinding.	VGCN-CM-037-EPS-04	Offshore Risk and Compliance Coordinators environmental inspection checklist	
		NAF is not used during the drilling activity.	VGCN-CM-037-EPS-05	Completed operational reports	
Inventory control procedure	VGCN-CM-038	Only residual water-based fluid systems, brine, completion chemicals, cement and cement spacer within MODU mud pits and surface tanks that is no longer required will diverted overboard.	VGCN-CM-038-EPS-01	End of Well Report Completed operational reports	VGCN-EPO-03 VGCN-EPO-04 VGCN-EPO-05
		Unusable inventories of bulk cement, drilling fluid solid additives, brine and drill water on-board the MODU managed according to the decision list in Table 6-19.	VGCN-CM-038-EPS-02	End of Well Report Completed decision log	
Oil content measurement procedure	VGCN-CM-039	All drilling-related oil content measurements and calculations will be made in accordance with the methods detailed in Santos' Operational Guidelines and Environmental Performance Measures for Handling and Usage of Drilling Fluids and Bulks (DR-91-ID-016).	VGCN-CM-039-EPS-01	Completed operational reports	VGCN-EPO-03 VGCN-EPO-04 VGCN-EPO-05
Lost-circulation material procedures	VGCN-CM-040	Surface returns of hydrocarbon-based lost-circulation material will be contained for onshore disposal if the circulating material can be isolated; otherwise the material will be discharged directly to sea.	VGCN-CM-040-EPS-01	Completed operational reports	VGCN-EPO-03 VGCN-EPO-04 VGCN-EPO-05
Quality control limits for barite	VGCN-CM-041	Contaminant limit concentrations in barite: • mercury (Hg) – 1 mg/kg dry weight in stock barite • cadmium (Cd) – 3 mg/kg dry weight in stock barite.	VGCN-CM-041-EPS-01	Records show barite used for the drilling meets the below standard: • mercury (Hg) – 1 mg/kg dry weight in stock barite • cadmium (Cd) – 3 mg/kg dry weight in stock barite	VGCN-EPO-03 VGCN-EPO-04 VGCN-EPO-05
		All barite is selected in accordance with API specifications, which has limitations on all contaminant concentrations.	VGCN-CM-041-EPS-02	Mud reports show all mud is API standard	

Control Measure	CM Reference	Environmental Performance Standard	EPS Reference No.	Measurement Criteria	EPO Reference No.
Fluids received to the MODU/LWIV vessel during well kill will be treated by bleed off package before discharged	VGCN-CM-042	Less than 1% oil content achieved before discharge of fluids from well bleed off package.	VGCN-CM-042-EPS-01	Records show discharge criteria were met before discharge or fluids were contained	VGCN-EPO-03 VGCN-EPO-04 VGCN-EPO-05
Mud pit wash residue will be measured for oil content prior to discharge. If discharge specification not met (<1% oil by volume), the fluid will be returned to shore.	VGCN-CM-043	Less than 1% oil by volume content achieved before discharge of fluids from mud pit wash.	VGCN-CM-043-EPS-01	Records demonstrate that discharge criteria were met before discharge or fluids were contained	VGCN-EPO-03 VGCN-EPO-04 VGCN-EPO-05
Cement and swarf cuttings returned to MODU will be discharged below the water line to reduce carriage of solids by surface currents	VGCN-CM-044	Cement and swarf cuttings discharged below the water line.	VGCN-CM-044-EPS-01	Records confirm solids discharge chute/line is below the water line	VGCN-EPO-03 VGCN-EPO-04 VGCN-EPO-05
Dropped object prevention procedures	VGCN-CM-045	MODU/LWIV Safety Case includes the following control measures for dropped objects that reduce the risk of objects entering the marine environment: • lifting equipment certification and inspection • lifting crew competencies • heavy-lift procedures • preventative maintenance on cranes.	VGCN-CM-045-EPS-01	NOPSEMA-accepted Safety Case Completed inspection checklist Details contained in incident documents	VGCN-EPO-03 VGCN-EPO-08
		Lifting operations managed in accordance with MODU/LWIV work instructions or procedures.	VGCN-CM-045-EPS-02	Vessel work instructions or procedures	
		Objects dropped overboard are recovered (if possible) to mitigate the environmental consequences from objects remaining in the marine environment, unless the environmental consequences are negligible, or safety risks are disproportionate to the environmental consequences.	VGCN-CM-045-EPS-3	Fate of dropped objects detailed in incident documents	
Recovery procedures	VGCN-CM-046	A recovery procedure/s will be developed, reviewed and issued for use prior to mobilisation to the field. A Hazard Identification and Risk Assessment Review of the procedures will be performed to ensure risks have been managed in accordance with ALARP principles prior to issuing procedures for use. Procedures developed are to include: • wellhead and guide base removal and XT Wet Parking Procedure, which details the procedural activities associated with removal and wet parking.	VGCN-CM-046-EPS-01	Records of the constructability review and HAZID are available Records confirm floating assets recovered in accordance with procedure	VGCN-EPO-03
Implementation of the management controls in the Santos Invasive Marine Species Management Plan (IMSMP)	VGCN-CM-047	Vessels are managed to low risk in accordance with the Santos IMSMP (EA-00-RI-10172) and consistent with the International Maritime Organization (IMO) 2023 Guidelines for the control and management of ships' biofouling to minimize the transfer of invasive aquatic species (Biofouling Guidelines 2023) prior to movement or transit into or within the invasive marine species management zone, which requires: • assessment of applicable vessels using the IMSMP risk assessment • the management of immersible equipment to low risk.	VGCN-CM-047-EPS-01	Completed risk assessment demonstrating equipment and vessels are ‘low risk’	VGCN-EPO-07
		Pursuant to the *Biosecurity Act 2015* and Australian Ballast Water Management Requirements 2017, primary and support vessels carrying ballast water and engaged in international voyages shall manage ballast water so that marine pest species are not introduced.	VGCN-CM-047-EPS-02	Records show Ballast Water Management is implemented Completed ballast water record book or log is verified by Santos Offshore Representative	
		Vessels receive entry clearance from DAFF (Seaports) as necessary (or as applicable to their location and movements).	VGCN-CM-047-EPS-03	Records show a complete Questionnaire for Biosecurity Exemptions for Biosecurity Control Determination issued to Seaports at least one month in advance where practicable	
Anti-foulant system	VGCN-CM-048	Vessel anti-foulant system maintained in compliance with International Convention on the Control of Harmful Anti-fouling Systems on Ships, where applicable.	VGCN-CM-048-EPS-01	OVID or equivalent confirms current International Anti-Fouling System Certificate	VGCN-EPO-07

Control Measure	CM Reference	Environmental Performance Standard	EPS Reference No.	Measurement Criteria	EPO Reference No.
Hazardous chemical management procedures	VGCN-CM-049	For hazardous chemicals, the following standards apply to reduce the risk of an accidental release to sea: • storage containers closed when the product is not being used • storage containers managed in a manner that provides for secondary containment in the event of a spill or leak • storage containers labelled with the technical product name as per the SDS • spills and leaks to deck, excluding storage bunds and drip trays, immediately cleaned up • storage bunds and drip trays do not contain free flowing volumes of liquid • spill response equipment readily available.	VGCN-CM-049-EPS-01	Contractor's routine inspection of the chemical storage/SDSs verified by onsite inspection – by either Santos Offshore Representative or Marine Assurance Inspection Contractor's chemical management procedures. Verified by onsite inspection – by either Santos Offshore Representative or Marine Assurance Inspection	VGCN-EPO-03 VGCN-EPO-08
MODU/LWIV spill response plans (SOPEP/SMPEP)	VGCN-CM-050	Vessels have current and implemented a SOPEP, or SMPEP, pursuant to MARPOL Annex I.	VGCN-CM-050-EPS-01	Approved SOPEP or SMPEP	VGCN-EPO-03 VGCN-EPO-08 VGCN-EPO-01
		SOPEP or SMPEP spill response exercises conducted not less often than every three months to ensure personnel are prepared.	VGCN-CM-050-EPS-02	Spill exercise records or evidence of a spill exercise in an operational report	
Maritime dangerous goods code	VGCN-CM-051	Dangerous goods managed in accordance with the International Maritime Dangerous Goods Code to reduce the risk of an environmental incident, such as an accidental release to sea or unintended chemical reaction.	VGCN-CM-051-EPS-01	Completed Multimodal Dangerous Goods Form for offshore support vessel transfers Completed inspection checklist	VGCN-EPO-03 VGCN-EPO-08
Bulk liquid transfer procedure	VGCN-CM-052	Bulk liquids transferred in accordance with the bulk transfer procedure to reduce the risk of a release to sea. The procedures will require: • hose integrity: certified hoses shall be used • hose flotation: bulk hoses in the water fitted with floatation collars • hose connections: hoses used for hydrocarbons fitted with hammer union connections at the MODU's manifold, self-sealing (dry-break) connections at the vessel end and self-sealing break-away connections when two or more hoses are joined together • valve alignment: a MODU supervisor checks that all valves are lined up correctly • communications: constant radio communications between MODU control room and vessel • inventory control: MODU control room monitors tank fill levels • emergency shutdown available and tested before each transfer operation.	VGCN-CM-052	Completed procedural documents, for example work permits, job safety analysis forms, checklists, etc	VGCN-EPO-03
Bulk solids transfer procedure	VGCN-CM-053	Bulk solids transferred in accordance with bulk transfer procedures to reduce the risk of an unintentional release to sea. The procedures include standards for: • hose integrity: certified hoses • hose flotation: bulk hoses in the water fitted with floatation collars • valve alignment: a MODU supervisor checks that all valves are lined up correctly • communications: constant radio communications between MODU control room and vessel • inventory control: MODU control room monitors tank fill levels or air vents watched to detect tank overfill • emergency shutdown available and tested before each transfer operation.	VGCN-CM-053-EPS-01	Completed procedural documents, for example work permits, job safety analysis forms, checklists, etc Spill details contained in incident documentation	VGCN-EPO-03
Remotely operated vehicle (ROV) inspection and maintenance procedures	VGCN-CM-054	Preventative maintenance on ROV completed as scheduled to reduce the risk of hydraulic fluid releases to sea.	VGCN-CM-054-EPS-01	Maintenance records or evidence of maintenance in operational reports	VGCN-EPO-03
		ROV pre-deployment inspection completed to reduce the risk of hydraulic fluid releases to sea.	VGCN-CM-054-EPS-02	Completed pre-deployment inspection checklist	
Well Operations Management Plan (WOMP) and Source Control Plan	VGCN-CM-055	A NOPSEMA-accepted WOMP in place that includes control measures for well integrity to reduce the risk of an unplanned release of hydrocarbons. The WOMP includes control measures to manage well integrity risks to ALARP, including: • barriers in place to isolate hydrocarbons from the marine environment • inspection, monitoring and testing of barriers over the life of the well • response to increases in well integrity risk • notification and reporting requirements.	VGCN-CM-055-EPS-01	NOPSEMA accepted WOMP Incident records confirm no breach of containment	VGCN-EPO-08 VGCN-EPO-01

Control Measure	CM Reference	Environmental Performance Standard	EPS Reference No.	Measurement Criteria	EPO Reference No.
Accepted OPEP	VGCN-CM-056	In the event of a hydrocarbon spill to sea, the Santos OPEP requirements are implemented to mitigate environmental impacts.	VGCN-CM-056-EPS-01	Incident report	VGCN-EPO-08 VGCN-EPO-01
Dynamic Positioning system	VGCN-CM-057	For vessels equipped with Dynamic Positioning (DP) equipment design, redundancy, equipment maintenance and operation in accordance with the International Marine Contractors Association Guideline for the Design and Operation of Dynamically Positioned Vessels.	VGCN-CM-057-EPS-01	Records of annual DP trials	VGCN-EPO-08 VGCN-EPO-01
		DP trials to ensure correct operation.	VGCN-CM-057-EPS-02	Record of field entry DP trails	
Santos Refuelling and Chemical Transfer Standard	VGCN-CM-058	Bunkering activities follow the requirements of the Santos Refuelling and Chemical Transfer Standard (SO-91-IQ-00098), which includes key requirements to prevent spills to the environment such as: • when bunkering activities can occur • roles and responsibilities • dry-break couplings and breakaway couplings used • bunkering activity communication requirements • bunker hose undergoes hydrostatic leak testing.	VGCN-CM-058-EPS-01	Completed bunkering checklist Spill details contained in incident documentation	VGCN-EPO-08 VGCN-EPO-01
Decision list for managing bulk powders remaining on the MODU at the end of the drilling campaign	VGCN-CM-059	Decision criteria for remaining bulk products, in order of priority: • retain • sell • minimise • transfer to alternative MODU (overboard disposal of stock; stock will be discharged as wet slurry).	VGCN-CM-59-EPS-01	Decision record for management of residual bulk powders	VGCN-EPO-01 VGCN-EPO-04

8.5 Roles and responsibilities

OPGGS(E)R 2023 Requirements
Section 22(3)
The implementation strategy must establish a clear chain of command, setting out the roles and responsibilities of personnel in relation to the implementation, management and review of the environment plan, including during emergencies or potential emergencies.

While the Santos Chief Executive Officer (CEO) has the overall accountability for the implementation of the Santos Management System and Santos Environment Policy, the VGCN assets sits under the remit of the Executive Vice President of WA, Northern Australia, Timor Leste Business Unit. The Santos General Manager – Projects and Decommissioning is accountable for ensuring implementation, management, and review of this EP.

Key roles and environmental responsibilities for the decommissioning activity are detailed in Table 8-3 and will be communicated to these positions before the activity commences and when any changes are made to these positions.

Table 8-3: Chain of command, key leadership roles and responsibilities

Role	Responsibilities
General Manager – Drilling and Completions	• Ensure Santos' policies and standards are adhered to and communicated to all employees and contractors • Promote HSE as a core value integral with how Santos does its business. • Empower personnel to 'stop-the-job' due to HSE concerns. • Provide resources for HSE management. • Ensure a high level of HSE performance and drives improvement opportunities. • Ensure emergency response plans are in place. • Maintain communication with company personnel, government agencies and the media. • Approve MoC documents, if acceptable and ALARP. • Ensure the annual HSE Improvement Plan is completed.
Santos Drilling Superintendent	• Ensure conformance with environmental performance outcomes and standards in the EP. • Delegate HSE responsibility and informs these personnel of their responsibilities under the EP. • Empower personnel to `stop-the-job' due to HSE concerns. • Ensure HSE incidents are reported, investigated, corrected and communicated. • Ensure MODU/LWIV meets quarantine requirements to operate in Australian waters. • Ensure HSE inspections and audits are completed and corrective actions implemented. • Review MoC documents. • Ensure personnel on the MODU have the necessary qualifications, training and/or supervision.
Santos Supervisors/MODU Offshore Installation Manager/Vessel Masters	Has overall responsibility for: • implementing and ensuring compliance with relevant environmental legislative requirements, EP commitments and operational procedures on the MODU/LWIV • maintaining clear communication with personnel on board • communicating hazards and risks to the workforce • monitoring daily activities on the MODU/LWIV to ensure the relevant environmental legislative requirements, EP commitments and operational procedures are being followed • maintaining vessels/MODU/LWIV to all regulatory and class requirements • maintaining their vessel/MODU/LWIV in a state of preparedness for emergency response • reporting environmental incidents to PIC and ensuring follow-up actions are performed.

Role	Responsibilities
Company Site Representative	Has responsibility for: • implementing EP commitments • ensuring personnel competency • ensuring compliance with procedures and work instructions • being site focal point for onshore/offshore communications • reporting all incidents and potential hazards • leading site-based incident response • implementing corrective actions from environmental incidents and audits
Environment Approvals Manager	• Ensure adequate resources are in place to meet environment compliance requirements within the EP. • Notify NOPSEMA of a change in titleholder, a change in the titleholder's nominated liaison person or a change in the contact details (as per Section 1.4). Ensure incident preparedness and response arrangements meet Santos and regulatory requirements. • Ensure adequate resources are in place to meet the compliance requirements within the OPEP. • Has overall responsibility for approving the OPEP.
Support personnel	
Santos Marine Superintendent	• Ensure conformance with environmental performance outcomes and standards in the EP delegates HSE responsibility and informs these personnel of their responsibilities under the EP. • Empower personnel to `stop-the-job' due to HSE concerns. • Ensure HSE incidents are reported, investigated, corrected and communicated. • Ensure vessels meet quarantine requirements to operate in Australian waters. • Ensure HSE inspections and audits are completed and corrective actions implemented. • Ensure personnel on the vessels have the necessary qualifications, training and/or supervision.
Santos HS Manager	Has overall responsibility for: • ensuring incident preparedness and response arrangements meet Santos and regulatory requirements • approving the OPEP • providing ongoing resources to maintain compliance with the OPEP and other Santos incident response requirements.
Senior Stakeholder Adviser/Relevant Persons Coordinator	• Be responsible for implementation of steps described in Section 8.12 relating to post acceptance consultation throughout the duration of the activity. • Maintain a Relevant Persons contact and information database. • Maintain a Relevant Persons Notification Log specific to the EP. • Maintain records of all Relevant Persons correspondence specific to the EP • Ensure relevant stakeholders are identified throughout the life of the EP. • Prior to commencement of the activity and on advice of HSE Team Lead, provide a notification to all relevant stakeholders listed, or as revised, in Table 8-4 and Table 8-6.The notification will include information on activity timing, vessel movements and vessel details. • On advice of Santos Environmental Coordinator (Compliance), provide cessation notifications to relevant stakeholders identified in Table 8-4 and Table 8-6. • Be available before, during and after the activity to ensure opportunities for stakeholders to provide feedback are available. • Prepare and distribute quarterly consultation updates to relevant
Santos Environmental Coordinator (Compliance)	• Ensure environmental monitoring is conducted in accordance with the Santos Management System and this EP. • Ensure incident investigations are conducted as per Santos Management System. • Ensure EP compliance report that covers environmental performance of the activity in this EP is prepared and submitted to NOPSEMA.

Role	Responsibilities
Senior Oil Spill Response Adviser	Has overall responsibility for: • providing upfront and ongoing guidance, framework, and direction on preparation of the OPEP • developing and maintaining arrangements and contracts for incident response support from third-parties • developing and defining objectives, strategies and tactical plans for response preparedness defined in the OPEP and Incident Response Plan • undertaking assurance activities on arrangements outlined within the OPEP.

8.6 Workforce training and competency

OPGGS(E)R 2023 Requirements
Section 22(4)
The implementation strategy must include measures to ensure that each employee or contractor working on, or in connection with, the activity is aware of his or her responsibilities in relation to the environment plan, including during emergencies or potential emergencies, and has the appropriate competencies and training.

This section describes the mechanisms that will be in place so that each employee and contractor is aware of his or her responsibilities in relation to the EP and has appropriate training and competencies.

8.6.1 Activity inductions

All personnel on the MODU/LWIV and support vessels will complete an induction that will include a component addressing their EP responsibilities. Induction attendance records for all personnel will be maintained. Inductions will include information on:

- Santos' Environment Policy (Appendix A)
- regulatory regime (NOPSEMA regulations)
- operating environment (e.g. nearby protected marine areas, sensitive environmental periods)
- interaction with other marine users (i.e. topic to reinforce the importance of marine communications regarding any potential interactions with active commercial fishing)
- activities with highest risk (e.g. invasive marine species and hydrocarbon releases)
- EPOs and environmental management measures (e.g. Table 8-2)
- incident reporting and notifications
- regulatory compliance reporting
- management of change process for changes to EP activities
- oil pollution emergency response (e.g. OPEP requirements).

8.6.2 Training and competency

All members of the workforce on the MODU/LWIV and vessels will complete relevant training and hold qualifications and certificates for their role. Santos and its contractors are individually responsible for ensuring that their personnel are qualified and trained. The systems, procedures and responsible persons will vary and will be managed through the use of online databases, staff onboarding process and training departments, etc.

Personnel qualification and training records will be sampled before and/or during an activity. Such checks will be performed during the procurement process, facility acceptance testing, inductions, crew change, and operational inspections and audits.

8.6.3 Workforce involvement and communication

Daily operational meetings will be held at which HSE will be a standing agenda item. It is a requirement that supervisors attend daily operational meetings and that all personnel attend daily toolbox or pre-shift meetings. Toolbox or pre-shift meetings will be held to plan jobs and discuss work tasks, including HSE risks and their controls.

HSE performance will be monitored and reported during the activity, and performance metrics (such as the number of environmental incidents) will be regularly communicated to the workforce. Workforce involvement and environmental awareness will also be promoted by encouraging offshore personnel to report marine fauna sightings and marine pollution (for example, oil on water, dropped objects).

8.7 Emergency preparedness and response

OPGGS(E)R 2023 Requirements
Section 22(8)
The implementation strategy must contain an oil pollution emergency plan and provide for updating the plan.

MODU/LWIV and vessels are required to have and implement incident response plans, such as an emergency response plan and SMPEP or SOPEP. Regular incident response drills and exercises (for example, as defined in an emergency response plan, SMPEP or SOPEP) are performed to refresh the crew in using equipment and implementing incident response procedures.

Santos will implement the activity OPEP (7745-236-EMP-0002) in the event of a hydrocarbon spill. The OPEP details how Santos will prepare and respond to a spill event and meets the requirement of the OPGGS(E)R 2023.

8.8 Incident reporting, investigation and follow-up

OPGGSR 2023 Requirements
Section 22(7)
The implementation strategy must state when the titleholder will report to NOPSEMA in relation to the titleholder's environmental performance for the activity. The interval between reports must not be more than 12 months. Note: section 51 requires a titleholder to report on environmental performance at the times or intervals set out in the environment plan.
Section 22(6)
The implementation strategy must provide for sufficient monitoring of, and maintaining a quantitative record of, emissions and discharges (whether occurring during normal operations or otherwise), such that the record can be used to assess whether the environmental performance outcomes and standards in the environment plan are being met.

The requirements for reporting, investigating, and learning from unplanned or uncontrolled events that have or could have resulted in harm to people, the environment or company assets are defined in the Incident Reporting Procedure.

All personnel will be informed through inductions and daily operational meetings of their duty to report HSE incidents and hazards. Reported HSE incidents and hazards will be shared during daily operational meetings and will be documented in Santos' incident management system. HSE incidents will be investigated using root cause analysis.

Environmental recordable and reportable incidents will be reported to NOPSEMA as required, in accordance with Table 8-4. The incident reporting requirements will be provided to all crew on board the facilities and support vessels with special attention to the reporting time frames to provide for accurate and timely reporting.

For the purposes of this activity, in accordance with OPGGS(E) Regulations:

- a recordable incident, for an activity, means a breach of an EPO or EPS, in the EP that applies to the activity, that is not a reportable incident
- a reportable incident, for an activity, means an incident relating to the activity that has caused, or has the potential to cause, moderate to significant environmental damage.

For the purposes of this EP, a reportable incident is an incident that is assessed to have an environmental consequence of moderate or higher in accordance with the Santos environmental impact and risk assessment process outlined in Section 5. Of the planned and unplanned events assessed within this EP, the following were identified to have a potential consequence level of Moderate or higher if the event were to occur and would therefore be a reportable incident:

- introduction of invasive marine species (IV Major)
- hydrocarbon release from LOWC (IV Major).

8.9 Reporting and notifications

OPGGSR 2023 Requirements
Section 22(7)
The implementation strategy must state when the titleholder will report to NOPSEMA in relation to the titleholder's environmental performance for the activity. The interval between reports must not be more than 12 months. Note: section 51 requires a titleholder to report on environmental performance at the times or intervals set out in the environment plan.
Section 22(6)
The implementation strategy must provide for sufficient monitoring of, and maintaining a quantitative record of, emissions and discharges (whether occurring during normal operations or otherwise), such that the record can be used to assess whether the environmental performance outcomes and standards in the environment plan are being met.

8.9.1 Notifications and compliance reporting

Regulatory and compliance reporting requirements are summarised in Table 8-4.

Activity notifications requested during consultation or where Santos has standing arrangements are summarised in Table 8-6.

Table 8-4: Activity notification and reporting requirements

Requirement	Required Information	Timing	Type	Recipient
Before the activity				
AHO Notification Standing arrangement with AHO.	Activity timing, location, description, and vessel contact details.	At least four weeks before the activity commences where practicable.	Written	AHO: datacentre@hydro.gov.au
OPGGS(E) sections 54 and 55 – Notifications NOPSEMA must be notified that the activity is to commence.	Complete NOPSEMA's section 29 Start or End of Activity Notification form prior to each campaign.	At least ten days before the campaign activity commences.	Written	NOPSEMA
During the activity				
OPGGS(E) section 50 – Recordable Incidents NOPSEMA must be notified of a breach of an EPO or EPS, in the environment plan that applies to the activity that is not a reportable incident.	Complete NOPSEMA's Recordable Environmental Incident Monthly Report form.	As soon as practicable after the end of the calendar month, and in any case, not later than 15 days after the end of the calendar month.	Written	NOPSEMA
OPGGS(E) section 24(c), 47 and 48 – Reportable Incident NOPSEMA must be notified of any reportable incidents. For the purposes of section 16(c), a reportable incident is defined as "an incident relating to the activity that has caused, or has the	The oral notification must contain: • all material facts and circumstances concerning the reportable incident known or by reasonable search or enquiry could be found out • any action taken to avoid or mitigate any adverse environmental impacts of the reportable incident • the corrective action that has been taken, or is proposed to be taken, to stop, control or remedy the reportable incident.	As soon as practicable, and in any case not later than two hours after the first occurrence of a reportable incident, or if the incident was not detected at the time of the first occurrence, at the time of becoming aware of the reportable incident.	Oral	NOPSEMA
	A written record of the oral notification must be submitted. The written record is not required to include anything that was not included in the oral notification.	As soon as practicable after the oral notification.	Written	NOPSEMA National Offshore Petroleum Titles Administrator

Requirement	Required Information	Timing	Type	Recipient
potential to cause, moderate to significant environmental damage".	A written report must contain: • all material facts and circumstances concerning the reportable incident known or by reasonable search or enquiry could be found out • any action taken to avoid or mitigate any adverse environmental impacts of the reportable incident • the corrective action that has been taken, or is proposed to be taken, to stop, control or remedy the reportable incident • the action that has been taken, or is proposed to be taken, to prevent a similar incident occurring in the future. • Consider reporting using NOPSEMA's Report of an Accident, Dangerous Occurrence or Environmental Incident form.	Must be submitted as soon as practicable, and in any case not later than three days after the first occurrence of the reportable incident unless NOPSEMA specifies otherwise. Same report to be submitted to National Offshore Petroleum Titles Administrator within seven days after giving the written report to NOPSEMA.	Written	NOPSEMA National Offshore Petroleum Titles Administrator
OPGGS(E) section 51 – Environmental Performance NOPSEMA must be notified of the environmental performance at the intervals provided for in the EP.	Report must contain sufficient information to determine whether or not environmental performance outcomes and standards in the EP have been met.	Annual performance report to be submitted to NOPSEMA annually from the date of acceptance of this EP.	Written	NOPSEMA
AMSA Reporting Under the MoU between Santos and AMSA and as requested by AMSA during consultation.	Any changes to the intended operations.	As soon as practicable.	Written	AMSA's JRCC: rccaus@amsa.gov.au
	Titleholder agrees to notify AMSA of any marine pollution incident[1].	Within two hours of incident.	Oral	AMSA
	POLREP and SITREP available online (refer to OPEP).	POLREP as requested by AMSA following verbal notification. SITREP as requested by AMSA within 24 hours of request.	Written	AMSA

[1] *For clarity and consistency across Santos regulatory reporting requirements Santos will meet the requirement of reporting marine oil pollution by reporting oil spills assessed to have an environmental consequence of moderate or higher in accordance with Santos environmental impact and risk assessment process outlined in Section 7.*

Requirement	Required Information	Timing	Type	Recipient
Director of National Parks Reporting Notification of the event of oil pollution within a marine park or where an oil spill response action must be taken within a marine park; or if any changes to intended operations (requested through consultation).	The DNP should be made aware of oil/gas pollution incidences that occur within a marine park or are likely to impact on a marine park as soon as possible. Notification should be provided to the 24-hour Marine Compliance Duty Officer on 0419 293 465. The notification should include: • titleholder details • time and location of the incident (including name of marine park likely to be affected) • proposed response arrangements as per the OPEP (such as dispersant, containment) • confirmation of providing access to relevant monitoring and evaluation reports when available • contact details for the response coordinator. Note that the DNP may request daily or weekly Situation Reports, depending on the scale and severity of the pollution incident.	So far as reasonably practicable prior to response action being written.	Oral and written	Director of National Parks
	Notify if details regarding the activity change and result in an overlap with or new impact to a marine park.	As soon as practicable.	Written	DNP: marineparks@awe.gov.au
DPIRD Reporting If marine pests or disease are suspected this must be reported to DPIRD.	Notification of any suspected marine pests or diseases including any organism listed in the Western Australian Prevention List for Introduced Marine Pests and any other non-endemic organism that demonstrates invasive characteristics.	Within 24 hours.	Oral	DPIRD FishWatch
DCCEEW Reporting Any harm or mortality to EPBC Act listed threatened marine fauna. Marine Fauna Sighting Data.	Notification of any harm or mortality to an EPBC listed species of marine fauna whether attributable to the activity or not.	Within seven days to EPBC.permits@environment.gov.au.	Written	DCCEEW
	Marine fauna sighting data recorded in the marine fauna sighting database.	As soon as practicable, in any case no later than three months of the end of the activity.	Written	DCCEEW

Requirement	Required Information	Timing	Type	Recipient
Department of Biodiversity, Conservation and Attractions Reporting Any harm or mortality to fauna listed as threatened under the *WA Biodiversity Conservation Act 2016*.	Notification of any harm or mortality to fauna listed as a threatened species under the WA *Biodiversity Conservation Act 2016* as a result of Santos' activities.	A fauna report will be submitted to DBCA within seven days to fauna@dbca.wa.gov.au.	Written	DBCA
Australian Marine Mammal Centre Reporting Any ship strike incident with cetaceans will also be reported to the National Ship Strike database.	Ship strike report provided to the Australian Marine Mammal Centre: https://data.marinemammals.gov.au/report/shipstrike.	As soon as practicable.	Written	DCCEEW
Department of Biodiversity, Conservation and Attractions Reporting Notification of the event of a hydrocarbon release.	Notification of actual or impending spillage.	As soon as practicable.	Oral or Written	DBCA Pilbara regional office
Department of Transport and Major Infrastructure Reporting All actual or impending MOP incidents that are in, or may impact, State waters resulting from an offshore petroleum activity.	Notification of actual or impending spillage, release or escape of oil or an oily mixture that is capable of causing loss of life, injury to a person or damage to the health of a person, property, or the environment.	Within two hours.	Oral	DTMI
	WA DTMI POLREP and SITREP available online (refer OPEP).	As requested by DTMI after verbal notification.	Written	DTMI

Requirement	Required Information	Timing	Type	Recipient
DWER	Notification of a spill event.	As soon as practicable.	Oral and written	DWER Recipient 1300 784 782 and email: pollutionwatch@dwer.wa.gov.au
CASA	All strikes will be reported by the helicopter operator to CASA.	As soon as possible	Oral with follow up email	CASA
End of activity				
OPGGS(E) section 54 – Notifications NOPSEMA must be notified that the activity is completed.	Complete NOPSEMA's Section 29 Start or End of Activity Notification form for both notifications.	Within ten days after cessation of each activity campaign.	Written	NOPSEMA
Commercial Fishers Notification As requested during consultation.	Activity Cessation Notification provided to relevant commercial fishing stakeholders, as agreed with WAFIC or relevant industry body.	Within ten days after cessation of each campaign.	Written	WAFIC: oilandgas@wafic.org.au
OPGGS(E) section 51 – Environmental Performance NOPSEMA must be notified of the environmental performance of the activity.	Report must contain sufficient information to determine whether or not environmental performance outcomes and standards in the EP have been met.	An environmental performance report will be submitted within three months of completion of each campaign.	Written	NOPSEMA

Requirement	Required Information	Timing	Type	Recipient
OPGGS(E) section 54 EP ends when titleholder notifies completion and the regulator accepts the notification. NOPSEMA must be notified that the activity has ended and all EP obligations have been completed.	Notification advising NOPSEMA of end of all activities to which the EP relates and that all obligations have been completed.	Within 12 months of the final section 54 notification.	Written	NOPSEMA

8.9.2 Monitoring and recording emissions and discharges

OPGGS(E)R 2023 Requirements
Section 34(e)
Includes an appropriate implementation strategy and monitoring, recording and reporting arrangements.
Section 22(6)
The implementation strategy must provide for sufficient monitoring of, and maintaining a quantitative record of, emissions and discharges (whether occurring during normal operations or otherwise), such that the record can be used to assess whether the environmental performance outcomes and standards in the environment plan are being met.

Vessel-based discharges to the marine environment, associated with this activity will be recorded and controlled in accordance with requirements under relevant marine orders.

Santos and support vessel contractors will maintain records so that emissions and discharges can be determined or estimated. Such records will be maintained for a period of five years. Contractors are required to make these records available upon request. Santos records discharges or emissions (where practicable), to the environment as described in Table 8-5.

Table 8-5: Monitoring methods for emissions and discharges

Discharge/Emission	Parameter	Quantitative Record	Recording Frequency
Chemicals (discharged to marine environment as per Section 2.8)	Volume	Chemical Risk Assessment Volumes used will be estimated based on known inventories	For every chemical use with a fate to the marine environment
Oily water	Volume and location	Oil Record Book* or equivalent report	For every discharge
Garbage (including food scraps)	Volume and location	Garbage Record Book*	For every discharge
Sewage	Volume and location	Sewage Record Book* or estimated from personnel on board numbers	For every discharge
Ballast water	Volume and location	Ballast water record book or log**	For every discharge
Unplanned discharge of solid objects	Volume	Incident report	For every discharge
Unplanned discharge of hazardous liquids	Volume	Incident report	For every discharge
Unplanned hydrocarbon release	Volume	Incident report	For every discharge

Maintained as per vessel class in accordance with relevant marine orders.

*** Maintained as per Australian Ballast Water Management Requirements 2017.*

8.10 Document management

8.10.1 Information management and document control

This EP and OPEP, as well as approved management of change documents, are controlled documents and current versions will be available on Santos' intranet. Santos contractors are also required to maintain current versions of these documents.

Santos, and the MODU/LWIV and vessel contractors, will maintain records so that emissions and discharges can be determined or estimated. Environmental performance outcomes and standards will be measured based on the measurement criteria listed in Table 8-2. Such records will be maintained for a period of five years. Contractors are required to make these records available upon request.

8.10.2 Environment Plan management of change

The MoC process provides a systematic approach to initiate, assess, document, approve, communicate and implement changes to EPs and OPEPs.

The MoC process considers sections 7, 8 and 17 of the OPGGS(E)R 2023 and determines if a proposed change can proceed and the manner in which it can proceed. The MoC procedure will determine whether a revision of the EP is required and whether that revision is to be submitted to NOPSEMA. For a change to proceed, the associated environmental impacts and risks must be demonstrated to be acceptable and ALARP. Additional stakeholder consultation may be required, depending on the nature and scale of the change. Additional information about the MoC process is provided in Figure 8-1.

The MoC procedure also allows for the assessment of new information that may become available after EP acceptance, such as new management plans for AMPs, new recovery plans or conservation advice for species, and changes to the EPBC Protected Matters Search results. If a review identifies new information, this is treated as a “Change that has an impact on EP”, and the MoC process is followed accordingly.

The MoC procedure also includes an assurance check process that applies the MoC process to long term (usually five-year multi-activity) EPs that may have lengthy periods of time between use or acceptance and activity commencement. Applying this assurance check to this EP helps Santos determine whether the activity will still comply with the EP and is still acceptable, or, if there are any changes to what is covered by the relevant EP. Where there is an identified change from the accepted EP content, a check is done to test the ‘significance’ of the change, to determine whether it can be accommodated, which may then result in an MoC as described above.

Accepted MoCs become part of the in-force EP or OPEP, are tracked on a register and are made available on Santos’ intranet. Where appropriate, the EP compliance register will be updated so that CM or EPs changes are communicated to the workforce and implemented. Any MoC will be distributed to the management people identified in Table 8-3 (excluding the Chief Executive Officer and Directors), and the most relevant management position will ensure the MoC is communicated and implemented, which may include crew meetings, briefings or communications as appropriate for the change.

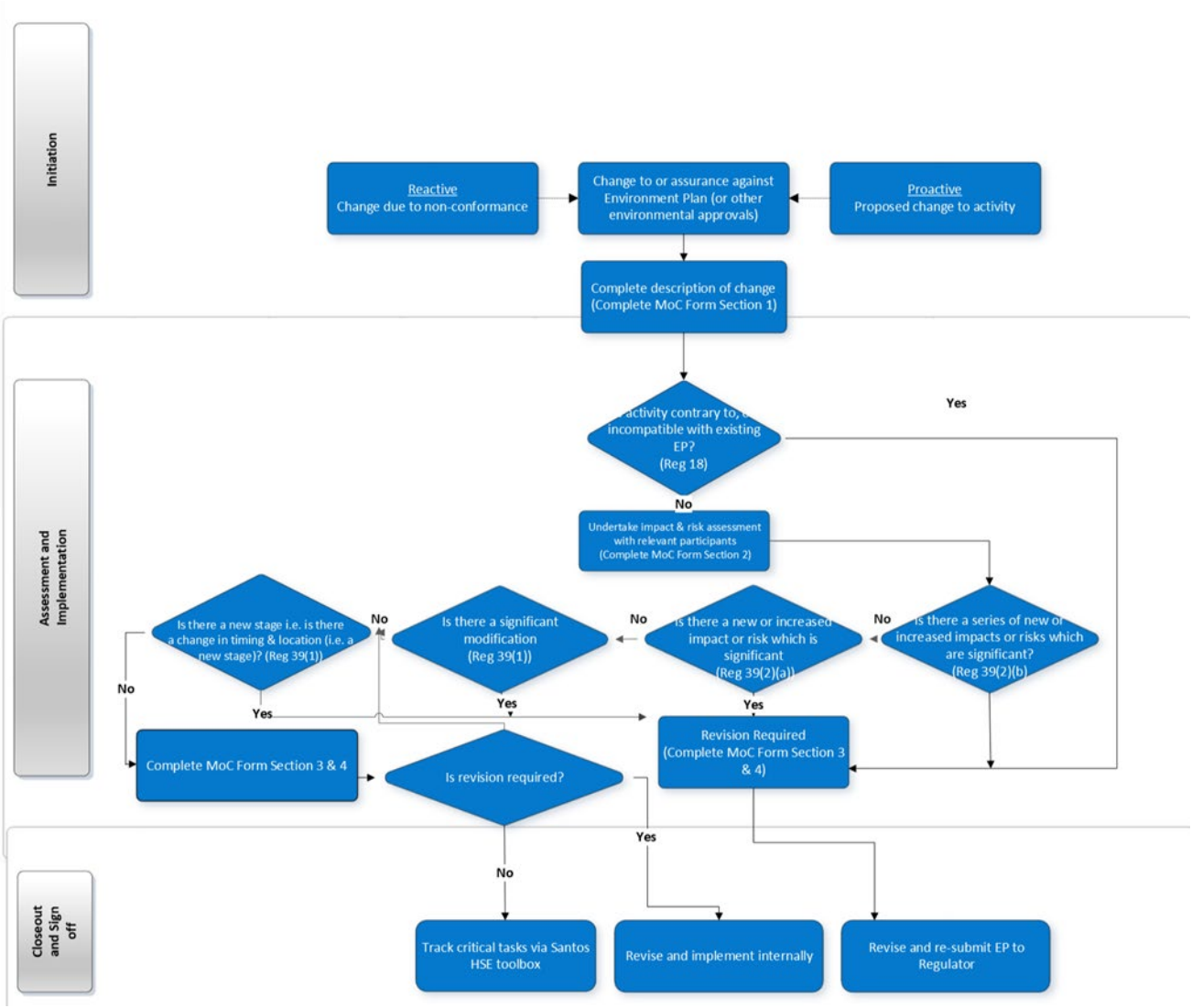

Figure 8-1: Environment Plan 'management of change' process schematic

8.10.3 Reviews

This EP has assessed impacts and risk across the Operational Area, during any time of the year, for planned and unplanned events given the nature of the 24/7 operations.

It is recognised that over the validity of this EP things may change, such as:

- legislation
- businesses conditions, activities, systems, processes and people
- industry practices
- science and technology
- societal and stakeholder expectations.

To ensure Santos maintains up-to-date knowledge of the industry, legislation and conservation advice, the following tasks are undertaken:

- Maintain membership of AEP, which provides a mechanism for communicating potential changes in legislation, industry practice and other issues that may affect EP implementation to relevant personnel in Santos.
- Undertake annual spill response exercises to check spill response arrangements and capability are adequate.

- Identify stakeholders prior to the activity commencing under this EP via the mechanisms outlined in Section 4.
- Review the values and sensitivities within the EMBA, which includes completing a new EPBC PMST search, reviewing Appendix D against relevant legislation to capture and review any relevant updates and incorporate as required, and reviewing any known recently published relevant scientific papers.
- Subscribe to various regulator updates.
- Have regular liaison meetings with regulators.

Through maintenance of up-to-date knowledge, these changes are identified. If the changes have an impact on the activity or risks described and assessed in this EP, the EP will be reviewed and any changes required documented in accordance with Santos' MoC procedure (Section 8.10.2).

8.11 Audits and inspections

OPGGS(E)R 2023 Requirements
Section 22(5)
The implementation strategy must provide for sufficient monitoring, recording, audit, management of nonconformance and review of the titleholder's environmental performance and the implementation strategy to ensure that the environmental performance outcomes and standards in the environment plan are being met.

8.11.1 Audits

Santos audit plans and schedules are reviewed and updated at the beginning of each calendar year and cover all Santos facilities and activities. Santos' audit schedule may be amended to accommodate operational priorities, activity risk, personnel availability or high audit demand during certain periods (for example, regulatory audits, contractor audits). Santos will determine if a vessel audit is required following contract award and vessel confirmation.

Audits will be undertaken in a manner consistent with Santos' Assurance Technical Standard.

Audit scope typically includes a selection of CMs and EPSs and EPOs. However, audits may also include other parts of the EP.

Audits findings may include opportunities for improvement and non-conformances. Audit non-conformances are managed as described in Section 8.11.3.

8.11.2 Inspections

During the activity, HSE inspections (desktop or MODU/LWIV/vessel based) will be conducted at least once during the activity to identify hazards, incidents and EP non-conformances. These inspections will also check compliance against all the EPOs and EPSs of this EP (Table 8-2) and inform end of activity reporting (Table 8-4). Any in-field opportunities for improvement or corrective actions will be discussed during the inspection with the Vessel Master or Offshore Installation Manager.

8.11.3 Non-conformance management

EP non-conformances will be addressed and resolved by a systematic corrective action process, as outlined in Santos' Assurance Technical Standard. Non-conformances arising from audits and inspections will be entered into Santos' incident and action tracking management system (as in, HSE Toolbox). Once entered, corrective actions, timeframes and responsible persons (including action owners and event validators) will be assigned. Corrective action 'close out' will be monitored using a management escalation process. Any non-conformances that trigger recordable or reportable incident reporting to NOPSEMA will be managed per Section 8.8 and Section 8.9.

8.11.4 Continuous improvement

For this EP, continuous improvement will be driven by the list below and may result in a review of the EP with changes applied in accordance with Section 8.10.2:

- improvements identified from the review of business-level HSE key performance indicators
- actions arising from Santos and departmental HSE improvement plans
- corrective actions and feedback from HSE audits and inspections, incident investigations and after-action reviews

- opportunities for improvement and changes identified during pre-activity reviews and MoC documents
- actions taken to address concerns and issues raised during the ongoing stakeholder management process (Section 4).

Identified continuous improvement opportunities will be assessed in accordance with the MoC process to ensure any potential changes to this EP, or OPEP, are managed in accordance with the OPGGS(E)R 2023 and in a controlled manner.

8.12 Post acceptance consultation implementation strategy

OPGGS(E)R 2023 Requirements
Section 22(15). Implementation Strategy for the Environment Plan
The implementation strategy must provide for appropriate consultation with: (a) relevant authorities of the Commonwealth, a State or a Territory (b) other relevant interested persons or organisations.

Santos is committed to appropriate post acceptance consultation implementation for this activity with relevant government authorities and other relevant interested persons and organisations.

Post acceptance consultation activities for this EP will be principally supported by Santos' regional engagement program for its existing operational footprint in the Carnarvon Basin, with a focus on First Nations people and groups and local governments, communities and industry with interests in the lands and waters of the adjacent Pilbara region.

Information will be provided principally by way of quarterly written activity updates. Santos includes in its supporting communications to recipients of the quarterly update (including those listed in this section) if they:

- would like to receive pre-start and upon completion activity notifications for planned activities
- would like to provide feedback about these activities as part of our ongoing consultation activities
- know of any other authorities, organisations or individuals who Santos should contact to seek feedback.

Santos will also use email notifications where relevant to keep relevant authorities or other relevant interested persons or organisations informed of intermittent activities, such as maintenance or project activities.

Consideration of whether notifications are required for an intermittent activity will be given prior to the commencement of that activity. If notification is required, it will be undertaken in a format that is relevant given the information needs of the authority, person or organisation.

Timeframes for consultation notifications, if required, are outlined in Table 8-6.

During this EP validity period, Santos will periodically review information sources, which may give rise to additional or new relevant persons, primarily through the planned consultation to support future phases of decommissioning of the VGCN assets.

Santos will continue to accept, assess and respond to post acceptance consultation feedback during the life of the EP. Records of any post acceptance consultation will be maintained in an appropriate Santos consultation database.

If, during the course of post acceptance consultation, Santos receives information demonstrating a new or increased environmental impact or risk that is not provided for in this EP, as in force at the time, Santos will apply its MoC process outlined in Section 8.10.2.

Santos will maintain a database of relevant authorities, and other relevant interested persons and organisations for this activity. This includes updating its database in light of post acceptance consultation, including identification of new Relevant Persons.

8.12.1 Local governments, communities and industry

For this EP, Santos will provide quarterly written activity updates to the following representative organisations:

- local government – Shire of Exmouth
- local industry – Exmouth Chamber of Commerce and Industry
- community organisations – Exmouth Community Liaison Group.

Santos will also provide quarterly written activity updates to the commercial fishing industry via its representative organisation, Western Australian Fishing Industry Council and to the recreational fishing community via its representative organisation, Recfishwest.

Other than the quarterly written updates above, Santos has elected not to provide activity updates to other local government and associated communities, unless otherwise requested.

8.12.2 First Nations people and groups

For this EP, Santos will provide quarterly written activity updates via Representative Aboriginal/Torres Strait Islander Bodies and Prescribed Bodies Corporate, specifically to the nominated contacts for:

- Yamatji Marlpa Aboriginal Corporation
- Buurabalayji Thalanyji Aboriginal Corporation
- Nganhurra Thanardi Garrbu Aboriginal Corporation.

Table 8-6: Consultation and standing arrangement notifications

Initiation	Required Information	Timing	Type	Recipient
Before the activity				
Department of Defence Standing arrangement with DoD.	Activity timing, location, description, and vessel contact details. Confirm restricted air space status.	At least five weeks before the activity commences where practicable.	Written	DoD: offshore.petroleum@defence.gov.au
Australian Fisheries Management Authority Standing arrangement with AFMA.	Activity timing, location, description, and vessel contact details.	At least four weeks before the activity commences where practicable.	Written	AFMA: petroleum@afma.gov.au offshoreenergy@afma.gov.au
Australian Institute of Marine Science – WA Branch Requested during consultation.	Activity timing, location, description, and vessel contact details.	At least four weeks before the activity commences where practicable.	Written	Australian Institute of Marine Science – WA Branch: WAadmin@aims.gov.au
Department of Mines, Petroleum and Exploration Standing arrangement with DMPE.	Activity timing, location, description, and vessel contact details.	At least ten days before the activity commences where practicable.	Written	DMPE: petroleum.environment@dmpe.wa.gov.au.
Department of Agriculture, Fisheries and Forestry Standing arrangement with DAFF.	Activity timing, location, description, and vessel contact details.	At least four weeks before the activity commences where practicable.	Written	DAFF: petroleum&fisheries@agriculture.gov.au

Initiation	Required Information	Timing	Type	Recipient
Director of National Parks – Marine Parks Authorisations Standing arrangement with DNP.	Activity timing, location, description, and vessel contact details.	At least four weeks before the activity commences where practicable.	Written	DNP – Marine Parks Authorisations: marineparksauthorisations@dcceew.gov.au
Department of Primary Industries and Regional Development Standing arrangement with DNP.	Activity timing, location, description, and vessel contact details.	At least four weeks before the activity commences where practicable.	Written	DPIRD: environment@dpird.wa.gov.au enquiries@dpird.wa.gov.au
Recfishwest Standing arrangement with Recfishwest.	Activity timing, location, description, and vessel contact details.	At least four weeks before the activity commences where practicable.	Written	Recfishwest: info@recfishwest.org.au
Western Australian Fisheries Industry Council Standing arrangement with WAFIC.	Activity timing, location, description, and vessel contact details.	At least four weeks before the activity commences where practicable.	Written	WAFIC: oilandgas@wafic.org.au
Tuna Australia Standing arrangement with Tuna Australia.	Activity timing, location, description, and vessel contact details.	At least four weeks before the activity commences where practicable.	Written	Contact details as provided by Tuna Australia
	Activity timing, location, description, and vessel contact details.	At least one week prior to the start the activity commences where practicable.	Written	Contact details as provided by Tuna Australia

Initiation	Required Information	Timing	Type	Recipient
AMSA Joint Rescue Coordination Centre Standing arrangement with AMSA JRCC.	Notification to AMSA's JRCC of proposed start and end dates and any other relevant information for the Notice to Mariners to be issued. AMSA's JRCC requires the: • vessel details (including name, callsign and Maritime Mobile Service Identity) • satellite communications details (including INMARSAT-C and satellite telephone numbers) • area of operation • requested clearance from other vessels • any other information that may contribute to safety at sea • when operations start and end.	24 to 48 hours before the activity commences.	Written	AMSA's JRCC: rccaus@amsa.gov.au
During the activity				
AHO Notification Standing arrangement with AHO.	Any changes to the intended operations.	As soon as practicable.	Written	AHO: datacentre@hydro.gov.au
DMPE Requested during consultation.	Environmental incidents that could potentially impact any land or water in State jurisdictions	As soon as practicable.	Written	DMPE: petroleum.environment@dmpe.wa.gov.au
DPIRD	Notification of a spill event.	Within 24 hours of Santos reporting the incident to the appropriate authority.	Written	DPIRD: environment@dpird.wa.gov.au
Ngarluma Aboriginal Corporation Requested during consultation.	Notification of a spill event.	As soon as practicable.	Oral or written	ceo@ngarluma.com.au and chairperson
Nhuwala Claim Group Requested during consultation	Notification of a spill event.	As soon as practicable.	Oral or written	Contact details as provided by Nhuwala Claim Group

Initiation	Required Information	Timing	Type	Recipient
Wirrawandi Aboriginal Corporation Requested during consultation.	Notification of a spill event.	As soon as practicable.	Oral or written	Contact details as provided by Wirrawandi Aboriginal Corporation:
WAFIC Standing arrangement.	Phone call within 24 hours of incident being identified with potential to impact to the WA commercial fisheries.	Within 24 hours	Oral or written	WAFIC: oilandgas@wafic.org.au
	To be included on the vessel operations look ahead.		Written	WAFIC: oilandgas@wafic.org.au
DCCEEW Standing arrangement with DCCEEW.	Notify regulators of the discovery of any suspected UCH identified during the planning, development, operation, or decommissioning.	Within 21 days of the discovery.	Written	DCCEEW Australasian Underwater Cultural Heritage Database at: https://environment.gov.au/shipwreck/public/forms/notification reception@museum.wa.gov.au
Santos' commitment to include activity in Quarterly Consultation Update until activity ends.	The Quarterly Consultation Update will include the activity. This consultation will cease once the activity has ended.	Quarterly.	Written	The Quarterly Consultation Update is circulated to a broad group of Santos' stakeholders, including many of the stakeholders identified in Section 4.
End of activity				
AHO AFMA AMSA JRCC AIMS– WA Branch DAFF DoD DPIRD DMPE DNP – Marine Parks Authorisations Recfishwest WAFIC Tuna Australia	Activity Cessation Notification.	Within ten days after cessation of each campaign.	Written	AHO: datacentre@hydro.gov.au AFMA: petroleum@afma.gov.au AMSA's JRCC: rccaus@amsa.gov.au AIMS – WA Branch: WAadmin@aims.gov.au DAFF: Petroleum&Fisheries@agriculture.gov.au DoD: offshore.petroleum@defence.gov.au DPIRD: environment@dpird.wa.gov.au DMPE: petroleum.environment@dmpe.wa.gov.au DNP – Marine Parks Authorisations: marineparksauthorisations@dcceew.gov.au Recfishwest: info@recfishwest.org.au WAFIC: oilandgas@wafic.org.au Tuna Australia: details on file

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Appendix A Santos Environment Policy

Santos

Environment

Policy

Our Commitment

Santos is committed to minimising our environmental impact.

Our Actions

We will:

1. Integrate environmental management requirements into the way we work, including measures for biodiversity, emissions and air quality, and waste and water management
2. Comply with all relevant environmental laws and continuously improve our management systems
3. Include environmental considerations in business planning, decision making and asset management processes
4. Identify, control and monitor risks that have the potential for environmental impact, so far as is reasonably practicable, applying the mitigation hierarchy (avoid, minimise, restore, offset)
5. Report, investigate and learn from our incidents
6. Consult and communicate with, and promote the participation of, all workers to maintain a strong environmental culture
7. Provide training for employees to understand the impacts of the company's activities on the environment
8. Work proactively and collaboratively with our stakeholders and the communities in which we operate
9. Not undertake new exploration activities within the boundaries of natural sites on the World Heritage List (as specified on 19 August 2025)
10. Set, measure, review and monitor objectives and targets to demonstrate proactive risk reduction processes are in place and support a continuous improvement approach to managing environmental impacts
11. Report publicly on our environmental performance

Governance

The Safety and Sustainability Committee is responsible for reviewing the effectiveness of this policy.

This policy will be reviewed at appropriate intervals and revised when necessary to keep it current.

This policy applies to employees and contractors as defined in the Santos Code of Conduct.

Kevin Gallagher

Managing Director and CEO

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Approved by:	The Board		
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Appendix B Legislative Requirements

Australian Legislation

Commonwealth Legislation	Summary	Relevant to Activity?	Administering Authority	Relevant Aspects of the Activity	EP Section
Aboriginal and Torres Strait Islander Heritage Protection Act 1984	This Act provides for the preservation and protection from injury or desecration areas and objects that are of significance to Aboriginal people, under which the Minister may make a declaration to protect such areas and objects. The Act also requires the discovery of Aboriginal remains to be reported to the Minister.	Yes	Commonwealth – Department of Agriculture, Water, and the Environment	There are no known sites of Aboriginal Heritage Significance within the Operational Area but it is present within the wider EMBA. This Act would only apply to the activity if there was a discovery of Aboriginal remains, which is not considered likely to occur given the offshore location of the activity.	Section 3.2.5: Protected and significant areas Section 3.2.7: Socio-economic receptors
Australian Ballast Water Management Requirements, Version 8	Australian Ballast Water Management Requirements outline the mandatory ballast water management requirements to reduce the risk of introducing harmful aquatic organisms into Australia's marine environment through ballast water from international vessels. These requirements are enforceable under the *Biosecurity Act 2015.*	Yes	Commonwealth – Department of Agriculture and Water Resources	Potential internationally sourced vessel operating in Australian waters, which could have the potential for introduction of IMS and potential ballast water exchange.	Section 7.2: Introduction of invasive marine species
Australian Heritage Council Act 2003	This Act identifies areas of heritage value listed on the Register of the National Estate and sets up the Australian Heritage Council and its functions.	Yes	Australian Heritage Council	There are no national heritage places within the EMBA, as identified by the Act.	Section 3.2.5:-Protected and significant areas

Commonwealth Legislation	Summary	Relevant to Activity?	Administering Authority	Relevant Aspects of the Activity	EP Section
Australian Maritime Safety Authority Act 1990	This Act specifies that AMSA's role includes protection of the marine environment from pollution from ships and other environmental damage caused by shipping. AMSA is responsible for administering the Marine Order in Commonwealth Waters. This Act facilitates international cooperation and mutual assistance in preparing and responding to a major oil spill incident and encourages countries to develop and maintain an adequate capability to deal with oil pollution emergencies. Requirements are given effect through AMSA. AMSA is the lead agency for responding to oil spills in the marine environment and is responsible for the Australian National Plan for Maritime Environmental Emergencies.	Yes	AMSA	This Act applies to the use of any vessel associated with operations and is relevant to the activity in regard to the unplanned pollution from ships.	Section 7.7: Hydrocarbon release MDO
Aquatic Resources Management Act 2016	This Act will be the primary legislation used to manage fishing, aquaculture, pearling, and aquatic resources in Western Australia. The Act was scheduled for commencement on 1 January 2019; however, this has been deferred while an amendment to the Act is progressed.	Yes	DPIRD	Vessel movements have the potential to introduce IMS.	Section 7.2: Introduction of invasive marine species
Marine Orders	Marine Orders (MO) are subordinate rules made pursuant to the *Navigation Act 2012* and *Protection of the Sea (Prevention of Pollution from Ships) Act 1983* affecting the maritime industry. They are a means of implementing Australia's international maritime obligations by giving effect to international conventions in Australian law.	Yes	AMSA	Vessel movements, safety, discharges, and emissions	Sections 6 and 7: Planned and unplanned events

Commonwealth Legislation	Summary	Relevant to Activity?	Administering Authority	Relevant Aspects of the Activity	EP Section
Maritime Powers Act 2013	Protects the heritage values of shipwrecks and relics for shipwrecks over 75 years. It is an offence to interfere with a shipwreck covered by this Act. Available historic shipwreck locations covered by international conventions enacted by this legislation have been identified and assessed (as applicable) within this EP.	No	The Department of Immigration and Border Protection	This Act applies to the shipwrecks (over 75 years old) within the EMBA. There is no planned interaction or interference with shipwrecks, and any unplanned impacts is only expected to affect the surface waters.	NA
Biosecurity Act 2015 Biosecurity Regulations 2016	This Act provides the Commonwealth with powers to take measures of quarantine, and implement related programs as are necessary, to prevent the introduction of any plant, animal, organism or matter that could contain anything that could threaten Australia's native flora and fauna or natural environment. The Commonwealth's powers include powers of entry, seizure, detention and disposal. This Act includes mandatory controls on the use of seawater as ballast in ships and the declaration of sea vessels voyaging out of and into Commonwealth Waters. The Regulations stipulate that all information regarding the voyage of the vessel and the ballast water is declared correctly to the quarantine officers.	Yes	Commonwealth – Department of Agriculture and Water Resources	This Act applies to all internationally sources vessels operating in Australian waters that could have the potential for the introduction of IMS and potential ballast water exchange.	Section 7.2: Introduction of invasive marine species
Corporations Act 2001	This Act is the principal legislation regulating matters of Australian companies, such as the formation and operation of companies, duties of officers, takeovers, and fundraising.	Yes	Commonwealth – Australian Securities and Investments Commission	The titleholder has provided ACN details within the meaning of the Act.	Section 1.5.1: Titleholder

Commonwealth Legislation	Summary	Relevant to Activity?	Administering Authority	Relevant Aspects of the Activity	EP Section
Environment Protection and Biodiversity Conservation Act 1999 EPBC Amendment Regulations 2006	NOPSEMA is the sole assessor for offshore petroleum activities in Commonwealth water (as of 28 February 2014). Under the new arrangements, environmental protection will be met through NOPSEMA's decision-making processes. This Act is the Australian Government's key piece of environmental legislation. The Act focuses on protecting MNES. AMP management plans were also developed under this Act.	Yes	Commonwealth – Department of Agriculture, Water, and the Environment	This Act applies to all aspects of the activity that have the potential to impact MNES. Appropriate environmental approvals will be sought from NOPSEMA for all operations (this EP), which outlines compliance with the relevant regulations and plans under the Act. Where activities have existing approvals under the Act, these will continue to apply.	Section 6.1: Noise emissions Section 6.2: Light emissions Section 6.7: Drilling discharges Section 6.6: Planned chemical discharges Sections 7.6 and 7.7: Hydrocarbon release
National Greenhouse and Energy Reporting Act 2007	Introduces a single national reporting framework for the reporting and dissemination of information about greenhouse gas emissions, greenhouse gas projects and energy use and production of corporations.	Yes	Commonwealth – Department of Agriculture, Water, and the Environment	This Act applies to the atmospheric emissions through combustion engine use to operate the vessels associated with the activity. Implementation of the Act will reduce the impact of GHG emissions associated with vessel use for the installation and pre-commissioning activity, through compliance with MARPOL Annex VI (Marine Order 97: Marine pollution prevention – air pollution) and require the use of low sulphur fuel.	Section 6.3: Atmospheric emissions
Maritime Legislation Amendment (Prevention of Air Pollution from Ships) Act 2007	This Act implements the requirements of MARPOL 73/78 Annex VI for shipping in Commonwealth waters.	Yes	Commonwealth, Department of Infrastructure and Regional Development.	Implementation of this Act reduces the impact of GHG emissions associated with vessel use for the installation and pre-commissioning activity, through compliance with MARPOL Annex VI (Marine Order 97: Marine pollution prevention – air pollution) and require the use of low sulphur fuel.	Section 6.3: Atmospheric emissions
Marine Safety (Domestic Commercial Vessel) National Law Act 2012	This Act is a single regulatory framework for the certification, construction, equipment, design, and operation of domestic commercial vessels inside Australia's exclusive economic zone.	Yes	Commonwealth – Australian Maritime Safety Authority	All vessel movements associated with the activity will be governed by AMSA marine safety regulations under the Act.	Section 6.5: Interaction with other marine users Section 7.7: Hydrocarbon spill – MDO

Commonwealth Legislation	Summary	Relevant to Activity?	Administering Authority	Relevant Aspects of the Activity	EP Section
Navigation Act 2012	An Act regulating navigation and shipping including SOLAS. A number of Marine Orders enacted under this Act apply directly to offshore petroleum exploration and production activities: • Marine Order 21: Safety and emergency arrangements • Marine Order 27: Safety of navigation and radio equipment • Marine Order 30: Prevention of collisions • Marine Order 58: Safe management of vessels • Marine Order 70: Seafarer certification.	Yes	AMSA (operational) Department of Infrastructure and Regional Development Minister for Infrastructure and Regional Development	All vessel movements associated with the activity will be governed by marine safety regulations and Marine Orders under the Act.	Section 6.5: Interaction with other marine users Section 7.7: Hydrocarbon spill – MDO
Offshore Petroleum and Greenhouse Gas Storage Act 2006 Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2023	Petroleum exploration and development activities in Australia's offshore areas are subject to the environmental requirements specified in the OPGGS Act and associated Regulations. The OPGGS Act contains a broad requirement for titleholders to operate in accordance with "good oil-field practice". Specific environmental provisions relating to work practices essentially require operators to control and prevent the escape of wastes and petroleum. The Act also requires that activities are carried out in a manner that does not unduly interfere with other rights or interests, including the conservation of the resources of the sea and sea bed, such as fishing or shipping. In some cases, where there are particular environmental sensitivities or multiple use issues it may be necessary to apply special conditions to an exploration permit area. The holder of a petroleum title must maintain adequate insurance against expenses or liabilities arising from activities in the title, including expenses relating to clean-up or	Yes	NOPSEMA	The activity involves cessation of production activities, which is a petroleum activity regulated by NOPSEMA under this Act.	Section 6: Risk assessments for planned events Section 7: Risk assessments for unplanned events

Commonwealth Legislation	Summary	Relevant to Activity?	Administering Authority	Relevant Aspects of the Activity	EP Section
	other remedying of the effects of the escape of petroleum. The OPGGS(E)R provide an objective based regime for the management of environmental performance for Australian offshore petroleum exploration and production activities in areas of Commonwealth jurisdiction. Key objectives of the OPGGS(E)R include to: • ensure operations are carried out in a way that is consistent with the principles of ESD • adopt best practice to achieve agreed environment protection standards in industry operations • encourage industry to continuously improve its environmental performance.				
Ozone Protection and Synthetic Greenhouse Gas Management Act 1989	Regulates the manufacture, importation, and use of ODS (typically used in fire-fighting equipment and refrigerants). Applicable to the handling of any ODS.	Yes	Commonwealth – Department of Agriculture, Water, and the Environment	The activity does not include import, export, or manufacture activities of ODS. This Act applies where ODS is found on vessel refrigeration systems; however, this is a rare occurrence.	Section 6.3: Atmospheric emissions

Commonwealth Legislation	Summary	Relevant to Activity?	Administering Authority	Relevant Aspects of the Activity	EP Section
Protection of the Sea (Powers of Intervention) Act 1981 Protection of the Sea (Powers of Intervention) Regulations 1983	The Act authorises the Commonwealth to take measures for the purpose of protecting the sea from pollution by oil and other noxious substances discharged from ships and provides legal immunity for persons acting under an AMSA direction.	Yes	Commonwealth – Department of Infrastructure and Regional Development	This Act applies to vessel discharges and movements associated with the activity. The Act is relevant to the extent that Santos will comply with MARPOL through the following relevant Marine Orders relating to marine pollution prevention have been put in place to give effect to relevant regulations of Annexes I, II, III, IV, V and VI of MARPOL 73/78: • Marine Order 91: Marine pollution prevention – oil • Marine Order 93: Marine pollution prevention – noxious liquid substances • Marine Order 94: Marine pollution prevention – packaged harmful substances • Marine Order 95: Marine pollution prevention – garbage • Marine Order 96: Marine pollution prevention – sewage.	Section 6.5: Interaction with other marine users Section 6.6: Planned operational discharges Sections 7.6 and 7.7: Hydrocarbon release Section 7.2: Introduction of IMS

Commonwealth Legislation	Summary	Relevant to Activity?	Administering Authority	Relevant Aspects of the Activity	EP Section
Protection of the Sea (Prevention of Pollution from Ships) Act 1983 Protection of the Sea (Prevention of Pollution from Ships) (Orders) Regulations 1994	This Act relates to the protection of the sea from pollution by oil and other harmful substances discharged from ships. This Act disallows any harmful discharge of sewage, oil and noxious substances into the sea and sets the requirements for a shipboard waste management plan. The following Marine Orders relating to marine pollution prevention have been put in place to give effect to relevant regulations of Annexes I, II, III, IV, V and VI of MARPOL 73/78: • Marine Order 91: Marine pollution prevention – oil • Marine Order 93: Marine pollution prevention – noxious liquid substances • marine order 94: marine pollution prevention – packaged harmful substances • Marine Order 95: Marine pollution prevention – garbage • Marine Order 96: Marine pollution prevention – sewage • Marine Order 97: Marine pollution prevention – air pollution.	Yes	Commonwealth – Department of Infrastructure and Regional Development	This Act applies to vessel discharges and movements associated with the activity. The Act is relevant to the extent that Santos will comply with MARPOL through the following relevant Marine Orders relating to marine pollution prevention have been put in place to give effect to relevant regulations of Annexes I, II, III, IV, V and VI of MARPOL 73/78: • Marine Order 91: Marine pollution prevention – oil • Marine Order 93: Marine pollution prevention – noxious liquid substances • Marine Order 94: Marine pollution prevention – packaged harmful substances • Marine Order 95: Marine pollution prevention – garbage • Marine Order 96: Marine pollution prevention – sewage.	Section 6.5: Interaction with other marine users Section 6.6: Planned operational discharges Sections 7.6 and 7.7: Hydrocarbon release Section 7.2: Introduction of IMS
Protection of the Sea (Civil Liability of Bunker Oil Pollution Damage) Act 2008	This Act implements the requirements for the International Convention on Civil Liability for Bunker Oil Pollution Damage.	Yes	AMSA	This Act applies to diesel refuelling that may be undertaken at sea as part of the activity. Compliance with the Act reduces the risk of bunker oil pollution.	Section 7.7: Hydrocarbon spill – MDO

Commonwealth Legislation	Summary	Relevant to Activity?	Administering Authority	Relevant Aspects of the Activity	EP Section
Sea Installations Act 1987	This Act regulates the placement, use and maintenance of seabed installations in Australian waters. A sea installation refers to any manmade structure that is in contact with the seabed and used for an environment-related activity, for example: • Tourism or recreation • Carrying on of a business • Exploring, exploiting or using the living resources of the sea, seabed or sub-soil of the seabed whether by way of fishing, pearling, oyster farming, fish farming or otherwise • Marine archaeology Other activities including scientific activity or transport activity.	No		Yes – the London Protocol is implemented through Section 5 of the Sea Dumping Act; Article 1.4.1.4 of the London Protocol covers the abandonment of manmade structures. Santos has reviewed the Sea Dumping Act 1981 and determined a permit is not required in this instance as the Act came into operation on 6 March 1984 and the Tern-2 wellhead predates the Act as it was temporarily plugged and abandoned in 1982.	NA
Protection of the Sea (Harmful Antifouling Systems) Act 2006	This Act relates to the protection of the sea from the effects of harmful anti-fouling systems. It prohibits the use of harmful organotin in ant-fouling paints used on ships. This is enacted by Marine Order 98 (Marine pollution – anti-fouling systems) 2013.	Yes	Commonwealth, Department of Infrastructure and Regional Development and AMSA	This Act applies to vessel movements in Australian waters associated with the activity. Vessels are required to have biofouling systems in place to prevent introduction of IMS/harmful impact on Australian biodiversity. This is enacted by Marine Order 98 (Marine Pollution – Anti-fouling Systems) 2013.	Section 7.2: Introduction of IMS
Underwater Cultural Heritage Act 2018	This Act replaces the *Historic Shipwrecks Act 1976* and extends protection to other wrecks such as submerged aircraft and human remains. It also increases penalties applicable to damaged sites. The Act came into effect on 1 July 2019.	Yes		No planned interaction or interference to shipwrecks. Potential impact could be due to a hydrocarbon spill, but the credible spill is to surface, and therefore shipwrecks are highly unlikely to be impacted. Numerous shipwrecks identified within EMBA.	Sections 7.6 and 7.7: Hydrocarbon release
Draft Guidelines to protect underwater cultural heritage	Aims to provide direction on addressing legislative requirements and promoting best practice for identifying, assessing, and protecting underwater cultural heritage in Australian waters.	Yes	Commonwealth – Department of Climate Change, Energy, the Environment and Water (DCCEEW)	There is no planned interaction with cultural, historical or archaeological sites as defined in the draft guidelines. Any unplanned impact is only expected to affect surface waters.	Section 3– Existing Environment

Commonwealth Legislation	Summary	Relevant to Activity?	Administering Authority	Relevant Aspects of the Activity	EP Section
Environment Protection (Sea Dumping) Act 1981	Regulates the loading and dumping of waste at sea and fulfils Australia's international obligations under the London protocol to prevent marine pollution by controlling dumping of wastes and other matter. The Sea Dumping Act applies to all vessels, aircraft and platforms in Australian waters and to all Australian vessels and aircrafts in any part of the sea. This Act does not apply in relation to the disposal or storage of controlled material (other than a vessel, aircraft or platform) directly arising from, or related to, the exploration, exploitation and associated offshore processing, of seabed mineral resources.	No	Commonwealth – Department of Climate Change, Energy, the Environment and Water (DCCEEW)	The Act regulates the loading and dumping of waste at sea. Since the abandonment took place before the *Environment Protection (Sea Dumping) Act 1981* came into force, a permit is not required.	NA
National Biofouling Management Guidance for the Petroleum Production and Exploration Industry 2009	The guidance document provides recommendations for the management of biofouling hazards by the petroleum industry.	Yes	Commonwealth – Department of Agriculture, Fisheries and Forestry (DAFF)	Applying the recommendations within this document and implementing effective biofouling controls can reduce the risk of the introduction of an introduced marine species.	Section 7.2 – Introduction of invasive marine species
State legislation					
Western Australian *Fish Resources Management Act 1994*	The Act's primary objective is to manage fisheries and aquaculture in a sustainable way to ensure the long-term health of fish stocks and aquatic environments. This includes the management of noxious fish as per Part 9 of the Act (ss.103 - 108)	Yes	DPIRD	This Act applies to all aspects of the activity that have the potential to impact fish stocks and interaction with Commercial fisheries, including the management of invasive marine species, including noxious fish.	Section 6.1 – Interaction with Commercial Fisheries and Section 7.7 – Introduction of Invasive Marine Species

Commonwealth Legislation	Summary	Relevant to Activity?	Administering Authority	Relevant Aspects of the Activity	EP Section
Western Australian Fish Resources Management Regulations 1995	Working alongside the Fish Resourced Management Act, the regulations' objective is to manage fisheries and aquaculture in a sustainable way to ensure the long-term health of fish stocks and aquatic environments. This includes the management of noxious fish as per s.70 and schedule 5 of the Regulations.	Yes	DPIRD	This Act applies to all aspects of the activity that have the potential to impact fish stocks and interaction with Commercial fisheries, including the management of invasive marine species, including noxious fish.	Section 6.1 – Interaction with Commercial Fisheries and Section 7.7 – Introduction of Invasive Marine Species

International Agreements and Conventions

International Agreements and Conventions	Summary	Relevant to Activity	Relevant Aspects	EP Section
1996 Protocol to the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, 1972	Implemented in WA *Marine (Sea Dumping) Act* and *Environmental Protection (Sea Dumping) Act 1981*.	Yes	Sewage, grey water, and putrescible wastes generated from vessels. Deck drainage/deck wash-down, cooling, brine, ballast, and bilge water from support vessels. Hydraulic fluid released by petroleum industry in subsea production systems.	Section 6.6: Planned operational discharges
London Convention and Protocol (2006)	The objective of the London Convention and Protocol is to promote the effective control of all sources of marine pollution. Contracting Parties shall take effective measures to prevent pollution of the marine environment cause by dumping at sea. The Protocol is more restrictive than the convention as application of a 'precautionary approach' is included as a general obligation; a 'reverse list' approach is adopted, which implies that all dumping is prohibited unless explicitly permitted.	No	See *Sea Installations Act 1981*	NA

International Agreements and Conventions	Summary	Relevant to Activity	Relevant Aspects	EP Section
Agreement Between the Government of Australia and the Government of Japan for the Protection of Migratory Birds in Danger of Extinction and Their Environment 1974 (commonly referred to as the Japan Australia Migratory Bird Agreement or JAMBA)	This agreement recognises the special international concern for the protection of migratory birds and birds in danger of extinction that migrate between Australia and Japan. Implemented in EPBC Act.	Yes	Only relevant in so far as the credible spill scenario may result in impact to migratory seabirds foraging in area.	Sections 7.6 and 7.7: Hydrocarbon release
Agreement Between the Government of Australia and the Government of the People's Republic of China for the Protection of Migratory Birds and Their Environment 1986 (commonly referred to as the China Australia Migratory Bird Agreement or CAMBA)	This agreement recognises the special international concern for the protection of migratory birds and birds in danger of extinction that migrate between Australia and China. Implemented in EPBC Act.	Yes	Only relevant in so far as the credible spill scenario may result in impact to migratory seabirds foraging in area.	Sections 7.6 and 7.7: Hydrocarbon release
Convention for the Control of Transboundary Movements of Hazardous Wastes and Their Disposal 1989 (Basel Convention)	This convention deals with the transboundary movement of hazardous wastes, particularly by sea. Implemented in *Hazardous Waste (Regulation of Exports and Imports) Act 1989*.	No	Activity will be compliant with any transboundary movement requirements on hazardous waste.	Section 6.6: Planned operational discharges
United Nations Convention on Biological Diversity 1992	An international treaty to sustain life on earth.	Yes	Relevant only insofar as the activity may interact with MNES (threatened and migratory species) protected under the EPBC Act.	Section 6.4: Seabed disturbance Section 6.2: Light emissions Section 6.1: Noise emissions Section 7.3: Interaction with marine fauna Sections 7.6 and 7.7: Hydrocarbon release
Convention on Oil Pollution Preparedness, Response and Co-operation 1990 (OPRC 90)	This convention comprises national arrangements for responding to oil pollution incidents from ships, offshore oil facilities, sea ports and oil handling. The convention recognises that in the event of pollution incident, prompt and effective action is essential.	Yes	In the event that worse-case credible spill scenarios may enact a national arrangement for response.	Sections 7.6 and 7.7: Hydrocarbon release Section 6.8: Spill response operations
Convention on the Conservation of Migratory Species of Wild Animals 1979 (Bonn Convention)	The Bonn Convention aims to improve the status of all threatened migratory species through national action and international agreements between range states of particular groups of species.	Yes	Only relevant in so far as the credible spill scenario may result in impact to MNES protected migratory species.	Section 7.6: Hydrocarbon release Section 6.8: Spill response operations

International Agreements and Conventions	Summary	Relevant to Activity	Relevant Aspects	EP Section
Hong Kong International Convention for the Safe and Environmentally Sound Recycling of Ships, 15 May 2009	The Hong Kong Convention is aimed at ensuring that ships, when being recycled after reaching the end of their operational lives, do not pose any unnecessary risk to human health and safety or to the environment.	Yes	The Hong Kong Convention, while not formally ratified, provides the overarching requirements of what is required by a ship recycling facility, to recycle with an ALARP approach to the environment, and to human health and safety. Accordingly, ship recycle facilities are required to provide a Ship Recycling Plan (SRP) demonstrating how the FPSO will be recycled based on the FPSO characteristics.	N/A
International Convention for the Establishment of an International Fund for Compensation for Oil Pollution Damage (Fund 92)	This convention ensures compensation is provided for damage caused by oil pollution.	No	Relevant to oil tankers, not supply or support vessels.	N/A
International Convention for the Prevention of Pollution from Ships 1973/1978 (MARPOL 73/78)	This Convention and Protocol (together known as MARPOL 73/78) build on earlier conventions in the same area. MARPOL is concerned with operational discharges of pollutants from ships. It contains six Annexes, dealing respectively with oil, noxious liquid substances, harmful packaged substances, sewage, garbage and air pollution. Detailed rules are laid out as to the extent to which (if at all) such substances can be released in different sea areas. The legislation giving effect to MARPOL in Australia is the *Protection of the Sea (Prevention of Pollution from Ships) Act 1983*, the *Navigation Act 2012* and several Parts of Marine Orders made under this legislation.	Yes	Already dealt with through the *Protection of the Sea (Prevention of Pollution from Ships) Act 1983* – refer to legislation table.	N/A
International Convention for the Safety of Life at Sea 1974	This convention is generally regarded as the most important of all international treaties concerning the safety of merchant ships Implemented in the *Air Navigation Act 1920.*	Yes	Only relevant in so far as SOLAS relates to safety aspects of the activity, such as navigation aids, that reduce potential for vessel collision and hydrocarbon release to the environment.	Section 6.5: Interaction with other marine users
International Convention on Civil Liability for oil pollution damage (1969)	This convention provides a mechanism for ensuring the payment of compensation for oil pollution damage.	No	Relevant to oil tankers.	N/A

International Agreements and Conventions	Summary	Relevant to Activity	Relevant Aspects	EP Section
International Convention for the Control and Management of Ships' Ballast Water and Sediments (Ballast Water Convention) 2004	The IMO has been addressing the problem of invasive marine species in ships' ballast water since the 1980s. Ballast water and sediments guidelines were adopted in 1991 and the ballast water convention was adopted in 2004. Recent accession by Finland has triggered the final entry into force of these international requirements. As a result, the International Convention for the Control and Management of Ships Ballast Water and Sediment will enter into force on 8 September 2017 (IMO Briefing 22 2016). It aims to prevent the spread of harmful aquatic organisms from one region to another, by establishing standards and procedures for the management and control of ships' ballast water and sediments. Ballast Water Management systems must be approved by the Administration in accordance with this IMO Guidelines.	Yes	Potential internationally sourced vessel operating in Australian waters that could have the potential for introduction of IMS and potential ballast water exchange.	Section 7.2: Introduction of invasive marine species
Minamata Convention on Mercury (Australia ratified the convention on 7 December 2021)	The Minamata Convention on Mercury is an international treaty that seeks to protect human health and the environment from anthropogenic emissions and releases of mercury and mercury compounds. The Convention covers all aspects of the life cycle of mercury, controlling and reducing mercury across a range of products, processes, and industries.	Yes	Relevant to the contaminant limit concentrations in barite. Santos have committed to H2-DC-CM-030 Quality Control limits for Barite (relevant to mercury): • Mercury (Hg) – 1 mg/kg dry weight in stock barite • +Cadmium (Cd) – 3 mg/kg dry weight in stock barite	Section 6.6: Planned operational discharges

International Agreements and Conventions	Summary	Relevant to Activity	Relevant Aspects	EP Section
United Nations Convention on the Law of the Sea (UNCLOS) (1982)	Part XII of the convention sets up a general legal framework for marine environment protection. The convention imposes obligations on State Parties to prevent, reduce and control marine pollution from the various major pollution sources, including pollution from land, from the atmosphere, from vessels and from dumping (Articles 207 to 212). Subsequent articles provide a regime for the enforcement of national marine pollution laws in the many different situations that can arise. Australia signed the agreement relating to the implementation of Part XI of the Convention in 1982, and UNCLOS in 1994.	Yes	Only relevant to the extent that Santos will comply with MARPOL through the following relevant Marine Orders relating to marine pollution prevention have been put in place to give effect to relevant regulations of Annexes I, II, III, IV, V and VI of MARPOL 73/78: • Marine Order 91: Marine pollution prevention – oil • Marine Order 93: Marine pollution prevention – noxious liquid substances • Marine Order 94: Marine pollution prevention – packaged harmful substances • Marine Order 95: Marine pollution prevention – garbage • Marine Order 96: Marine pollution prevention – sewage • Marine Order 97: Marine pollution prevention – air pollution.	Section 6.6: Planned operational discharges Sections 7.6 and 7.7: Hydrocarbon release Section 7.2: Introduction of invasive marine species
United Nations Framework Convention on Climate Change (1992)	The objective of the convention is to stabilise greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous interference with the climate system. Australia ratified the convention in December 1992 and it came into force on 21 December 1993.	Yes	Only relevant to the extent that to reduce impact of GHG emissions associated with vessel use, Santos will comply with MARPOL Annex VI (Marine Orders Part 97: Marine Pollution Prevention – Air Pollution) and require the use of low sulphur fuel. The vessels will use diesel, which is a low sulphur fuel.	Section 6.3: Atmospheric emissions

Appendix C Values and Sensitivities of the Marine and Coastal Environment

Santos

VAN GOGH CONISTON NOVARA VGA-4H GI ST1 WELL VALUES AND SENSITIVITIES OF THE MARINE AND COASTAL ENVIRONMENT

February 2026

VALUES AND SENSITIVITIES OF THE MARINE AND COASTAL ENVIRONMENT

Project / Facility	Van Gogh Coniston Novara VGH-4H GI ST1 Well Decommissioning
Review interval (months)	12 Months
Safety critical document	No

Rev	Owner	Reviewer(s) *Managerial/Technical/Site*	Approver
	Environmental Consultant	**Senior Environmental Approvals Advisor**	**Environment Manager - WANTTL**
D			

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1. Introduction

1.1. Overview

Santos Energy Limited (Santos) is the titleholder of the Van Gogh Coniston Novara (VGCN) fields (production licenses WA-35-L and WA-28-PL), located in marine waters off north-western Western Australia (WA). This document describes the Environment that may be affected (EMBA) for suspension or decommissioning of the VGA-4HG1 well, and includes details of the relevant values and sensitivities of that environment as required by the Commonwealth *Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2023.*

The socio-economic EMBA (the EMBA) represents the total area potentially affected by the worst-case hydrocarbon spill events associated with this activity. Worst-case hydrocarbon spills generally have the largest EMBA of all the environmental impacts and risks managed by Santos. Santos routinely commissions hydrocarbon spill modelling studies to assist in assessing the environmental risk of a hydrocarbon spill. The low hydrocarbon exposure values as defined in NOPSEMA Information Paper, *Application of oil spill modelling in Environment Plans* (NOPSEMA, 2025have been used in the modelling to set the outer boundaries of the EMBA for a given hydrocarbon spill.

The EMBA encompasses the full range of values (including ecosystem, spiritual and monetary provision) and sensitivities (receptors vulnerable to impact) that might be contacted by surface and subsurface hydrocarbons in the unlikely event of any worst-case oil spill from well suspension decommissioning activities as defined in Section 2 of the Van Gogh VGH-4HGI Decommissioning Environmental Plan (EP) (7745-236-EMP-0001)). These receptors include more broadly the physical environments and biological communities present, as well as protected species and areas, socio-economic and cultural features and values.

This document is informed by searches of:

- the Protected Matters search tool (PMST) published by the Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW). PMST searches were undertaken in February 2026 and are provided in **Appendix C of the VGCN-VGA-4H GI ST1 Well Decommissioning EP**
- published scientific literature and studies, and
- State protected species databases where applicable.

Descriptions of marine and coastal fauna within the EMBA that may credibly be impacted by Santos' activities are provided, with a focus on protected species that are threatened and migratory.

The PMST searches were made using the EMBA. The EMBA includes the same spatial data used to inform the figures in the associated EP, ensuring that the EMBA encompasses the full range of environmental receptors that might be affected by surface and subsurface hydrocarbons at the low exposure level within the EMBA.

PMST search limitations required the EMBA be split into two subsets. Both subsets of the EMBA were used to perform PMST searches.

Figures provided throughout this document are scaled up to the relevant data represented to allow detail to be shown at a readable scale.

1.2. Geographical Extent

The EMBA includes the coastal waters and shoreline habitats of WA, encompassing the Abrolhos Islands at its southern extent, Broome at its northern extent and extending westwards in Commonwealth marine waters to encompass Christmas Islands. This area largely overlaps the Commonwealth North-West Marine Region (NWMR) and South-West Marine Region (SWMR). Based on the Integrated Marine and Coastal Regionalisation of Australia (IMCRA) Version 4.0 spatial framework, there are 10 provincial-scale bioregions that occur within the EMBA. These bioregions are based on the characteristics of fish assemblages, benthic habitats, and oceanographic data (IMCRA v. 4.0, Figure 1). Where relevant, the physical, biological, and social environments within the EMBA are discussed with reference to the IMCRA Provincial Bioregions.

The bioregions of most relevance are:

North-West Marine Region

- Central Western Shelf Province.
- Central Western Shelf Transition
- Central Western Transition
- Northwest Province
- Northwest Shelf Province
- Northwest Shelf Transition
- Northwest Transition
- Timor Province

South-West Marine Region

- Southwest Shelf Transition

Other Marine Regions

- Christmas Island Province

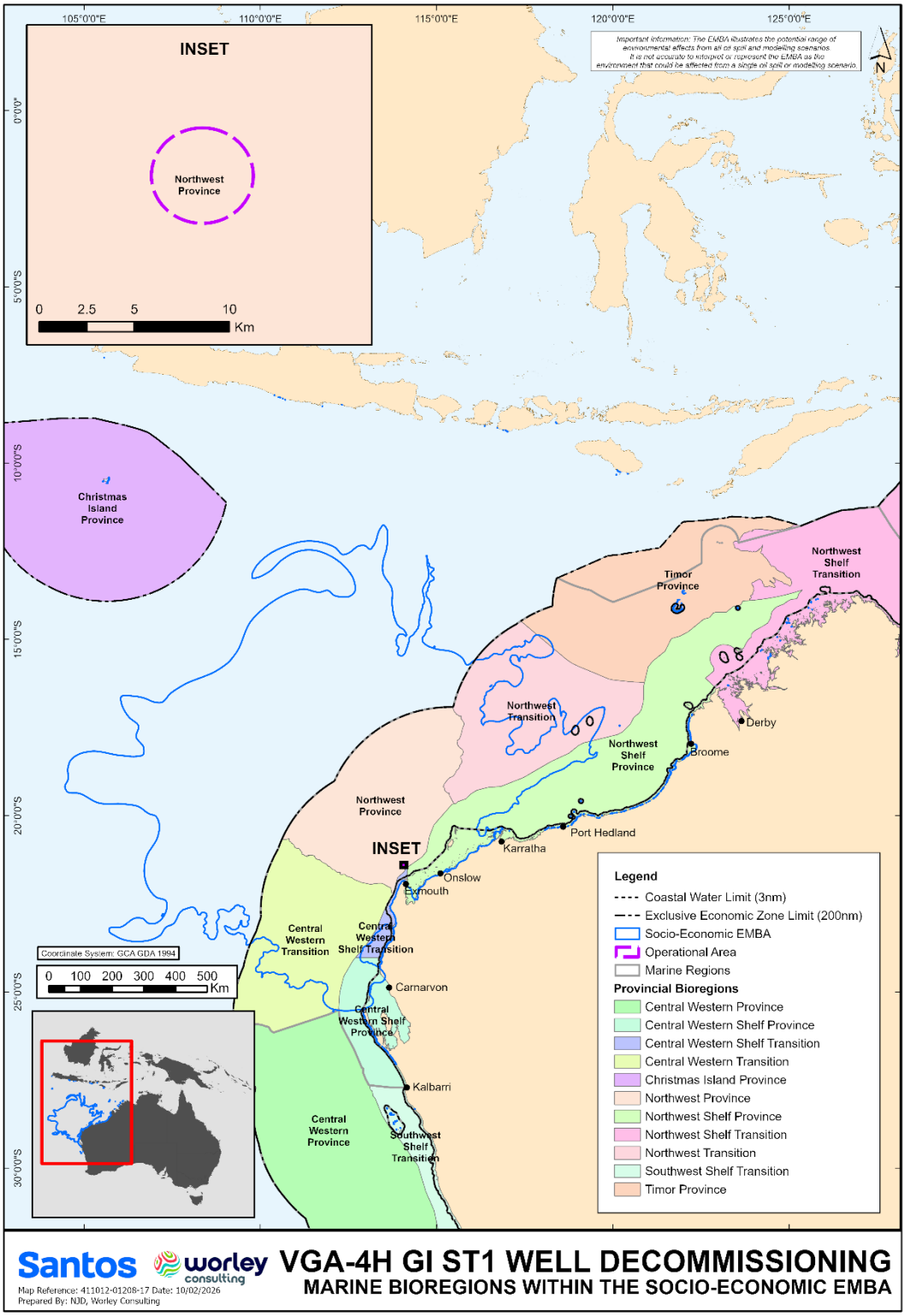


Figure 1: IMCRA 4.0 Provincial Bioregions within the EMBA

2. Physical Environment

2.1. Geomorphology

2.1.1. Formation History

Approximately 550–160 million years ago, the northern and western parts of the present-day Australian continent formed part of the northern margin of Gondwana. About 300 million years ago, crustal stretching, rifting and breakup initiated the development of an extensive basin that became the site for deposition of sediments (Baker et al. 2008 in Department of the Environment, Heritage, Water, and the Arts (DEWHA) 2008a). Approximately 135 million years ago the continent broke up resulting in the separation of greater India and Australia. Ocean spreading associated with the continental break-up resulted in the creation of the Argo and Cuvier abyssal plains. Subsidence of the rifted margin resulted in the formation of the Exmouth and Scott plateaux and the Rowley Terrace. The narrow shelf south of North West Cape was formed approximately 130 million years ago as a result of the separation of India and sea floor spreading (Baker et al. 2008 in DEWHA 2008a).

The South-west region has been relatively stable throughout its recent geological past. This has shaped a continental shelf that has high wave exposure and is punctuated with coastal features such as island groups and fringing coastal reefs providing sheltered habitats for marine communities (DEWHA 2008a).

2.1.2. Present Day Geological Features

The EMBA consists of five major landform features: continental shelf, continental slope, continental rise, Exmouth plateau and abyssal plain. Most of the area consists of either continental shelf or continental slope (DEWHA 2008a).

Limited surveys have shown that the continental slope in the EMBA comprises diverse geological features such as canyons, plateaux, terraces, ridges, reefs, banks and shoals (DEWHA 2008a). These features are significant in that over half of the total area of banks and shoals across Australia's entire marine jurisdiction occurs in the Commonwealth waters from the South Australian border to the Northern Territory border, as well as 39 % of terraces and 56 % of deeps, holes and valleys (DEWHA 2008a).

An important characteristic of the EMBA is the significant narrowing of the continental shelf around North West Cape from the broad continental shelf in the north. For example, in the Joseph Bonaparte Gulf (at the NT boundary), the continental shelf is around 400 km wide, whereas at North West Cape the shelf is only 7 km wide – the narrowest of anywhere on the Australian continental margin (DEWHA 2008a). Shelf width affects oceanography with flow on effects to productivity and ecosystem functioning.

Several geomorphic formations within the EMBA have been associated with Key Ecological Features (DEWHA 2008a) and these are discussed in Section 10.

2.1.3. Southwest Shelf Transition

This bioregion consists of a narrow continental shelf, ranging from approximately 40-80 km wide that is noted for its physical complexity. It includes a series of nearshore ridges and depressions that form inshore lagoons, a smooth inner shelf plain, a series of offshore ridges and a steep, narrow outer shelf. The near-shore ridges are formed by eroded limestone reefs and pinnacles that stand 10-20 m above the sea floor. The edge of the inner shelf plain is marked by a series of broken offshore ridges that extend north to the northern limits of the bioregion, where they emerge to support the tropical carbonate reef growth of the Houtman Abrolhos Islands (DEWHA, 2008b).

2.1.4. Central Western Shelf Province

This bioregion is located on the Dirk Hartog Shelf and is generally very flat. It varies in width from less than 20 km in the north to around 125 km in the vicinity of Shark Bay. A small area of reef and tidal sand waves or sandbanks occur at the entrance to Shark Bay and within its vicinity. Other topographic features of the bioregion include a deep hole and associated area of banks and shoals offshore of Kalbarri. The banks and shoals in this bioregion

are of note because they occur at latitudes significantly south of banks and shoals elsewhere in the North-west Marine Region (DEWHA, 2008a).

2.1.5. Central Western Transition

The Central Western Transition is characterised by large areas of continental slope, with sediments dominated by muds and sands that decrease in grain size with increasing depth. The slope is incised by numerous topographic features such as terraces (i.e. the Carnarvon Terrace), canyons (i.e. Cloates Canyon and Carnarvon Canyon) and rises. A large part of the bioregion consists of the Cuvier Abyssal Plain. The Wallaby Saddle is another important feature of this bioregion, and it is the most extensive area of this type of topographic feature in the North-west Marine Region (DEWHA, 2008a).

2.1.6. Central Western Shelf Transition

The Central Western Shelf Transition is located entirely on the continental shelf and is comprised mainly of sandy sediments. The close proximity of the coast to the shelf break is a significant feature of this bioregion and is an important factor in determining its biodiversity (DEWHA, 2008a).

Ningaloo Reef is the most significant geomorphic feature in the bioregion. It extends south of North West Cape along the Cape Range Peninsula, and stretches for over 260 km. It is the only example in the world of an extensive fringing coral reef on the west coast of a continent (DEWHA, 2008a).

2.1.7. Northwest Province

The bioregion occurs entirely on the continental slope and is comprised of muddy sediments. It is distinguished by a number of topographic features, such as the Exmouth Plateau, terraces and canyons (including the Swan and Cape Range canyons), as well as deep holes and valleys on the inner slope. The Montebello Trough occurs on the eastern side of the Exmouth Plateau and represents more than 90 per cent of the area of troughs in the North-west Marine Region. Significantly, this bioregion contains the steepest shelf break of the North-west Marine Region, along the Cape Range Peninsula near Ningaloo Reef (DEWHA, 2008a).

2.1.8. Northwest Transition

The majority (52 %) of the Northwest Transition bioregion occurs on the continental slope, with smaller areas in the north-west of the bioregion located on the Argo Abyssal Plain and continental rise. The sediments of the slope are dominated by sands, whereas the sediments of the abyssal plain/deep ocean floor are dominated by muds. More than 60 % of the Argo Abyssal Plain occurs within this bioregion and much of the Northwest transition occurs in water over 4,000 m deep (DEWHA, 2008a).

Other topographic features within the bioregion include areas of rise, ridges, canyons and apron/fans. The bioregion also has reefs such as Mermaid, Clerke and Imperieuse reefs, which are collectively known as the Rowley Shoals (DEWHA, 2008a).

2.1.9. Northwest Shelf Province

The Northwest Shelf Province is located almost entirely on the continental shelf, except for a small area to the north of Cape Leveque that extends onto the continental slope. This bioregion includes more than 60 % of the continental shelf in the North-west Marine Region (DEWHA, 2008a). The shelf gradually slopes from the coast to the shelf break but displays a number of sea floor features such as banks/shoals and holes/valleys. These are thought to be morphologically distinct from other features of these types found elsewhere in the North-west Marine Region, and have a different sedimentology (DEWHA, 2008a). For example, the Glomar Shoals occur approximately 30–40 km offshore of Dampier in water depths of between 26–70 m and are distinguished by highly fractured molluscan debris, coralline rubble, and coarse carbonate sand. The province also includes the Leveque Rise, a large plateau, and one of only two shelf plateaux within the North-west Marine Region (DEWHA, 2008a).

2.1.10. Northwest Shelf Transition

The Northwest Shelf Transition is predominantly located on the continental shelf with a small portion extending onto the continental slope causing waters in the area to be relatively shallow, only up to 330 m. It also consists of geomorphic features that are unique to the Northwest Shelf Transition and not found elsewhere in the North-west

Marine Region (DEWHA, 2008a). An example of this is that 90 % of the Region's carbonate banks are located within the Northwest Shelf Transition (DEWHA, 2008a).

The Bonaparte Depression lies within the Northwest Shelf Transition, which is a 45 000 km^2 geomorphic basin that is the only occurrence of its type in the North-west Marine Region (DEWHA, 2008a). The Bonaparte Depression is a relatively flat feature with a higher content of mud and gravel than what is found elsewhere in the Northwest Shelf Transition and it has a number of pinnacles of which form the key ecological feature 'pinnacles of the Bonaparte Basin' (see Section 10)

2.1.11. Timor Province

The Timor Province is located on the continental slope. The notable topographical features include the Scott Plateau, the Ashmore Terrace and part of the Rowley Terrace and Argo Abyssal Plain (DEWHA, 2008a). Of these, the Scott Plateau is particularly significant with water depths of up to 3,000 m and being fringed by spurs and valleys (DEWHA, 2008a). The Scott Plateau is also separated from Rowley Terrace by canyons that are up to 50 million years old (DEWHA, 2008a).

The Timor Province encompasses almost half of the reefs in the North-west Marine Region, including Scott Reef, Seringapatam Reef and Ashmore Reef which are all within the EMBA (DEWHA 2008a).

2.1.12. Christmas Island Province

This bioregion contains the 4th largest abyssal plain/deep ocean floor area and smallest area of slope of all the National Benthic Marine Bioregionalisation (NBMB) bioregions (DEH, 2005a). Christmas Island is an uplifted limestone island. It is relatively stable despite active uplift (Brewer et al., 2009). Due to the similar geomorphology and location adjacent to Indonesia in the tropical Indian Ocean, the fauna contained in this bioregion is probably similar or related to the fauna associated with the Cocos (Keeling) Island bioregion.

2.1.13. Sediments

Terrestrial environments are not a major source of sediment to the EMBA and terrigenous sediments tend to be confined to the inner shelf (generally less than 100 m water depth), particularly in areas adjacent to rivers. Sediments in the area generally become finer with increasing water depth, ranging from sand and gravels on the shelf to mud on the slope and abyssal plain.

The distribution and resuspension of sediments on the inner shelf is strongly influenced by the strength of tides across the continental shelf as well as episodic events such as cyclones. Further offshore, on the mid to outer shelf and on the slope itself, sediment movement is primarily influenced by ocean currents and internal tides. Internal tides describe the tidal movement across a slope of water stratified by marked differences in density. Internal tides cause resuspension and net down-slope deposition of sediments on the North West Shelf (DEWHA 2008a).

Surveys conducted over the North West Shelf indicate that similar sediments occur extensively over this geographic region, but with spatial variation in the grain size and origin of the surface sediments.

The ecology of the southwest is also greatly influenced by the lack of river discharge into the Region. The few significant rivers adjacent to the Region flow intermittently and their overall discharge is low. The low discharge of rivers and the generally low rate of biological productivity also results in low turbidity (suspended sediments), making the waters of the Region relatively clear (McLoughlin & Young 1985). Surface sediments in the area are predominantly composed of skeletal remains of marine fauna, with lenses of weathered sands (McLoughlin & Young 1985).

Shoals and banks are naturally forming, submerged and made of consolidated material such as sand. Normally, the shoal or bank rises close to the water surface having been created when an ocean current deposits sediment. Shoals and banks are found within the EMBA. Glomar shoal is the only shoal within the EMBA that is listed as a Key Ecological Feature and is discussed along with several other geomorphic formations (DEWHA 2008a) in Section 10.

2.2. Climate

Waters in northern Western Australia predominantly lie in the arid tropics, experiencing high summer temperatures and periodic tropical cyclones in summer. Rainfall in the region is low, although intense rainfall may occur during the passage of summer tropical cyclones and thunderstorms (Condie et al. 2006). Mean air temperatures range from a minimum of 11°C in winter to a maximum of 36°C in summer (Condie et al. 2006). Due to the arid climate, daytime visibility in the area is generally greater than 5 nautical miles (SSE 1991).

The summer and winter seasons fall into the periods September–March and May–July, respectively. Winters are characterised by clear skies, fine weather, predominantly strong east to southeast winds and infrequent rain (calculated from the National Centres for Environmental Prediction and National Centre for Atmospheric Research (NCEP-NCAR) dataset measured from 1982 to1999; Condie et al. 2006; Figure 2).

Summer winds are more variable, with strong south-westerlies dominating. Transitional wind periods, during which either pattern may predominate, can be experienced in April–May and September of each year.

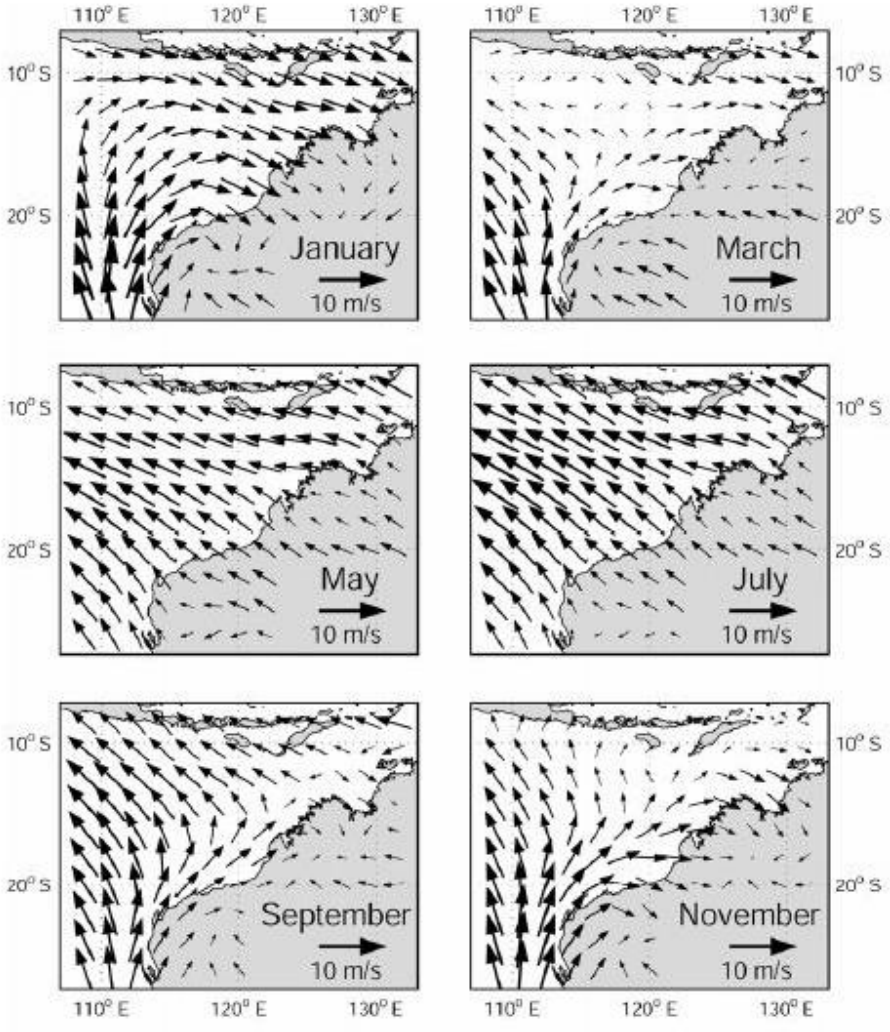


Figure 2: Seasonally averaged winds at 10 m above mean sea level

Calculated from NCEP-NCAR dataset measured from 1982 to 1999. Source: Condie et al. (2006)

Tropical cyclones generate the most significant storm conditions in the area (SSE 1993). These clockwise-spiralling storms have generated wind speeds 50–120 knots (SSE 1991). Tropical cyclones develop in the eastern Indian Ocean, and the Timor and Arafura Seas during the summer months. Three to four cyclones per year are typical, with the official cyclone season being November through to April (Bureau of Meteorology (BoM) 2013).

Waters in the southwest and southern Western Australia experience a Mediterranean style climate that is characterised by cool, wet winters and hot, dry summers. In winter, wind patterns are characterised by a prevailing westerly wind stream. This enables winter cold fronts and strong westerly winds to regularly penetrate the south-west, with cold fronts crossing the coast every week or so. Apart from the passage of storms, typically lasting one day or less, the weather is otherwise mild in winter with winds variable and relatively weak. In summer, cold fronts rarely penetrate into the south of the state with any strength and hot easterly winds prevail.

The Timor Sea region in the north has a tropical climate. These areas experience a distinct ‘wet’ season with summer monsoonal conditions from October to March and a distinct ‘dry’ season with cooler and drier conditions from April to September. The wet season usually comprises south-westerly winds capable of generating thunderstorm activity, high rainfall and cyclones. The dry season usually comprises dry and warm conditions with little rainfall (Fugro, 2015).

2.3. Oceanography

Major drivers of marine ecosystems include ocean currents, tides, waves, temperature and salinity. The dominant offshore sea surface current is the Leeuwin Current (Figure 3), which carries warm tropical water south along the edge of Western Australia's continental shelf, reaching its peak strength in winter and becoming weaker and more variable in summer (Condie et al. 2006). The current is typically located seaward of the shelf break (200 m isobath) and is a narrow, surface current, extending to a depth of 150 m (BHPB 2005, Woodside 2005) and a width of 50–100 km (DEWHA 2008a). The formation of meanders and eddies are also a feature of the Leeuwin Current and a number of eddies occur south of Shark Bay (DEWHA 2008a). The strength of the Leeuwin Current is influenced by seasonal variability in the pressure gradient (DEWHA 2008a). The Holloway Current is the prevailing seasonal current, travelling south-west along the north West Australian coast in winter and north-east in summer (Brewer et al. 2007). It is a relatively narrow boundary current that flows along the north-west shelf at between 100 m and 200 m depth, flowing towards the north-east in summer and the south-west in winter (Fugro, 2015).

The Indonesian Throughflow is the other important current influencing the upper 200 m of the outer North West Shelf (Woodside 2005). This current brings warm and relatively fresh water to the region from the western Pacific via the Indonesian Archipelago (Figure 3). Modelling undertaken by Woodside and Commonwealth Scientific and Industrial Research Organisation (CSIRO) Marine and Atmospheric Research indicates that significant east–west flows occur across the North West Shelf to the north of the North West Cape, possibly linking water masses in the area (Woodside 2005, Condie et al. 2006).

Currents in the coastal zone and over the inner to mid-shelf are largely driven by tides and winds, whereas offshore, over the continental shelf, slope and rise are influenced by large scale regional circulation (DEWHA 2008a). Large-scale currents of the Timor and Arafura seas in the north are dominated by the Indonesian Throughflow. Christmas and Cocos (Keeling) Islands territories are located in the eastern Indian Ocean, in the path of the South Equatorial Current that carries the Indonesian Throughflow waters into the Indian Ocean. During summer, monsoon winds are highly influential in driving water movement and water column mixing (O’Hara 2023).

The nearshore Ningaloo Current flows northwards opposite to the Leeuwin Current, along the outside of the Ningaloo Reef and across the inner shelf from September to mid-April (BHPB 2005, Woodside 2005). The nearshore Capes Current, which is to the south of the Ningaloo Current, is a seasonal current that appears strongest between Cape Leeuwin and Cape Naturaliste, in the southwest of Western Australia (Pearce and Pattiaratchi 1999). Strong northwards winds between November and March slow the Leeuwin Current and increase the strength of the Capes Current. Localised upwelling is also known to occur in the area (Pearce and Pattiaratchi 1999).

Tides increase in amplitude from south to north, corresponding with the increasing width of the shelf (Holloway 1983). Tides in the area are generally semi-diurnal (i.e. two high tides and two low tides per day) with a spring/neap cycle. The northern area experiences some of the largest tides in the world. In the Kimberley, the daily tidal range is up to 10 m during spring tides and less than 3 m during some neap tides. Mid-shelf tidal currents are predicted to have average speeds of approximately 0.25 knots during neap tides and up to 0.5 knots during spring tides (NSR 1995, WNI 1995).

The wave climate in the northwest is composed of locally-generated wind waves (seas) and swells that are propagated from distant areas (WNI 1995). In summer the seas typically approach from the west and southwest, while in winter the seas typically approach from the south and east. Mean sea wave heights are typically less than 1 m and peak heights of less than 2 m are experienced in all months of the year (WNI 1995). Cyclones and

tropical storms can greatly increase wave heights by up to 8 m in the outer Timor Sea during the cyclone season (Przeslawski et al. 2011).

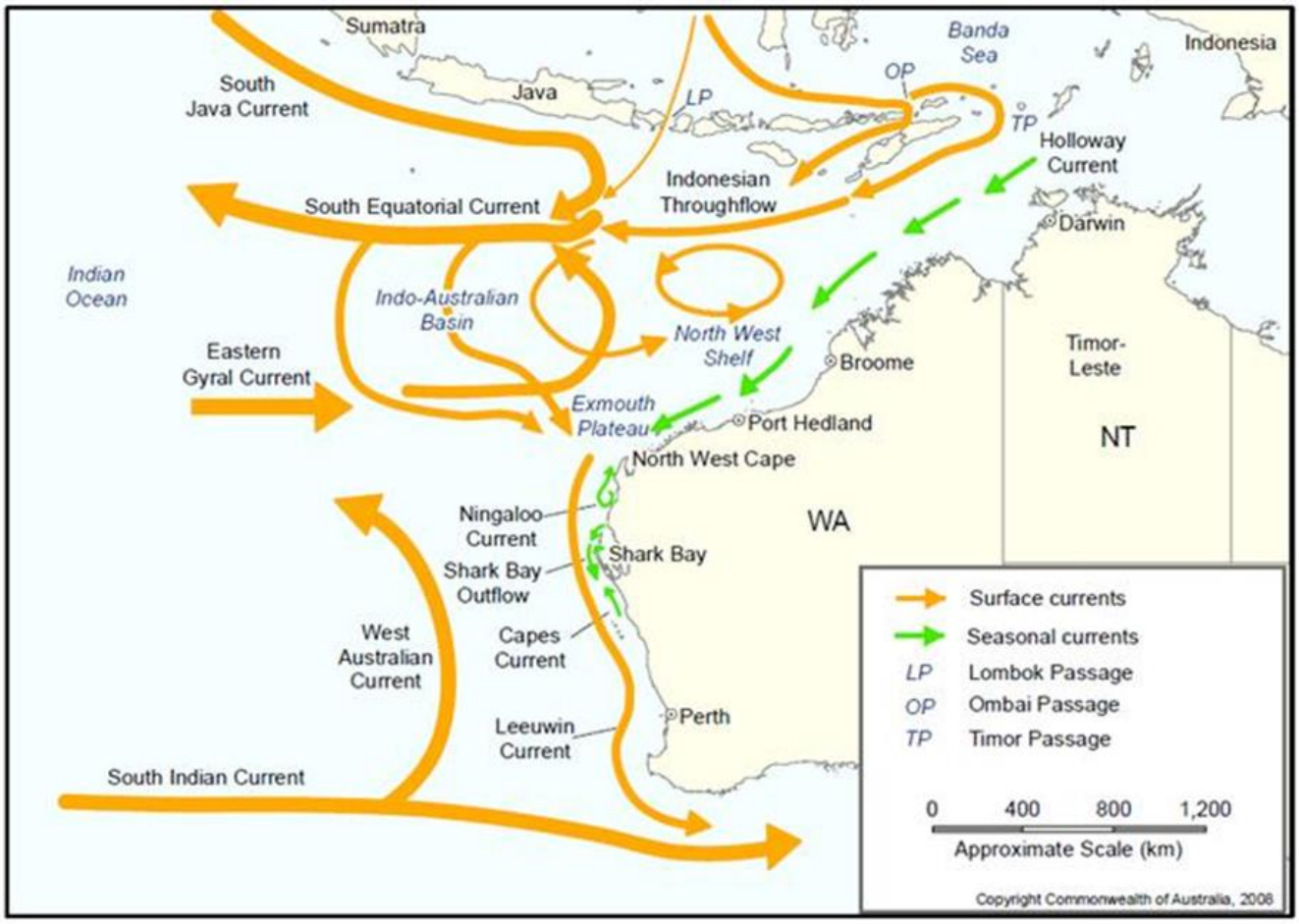
Average swell heights are low, around 0.4–0.6 m in all months. The greatest exposure to swells is from the west (SSE 1993). Tropical cyclones have generated significant swell heights of up to 5 m in this area, although the predicted frequency of swells exceeding 2 m is less than 5% (WNI 1996). In the open ocean, sustained winds result in wind-forced currents of approximately 3% of the wind speed (Holloway & Nye 1985).

Tides in the South West Capes area are mixed (i.e. diurnal and semi-diurnal) and generally less than one metre, with a typical daily range of about 0.7 m during spring tides and about 0.5 m during neap tides. Tides of this magnitude produce weak currents compared to wind and wave driven flows (Hill & Ryan 2002 cited in Department of Environment and Conservation (DEC) 2013).

Waters on the continental shelf are usually thermally-stratified, with a marked change in water density at approximately 20 m (SSE 1993). Surface temperatures vary annually, being warmest in March (32°C) and coolest in August (19°C). Vertical gradients are related to the seasonality of sea surface temperatures and are greatest during the warm-water season (SSE 1991). Near-bottom water temperature on the North West Shelf is approximately 23°C, with no discernible seasonal variation.

Salinity is relatively uniform at 34–35 ppt throughout the water column and across the North West Shelf. Due to the low rainfall there is little freshwater run-off from the adjacent mainland (Blaber et al. 1985).

Pronounced shifts in water column characteristics can occur following the passage of tropical cyclones (McKinnon et al. 2003). Changes in water temperature and salinity characteristics can result from changes in local heating and evaporation following the southward movement of warmer water due to southward-moving cyclones and can have flow-on effects to primary and secondary productivity (McKinnon et al. 2003).



Source: DEWHA (2008b)

Figure 3: Surface currents in WA

3. Benthic and Pelagic Habitats

Benthic habitats are defined as those subtidal habitats lying below the lowest astronomical tide (LAT). The benthic habitats within waters in the EMBA lie at depths ranging from LAT down to more than 6,000 m at Argo and Cuvier abyssal plains (DEWHA 2008a, 2008b, 2008c).

Benthic habitats are partially driven by light availability. Primary producers (photosynthetic corals, seagrasses and macroalgae) are limited to the photic zone, whereas benthic invertebrates including filter feeding communities may be found in deeper waters. The depth of the photic zone varies spatially and temporally and is predominantly dependent on the volumes of suspended material in the water column. The photic zone in the offshore Pilbara is approximately 70 m whereas in oceanic waters in the northwest and coastal waters of the southwest the photic zone may extend to 120 m (DEWHA 2008b). The photic zone in the offshore north extends to 100 m (DEWHA 2008c).

The following section broadly categorises benthic habitats as four biological communities: coral, seagrasses, macroalgae and non-coral benthic invertebrates. These communities are discussed in terms of the 18 IMCRA v. 4.0 bioregions. Some broad scale benthic habitat mapping exists for the Northwest and Central Western Shelf Provinces and this is shown in Figure 4.

3.1. Coral Reefs

Corals are both primary producers and filter feeders and thus play a role in the provision of food to marine fauna and in nutrient recycling to support ecosystem functioning (Conservation and Land Management (CALM) & Marine Parks and Reserves Authority (MPRA) 2005a).

Corals create settlement substrate and shelter for marine flora and fauna. Studies have shown that declines in the abundance, or even marked changes in species composition of corals, has a marked impact on the biodiversity and productivity of coral reef habitats (Pratchett et al. 2008). As part of the reef building process, Scleractinian corals are also important for protection of coastlines through accumulation and cementation of sediments and dissipation of wave energy (CALM & MPRA 2005a).

The waters in the EMBA contain extensive coral communities. Coral reefs in the area fall into two general groups: the fringing reefs around coastal islands and the mainland shore; and large platform reefs, banks and shelf-edge atolls offshore (Woodside 2011). The distribution of corals is governed by the availability of hard substrate for attachment and light availability.

Coral reefs are dynamic environments that regularly undergo cycles of disturbance and recovery. Depending on how frequent and severe the disturbances are, recovery can take a few years or more than a decade. Disturbances can include bleaching, cyclones and disease outbreaks (Australian Institute of Marine Science (AIMS) 2011).

Corals in the northwest and central provinces have experienced bleaching events and subsequent recovery. Bleaching is the process where symbiotic algae are expelled from the coral tissue, often leading to the death of the colony. Causes of bleaching include high temperatures (Ningaloo; 2011 and Scott Reef; 1998 and 2016) (information available at AIMS.gov.au), anoxic conditions (Bill's Bay; 2008) or smothering (Waples & Hollander 2008, Gilmour et al. 2013). Coral susceptibility to bleaching and their ability to recover is an important consideration in the context of potential anthropogenic impacts.

Two bioregions (Northwest Province and Central Western Transition) lie in deep waters below the photic zone. Photosynthetic corals are not present in these locations and hence these bioregions are not discussed further.

3.1.1. Southwest Shelf Transition

The coral reefs of the Houtman Abrolhos Islands are the most southern extensive coral community along the west coast. Smaller localised pockets do occur as far south as Rottnest Island and even extend to Cape Naturaliste in the Southwest Shelf Province. The reefs around the Abrolhos Islands comprise 211 known species of corals and all but two of the coral species are tropical (Department of Fisheries (DoF) 2012). The greatest diversity and density of corals is found on the reef slopes, shallow reef perimeters and lagoon patch reefs in the more sheltered northern and eastern sides of each of the three limestone platforms that support the island groups (DoF 2012).

3.1.2. Central Western Shelf Province

The Central Western Shelf Province occurs on the continental shelf between Coral Bay and Busselton and is generally flat with depths ranging from 0–100 m. The province includes Shark Bay and Bernier, Dorre and Dirk Hartog Islands.

Studies at Shark Bay recorded 80 species of coral (Marsh 1990). The study determined that salinity and seasonal temperature gradients restrict the distribution of corals to areas that have normal salinity in the western half of the Bay, a few species occur in the metahaline waters but none in the hyper saline areas (Marsh 1990). The eastern shores of Bernier, Dorre and Dirk Hartog Islands provide the most favourable habitats for coral growth due to shelter, and water with relatively small salinity and temperature fluctuations. Some sections of these islands support prolific coral growth (up to 100% cover) both in the sheltered leeward and exposed areas. This bioregion is a transitional zone between the predominantly tropical flora and fauna of the north and temperate flora and fauna further south (CALM & NPNCA 1996).

3.1.3. Central Western Shelf Transition

A significant proportion of this bioregion is covered by the Ningaloo Reef. The Ningaloo Reef is unique in that it is the largest fringing reef in Australia and is the only large reef found on the western side of a continent in the southern hemisphere.

A 300 km section of the coast, from Red Bluff to North West Cape and extending to Bundegi in Exmouth Gulf, is included in the Ningaloo Marine Park. Ningaloo Reef supports variable lagoonal, intertidal and subtidal coral communities along its length. Ningaloo Reef is characterised by a high diversity of hard corals with at least 217 species representing 54 genera of hermatypic (reef building) corals recorded to date (Veron & Marsh 1988). The most diverse coral communities are found in the shallow relatively clear water, high energy environment of the fringing barrier reef and low energy lagoonal areas to the west of North West Cape (CALM & MPRA 2005a).

Coral diversity reduces with increasing depth, and corals are uncommon at depths greater than 40 m (Waples & Hollander 2008). At depths between 20 and 30 m hard corals have been found to be more dominant in the northern areas of the Ningaloo Marine Park, whereas in southern areas other sessile invertebrates such as sponges, are more prevalent (Waples & Hollander 2008).

3.1.4. Northwest Transition

This bioregion lies mostly over the continental slope and the abyssal plain in deep waters that preclude photosynthetic coral growth (DEWHA 2008a). However, in contrast with the surrounding area, the Rowley Shoals are three distinct reef systems (Mermaid, Clerke and Imperieuse Reefs) approximately 30–40 km apart that rise vertically to the surface from depths of between 500 and 700 m. The marine reef fauna of the Rowley Shoals is considered to be exceptionally rich and diverse, including species typical of the oceanic coral reef communities of the Indo-West Pacific. As many of these species are not found in the inshore tropical waters of northern Australia, such populations are of regional significance (DEWHA 2008a).

A 1993 survey at Mermaid Reef recorded 214 species of scleractinian corals (Done et al. 1994) which is comparable to a more recent survey recording 211 species, including 22 new distribution records (McKinney 2009). The Rowley Shoals system has maintained high coral cover and has not been impacted by mass bleaching, despite neighbouring bleaching events reported at Scott reef during 1998 and 2016 (Gilmour et al*., 2021*). Since 1997, mean coral cover has increased through periods of impact and recovery from cyclones, reaching the highest (71%) on record in 2017 (Gilmour et al. 2019). The survey found that coral assemblages of the Rowley Shoals are broadly comparable to those found on the reefs of the outer Great Barrier Reef and in the Coral Sea. While the coral fauna is similar to Scott Reef, it differs considerably from that of north-western Australia (Veron 1986). Veron (1986) notes that the clear water of the Rowley Shoals allows coral communities to exist over a great range of depths, while the strong wave action on the outer coral slopes and the wide tidal range result in distinct patterns of zonation.

Recent genetic studies have also shown distinct genetic differences between offshore reef systems, the inshore macrotidal Kimberley region and Ningaloo Coast World Heritage Area reefs (Adam et al. 2022, Gilmour et al. 2016, Underwood 2009, Underwood et al. 2020). This is likely a result of their isolation, with negligible supply of larva from other reefs (Adam et al. 2022, Thomas et al. 2017). These studies highlight the importance of local recruitment in offshore reef systems in order to maintain healthy coral populations, which may reduce their capacity to adapt to rapid environmental change.

3.1.5. Northwest Shelf Province

This province contains numerous small coastal islands in addition to larger archipelago and offshore island groups. Many of these features are surrounded by shallow waters with small barrier and fringing reefs that support coral communities. Key areas recognised for coral communities in this bioregion are discussed below.

The Dampier Archipelago supports coral reefs in shallow waters near islands and submerged pinnacles. The most significant coral reefs have formed along the seaward slopes of Delambre Island, Hamersley Shoal, Sailfish Reef, Kendrew Island and north-west Enderby Island (CALM & MPRA 2005). Field trips in the Dampier Archipelago between 1972 and 1998 recorded 229 species of corals from 57 genera (Griffith 2004). Surveys of the Dampier Port and inner Mermaid Sound recorded approximately 120 coral species from 43 genera (Blakeway & Radford 2005) with coral reefs dominated by acroporids and pocilloporids. The greatest coral cover (up to 70%) was recorded in the eastern half of the archipelago (Wells et al. 2003).

The Montebello, Lowendal and Barrow islands include 315 islands associated with extensive coral reefs, the most significant of which occur in the sheltered waters on the eastern side of the islands. Examples of these significant reefs include Dugong Reef, Batman Reef and reefs along the Lowendal Shelf (DEC & MPRA 2007a). Dominant corals include acroporids and poritids, with greater than 70% cover recorded for some areas (Chevron 2010). Subtidal coral reef communities around the islands are highly diverse, with at least 150 species of hard corals recorded from fringing and patch coral reef areas (DEC & MPRA 2007a).

Coral distribution near the mainland is restricted by lack of light due to natural turbidity. Corals may exist as sparse coral colonies in some locations, rather than extensive coral communities. Within Exmouth Gulf, coral communities are less common but are present on fringing reefs surrounding islands, as solitary corals distributed across areas of hard substrate, or on larger isolated patch reefs.

An epibenthic dredge survey of nearshore areas north of Broome identified 14 species of hard corals from six families (Keesing et al. 2011). Limited coral surveys conducted at Broome (15 species) and the Lacepede Islands (ten species) (Veron & Marsh 1988) suggest the species diversity in this locality may be low. However, low species diversity observed during the dredge survey may reflect the limited sampling frequency, limited depth range (11–23 m) or inadequate sampling in habitats considered favourable for the proliferation of hard corals (hard substrate). In contrast, other surveys of nearshore locations in the region have recorded much higher levels of species diversity. Veron and Marsh (1988) stated that 102 species of hard corals have been recorded from the Kimberley coast and nearshore reefs and Cairns (1998) recorded 87 species of azooxanthellate hard coral species from north-western Australian waters.

3.1.6. Northwest Shelf Transition

Coral communities of the Northwest Shelf Transition have historically not been well studied. However, based on the scale of reef development and the diversity of coral species recorded through limited surveys, it is highly likely that further surveys will demonstrate that the Kimberley contains a coral reef province of global significance (Masini et al. 2009).

Coral reefs in the province include fringing reefs around coastal islands and some mainland shores. Development of coral communities in inshore areas is limited due to persistent high turbidity. Known examples of coral reefs in the bioregion are given below, however further mapping is required.

Benthic habitat surveys at Adele and Long Islands in 2009 and 2010 revealed extensive development of hard and soft coral communities (Richards et al. 2013). Scleractinian coral communities at Adele Island were diverse, supporting 176 species in intertidal and subtidal areas up to 14 m depth. At Long Island approximately 200 species of scleractinian corals were recorded in intertidal and subtidal areas. These surveys also identified two significant and unique habitats; a zone of mixed corallith and rhodolith habitat at Adele Island and an Organ Pipe Coral habitat zone with unusually high benthic cover at Long Island (Richards et al. 2013).

Studies by the Western Australian Department of Biodiversity, Conservation and Attractions (DBCA) and the liquified natural gas (LNG) industry indicate that fringing and emergent coral reefs are well developed in the Heyward Island group.. Surveys by INPEX of Maret, Bethier and Montalivet islands, which were largely restricted to the intertidal zone, have recorded 280 species of coral from at least 55 genera, making the Kimberley Bioregion the most coral-diverse area in WA (INPEX 2008).

Montgomery Reef has been identified as a key feature in the area. Montgomery Reef is a huge, submerged rock platform covering approximately 400 km^2. Corals occur in the subtidal area around Montgomery Reef, and in the many rock pools on the platform where there is shaded from the sun by algae or rock ledges (DEWHA 2008a). A

survey of benthic habitats at Montgomery Reef was conducted in 2009 by AIMS but a literature search found no published results from this survey (AIMS 2014).

Browse Island is surrounded by a minor fringing coral reef. Assemblages at Browse Island are characteristic of coral platform reefs throughout the Indo-West Pacific region, particularly Cartier Island. Coral diversity was greatest on the reef faces and shallow lagoons, but these areas were of very limited extent (URS 2010a).

3.1.7. Timor Province

Although water depths in this province are generally deep (200 m to almost 6,000 m) there are several reefs and islands that are regarded as biodiversity hotspots (DEWHA 2008a).

Scott Reef is an area of enhanced local biological productivity, within an area of relatively unproductive waters.

Scott Reef consists of two reefs, North Scott Reef and South Scott Reef, which are separated by a deep (400–700 m) channel. North Scott Reef is an annular reef which encloses a lagoon that is connected to the ocean. South Scott Reef is a crescent-shaped reef which forms an arc and partially encloses another lagoon. Light penetration at Scott reef is high due to low turbidity. Light penetration depths to the deeper part of South Reef Lagoon are in excess of 50m with corals able to survive at depths of up to 70 m (Woodside Energy Limited et al. 2010). Studies at Scott reef have identified over 300 scleractinian coral species in the shallow water habitats alone, from almost 60 genera and 14 different families (Gilmour et al. 2013). The Scott reef system has experienced two mass bleaching events in 1998 and 2016, with the latter showing > 90% decreases in cover of branching corals (Porites, Acropora, Millepora, Isopora and Pocillopoiridae) (Gilmour et al., 2021). Regular monitoring following the 1998 mass bleaching event showed increasing cover of branching corals 5 years post bleaching event, with most coral groups recovering approximately 12 years later (Gilmour et al., 2021).

In general, the submerged features are characterised by abrupt bathymetry, rising steeply from the surrounding outer continental shelf at depths of 100 m–200 m. The shoals and banks tend to flatten at depths of 40-50 m, with horizontal plateau areas of several square kilometres generally present at 20-30 m depths (Heyward et al. 2010). The shoals and banks support a diverse and varied range of benthic communities, including algae, reef-building soft corals, hard corals and filter-feeders (Heyward et al. 1997, Heyward et al. 2012). The plateau areas were dominated by benthic primary producer habitat, with interspersed areas of sand and rubble patches (Heyward et al. 2012).

3.1.8. Christmas Island Province

The subsurface marine habitat immediately surrounding Christmas Island consists of a relatively narrow and shallow coral reef shelf about 20 to 100 metres wide in approximately six to 20 metres of water depth. There are caves in some of the island's rocky sea cliffs that adjoin the coral reef shelves. Coral reef shelves also contain areas of sand and rubble.

The shallow coral reef shelves drop off steeply to the island's mid and deep-water marine habitats which include outer reef seaward slopes, vertical walls and oceanic waters. The marine boundary of the Christmas Island National Park extends 50 metres seaward from the low water mark, which means that the park has no true deep-water habitats, but some outer reef slopes and vertical walls fall within the park's waters (DoNP, 2012). Eighty-five reef building corals have been identified surrounding Christmas Island (Woodroffe & Berry 1994 in Brewer et al., 2009)

3.2. Seagrasses

Seagrasses are biologically important for four reasons:

- As sources of primary production
- As habitat for juvenile and adult fauna such as invertebrates and fish
- As a food resource
- For their ability to attenuate water movement and trap sediment (Masini et al. 2009).

Twenty-five species of seagrass have been recorded in WA, the highest diversity in the world, and over 30 species of seagrasses have been recorded as occurring within Australian waters (Masini et al. 2009). Waters extending from Busselton to the NT border support predominantly tropical species although temperate species are also found, particularly between Busselton and Exmouth (Walker 1987). One species, *Cymodocea angustata*, is endemic to WA (Department of Parks and Wildlife (DPAW) 2013).

The more temperate regions of the EMBA have large, permanent seagrass meadows that dominate in estuaries and sheltered coastal areas providing year-round habitat and sediment structure support (Kilminster et al., 2018). The persistent meadows of these perennial species often contribute important ecological functions, increasing habitat complexity and supporting biodiverse communities at key life-history stages (Kendrick, et al 2019).

Two bioregions (Northwest Province and Central Western Transition) lie entirely in deep waters below the photic zone. Seagrasses are not present hence these bioregions are not discussed further.

3.2.1. Southwest Shelf Transition

Species diversity of seagrasses in this bioregion is the highest in the world, with 14 species occurring (DEWHA 2008a). In total, 10 seagrass species have been recorded at the Abrolhos Islands ranging from small, delicate species (e.g. *Halophila* spp.) to larger, more robust types (*Posidonia* spp.) that grow in large meadows (DoF 2012). Small paddle-weeds (*Halophila* spp.) grow in protected lagoon areas or deep waters between the islands, such as Goss Passage and the larger species may be found growing on reef as well as in sandy areas (DoF 2012). *Thalassodendron pachyrhizum*, which is encountered growing on the exposed reef crest area, has been recorded at several of the island groups. There are also two species of wire-weed (*Amphibolis* spp.), endemic to southern Australia, found at the Abrolhos (DoF 2012). The most abundant seagrass is *Amphibolis antarctica*, while *Amphibolis griffithii* appears to be restricted to bays such as Turtle Bay in the Wallabi Group.

The larger ribbon-weeds (*Posidonia* species) grow in sheltered bays and lagoons where the sand cover is deeper and more stable (e.g. Turtle Bay, the Gap, East Wallabi Island, the lagoon on the west side of West Wallabi Islands and around North Island) (DoF 2012).

3.2.2. Central Western Shelf Province

Shark Bay contains the largest reported seagrass meadows in the world (approximately 4,000 km^2), as well as some of the most species-rich seagrass assemblages (Walker et al. 1989). Twelve species of seagrass are found in the Bay with the dominant species being *Amphibolis antarctica*. Seagrass is a fundamental component of biological processes in Shark Bay; it has modified the physical, chemical and biological characteristics of the Bay and provides food, habitat and nursery grounds for many species (CALM & National Parks and Nature Conservation Authority (NPNCA) 1996).

3.2.3. Central Western Shelf Transition

Nine species of seagrasses have been found throughout Ningaloo Reef (van Keulen & Langdon 2011). Some delineation of temperate and tropical species exists; however, several species were found throughout the Ningaloo Reef. Halophila ovalis was the most commonly found seagrass at Ningaloo and was generally found growing in sandy patches between coral bomboras. *Amphibolis antarctica* is a large meadow forming species that has been found growing in large clumps in Bateman Bay, north of Coral Bay (van Keulen & Langdon 2011).

3.2.4. Northwest Transition

The Rowley Shoals provide the only suitable shallow substrate for seagrasses in this predominantly deep bioregion. Sparse seagrass is found within subtidal coral reef communities of the Rowley Shoals but is not a major habitat type. Two species of seagrass, *Thalassia hemprichii* and *Halophila ovalis*, have been recorded at Mermaid Reef (Huisman et al. 2009). Earlier studies at Mermaid and Imperieuse Reef recorded the above two species and a third species: *Thalassodendron ciliatum* (Walker & Prince 1987).

3.2.5. Northwest Shelf Province

In the Northwest Shelf Province, seagrasses are present but sparsely distributed to depths of approximately 30 m (LEC & Astron 1993, URS 2009, CALM 2005a). The abundance and distribution of tropical (and subtropical)

seagrass species can vary greatly due to seasonal changes in water quality (turbidity, light penetration) and conditions (wave action, temperature), with biomass tending to peak in summer (Lanyon & March 1995).

Studies between Quondong and Coulomb Points north of Broome identified seagrass communities of *Halophila* spp. patchily distributed across large areas, from the lower intertidal and out to a depth of approximately 20 m (DEC 2008, Fry et al. 2008). Similarly, *Halophila decipiens* was the only seagrass collected from epibenthic dredge studies at five localities near Broome from Gourdon Bay to Packer Island (Keesing et al. 2011).

Roebuck Bay is located south of Broome and includes large areas of intertidal mudflats. Extensive seagrass meadows occur in the northern regions of Roebuck Bay and are dominated by *Halophila ovalis* and *Halodule uninervis*. *Halophila minor* and *Halodule pinifolia* have also been reported at this location (Prince 1986, Walker & Prince 1987, Seagrass-Watch 2019).

In the Dampier Archipelago seagrass occurs in the larger bays and sheltered flats of the area (CALM & MPRA 2005). Six species of seagrass, including three Halophila species, have been recorded on the subtidal soft sediment habitats (CALM & MPRA 2005). Seagrasses do not form extensive meadows within the proposed reserves, but rather form interspersed seagrass/macroalgal beds. The largest areas of seagrass are found between Keast and Legendre islands, and between West Intercourse Island and Cape Preston (CALM & MPRA 2005).

Surveys near Onslow found that *Halophila* spp. were the most widespread of the seagrasses in that region. Seagrasses were found to be generally sparsely distributed (<10 % cover), occurring in small patches within larger areas of suitable substrate. Small areas of higher (>50 %) seagrass cover occurred in shallow clear water areas but were not common (URS 2009, URS 2010b, Chevron 2010).

Similarly, in the Montebello/Barrow Islands Marine Conservation Reserves, seagrasses appear not to form extensive meadows but are sparsely interspersed between macroalgae. Seven seagrass species have been recorded in the Reserves (DEC & MPRA 2007a) with *Halophila* spp. the most common seagrass species on shallow soft substrates and sand veneers. Distributions of these species extend from the intertidal zone to approximately 15m water depth (DEC & MPRA 2007a). Surveys to the northwest and southeast of Barrow Island from 2002 to 2004 did not identify any significant seagrass meadows but confirmed the presence of sparse coverage of *Halophila* and *Halodule* spp. in shallow areas east of Barrow Island (RPS BBG 2005).

A significant meadow of large seagrasses at Mary Anne Reef east of Onslow was identified almost 30 years ago and its presence today is unconfirmed. The meadow was several hundred hectares (ha) of *Cymodocea angustata* at 30–50 % cover, occurring primarily at a depth of 2–3 m (Walker & Prince 1987).

3.2.6. Northwest Shelf Transition

Extensive and diverse intertidal seagrass meadows are known from islands in the southern Kimberley, particularly in the Sunday Island One Arm Point area (Walker 1995, Walker & Prince 1987). Ten species of seagrasses have been recorded at One Arm Point, with the majority of meadows low to moderate in abundance and dominated by *Thalassia hemprichii* with *Halophila ovalis*, *Halodule uninervis* and *Enhalus acoroides* (Seagrass-Watch 2019).

While some seagrasses have been collected from intertidal sites in the central and north Kimberley (Walker et al. 1996, Walker 1997), these areas were not found to be species rich and did not support extensive seagrass meadows like those found in the southern Kimberley.

3.2.7. Timor Province

Seagrass has been reported on the reef flats of offshore reefs of this bioregion (Whiting 1999, Hale & Butcher 2013).

Scott Reef supports five species of seagrass (URS 2006), with *Thalassia hemprichii* most abundant (Skewes et al. 1999, URS 2006). The area of seagrass at Scott Reef is significantly less than that recorded for Ashmore Reef (approximately 100 ha) (Woodside 2011). The highly energetic environment and significant tidal exposure of Scott Reef restricts the area of habitats potentially suitable for seagrass establishment to a small proportion of the total area, resulting in low abundance (Skewes et al. 1999, URS 2006).

3.2.8. Christmas Island Province

The subsurface marine habitat immediately surrounding Christmas Island consists of a relatively narrow and shallow coral reef shelf about 20 to 100 metres wide in approximately six to 20 metres of water depth. The sandy areas and some lagoons are also known to support seagrass habitat (DoNP 2012).

Low species counts were found across Christmas Island and Cocos (Keeling) Island Provinces, with three species observed covering 26.0 km^2 of coastline (Fortes et al. 2018).

3.3. Macroalgae

Macroalgae are important contributors to primary production and nutrient cycling in the EMBA, providing food and habitat for vertebrate and invertebrate fauna. Macroalgae are also recognised for their role in spatial subsidies; the movement of nutrients or energy between neighbouring habitats. Spatial subsidies involving macroalgae include the movement of wrack from macroalgal beds to seagrass meadows, bare substrates and shorelines (Orr 2004, Mellbrand et al. 2011).

Macroalgae are primarily associated with hard substrates. They occur in moderate to high cover on exposed hard substrates, but typically have lower cover on hard substrates that are covered with a veneer of sediment (SKM 2009, BHPBIO 2011). Macroalgae exhibit very high seasonal and interannual variation in biomass (Heyward et al. 2006) and distribution, abundance, and biodiversity (Rio Tinto 2009, BHPBIO 2011). The distribution of hard substrates therefore indicates areas that may support macroalgal communities, although abundance and diversity may fluctuate annually.

Macroalgae are susceptible to disturbance from factors such as sedimentation, scouring and turbidity but the marked seasonality in biomass, abundance, diversity, and distribution suggests macroalgae are likely to be resilient to acute, short-term disturbance acting at local scales. Macroalgae may be more susceptible to impacts acting over longer time scales (years) and at certain times of the year, where recruitment at a regional scale could be affected. Indirect impacts affecting the numbers, distribution and community structure of herbivorous fish can also be expected to have impacts (either positive or negative) on macroalgal habitats (Vergès et al. 2011).

Two bioregions (Northwest Province and Central Western Transition) lie entirely in deep waters below the photic zone. Macroalgae are not present hence these bioregions are not discussed.

3.3.1. Southwest Shelf Transition

The Houtman Abrolhos Islands have known species of benthic algae with macroalgae communities considered important in supporting a diversity of marine life.

3.3.2. Central Western Shelf Province

Although seagrasses are the most visually dominant organisms found in Shark Bay (Walker et al. 1989) macroalgae are also a significant component within the system, with 161 taxa of benthic macroalgae reported from the location (Kendrick et al. 1990). The seagrass meadows host a large number of epiphytic algal species (Harlin et al. 1985, Kendrick et al. 1990), which numerically dominate the algal flora of the area. Eighty algal species were epiphytic on the seagrass *Amphibolis antarctica*, and of these, over half have been reported both as epiphytes and benthic algae. Benthic macroalgae can be found growing on occasional subtidal rock (limestone–sandstone) platforms and extensive sand flats that occur throughout Shark Bay, and as drift within seagrass meadows (Kendrick et al. 1990).

The benthic algae of Shark Bay are not predominantly temperate as is the case with the seagrasses (Walker et al. 1989) and seagrass epiphytes (Kendrick et al. 1990). The majority of taxa are either of tropical or cosmopolitan distribution. Their local distribution within Shark Bay is correlated with salinity, with benthic algal species richness lower in areas of high salinity (Kendrick et al. 1990).

Limestone platforms occur along the bioregion's coastline and high energy environments are likely to be dominated by large brown algae including *Ecklonia radiata* and *Sargassum* spp. with articulated coralline algae making up the understorey. More diverse algae assemblages may be observed in sheltered locations such as potholes and ledges (DoF 2007).

3.3.3. Central Western Shelf Transition

Macroalgal beds along the Ningaloo coastline are generally found on the shallow limestone lagoonal platforms and occupy about 2,200 ha of the Ningaloo Marine Park and Muiron Islands Marine Management Area (CALM & MPRA 2005a). Macroalgal communities within the area have been broadly described (Bancroft & Davidson 2000). The dominant genera are the brown algae *Sargassum*, *Padina*, *Dictyota* and *Hydroclathrus* spp. (McCook et al. 1995).

3.3.4. Northwest Transition

Although macroalgae is present at the Rowley Shoals, it is not recognised as a key habitat component in the Mermaid Reef Marine National Nature Reserve Plan of Management (EA 2000) or the Rowley Shoals Marine Park Management Plan (DEC & MPRA 2007b).

There is nothing to suggest that the algal flora of the Rowley Shoals is unique within the Indo-Pacific (Huisman et al. 2009). A study of macroalgae at 16 locations at Mermaid Reef recorded over 100 species (Huisman et al. 2009). The algal flora recorded at the Rowley Shoals represents a small portion of the highly diverse Indo-Pacific flora. The majority of species that were recorded at Mermaid Reef had been previously recorded from mainland north-western Australia or from Indonesia (Huisman et al. 2009).

3.3.5. Northwest Shelf Province

Macroalgae are diverse and widespread throughout the Northwest Shelf Province. They are restricted to depths where sufficient light penetrates to the substrate and therefore tend to be most common in shallow subtidal waters down to approximately 20 m depth.

In the nearshore regions of the Pilbara, macroalgae are often a dominant component of the mosaic of benthic organisms found on hard substrates in shallow water. In these shallow waters, regular disturbance to reef habitats from seasonal changes in sedimentation/ erosion patterns and the less frequent impacts of cyclones and storms through sedimentation and scouring may substantially alter the distribution and composition of the benthic communities associated with reefs, including macroalgal habitats (BHPBIO 2011).

Macroalgae dominate shallow (<10 m) submerged limestone reefs and also grow on stable rubble and boulder surfaces in the Dampier Archipelago (CALM & MPRA 2005). Huisman and Borowitzka (2003) reported approximately 200 species of macroalgae from the Dampier Archipelago. Low relief limestone reefs that are dominated by macroalgae, account for 17 % (approximately 35,460 ha) of the marine habitats within the proposed Marine Management Area (CALM 2005a).

Epibenthic dredge surveys along the coastline north of Broome identified 43 species of algae from 22 families (Keesing et al. 2011). The lower species diversity collected by this study is attributed to the method of collection and limited depth range (11–23 m) (Keesing et al. 2011).

Macroalgae occur around the numerous small offshore islands within this bioregion (including Thevenard Island, Airlie Island and Serrurier Island) associated with limestone pavement and protected areas of soft sediments. Dominant species are consistent with those described for the Dampier Archipelago (Woodside 2011).

In the shallow offshore waters of the Pilbara region, macroalgae are the dominant benthic habitat on hard substrates in both the Montebello and Barrow Islands Marine Parks and are the main primary producers (DEC & MPRA 2007a, Chevron 2010). Shallow water habitats outside these marine parks are also likely to support substantial areas of macroalgal habitat wherever conditions are suitable.

Macroalgae occupy approximately 40% of the benthic habitat area in the Montebello/ Lowendal/ Barrow Island region (CALM 2005b). At least 132 macroalgal taxa occur around Barrow Island, with most thought to be widely distributed in the tropical Indo-Pacific region (Chevron 2005).

Macroalgae monitoring around the Lowendal and Montebello Islands since 1996 (The Ecology Lab 1997, IRCE 2002 2003 2004 2006 2007, URS 2009) has found macroalgal cover and biomass to be naturally spatially and temporally variable. *Sargassum* spp. represented 70% of the macroalgal assemblage in 2009, compared to 96% in 2002 (URS 2009). Sargassum spp. cover as a percentage of total macroalgae cover was significantly lower in 2009 than in previous years, primarily due to an increase in filamentous algae at a number of sites (URS 2009).

3.3.6. Northwest Shelf Transition

There is a lack of information regarding the marine benthic flora of north-west Western Australia and no comprehensive marine flora list exists for the region (Huisman 2004). However, about 70 algae species were collected during a survey of intertidal reefs on the central Kimberley coast in 1997 (Walker 1997).

Tropical macroalgae species are typically associated with areas of hard substrate and various types of macroalgae occur on rock platforms intermingled with coral and sponge. Abundance and biomass typically exhibit strong seasonal trends (Heyward et al. 2006).

The diversity and abundance of algae in the Kimberley is probably linked to the region's extreme tidal exposure and highly turbid waters, reducing light penetration and resulting in deposition of fine sediments (Walker 1997). However, the role of algae appears crucial to the growth of reefs in the highly turbid waters of the Kimberley coast and islands (Brooke 1997). *Sargassum* spp. and coralline algae may be dominant (DPAW 2013).

It is also considered that in offshore parts of the Northwest Shelf Transition, there are high levels of primary production, including macroalgae. This is due to light penetration through relatively clear, shallow waters (DEWHA, 2008a).

3.3.7. Timor Province

Surveys at Scott Reef recorded over 100 species of marine algae (Huisman et al. 2009). The marine algal community was similar between reefs and also similar to the Rowley Shoals. Algae found at these offshore atolls forms a small subset of the Indo-Pacific algal flora, with virtually all of the species identified thus far having been previously collected from north-western Australia or from localities further north. Although further research is necessary, at present there is nothing to suggest that the macroalgae communities of these offshore atolls are unique within the Indo-Pacific (Huisman et al. 2009).

3.3.8. Christmas Island Province

Christmas Island coral reefs are 'turfed' with fine hair-like algae which are grazed by many animals. Some red algae form hard pink crusts which cement sand and dead coral together (DoNP, 2012).

3.4. Non-Coral Benthic Invertebrates

The offshore marine environment from Busselton to the Northern Territory is overwhelmingly dominated by soft sediment seabeds; sandy and muddy substrates, occasionally interspersed with hard substrates covered with sand veneers, and rarely, exposed hard substrate. In shallow waters, non-coral benthic invertebrates may form part of the mosaic of benthic organisms found on hard substrates, alongside macrophytes and coral colonies. As light reduces with water depth, non-coral benthic invertebrates are the dominant community, albeit at low densities.

Non coral benthic invertebrates feed by filtering small particles from the seawater, typically by passing the water over a specialised filtering structure. Examples of filter feeders are sponges, soft and whip corals and sea squirts.

3.4.1. Southwest Shelf Transition

The inner shelf of the bioregion, extending between 0-50 m deep, includes distinct ridges of limestone reef with extensive beds of macro-algae (principally *Ecklonia* spp.). These inshore lagoons are inhabited by a diverse range of coralline algae, sponges, molluscs and crustaceans. On the outer shelf and shelf break filter feeding sponges and bryozoans dominate the hard bottom. The reefs around the Houtman Abrolhos Islands support 492 known species of molluscs, 110 known species of sponges, 172 known species of echinoderms and 234 known species of benthic algae (DEWHA 2008b). Western rock lobster, the dominant large benthic invertebrate in this bioregion, is an important part of the food web of the inner shelf.

3.4.2. Central Western Shelf Province

The Central Western Shelf Province occurs on the continental shelf in water depths from 0 to 100 m. Biological communities of the shelf are likely to include a sparse invertebrate assemblage of sea cucumbers, urchins, crabs and polychaetes on sand substrates. Hard substrates are likely to contain sessile invertebrates such as sponges

and gorgonians. The biological communities of this bioregion share many similarities with the adjoining temperate region (DEWHA 2008a).

Stromatolites occur in Shark Bay. Although they are a microbial colony (prokaryote), and not an invertebrate (eukaryote), they are described here as a unique benthic biological community. Stromatolites are rock-like structures built by cyanobacteria. Shark Bay's stromatolites are 2,000 to 3,000 years old and are similar to life forms found on Earth up to 3.5 billion years ago. Until about 500 million years ago, stromatolites were the only macroscopic evidence of life on the planet; hence they provide a unique insight into early life forms and evolution. The stromatolites are located in the hypersaline environment of Hamelin Pool and are one of the reasons for the area's World Heritage Listing (DPAW 2009).

3.4.3. Central Western Transition

The Central Western Transition extends from the shelf break to the continental slope with some parts of the bioregion occurring on the abyssal plain. Water depths range from 80 m to almost 6,000 m. Sediments are dominated by muds and sands that decrease in grain size with increasing depth. The present level of understanding of the marine environment in this bioregion is generally poor. The harder substrate of the slope in waters of 200–2,000 m deep is likely to support populations of epibenthic fauna including bryozoans and sponges. These support larger infauna and benthic animals such as crabs, cephalopods, echinoderms and other filter feeding epibenthic organisms. In the deeper waters of the abyss, the benthic communities are likely to be sparse (DEWHA 2008a).

3.4.4. Central Western Shelf Transition

The Central Western Shelf Transition is located entirely on the continental shelf and is comprised mainly of sandy sediments in depths between 0 and 80 m (DEWHA 2008a).

Some sponge species and filter-feeding communities found in deeper waters offshore from the Ningaloo Reef appear to be significantly different to those of the Dampier Archipelago and Abrolhos Islands, indicating that the Commonwealth waters have some areas of potentially high and unique sponge biodiversity (Rees et al. 2004).

3.4.5. Northwest Province

The Northwest Province is located entirely on the continental slope in water depths of predominantly between 1,000–3,000 m and is comprised of muddy sediments. Despite the present poor knowledge of the benthic communities on the Exmouth Plateau, information on sediments in the bioregion indicates that benthic communities are likely to include filter feeders and epifauna. Soft-bottom environments are likely to support patchy distributions of mobile epibenthos, such as sea cucumbers, ophiuroids, echinoderms, polychaetes and sea pens.

3.4.6. Northwest Transition

The Northwest Transition is located from the shelf break (200 m water depth) over the continental slope to depths of more than 1,000 m at the Argo Abyssal Plain. Benthic habitat mapping surveys and epibenthic sampling conducted by CSIRO at the continental slope (approximately 400 m water depth) showed that all survey sites predominantly comprised soft, muddy sediment, which was often riffled. Gravel, boulders and small outcrops were occasionally recorded. Epifaunal abundance was similar all sites, with epifauna limited to sparsely distributed isolated individuals. Epifauna included isolated scattered sessile crinoids, anemones, glass sponges and seapens. Occasional non-sessile fauna included urchins, prawns and other decapods, holothurians and sea stars. Modelling indicated a 1 km long beam trawl across the continental shelf (approximately 400 m water depth) would be expected to yield sparse (<20 individuals) and low diversity (<10 species) of epibenthic fauna (≥1 cm body size) (Williams et al. 2010). Deeper on the continental slope at approximately 700 m and approximately 1,000 m, habitats were similar to those observed at 400 m (Williams et al. 2010).

Although soft sediment habitat may appear monotonous and featureless, there is likely to be some marked differences in terms of ecological functioning and faunal composition between shelf and deep-sea areas, with the 200 m isobath widely believed to represent a key boundary (Wilson 2013, Brewer et al. 2007, Gage & Tyler 1992). Beyond the 200 m isobath, deep-sea benthic communities rely exclusively on the settling of organic detritus from the overlying water column as a food source. The spatial and temporal distribution of benthic fauna depends on factors such as sediment characteristics, depth and season (Wilson 2013).

Due to contrasting depths, the Rowley Shoals supports a diverse marine invertebrate community including a number of endemic species. Invertebrate species (excluding corals) at the Rowley Shoals include sponges,

cnidarians (jellyfish, anemones), worms, bryozoans (sea mosses), crustaceans (crabs, lobsters, etc.), molluscs (cuttlefish, baler shells, giant clams, etc.), echinoderms (starfish, sea urchins) and sea squirts (DEC & MPRA 2007b).

3.4.7. Northwest Shelf Province

This bioregion is located primarily on the continental shelf in water depths from 0 to 200 m (DEWHA 2008a). The sandy substrates on the shelf within this bioregion are thought to support low density benthic communities of bryozoans, molluscs and echinoids (DEWHA 2008a). Sponge communities are also sparsely distributed on the shelf but are found only in areas of hard substrate. The region between Dampier and Port Hedland has been described as a hotspot for sponge biodiversity (Hooper & Ekins 2004).

Epibenthic dredge surveys in nearshore areas around Broome covered 1,350 m^2 of seabed in depths between 11 and 23 m. The survey recorded 357 taxa comprising 52 sponges, 30 ascidians, 10 hydroids, 52 cnidarians (not including scleractinian corals), 69 crustaceans, 73 molluscs and 71 echinoderms. The most important species on soft bottom habitats in terms of biomass was the heart urchin *(Breynia desorii)*, whilst sponges were the dominant fauna by biomass on hard bottom habitats. The biomass of other filter feeders, especially ascidians, soft corals, gorgonians was also high, indicating the importance of these groups in characterising hard bottom habitats.

In 2007, CSIRO conducted extensive benthic habitat mapping surveys and epibenthic fauna (living on the surface and ≥1 cm body size) sampling in deep waters (100–1,000 m) spanning thirteen sites between Barrow Island and Ashmore Reef running along the continental shelf and across the continental slope of the North West Shelf (Williams et al. 2010). At the continental shelf margin (approximately 100 m water depth) Williams et al. (2010) reported that similar benthic habitats occurred at each survey site across the breadth of the North West Shelf. Benthic habitats at this depth comprised a mix of riffled muddy sand (sometimes as a veneer over rocky sub-crops) together with gravel to pebble-sized rubble, cobbles, boulders and some rock outcrops. Typical epifauna found at these depths included scattered isolated hydroids, sea fans and soft corals and often small sponges. Other fauna observed at some of the sites included scattered isolated sea whips, crinoids, sea pens, urchins and anemones. Epibenthic fauna along the continental shelf margin were quantified as sparse and low diversity (Williams et al. 2010). Modelling indicated that a trawl sample of 1 km length would generally be expected to yield approximately 80 individuals represented by 15 species (Williams et al. 2010) in 100 m depth waters.

At the shelf edge (approximately 200 m water depth), two sites were surveyed. Both sites were similar to the continental shelf margin, except the northern site mainly comprised coarse material. Epifauna observed at the northern site was similar at 200 m as at 100 m. At the southern site, epifauna included sparse and scattered individual soft corals, anemones, glass sponges and stalked crinoids (Williams et al. 2010). Modelling indicated epibenthic fauna were sparse and had low diversity, numbering approximately 20–40 individuals in a 1 km long trawl sample represented by approximately 5–10 species (Williams et al. 2010).

Baseline studies undertaken in nearshore areas of the Pilbara (SKM 2009, Rio Tinto 2009, BHPBIO 2011) and offshore areas around Barrow Island (Chevron 2010) have shown that filter feeder communities are a dominant component of benthic habitats in depths >10 m where reduced light appears to inhibit extensive development of hard corals and macroalgae. The pavement habitats between Barrow Island and the mainland are covered by a sediment veneer that appears to periodically move, exposing areas of pavement reef. Sessile benthic organisms that require hard substrates for attachment, such as gorgonians, are frequently seen emerging through a shallow veneer of sand. This type of substrate (sediment veneer) with sparse filter feeder communities is common throughout this area (Skm^{2}009, Rio Tinto 2009, BHPBIO 2011).

3.4.8. Northwest Shelf Transition

The Northwest Shelf Transition is located on the continental shelf with a small area extending onto the continental slope, with water depths ranging from 0–330 m. Nearshore areas may support significant filter feeding communities, but these have not yet been described (Masini et al. 2009).

Pipeline route surveys north of the Kimberley in water depths from 10–250 m recorded a seabed largely devoid of hard substrate, with only sparse epibenthic fauna noted on the predominantly sandy substrate. Occasional epibenthic fauna (featherstars, gorgonians, bryozoans, sea urchins, hydroids and sponges) were recorded in areas where rocky substrate or outcrops were present (URS 2010a).

3.4.9. Timor Province

The Timor Province is located on the continental slope and abyssal plain and water depths range from 200 m to almost 6,000 m. Benthic studies in this bioregion are scarce, however data from the North West Slope Trawl Fishery suggests that muddy sediments in the Timor Province support significant populations of crustaceans (Brewer et al. 2007). Additionally, research into the demersal fish communities of the continental slope has identified the Timor Province as an important bioregion. This is due to the presence of a number of endemic fish species, and two distinct demersal community types associated with the upper slope (water depths of 225–500 m) and mid-slope (water depths of 750–1,000 m) (Last et al. 2005). The current understanding of the relationship between demersal fish communities and benthic environments on the continental slope is rudimentary (DEWHA 2008a).

3.4.10. Christmas Island Province

Three major molluscs grow on Christmas Island's reefs: bivalves, gastropods and cephalopods. Echinoderms include sea stars, brittle stars, feather stars, sea urchins and sea cucumbers (DoNP, 2012). The deeper waters connecting Christmas Island to the Cocos (Keeling) Island Province are described below (Section 4.3.4).

3.5. Plankton

Plankton abundance and distribution is patchy, dynamic, and strongly linked to localised and seasonal productivity (Trebilco et al. 2021). Fluctuations in abundance and distribution occur both vertically and horizontally in response to tidal cycles, seasonal variation (light, water temperature and chemistry, currents and nutrients) and cyclonic events. As a key indicator for ecosystem health and change, plankton distribution and abundance has been measured for over a century in Australia (Richardson et al. 2015). The compilation of this data has been made publicly available through the Australian Ocean Data Network (Australian Ocean Data Network 2022) and has been used in the Australia State of the Environment 2021 report (Trebilco et al. 2021) to nationally assess marine ecosystem health. According to their findings, primary production has decreased in the north-west and north-east shelf and offshore in the Indian Ocean. Increases have been observed in all waters south of 25S (Trebilco et al. 2021) including in offshore waters in the Great Australian Bight.

Within the EMBA, peak primary productivity varies on a local and regional scale. For example, peak phytoplankton biomass in waters surrounding Broome has been observed in May with a high variability recorded in August, whereas recorded phytoplankton biomass in waters surrounding Geographe Bay has been found to peak during winter and is localised close to the coast (Bloundeau-Patissier et al. 2011). In general, these peaks are linked to mass coral spawning events, peaks in zooplankton and fish larvae abundance and periodic upwelling. Regional upwelling is most common close to the coast and where surface waters diverge. Despite the suppression of major upwelling along the WA coast by the Leeuwin Current, known key upwelling regions include the Ningaloo region (Hanson & McKinnon 2009). It is also expected that a high abundance of plankton will occur within areas of localised upwelling in the EMBA where the seabed disrupts the current flow.

Christmas Island waters are generally low in surface plankton throughout the year, with a productivity peak normally in September/October (Davies 2006 in Brewer 2009).

In waters surrounding Indonesia, seasonal peaks in phytoplankton biomass are linked to monsoon related changes in wind. When the winds reverse direction (offshore vs. onshore), nutrient concentrations decrease/increase because of the suppression/enhancement of upwelling (National Aeronautics and Space Administration (NASA) 2017). Annual variability of phytoplankton productivity in waters surrounding Indonesia is heavily influenced by the El Niño-Southern Oscillation climate pattern (NASA 2017). For example, phytoplankton productivity around Indonesia increases during El Niño events.

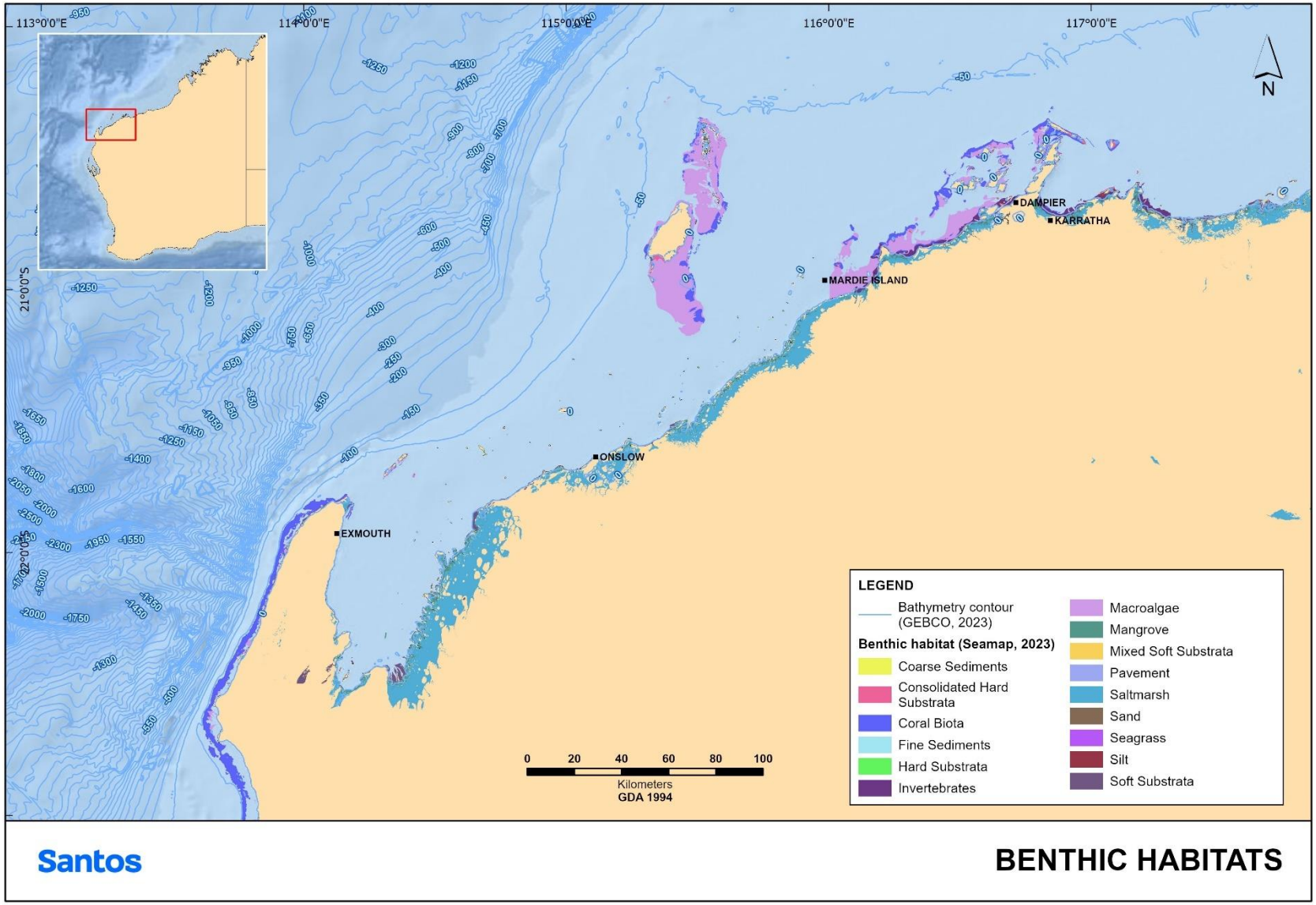


Figure 4: Benthic habitats from Coral Bay to Dampier

4. Shoreline Habitats

Shoreline habitats are defined as those habitats that are adjacent to the water along the mainland and of islands that occur above the Lowest Astronomical Tide (LAT) and most often in the intertidal zone.

The following section broadly categorises shoreline habitats as the following biological communities; mangroves, intertidal mud/sand banks, beaches, and rocky shores. These communities are discussed in Section 4, in terms of the 18 IMCRA v. 4.0 bioregions where relevant and where information is available.

Figure 4 broadly illustrate these habitats within the Northwest Shelf Province and Central Western Shelf Transition.

4.1. Mangroves

Mangroves commonly occur in sheltered coastal areas in tropical and sub-tropical latitudes (Kathiresan and Bingham 2001). Up to eight species of mangroves are found further north in the Central Western Shelf Transition region, but at most locations the dominant mangrove (in terms of area of intertidal zone occupied) is *Avicennia marina*, with the stilt rooted mangrove *Rhizophora stylosa* often occurring as thin zones of dense thickets within the broad zone of *A. marina*. Mangroves are found wherever suitable conditions are present including wave dominated settings of deltas, beach/dune coasts, limestone barrier islands and ria/archipelago shores (Semeniuk 1993). Mangrove plants have evolved to adapt to fluctuating salinity, tidal inundation and fine, anaerobic, hydrogen sulfide rich sediment (Duke et al. 1998).

Mangroves are important primary producers and have a number of ecological and economic values. For example, they play a key role in reducing coastal erosion by stabilising sediment with their complex root systems (Kathiresan and Bingham 2001). They are also recognised for their capacity to help protect coastal areas from the damaging effects of erosion during storms and storm surge. Mangroves are also important in the filtration of run-off from the land which helps maintain water clarity for coral reefs which are often found offshore in tropical locations (National Oceanic and Atmospheric Administration (NOAA) 2010). The intricate matrix of fine roots within the soil also binds sediments together.

Mangroves play an important role in connecting the terrestrial and marine environments (Alongi 2009). Numerous studies (e.g. Nagelkerken et al. 2000, Alongi 2002, Alongi 2009, Kathiresan and Bingham 2001) have shown mangroves to be highly productive and an important breeding and nursery areas for juvenile fish and crustaceans, including commercially important species (Kenyon et al. 2004). They also provide habitat for many juvenile reef fish species.

Mangroves also play an important ecosystem role in nutrient cycling and carbon fixing (NOAA 2010). The trees absorb carbon dioxide from the atmosphere and the organic matter such as fallen leaves forms nutrient rich sediments creating a peat layer that stores organic carbon (Alongi 2009, Ayukai 1998).

The muddy sediments that occur in mangrove forests are home to a variety of epibenthic, infaunal and meiofaunal invertebrates (Kathiresan and Bingham 2001). Crustaceans known to inhabit the mud in mangrove systems include fiddler crabs, mud crabs, shrimps and barnacles. Within the water channels of the estuary, various finfish are found from the smaller fish such as gobies and mudskippers (which are restricted to life in the mangroves) through to larger fish such as barramundi (*Lates calcarifer*) and the mangrove jack (*Lutjanus argentimaculatus).* Mangroves and their associated invertebrate-rich mudflats are also an important habitat for migratory shorebirds from the northern hemisphere, as well as some avifauna that are restricted to mangroves as their sole habitat (Garnet and Crowley 2000).

The two key State regulatory documents relevant to the protection and management of mangroves in WA are:

- EPA (2001) Guidance Statement for Protection of Tropical Arid Zone Mangroves along the Pilbara Coastline. Guidance Statement No. 1
- EPA (2016) Technical Guidance – Protection of Benthic Communities and Habitats.

4.1.1. Central Western Shelf Province

Shark Bay (in the Central Western Shelf Province) supports the southern-most area of substantial mangrove habitat in Western Australia (Rule et al. 2012). The mangroves of Shark Bay comprise only one species, the white mangrove *Avicennia marina*, and these trees occur around the coastline in widely dispersed and often isolated stands of varying size.

4.1.2. Central Western Shelf Transition

The regional mangroves from Exmouth to Broome (within the Central Western Shelf Transition and southern part of the Northwest Shelf Province) represent Australia's only 'tropical-arid' mangroves. The most significant stand of mangroves in the Central Western Shelf Transition is Mangrove Bay on the western side of the Cape Range Peninsula in the Ningaloo Marine Park. This small area of mangrove (37 ha) represents the largest area of mangrove habitat within the Ningaloo Marine Park and is considered extremely important from a biodiversity conservation perspective (CALM 2005).

4.1.3. Northwest Shelf Province

In the Pilbara region, the coast is a complex of deltas, limestone barrier islands and lagoons, with a variable suite of substrates. As a result, mangroves in this region form relatively diverse fringing stands, albeit often stunted in stature but at times quite extensive in area. The mangroves along the Pilbara coastline are the largest single unit of relatively undisturbed tropical arid zone habitats in the world. The area has nine mangrove taxa and a total of 632 km^2 mangroves (MangroveWatch 2014). As with most arid zone mangroves, Pilbara mangroves are characterised by open woodlands and shrublands that are of relatively lower productivity than the mangrove communities of the wet tropics because of the extreme water and salinity stresses that affect the intertidal zone in the Pilbara (EPA 2001). Significant stands of mangroves in the Pilbara include:

- Exmouth Gulf: mangrove assemblages within the Bay of Rest on the western shore of the Gulf and the extensive mangrove system on the eastern shore of the Gulf that extends as a series of tidal flats and creek channels from Giralia Bay to Yanrey Flats (Astron 2014). These areas of mangrove are also designated as 'regionally significant' by the EPA (2001). The importance of these mangroves to the Exmouth Prawn Fishery is discussed in Kangas et al. (2006)
- Mainland coast and nearshore islands: mangrove assemblages at Ashburton River Delta, Coolgra Point, Robe River Delta, Yardie Landing, Yammadery Island and the Mangrove Islands are all designated as 'regionally significant' by the WA EPA (2001) and the EPA will give these mangrove formations the highest degree of protection with respect to geographical distribution, biodiversity, productivity and ecological function
- Montebello, Barrow and Lowendal Islands: mangrove assemblages all lay within designated reserves. The mangrove communities of the Montebello Islands are considered globally unique as they occur in lagoons of offshore islands (DEC 2007). Mangrove stands identified on Varanus Island occur on the west coast in discrete patches within the tidal and supratidal zones, at South Mangrove Beach and a small embayment (Astron 2016). Mangrove stands on Varanus Island have been identified as healthy, with similar stands also identified as present on Bridled Island to the north of Varanus Island (Astron 2016).

The mangroves of the Kimberley are particularly diverse and relatively untouched. They occupy a variety of coastal settings including rocky shores, beaches and tidal flats (Cresswell and Semeniuk 2011). They belong to the Indo-Malaysian group of Old World Mangroves centred in the Indian-Pacific area (Cresswell and Semeniuk 2011). Of the eighteen species of mangrove plants known to Australia all are represented in the Kimberley including *Avicennia marina, Aegialitis annulata, Aegiceras corniculatum, Rhizophora stylosa, Ceriops tagal, Osbornia octodonta, Bruguiera exaristata, Camptostemon schultzii, Excoecaria agallocha, Sonneratia alba,* and *Xylocarpus australasicus* (Pendretti and Paling, 2001; Waples, 2007). Of these, ten occur only in the Kimberley (Waples 2007). *Rhizophora stylosa* and *Avicennia marina* are the most common mangrove species along the WA Coast.

Mangroves line much of the coastal area within the western Kimberley (and within the proposed Horizontal Falls Marine Park area). They are known to line the shore in the upper reaches of Talbot Bay and to fringe many of the islands of the Buccaneer Archipelago. There are large stands in the southern section of Dugong Bay. Kingfisher Islands has been noted to exhibit extensive mangroves where 10 species of mangrove have been recorded (Wilson 2013). Mangroves line the shores of the southern coast of Collier Bay and large tracts are found in Walcott Inlet and Secure Bay (Duke et al. 2010). The mangroves on the eastern side of the inlet extend about 30 km inland (Gueho 2007, Pendretti and Paling 2001, Zell 2007). Further along the coast mangroves have been

identified lining much of the shores of Doubtful Bay. Mangroves are also known to line the shores of the Sale River and have been identified in George Water. For detailed maps of mangrove distribution refer to Pedretti and Paling (2001).

4.1.4. Northwest Shelf Transition

Mangroves are also a prominent feature of the North Kimberley. Fringing mangroves have developed around the edge of Prince Frederick Harbour and to the east of Cape Voltaire extending along the shores of Walmesly Bay and Port Warrender (Zell 2007). This region is humid and *Xylocarpus granatum* is localised here (Cresswell and Semeniuk 2011). The rocky coastline between Cape Pond and Cape Voltaire does not lend itself to mangrove development; instead coastal woodland grows on the shores above high-water mark. Mangroves are interspersed with rocky outcrops and beaches around much of the Admiralty Gulf, Vansittart Bay and Napier Broome Bay (with extensive stands around the Drysdale estuary). Cape Londonderry marks the westerly limit of *Scyphiphora hydrophylacea* (Duke et al. 2010).

4.1.5. Timor Province

Details on habitats in the Timor Province is provided in Section 12.

4.1.6. Christmas Island Province

There are no coastal mangroves, but a stand of normally estuarine *Bruguiera gymnorhiza* and *B. sexangula* occurs at Hosnie's Spring (registered as international important wetlands under the Ramsar convention for being representative, rare or unique wetlands, or important for conserving biological diversity) about 50 metres above sea level. Two other mangrove species occur on the east coast. *Heritiera littoralis* occurs on the inland terrace above Greta Beach (outside the park) and further south towards Dolly Beach, as well as a discrete stand on the terrace above Dean's Point. *Cynometra ramiflora* occurs in two small stands south of Ross Hill (DoNP, 2012).

4.2. Intertidal Mud/Sand Flats

Intertidal mudflats form when fine sediment carried by rivers and the ocean is deposited in a low energy environment. Tidal mudflats are highly productive components of shelf ecosystems responsible for recycling organic matter and nutrients through microbial activity. This microbial activity helps stabilise organic fluxes by reducing seasonal variation in primary productivity which ensures a more constant food supply (Robertson 1988). Intertidal sand and mudflats support a wide range of benthic infauna and epifauna which graze on microscopic algae and microbenthos, such as bivalves, molluscs, polycheate worms and crustaceans (Zell 2007).

The high abundance of invertebrates found in intertidal sand and mudflats provides an important food source for finfish and shellfish which swim over the area at high tide. Mudflats have also been shown to be significant nursery areas for flatfish. During low tide, these intertidal areas are also important foraging areas for indigenous and migratory shorebirds. Mudflats also play a vital role in protecting shorelines from erosion (Wade and Hickey 2008).

4.2.1. Central Western Shelf Province

Shark Bay in the Central Western Shelf Province has a protected intertidal ecological community ‘Subtropical and Temperate Coastal Saltmarsh’, as listed under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). It is the northerly limit for this community and there is a transition zone for many saltmarsh species (CALM 1996). The EPBC ‘Listed Advice’ (DSEWPaC 2013a) reports that sediments associated with these communities generally consist of poorly-sorted anoxic sandy silts and clays and may have salinity levels that are much higher than seawater due to evaporation. The drainage characteristics of coastal soils, along with tidal patterns and elevation, can strongly influence the distribution of flora and fauna within the Coastal Saltmarsh ecological community (DSEWPaC 2013a).

4.2.2. Northwest Shelf Province

Within Northwest Shelf Province both Roebuck Bay and Eighty Mile Beach are areas with significant intertidal mudflats that are used by birds in spring and summer including species listed as threatened under the *Biodiversity Conservation Act 2016* (BC Act) or EPBC Act or listed on the IUCN Red List of Threatened Species (IUCN 2019).

Intertidal mudflats are also an important feature of the Kimberley coast forming in many bays and inlets of the region (Waples 2007). The sediments that dominate these flats are generally of terrigenous origin (Wilson 2013).

The mudflats of the Kimberley coast have been shown to be important for migratory birds of the East Asian-Australasian Flyway, which is estimated to support more than five million migratory shorebirds (Barter 2002, Bennelongia Pty Ltd 2010, Wade and Hickey 2008). The migratory birds visit the mudflats of the Kimberley coast to feed on benthic organisms prior to embarking on a 10,000–15,000 km migration to their breeding grounds in the Artic (Wade and Hickey 2008). Threatened and migratory birds that occur within the EMBA and are listed under the East Asian-Australasian Flyway are indicated in Table 10 to Table 14.

4.2.3. Northwest Shelf Transition

Extensive mud flats are located in Collier Bay, where the highest tidal range in Australia is found. (Wilson 2013, Zell 2007). A study by (Duke et al. 2010, Masini et al. 2009) also identified fringing mudflats around Walcott Inlet, and Doubtful Bay. The tidal mudflats of Walcott Inlet are up to 5 km wide and support a rich intertidal invertebrate community (Gibson and Wellbelove 2010). These invertebrate communities in turn also support large numbers of waterbirds (Wilson 1994).

Extensive intertidal mudflats occur in Prince Frederick Harbour and are generally backed by mangroves. The mudskipper is known to feed on these mudflats at low tide. Intertidal flats are also a feature of the estuary of the Mitchell River. The mudflats of Port Warrender are known to support 20 shorebird species and tern species and it is likely the other mudflats in the region also support high numbers of birds. The ecological significance of the wetlands of the Mitchell River has been recognised in *A Directory of Important Wetlands in Australia*. Mud and sand flats are also known to surround much of Deep Bay and Napier Broome Bay.

4.3. Intertidal Platforms

Intertidal platforms are areas of hard bedrock and/or limestone with or without a sediment veneer of varying thickness. These platforms can vary from low to high relief and provide a habitat for a diverse range of intertidal organisms (Morton and Britton in Jones 2004, SKM 2009, 2011, Hanley and Morrison 2012) and some species of shore birds (Garnet and Crowley 2000). They are common within each of the coastal bioregions within the EMBA.

4.3.1. Southwest Shelf Transition

Intertidal platforms within the Northwest and Southwest bioregions support a mosaic of fauna and flora that typically exhibits strong variability in percent cover, community composition, abundance, and diversity both between and within reefs at varying spatial and temporal scales (SKM 2009, 2011). Reef platforms typically exhibit zonation of fauna and flora from upper to lower levels on the intertidal zone, with increasing diversity, abundance, and biomass lower in the intertidal (Morton and Britton in Jones 2004, SKM 2009, 2010, 2011, Hanley and Morrison 2012).

Intertidal platforms are common along the Southwest Shelf Transition.

4.3.2. Central Western Shelf Province and Transition

Limestone pavements extend out from the beach into subtidal zones, e.g. along the Ningaloo Coast and North West Cape; and higher relief platforms (>0.5 m off high water mark) are also present at several headlands along the North West Cape.

Shark Bay in the Central Western Shelf Province has a high diversity of intertidal marine habitats because of the diversity of benthic substrate, salinity and the broad geographical features which influence depth, water movement and turbidity (CALM 1996, DSEWPaC 2013b). This includes extensive limestone platforms as well as sand flats, mud flats, salt marsh and mangroves and beaches (CALM 1996).

4.3.3. Northwest Shelf Province and Northwest Shelf Transition

Large tidal regimes are likely to be the defining environmental factor influencing the distribution of intertidal flora and fauna in the Northwest Shelf Province and Northwest Shelf Transition. The intertidal area of the Kimberley has an extreme tidal range (hypertidal) which creates unique environmental conditions and habitats not seen else anywhere else in the world. As a remote area many of the habitats are untouched and they are recognised as having significant conservation value (DPaW 2013). DPaW (2013) reports that as a result of the monsoonal influxes of freshwater and land-derived nutrients distinctive tropical marine ecosystems have occurred.

4.3.4. Christmas Island Province

Rocky shore platforms occur at many locations around the island, more extensively on the western coastline between North West Point and Egeria Point. There are also tidal rock pools which are maintained by wave splash and tidal surge (DoNP, 2012).

4.4. Sandy Beaches

Sandy beaches are those areas within the intertidal zone where unconsolidated sediment has been deposited (and eroded) by wave and tidal action. Sandy beaches can vary from low to high energy zones; the energy experienced influences the beach profile due to varying rates of erosion and accretion. Sandy beaches are found across the EMBA and vary in length, width, and gradient. They are interspersed among areas of hard substrate (e.g. sandstone) that form intertidal platforms and rocky outcrops. There is a wide range of variation in sediment type, composition, and grain size along the EMBA.

Sandy beaches provide habitat to a variety of burrowing invertebrates and subsequently provide foraging grounds for shorebirds (Garnet and Crowley 2000). The number of species and densities of benthic macroinvertebrates that occur in the sand are typically inversely correlated with sediment grain-size and exposure to wave action, and positively correlated with sedimentary organic content and the amount of detached and attached macrophytes (Wildsmith et al. 2005). However, the distributions of these faunas among habitats will also reflect differences in the suite of environmental variables that characterize those habitats (Wildsmith et al. 2005).

Sandy habitats are important for both resident and migratory seabirds and shorebirds (refer Section 1.1) While sand flats and beaches generally support fewer species and numbers of birds than mudflats of similar size; some species such as the beach thick knee (*Esacus giganteus*) a crab eater, are commonly associated with sandy beaches (Garnet and Crowley 2000). Sandy beaches can also provide an important habitat for turtle nesting and breeding (see marine turtles Section 6.1).

4.4.1. Southwest Shelf Transition

Sandy beaches throughout the Abrolhos Islands host breeding populations of the Australian sea lion. The Abrolhos Islands represent the northernmost breeding population of Australian sea lions. The current population at the Abrolhos Islands is estimated to be approximately 90 individuals (DoF 2012).

In addition to this, beaches in the South West province provide a variety of socio-economic values including tourism, commercial and recreational fishing, and support of other recreational activities.

4.4.2. Central Western Shelf Province

Sandy beaches are found along the coastline at Shark Bay within the marine park which is further described in Section 12.3.2.

4.4.3. Northwest Shelf Province

Eighty Mile Beach Marine Park is one of the Australia's largest uninterrupted sandy beaches (stretching 220 km) and is an important feeding grounds for small wading birds that migrate to the area each summer, travelling from countries thousands of kilometres away (DEC 2012a). It is also a listed Ramsar wetland (see Section 9 Protected Areas).

4.4.4. Northwest Shelf Transition

Sand habitat within the Camden Marine Park is mainly associated with shorelines and inlets on both mainland and island shores. Some beach deposits on islands in the Kimberley are composed of skeletal carbonate sand, while they may also consist of sediments from inland areas carried to the sea by rivers and gullies (DPaW 2013). The sediment coarseness of the sand may vary, and may also be littered with dead shell, rock and/or coral material. Sea cucumbers that ingest sand and filter out microscopic food are often common in this habitat DPaW 2013).

Generally, in this region, sand habitat is adjacent to either dense mangrove stands or rocky cliffs (DPaW 2013). Beaches can be highly influenced by tide and weather conditions. Those that overlie rock are likely to shift and be ephemeral in nature.

4.4.5. Christmas Island Province

These are formed of sand and of coral and shell rubble, often with limestone outcrops. Dolly and West White Beaches are the two largest beaches in the island, while Dolly and Greta Beaches hold sufficient sand to provide habitat for hermit and ghost crabs and to enable green turtles to dig nests (DNP, 2012).

4.5. Rocky Shorelines

Rocky shorelines are found across the EMBA and are often indicative of high energy areas (wave action) where sand deposition is limited or restricted (perhaps seasonally or during a cyclone). They are formed from limestone pavement extending out from the beach into subtidal zones, for example along the Ningaloo Coast and North West Cape; higher relief platforms (>0.5 m off high water mark) are also present at a number of headlands along the North West Cape. This habitat is also widespread heading south towards Perth.

Rocky shores can include pebble/ cobble, boulders, and rocky limestone cliffs (often at the landward edge of reef platforms). Rocky outcrops typically consist of hard bedrock, but some of the coastline has characteristic limestone karst cliffs with an undercut notch. Rocky shorelines can vary from habitats where there is bedrock protruding from soft sediments to cliff like structures that form headlands. Rocky shorelines are an important foraging area for seabirds and habitat for invertebrates found in the intertidal splash zone (Morton and Britton cited in Jones 2004). For example, oyster catchers and ruddy turnstones feed along beaches and rocky shorelines (see seabirds in Section 8.2.2).

5. Fishes and Sharks

Fish distributions in the EMBA are discussed with respect to the IMCRA Provincial Bioregions which were defined using CSIRO's 1996 regionalisation of demersal fish on the continental shelf to the shelf break, and their 2005 regionalisation of demersal fish on the continental slope to approximately 1,200 m depth (DEH 2006). The EPBC species listed as threatened and migratory found in the EMBA, according to the Protected Matters search (Appendix C of VGCN-VGA-4HGI ST1 Well Decommissioning EP), are shown in Table 1**,** along with their WA conservation listings (as applicable) and discussed in Section 5.2 below.

The following WA conservation codes apply to WA conservation significant fauna:

- Threatened species (listed under the *Biodiversity Conservation Act 2016* (WA) (BC Act)):
  - Critically endangered
  - Endangered
  - Vulnerable
- Specially protected species (listed under BC Act):
  - Migratory
  - Species of special conservation interest (conservation dependant fauna)
  - Other specially protected species

- Priority species (non-statutory state based administrative process):
  - Priority 1, 2 and 3: poorly-known species – possible threatened species that do not meet survey criteria or are otherwise data deficient. Ranked in order of priority. In urgent need of further survey.
  - Priority 4: species that are adequately known, are either: rare but not threatened; meet criteria for near threatened; or delisted as threatened species within last five years for reasons other than taxonomy. Requiring regular monitoring.

A detailed account of commercial and recreational fisheries that operate in the region is provided in the Commercial Fisheries Section 14 and detailed in *The State of the Fisheries Report* 2021/2022 (Newman et al., 2023).

Table 1: EPBC listed fish and shark species in the EMBA

Value/Sensitivity		Conservation Status			Socio-economic EMBA		BIA[1] in EMBA
Common name	Scientific name	Migratory Status	EPBC Act Status	BC Act Status	Presence	Type of Presence	
Dwarf Sawfish, Queensland Sawfish	*Pristis clavata*	Migratory	Vulnerable	P1 Migratory	✓	Species or species habitat known to occur within area	Yes – Refer to Table 3
Freshwater Sawfish	*Pristis pristis*	Migratory	Vulnerable	P3 Migratory	✓	Species or species habitat known to occur within area	Yes – Refer to Table 3
Giant Manta Ray	Mobula birostris	Migratory	-	Migratory	✓	Species or species habitat known to occur within area	None - BIA not found in EMBA
Green Sawfish, Dindagubba, Narrowsnout Sawfish	*Pristis zijsron*	Migratory	Vulnerable	Vulnerable	✓	Species or species habitat known to occur within area	Yes – Refer to Table 3Table 3
Grey Nurse Shark (west coast population)	*Carcharias taurus (west coast population)*	-	Vulnerable	-	✓	Congregation or aggregation known to occur within area	None - BIA not found in EMBA
Little Gulper Shark	*Centrophorus uyato*	-	Conservation Dependent	-	✓	Species or species habitat likely to occur within area	None - BIA not found in EMBA
Longfin Mako	*Isurus paucus*	Migratory	-	Migratory	✓	Species or species habitat likely to occur within area	None - BIA not found in EMBA
Narrow Sawfish, Knifetooth Sawfish	*Anoxypristis cuspidata*	Migratory	-	Migratory	✓	Species or species habitat likely to occur within area	None - BIA not found in EMBA
Northern River Shark, New Guinea River Shark	*Glyphis garricki*	-	Endangered	P1	✓	Species or species habitat may occur within area	None - BIA not found in EMBA
Oceanic Whitetip Shark	*Carcharhinus longimanus*	Migratory	-	-	✓	Species or species habitat likely to occur within area	None - BIA not found in EMBA
Porbeagle, Mackerel Shark	*Lamna nasus*	Migratory	-	Migratory	✓	Species or species habitat may occur within area	None - BIA not found in EMBA
Reef Manta Ray, Coastal Manta Ray	Mobula alfredi	Migratory	-	Migratory	✓	Species or species habitat known to occur within area	None - BIA not found in EMBA
Scalloped Hammerhead	*Sphyrna lewini*	-	Conservation Dependent	-	✓	Species or species habitat known to occur within area	None - BIA not found in EMBA
Shortfin Mako, Mako Shark	*Isurus oxyrinchus*	Migratory	-	Migratory	✓	Species or species habitat likely to occur within area	None - BIA not found in EMBA
Whale Shark	*Rhincodon typus*	Migratory	Vulnerable	Migratory	✓	Foraging, feeding or related behaviour known to occur within area	Yes – Refer to Table 3
White Shark, Great White Shark	*Carcharodon carcharias*	Migratory	Vulnerable	Vulnerable	✓	Foraging, feeding or related behaviour known to occur within area	None - BIA not found in EMBA

[1] Biologically Important Area

5.1. Regional Surveys

Within the EMBA a number of important geographical areas for fish exist, including Ningaloo Marine Park, Montebello/Barrow Island Marine Park, Abrolhos Marine Park and the Rowley Shoals.

5.1.1. Southwest Shelf Transition

A total of 389 finfish species have been recorded at the Abrolhos Islands (DoF 2012). The Abrolhos Islands and their surrounding coral and limestone reef systems consist of a combination of abundant temperate macroalgae with coral reefs, supporting substantial populations of large species such as baldchin groper and coral trout. Some of the species occurring in the Abrolhos Islands are dependent on larvae carried southward by the Leeuwin Current from areas further north, such as Shark Bay or Ningaloo Reef. Similarly, populations of some of the species occurring at Rottnest Island are dependent on larvae generated from breeding populations at the Abrolhos Islands (DoF 2012).

More than 20 species of sharks have been identified at the Abrolhos Islands (DoF 2012). These sharks include:

- Port Jackson shark (*Heterodontus portusjacksoni*)
- Tiger shark (*Galeocerdo cuvier*)
- Whaler shark (*Carcharhinus brachyurus*)
- Wobbegong (*Orectolobus maculatus*).

Abrolhos waters are considered to be an important food source for sharks, due to the resident fish populations. Various species of rays have been recorded at the Abrolhos Islands. These include the manta ray and the white spotted eagle ray (DoF 2012).

5.1.2. Central Western Shelf Province

The Central Western Shelf Province is located near Shark Bay and is the northern limit of a transition region between temperate and tropical marine fauna. Of the 323 fish species recorded from Shark Bay, 83 % are tropical species with 11 % warm temperate and 6 % cool temperate species (CALM 1996).

5.1.3. Central Western Shelf Transition

Ningaloo is the largest fringing coral reef in Australia, forming a discontinuous barrier that encloses a lagoon that provides habitat for many fish species. Gaps that regularly intercept the main reef line provide channels for water exchange with deeper, cooler waters (CALM 2005). Ningaloo Reef is a well-known biodiversity hotspot, supported by the direct link between the reef and the ancient reef systems found closer to the equator by the Leeuwin Current (Kemps 2010). Approximately 500 species of fish have been reported to inhabit the reef (Kemps 2010). The Piercam project from inception in 2005 to 2013, identified 165 fish species from 50 families at the Point Murat Navy Pier alone, located within the Ningaloo Marine Park (Whisson & Hoschke 2013).

Seasonal aggregations of whale sharks occur at Ningaloo each year (CALM 2005). There is limited data available on species diversity and distribution of sharks in the Ningaloo area as chondrichthyan biodiversity for the area has not been specifically recorded. Despite this, it is possible that the Ningaloo Reef Marine Park contains the largest and most diverse collection of sharks on the Australian coastline (Stevens et al. 2009). It was estimated in 2009 by Last and Stevens (cited in Stevens et al. 2009), that there are likely to be 118 species of chondrichthyan fishes occurring in the park. Of these species, 59 are shark species predicted to be found at depths of less than 200 m (Stevens et al. 2009).

The lagoon at Ningaloo Reef appears to provide a juvenile habitat and nursery area for shark species such as the grey nurse shark (*C. taurus*), black-tipped reef shark (*Carcharhinus melanopterus*) and other reef sharks (Carcharhinidiae) (Stevens et al. 2009). A study conducted on the distribution and abundance of elasmobranches in the Ningaloo Marine Park, in 2009, tracked the movements of six key shark species. Species such as *Galeocerdo cuvier* (tiger shark) and *Sphyrna mokarran* (great hammerhead) were found to remain for brief time periods in the park, in contrast to other species found to re-visit the Ningaloo area (Stevens et al. 2009). Several species of sharks within Ningaloo have been identified as key indicator species for the health of the system (Stevens et al. 2009).

Barrow Island includes Biggada Reef, an ecologically significant fringing reef, and the Montebello Islands comprise over 100 islands, the majority of which are rocky outcrops; providing fish habitat (DEC 2007a). Within the Barrow/Montebello region, at least 380 fish species have been recorded (de Lestang & Jankowski 2017). Most species exhibit wide distributions, with local species composition closely resembling that of the Dampier Archipelgao. Coral habitats support the most diverse fish community in this region, comprising, among others, many species of damselfish (Pomacentridae), parrotfish (Scaridae), snappers (Lutijanidae) and groupers (Serranidae) (de Lestang & Jankowski 2017). The region's macroalgal habitats are considered important nursery areas for a diverse range of fish species, such as emperor (Lethrinidae), threadfin bream (Nemipteridae), tuskfish (Labridae) and trevally (Carangidae) (de Lestang & Jankowski 2017).

Ramsar wetlands within the area (e.g. Eighty Mile Beach and Ashmore Reef National Nature Reserve) can also provide important habitat for fish (see Section 9.2).

5.1.4. Central Western Transition

The biological communities of the Central Western Transition are thought to be distinctive owing to the proximity of deep oceans areas to the continental slope and shelf, resulting in close interaction between pelagic species of the Cuvier Abyssal Plain and those of the slope and shelf (DEWHA 2008a).

The present level of understanding of the marine environment in this bioregion is generally poor. The diversity of fish and cephalopod species changes with depth, generally decreasing species numbers with increasing depth. The demersal slope fish bioregionalisation identified some endemism in communities in this bioregion (Last et al. 2005), however, it is lower than other areas of the North-west Marine Region (DEWHA 2008a).

Bentho-pelagic fish, such as deep-water snappers (e.g. *Paracaesio* spp, and *Eletis* spp.), hatchetfish (*Argyropelecus* spp.), dragonfish (*Melacosteus* spp.), viperfish (*Chauliodus* spp.) and a number of eels species migrate between the benthic and pelagic systems, forming an important link between these systems (DEWHA 2008a).

Transient fish species through the Central Western Transition bioregion include southern bluefin tuna (migrating to and from spawning grounds), broadbill swordfish (*Xiphius gladius*), bigeye tuna (*Thunnus obesus*), yellowfin tuna (*Thunnus albacares*) and striped marlin (*Tetrapturus audax*). Pelagic sharks also range across the bioregion following schools of pelagic fish (DEWHA 2008a).

5.1.5. Northwest Transition

The Northwest Transition bioregion may support sparse populations of bentho-pelagic fish and cephalopods in low densities. Pelagic fish species likely to be present include grenadiers and hatchetfish (*Argyropelecus* spp.) as well as transient populations of highly mobile pelagic fish. Adult and juvenile southern bluefin tuna are through to migrate through this bioregion on their way to and from spawning grounds in the north-eastern Indian Ocean (DEWHA 2008a).

The slope habitat of this bioregion is associated with important populations of demersal fish species and supports the second richest demersal fish assemblage nationally (Last et al. 2005). Over 508 fish species have been identified on the slope in this area and 64 of these species are endemic. The high diversity and endemism of the demersal fish fauna indicates important interactions between physical processes and trophic structures in this bioregion. For more information on the slope habitat for fish and sharks, refer to Section 10.

The Rowley Shoals within the Northwest Transition comprise three oceanic reef systems approximately 30–40 km apart, namely Mermaid Reef, Clerke Reef and Imperieuse Reef. The Shoals are thought to provide a source of invertebrate and fish recruits for reefs further south and as such are regionally significant (DEC 2007b).

5.1.6. Northwest Shelf Province and Northwest Province

The demersal zone of the North West Shelf (which includes the Northwest Province and Northwest Shelf Province) hosts a diverse assemblage of fish of tropical Indo-west Pacific affinity, with up to 1,400 species known to occur, with a great proportion of these occurring in shallow coastal waters (Allen et al. 1988). Last et al. (2005) and Fox and Beckley (2005) described the North-west Province as being characterised by a high level of endemism and species diversity. Certain areas of increased biological activity (e.g. Glomar Shoals) attract demersal fish species such as Rankin cod, red emperor, crimson snapper and spangled emperor that are exploited by commercial trawl and trap fisheries (Sainsbury et al. 1992, Fletcher and Santoro 2013).

The shallow waters (<30 m) of the Dampier Archipelago, in the Northwest Shelf Province, support a characteristic and rich fish fauna of 650 species from a variety of habitats including coral and rocky reefs, mangroves, sand and silty bottoms and sponge gardens (Hutchins 2003 & 2004). The majority of these species are found over hard substrate, but significant numbers are also found from soft bottom and mangrove areas. The outer islands of the Archipelago are inhabited predominantly by coral reef fishes whereas inner areas close to the mainland are occupied by mangrove and silty-bottom dwellers. The inter-island passages have a relatively rich soft bottom fauna. EPBC Act protected fish species within the Dampier Archipelago include the dwarf sawfish (*Pristis clavata*), freshwater sawfish (*Pristis pristis*) and narrow sawfish (*Anoxypristis cuspidate*).

The fish fauna of the archipelago is less diverse than the islands of the West Pilbara to the south but are closely related to the fauna at the offshore Montebello Islands (Hutchins 2004). The fish fauna of Barrow/ Lowendal/ Montebello Islands are widespread throughout the Indo-west Pacific region.

Within the southern portion of the Northwest and Northwest Shelf Province, small pelagic fish (e.g. lantern fishes) comprise a third of the total fish biomass (Bulman 2006) and inhabit a range of marine environments, including inshore and continental shelf waters. These small pelagic fish play an important ecological role, not only for this particular area but for the entire NWMR. They feed on pelagic phytoplankton and zooplankton and provide a food source for a wide variety of predators such as marine mammals, sharks, large pelagic fish and seabirds, thus providing a vital link between many of the region's trophic systems (Mackie et al. 2007).

Pelagic fish in the Northwest and Northwest Shelf Province include tuna, mackerel, herring, pilchard and sardine, and game fish such as marlin and sailfish (BBG 1994, Brewer et al. 2007), some of which are targeted by both commercial and recreational fishers. In particular, adult and juvenile southern bluefin tuna are thought to migrate through the North West Shelf on their way to and from spawning grounds in the north-eastern Indian Ocean. However, the timing of these migrations and the use of regional currents to assist their migration is still unclear. The oceanic waters of the North West Shelf are also believed to provide important spawning and nursery grounds for a number of large pelagic fish species. Table 2 provides a summary of the key fish species and likely timing of their spawning in the region (DoF correspondence).

5.1.7. Northwest Shelf Transition

Creek systems, mangroves and rivers, and ocean beaches within this region provide habitat for a variety of species including barramundi, tropical emperors, mangrove jack, trevallies, sooty grunter, threadfin and cods (Fletcher and Santoro 2013). The offshore atolls and the continental shelf waters in the Northwest Shelf Transition are also geographically important for fish species. They support species of recreational and commercial interest, including saddle-tail snapper and red emperor, cods, coral and coronation trout, sharks, trevally, tuskfish, tunas, mackerels and billfish (Gaughan et al. 2019).

The Rowley Shoals within the Northwest Shelf Transition comprise three oceanic reef systems approximately 30–40 km apart, namely Mermaid Reef, Clerke Reef and Imperieuse Reef. The Shoals are thought to provide a source of invertebrate and fish recruits for reefs further south and as such are regionally significant (DEC 2007b). See Section 11 on State Marine Parks and Nature Reserves for further details on important geographical areas for fish.

Table 2: Spawning and aggregation times of key commercially caught fish species within the North West Shelf

Species		Month											
Species Common Name	**Species Latin Name**	**J**	**F**	**M**	**A**	**M**	**J**	**J**	**A**	**S**	**O**	**N**	**D**
Blacktip shark	*Carcharhinus tilstoni* and *C. limbatus*	■										■	■
Goldband snapper	*Pristipomoides multidens*	■	■	■	■	■					■	■	■
Rankin cod	*Epinephelus multinotatus*			■	■			■	■	■	■	■	■
Red emperor	*Lutjanus sebae*	■	■	■	■	■	■			■	■	■	■
Sandbar shark	*Carcharhinus plumbeus*		■		■								
Spanish mackerel	*Scomberomorus commerson*									■	■	■	■
Pink snapper	*Pagrus auratus*					■	■	■					
Baldchin groper	*Choerodon rubescens*	■	■							■	■	■	■
Crystal (snow) crab	*Chaceon* spp.	■	■	■	■	■	■	■	■	■	■	■	■
King George whiting	*Sillaginodes punctatus*						■	■	■	■			
Spangled emperor	*Lethrinus nebulosus*									■	■	■	■
Pearl oyster	*Pinctada maxima*		■	■	■					■	■	■	■
Blue-spotted emperor	*Charaxes cithaeron*	■	■	■				■	■	■	■	■	■
Dusky whaler	*Carcharhinus obscurus*	May occur throughout the year											
Whiskery shark	*Furgaleus macki*								■	■	■		
Gummy shark	*Mustelus antarcticus*	Peak pupping periods unknown											
Fish	Other species	Timing of spawning activity varies between species											

5.1.8. Timor Province

The diversity of demersal fish assemblages on the continental slope in the Timor Province (as well as the Northwest Transition and the Northwest Province) is high compared to elsewhere along the Australian continental slope (DSEWPaC 2012). Elements of the Timor Province are not well known, due to limited survey data in the northern limits of the region. The province is geographically extensive and includes 418 fish species, 64 of which are endemic to the region (Last et al. 2009). Key indicator species include *Bembrops nelsoni*, *Bythaelurus* sp., *Halicmetus* sp., *Malthopsis* spp, *Neobythites australiensis*, *Nobythites bimaculatus*, *Neobythites macrops*, *Neobythites soelae*, *Parapterygotrigla* sp., *Physiculus roseus* (Last et al. 2005).

Scott Reef is regionally important for the diversity of its fauna, including 558 fish species (Department of the Environment (DoE) 2014). Scott Reef has enormous habitat diversity and is considered a hot spot for fish, with five endemic species (DoE 2014). Scott Reef has biogeographic significance due to the presence of species which are at or close to the limits of their geographic ranges, including fish known previously only from Indonesian waters such as cardinalfish, azure damselfish (*Chrysoptera hemicyanea*), comb-tooth blenny (*Escnius schroederi*) and several Gobiids (DoE 2014).

5.1.9. Christmas Island Province

The Christmas Island Province is in deep, offshore waters (2,200 m – 6,000 m depth range). The island's predominantly intact fringing reefs and adjacent waters support a number of marine and coastal ecosystems and species, including over 600 fish species, with most being typical of the Indian Ocean region. These waters provide habitat for pelagic finfish species including tuna (*Thunnus* sp.) and wahoo (*Acanthocybium solandri*), and some demersal species such as ruby snapper (*Etelis carbunculus)*. The island has more than 50 reef fish species that are not found anywhere else in Australia (although some species may also occur at the neighbouring Cocos Islands) (DNP, 2014).

5.2. Fish Species

Three species of fish listed as Threatened under the EPBC Act (Table 1) were identified in the Protected Matters search (**Appendix C of the VGCN-VGA-4HGI ST1 Well Decommissioning EP**):

- Blind gudgeon (*Milyeringa veritas*)
- Blind cave eel (*Ophisternon candidum*)
- Barrow cave gudgeon *(Milyeringa justitia*)

However, these three species are unlikely to be directly impacted by shoreline accumulation of hydrocarbons resulting from a potential oil spill. These species inhabit isolated anchialine groundwater systems that are physically separated from surface and coastal environments by geological barriers. Therefore, they have not been discussed further within the Van Gogh VGH-4HGI Well Decommissioning EP(

5.2.1. Blind Gudgeon, Blind Cave Eel and Barrow Cave Gudgeon

Both the blind gudgeon (*Milyeringa veritas*) and blind cave eel (*Ophisternon candidum*) are known to occur on the Cape Range Peninsula (in the Central Western Shelf Transition) (Humphreys and Feinberg 1995), and a related species of the genus Milyeringa, the Barrow cave gudgeon *(Milyeringa justitia*) has also been noted at Barrow Island (Humphreys 1999). They have been recorded in waters ranging from fresh to seawater at depths of up to 33 m in caves and 50 m in wells and bores. Both species are restricted to either caves or groundwater (Humphreys and Blyth 1994) and are the only vertebrate animals known from Australia for this (DoE 2014a).

5.2.2. Syngnathids

The EPBC Protected Matters search also identified 75 listed marine species of fish which are largely from the family Syngnathidae (Syngnathids are a group of bony fishes that include seahorses, pipefishes, pipehorses and sea dragons, although taxonomic uncertainty still surrounds a number of these (DEWHA 2012a). Knowledge about the distribution, abundance and ecology of syngnathids is limited, although no species is currently listed as threatened or migratory.

5.3. Sharks, Rays and Sawfishes

The diversity of marine environments in the waters within the NWMR has led to a rich fauna of cartilaginous fish (sharks and rays). Of the approximately 500 shark species found worldwide, 19% (94) are found in the region (DEWHA 2008a). The EPBC Act Protected Matters search identified six species of shark and three species of sawfishes listed as threatened within the search area between southwest WA (Table 1), including:

- Dwarf sawfish (*Pristis clavata*)
- Freshwater sawfish (*Pristis pristis*)
- Great white shark (*Carcharodon carcharias*)
- Green sawfish (*Pristis zijsron*).
- Grey nurse shark (*Carcharias taurus*)
- Northern river shark (*Glyphis garricki*)
- Scalloped hammerhead shark (*Sphyrna lewini)*

- Southern dogfish / Endeavour dogfish / little gulper shark (*Centrophorus uyato / Centrophorus zeehaani / Squalus uyato*)
- Whale shark (*Rhincodon typus*)

An additional seven sharks and rays protected as migratory under the EPBC Act (Table 1) were identified in the PMST search as potentially occurring within the EMBA.

Stingrays are found in Australia's coastal waters throughout the EMBA, primarily occupying shallow benthic habitats. Some nearshore and intertidal habitats, particularly in regions of northern Australia that experience greater tidal ranges, , have been identified as important nursery areas for many of these species (DBCA 2014).

5.3.1. Grey Nurse Shark

The grey nurse shark (*Carcharias taurus*) is listed as vulnerable under the EPBC Act and the BC Act *and* may be found within the EMBA. In Australia, the grey nurse shark is now restricted to two populations, one on the east coast from southern Queensland to southern NSW and the other is predominantly found around the southwest coast of WA but has been recorded on the North West Shelf (DEWHA 2012b, Pogonoski et al. 2002). It is believed that the east and west coast populations do not interact, and ongoing research will probably confirm that the populations are genetically different (Last and Stevens 2009).

While it is thought that grey nurse sharks have a high degree of site fidelity, some studies (McCauley 2004) suggest that grey nurse sharks move between different habitats and localities, exhibiting some migratory characteristics. In certain areas grey nurse sharks are vulnerable to localised pressure due to high endemism. The status of the west coast population is poorly understood although they are reported to remain widely distributed along the WA coast and are still regularly encountered, albeit with low and indeterminate frequency (Chidlow et al. 2006).

Grey nurse sharks are often observed hovering motionless just above the seabed, in or near deep sandy-bottomed gutters or rocky caves, and in the vicinity of inshore rocky reefs and islands (Pollard et al. 1996). The species has been recorded at varying depths but is generally found between 15–40 m (Otway & Parker 2000). Grey nurse sharks have also been recorded in the surf zone, around coral reefs, and to depths of around 200 m on the continental shelf (Pollard et al. 1996). Grey nurse sharks feed primarily on a variety of teleost and elasmobranch fishes and some cephalopods (Gelsleichter et al. 1999, Smale 2005).

No grey nurse shark BIAs were identified in the EMBA.

5.3.2. Great White Shark

The great white shark (*Carcharodon carcharias*) is listed as vulnerable and migratory under the EPBC Act and is listed as vulnerable under the BC Act. In Australia, great white sharks have been recorded from central Queensland around the south coast to northwest WA but may occur further north on both coasts (Last and Stevens 2009). There are no known aggregation sites for white sharks in the North-west marine region, but the species has been recorded in North West Shelf waters during humpback migrations (DEWHA 2012b). They are widely but not evenly distributed in Australian waters and are considered uncommon to rare compared to most other large sharks (CITES 2004).

Study into great white shark populations is difficult (Cailliet 1996) given the uncertainty about their movements, emigration, immigration and difficulty in estimating the rates of natural or fishing mortality.

Great white sharks can be found from close inshore around rocky reefs, surf beaches and shallow coastal bays to outer continental shelf and slope areas (Pogonoski et al. 2002). They also make open ocean excursions and can cross ocean basins (for instance from South Africa to the western coast of Australia and from the eastern coast of Australia to New Zealand). Great white sharks are often found in regions with high prey density, such as pinniped colonies (DEWHA 2009).

No great white shark BIAs were identified in the EMBA.

5.3.3. Northern River Shark

The northern river shark (*Glyphis garricki*) is listed as endangered under the EPBC Act and is one of the rarest species of shark in the world. Adults only recorded in marine habitats, whereas neonates, juveniles and subadults recorded in freshwater, estuarine and marine environments. It is also listed as a Priority 1 conservation species in WA and as Endangered under the NT TPWC Act.

The associated recovery plan (Sawfish and River Sharks Multispecies Recovery Plan, Commonwealth of Australia 2015) identifies adults and juveniles are being known in WA marine waters north of Derby. Pupping and juvenile sharks are identified as known to occur in Cambridge Gulf and pupping is also identified as likely to occur in King Sound. Under the associated recovery plan all areas where aggregations of individuals have been recorded displaying biologically important behaviours such as breeding, foraging, resting or migrating are considered critical to the survival of the species unless population data suggests otherwise.

No northern river shark BIAs were identified in the EMBA.

5.3.4. Whale Shark

The whale shark (*Rhincodon typus*) is listed as vulnerable and migratory under the EPBC Act and is also listed as a specially protected species under the BC Act as a species of special conservation interest (conservation dependent fauna). The species is also classified as vulnerable on the World Conservation Union's Red List of Threatened Species (Norman 2005) and are protected under the WA *Conservation and Land Management Act 1984,* NT TPWC Actand WA *Fish Resources Management Act 1994*.

The whale shark is the largest of all fish (>18 m; Borrell et al. 2011; Chen et al. 1997, Compagno 2001) and is a migratory species with worldwide geographical ranges between 30º N and 35º S (Last and Stevens 2009). Whale sharks are mostly epipelagic, whereby they spend a large amount of time in the top 200 m of the ocean (Tyminski et al. 2015), with a significant portion being spent at surface (<20 m) (Rowat & Brooks, 2012). This leads to an increased potential risk of vessel collision, which has been demonstrated from tracking data of 348 individuals (across all areas of distribution) showing a 92% horizontal and nearly 50% vertical space overlap with persistent large vessel (>300 gross tons) traffic (Womersley et al. 2022). There is a general lack of knowledge on many aspects of whale shark biology, however, the species is known to have a slow rate to sexual maturity, with field-based studies from the Maldives estimating male sexual maturity to be approximately 25 years (Perry et al. 2018), with females potentially maturing even later (Pierce et al. 2021). This 'slow' life-history strategy places whale sharks at increased vulnerability to anthropogenic impacts (Pierce et al. 2021).

The species is oceanic but often forms aggregations in coastal waters at sites throughout the tropics. Typically, these aggregations are seasonal and often coincide with specific productivity events that are a focus of feeding for the animals. For example, whale sharks aggregate to feed on dense swarms of copepods in Baja California (Clark and Nelson 1997), fish spawn off Belize (Heyman et al. 2001) and red crab larvae at Christmas Island (Meekan et al. 2009). However, recent studies analysing fatty acids within whale shark tissue, suggest the species may also feed on benthic food sources, such as floating macroalgae (Meekan et al*.,* 2022; Courturier et al*.,* 2013*; Marcus et al.*, 2016).

One of the best-known aggregation sites for whale sharks occurs along the central and NW coast of Western Australia from March to July and is focused on Ningaloo Reef, within the Exmouth region. The small size and general absence of female whale sharks from Ningaloo Reef suggests that the region may be important for feeding rather than breeding (Norman and Stevens 2007). The timing of this aggregation coincides with a pulse in seasonal productivity that results in large abundances of tropical krill on which these filter feeding sharks feed (Meekan et al. 2006, Jarman and Wilson 2004). At Ningaloo Reef, whale sharks are often found swimming close to the reef front, within a few kilometres of the shore and in water of less than 50 m deep. A tourist industry based on snorkelling with the sharks in this area has developed over the last 15 years and is now estimated to be worth over $4 million annually to the local economy of the Ningaloo region.

Estimates of the size of the population participating in the Ningaloo aggregation are between 300 and 500 individuals (Meekan et al. 2006), but research indicates that the Ningaloo population of whale sharks is declining (Bradshaw et al. 2007).

Whale sharks are known to be highly migratory with migrations of 13,000 km being recorded (Eckert and Stewart 2001). Research on the migration patterns of whale sharks in the western Indian Ocean, and isolated and infrequent observations of individuals, indicate that a small number of the Western Australian population migrate through the North West Shelf. Wilson et al. (2006) tagged 19 whale sharks in 2003 and 2004, with long term movements patterns successfully recorded from six individuals. All travelled north-east into the Indian Ocean after departing Ningaloo Reef, with one tracked to Ashmore Reef and another to Scott Reef. Whale sharks are occasionally observed from Santos'' offshore oil and gas facilities on the North West Shelf (Harriet Alpha and Stag platforms). In general, migration along the northern WA coastline broadly follows the 200 m isobath and typically occurs between July and November (DoE 2015). Whale sharks are well known to occur in the Christmas Island territory. There is evidence that the Christmas Island territory is on the migration route for many individuals, but they are rarely sighted within the Cocos (Keeling) Islands territory.

A common method for monitoring individual whale sharks is the use of variations in spot patterns, which has recently been tested to be 100% successful based on 154 photographic and genetic markers (Meenakshisundaram, 2021).

A biologically important area for whale sharks is located in northern WA, offshore of the Pilbara and Kimberley coastline, and broadly follows the 200 m isobath. The relevant whale shark BIAs in the EMBA are detailed in Table 3 and is shown on Figure 5**.**

DBCA has a wildlife management program to manage whale shark interactions in reserves - Whale shark management with particular reference to Ningaloo Marine Park, Wildlife Management Program no. 57 (2013).

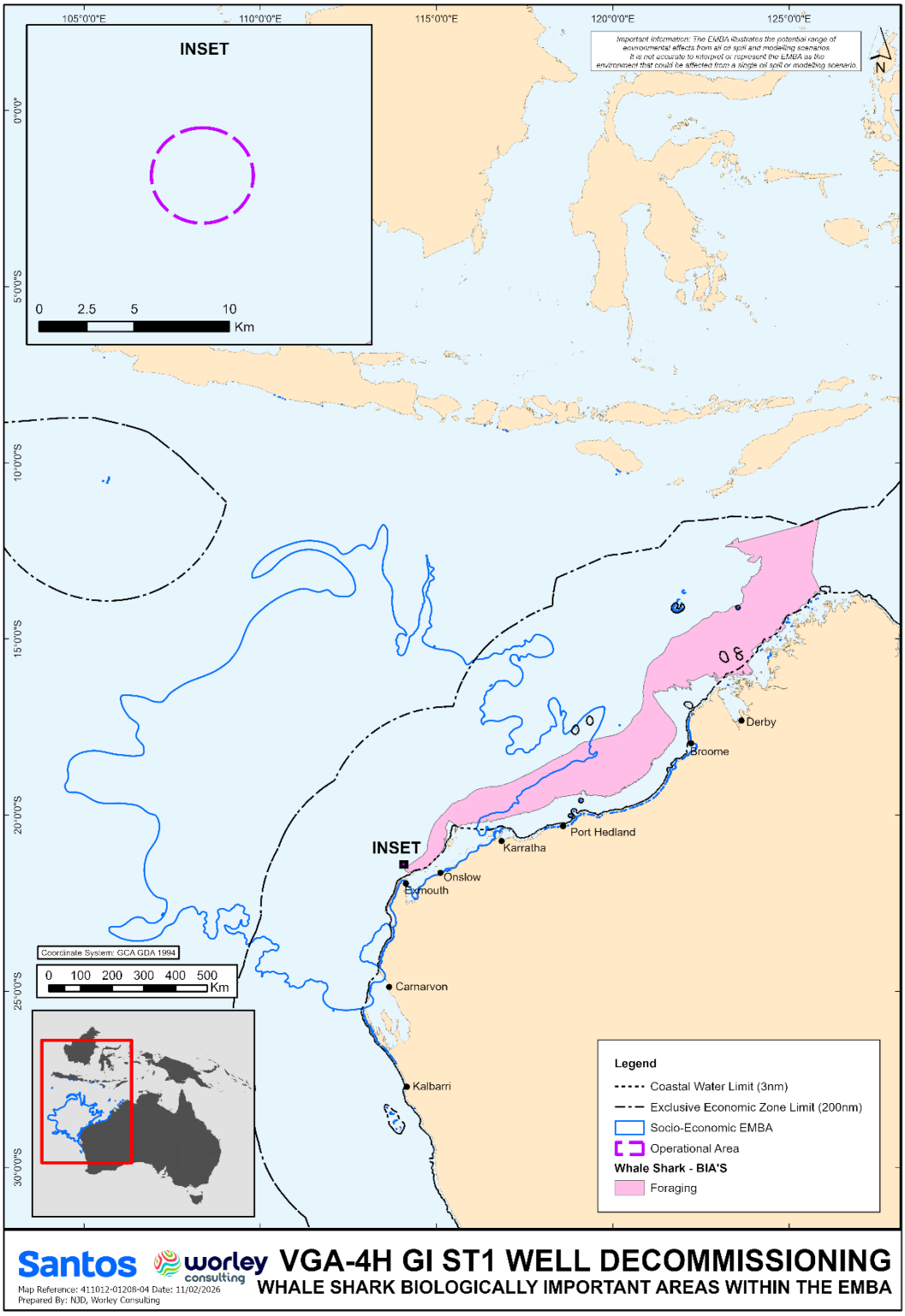


Figure 5: Biologically Important Areas – Whale Shark

5.3.5. Dwarf Sawfish

The dwarf sawfish (*Pristis clavata*) is listed as vulnerable under the EPBC Act and thought to be restricted to Australia (DoE 2014b). It is also listed as a Priority 1 conservation species in WA and as Vulnerable in the NT. The Australian distribution of the dwarf sawfish is considered to extend across northern Australia and along the Kimberley and Pilbara coasts (Last and Stevens 2009, Stevens et al. 2005). However, the majority of records of dwarf sawfish in WA and the NT have come from shallow estuarine waters of the Kimberley region which are believed to be nursery (pupping) areas, with immature juveniles remaining in these areas up until three years of age (Thorburn et al. 2004). Adults are known to seasonally migrate back into inshore waters (Peverell 2007); although it is unclear how far offshore the adults travel as captures in offshore surveys are very uncommon. The species' range is restricted to brackish and salt water (Thorburn et al. 2007).

The recovery plan identifies pupping as known to occur in the King Sound, the Cambridge Gulf and 80 Mile Beach, with pupping likely to occur identified at a number of locations along the Pilbara and Kimberly Plan (Commonwealth of Australia, 2015). Under the associated recovery plan all areas where aggregations of individuals have been recorded displaying biologically important behaviours such as breeding, foraging, resting or migrating are considered critical to the survival of the species unless population data suggests otherwise.

The relevant sawfish BIAs in the EMBA are detailed in Table 3.

5.3.6. Freshwater and Green Sawfish

The freshwater sawfish (*Pristis pristis) (*also previously listed as the Largetooth sawfish*)* and green sawfish (*Pristis zijsron)* are listed as vulnerable under the EPBC Act. The freshwater sawfish is listed as a Priority 3 conservation species in WA, while the green sawfish is listed as Vulnerable under the BC Act and both species are listed as Vulnerable in the NT under the TPWC Act.

The freshwater species are wider-ranging than the dwarf sawfish and are also found in the Indo-west Pacific (DoE 2014c, DoE 2014d). Important areas for sawfishes include King Sound, and the Fitzroy, Durack, Robinson and Ord rivers for the freshwater sawfish; and Cape Keraudren for the green sawfish (Stevens et al. 2008, Thorburn et al. 2007, 2008).

Sawfishes generally inhabit inshore coastal, estuarine and riverine environments. The freshwater sawfish has been recorded in north-west Australia from rivers (including isolated water holes), estuaries and marine environments (Stevens et al. 2005). Newborns and juveniles primarily occur in the freshwater reaches of rivers and in estuaries, while most adult freshwater sawfish have been recorded in marine and estuarine environments (Peverell 2005, Thorburn et al. 2007). It is believed that mature freshwater sawfish enter less saline waters during the wet season to give birth (Peverell 2005) and freshwater river reaches play an important role as nursery areas (DoE 2014c).

The green sawfish has predominantly been recorded in inshore coastal areas, including estuaries and river mouths with a soft substrate, although there have been records of sawfish offshore in depths up to 70 m (Stevens et al. 2005). This species does not occupy freshwater habitats (DoE 2014d).

Short-term tracking has shown that green sawfish appear to have limited movements that are tidally influenced, and they are likely to occupy a restricted range of only a few square kilometres within the coastal fringe, with a strong association with mangroves and adjacent mudflats (Stevens et al. 2008). Sawfishes feed close to the benthos on a variety of teleost fishes and benthic invertebrates, including cephalopods, crustaceans and molluscs (Compagno & Last 1999, Last & Stevens 2009, Pogonoski et al. 2002, Thorburn et al. 2007, 2008).

Baseline surveys undertaken for Chevron's Wheatstone project identified green sawfish habitat and nursery area for juveniles within the north-eastern lagoon of the Ashburton Delta and in Hooley Creek near Onslow. Distribution of sawfish in these creeks is spatially and seasonally variable due to changing tidal and environmental conditions. However, they typically return to inshore waters to breed and pup during the wet season (i.e. January) (Chevron 2011).

The relevant sawfish BIAs in the EMBA are detailed in Table 3.

5.3.7. Scalloped Hammerhead Shark

The scalloped hammerhead shark (*Sphyrna lewini*) is listed as conservation dependent under the EPBC Act and may be found within the EMBA. Globally distributed, in Australia, scalloped hammerhead sharks are found in both coastal and oceanic environments, in warm-temperate to tropical waters typically across the northern coastline.

There are no aggregation sites identified for scalloped hammerhead sharks in the EMBA, however juveniles of the species utilise shallower nearshore habitats of northern Australia, and there are some indications that there may be important nursery habitats in the area. As a species that is slow to mature and has low fecundity, the scalloped hammerhead shark is vulnerable to overfishing, with its unique head morphology also increasing its likelihood of capture as bycatch in net fisheries. Although no longer targeted by commercial fisheries, global population declines have prompted recent changes to national and state-based approaches to stock management, including total allowable catch limits (Northern Territory) or complete prohibition of take (Queensland) (DCCEEW, 2024d).

No scalloped hammerhead shark BIAs were identified in the EMBA.

5.3.8. Little Gulper shark (Southern Dogfish)

The southern dogfish (*Centrophorus uyato*) is listed as conservation dependent under the EPBC Act and may be found within the EMBA. The southern dogfish is a small, deepwater shark that is endemic to the continental shelf waters of southern Australia, occurring on the upper-slope in depths between 180 and 900 m. Genetic studies have suggested that there are likely to be three distinct stocks of southern dogfish, with the western stock distributed from the western GAB to southern Western Australia, overlapping with the EMBA. Similar to other shark species, southern dogfish are vulnerable to overfishing due to their life history characteristics of being slow to mature and having low fecundity, with southern dogfish thought likely to have some of the lowest fecundity rates of all sharks. Although there are no accurate species-specific data on the historic take of southern dogfish, they are caught incidentally by commercial fisheries. However, the current areas targeted by these sectors are unlikely to have substantial overlap with southern dogfish.

No southern dogfish BIAs were identified in the EMBA.

5.3.9. Narrow Sawfish

The narrow sawfish (*Anoxypristis cuspidata*) is listed as migratory under the EPBC Act. It is a marine or marginal (brackish water) species found from inshore waters to a depth of 40 m (Compagno et al. 2006). Though details of its ecology are not precisely known, it probably spends most of its time on or near the bottom in shallow coastal waters and estuaries. A study showed the narrow sawfish to be the most abundant amongst the sawfish sampled in the Gulf of Carpentaria (Peverell, 2005) which holds some consistency with the offshore distribution of the species as shown by a study of Northern Prawn Fishery by-catch. Peverell (2005) also used catch data of offshore surface net fisheries to conclude that narrow sawfish also inhabit the mid-water column and can thus be described as a benthopelagic animal. The narrow sawfish is known to form aggregations of mature females during the months of October to November. Its Australian distribution is unclear though it is most common in the Gulf of Carpentaria with southward ranges extending to Broad Sound in Queensland and the Pilbara Coast (circa 116°E), Western Australia (Last & Stevens 2009).

5.3.10. Giant Manta Ray / Reef Manta Ray

The giant manta ray appears to be a seasonal visitor to coastal or offshore sites. Giant manta rays are often seen aggregating in large numbers to feed, mate, or clean. Sightings of these giant rays are often seasonal or sporadic but in a few locations their presence is a more common occurrence. This species is not regularly encountered in large numbers and, unlike some other rays do not often appear in large schools (>30 individuals) when feeding. Overall, they are encountered with far less frequency than the smaller manta species, despite having a larger distribution across the globe (IUCN 2019).

The giant manta ray (*Mobula birostris*) occurs in tropical, sub-tropical and temperate waters of the Atlantic, Pacific and Indian Oceans. They are commonly sighted along productive coastlines with regular upwelling, oceanic island groups and particularly offshore pinnacles and seamounts. The giant manta ray is commonly encountered on shallow reefs while being cleaned or is sighted feeding at the surface inshore and offshore. It is also occasionally observed in sandy bottom areas and seagrass beds (IUCN 2019).

The reef manta ray (*Mobula birostris*) has a circumtropical and sub-tropical distribution, existing in the Pacific, Atlantic and Indian Oceans. Within this broad range, however, actual populations appear to be sparsely distributed and highly fragmented. This is likely due to the specific resource and habitat needs of this species.

Overall population size is unknown, but subpopulations appear, in most cases, to be small (about 100–2,000 individuals). A proportion of the individuals in some populations undertake significant coastal migrations (IUCN 2019). Since the species is migratory it is possible that individuals may be encountered in the operational area,

however, given that they generally do not aggregate in large groups, high numbers are not expected to be encountered during the activities.

5.3.11. Oceanic Whitetip Shark

The oceanic whitetip shark (*Carcharhinus longimanus*) is listed as migratory under the EPBC Act. The oceanic whitetip shark is widespread throughout tropical and subtropical waters of the world (30° N to 35° S) (IUCN 2020). They are an oceanic and pelagic species that regularly occurs in waters of 18 to 28°C, usually >20°C (IUCN 2020). Within Australian waters, they are found from Cape Leeuwin (Western Australia) through parts of the Northern Territory, down the east coast of Queensland and New South Wales to Sydney (Last and Stevens 2009). They are usually found in surface waters, though can reach depths of >180 m (Castro et al. 1999). They have occasionally been recorded inshore but are more typically found offshore or around oceanic islands and areas with narrow continental shelves (Fourmanoir 1961, Last and Stevens 1994).

5.3.12. Shortfin Mako and Longfin Mako Sharks

The shortfin mako and longfin mako sharks are listed as migratory under the EPBC Act. The longfin mako is widely distributed but rarely encountered oceanic shark that ranges from Geraldton around the north coast to at least Port Stephens in New South Wales (DSEWPaC 2012). The shortfin mako is an oceanic and pelagic species, although they are occasionally seen inshore. They are found throughout temperate seas but are rarely found in waters colder than 16°C.

5.3.13. Porbeagle (Mackerel Shark)

The porbeagle (mackerel shark) (*Lamna nasus*) is listed as migratory under the EPBC Act. The porbeagle is wide-ranging, typically occurring in oceanic waters off the continental shelf, although they occasionally enter coastal waters (Francis et al. 2002 cited in DoE 2014e). The porbeagle is known to undertake seasonal migrations, although the timing and details of these migratory movements are not well understood (Saunders et al. 2011 cited in DoE 2014e).

5.4. Biologically Important Areas / Critical Habitat – Fishes and Sharks

BIAs are spatially defined areas where aggregations of individuals of a species are known to display biologically important behaviour such as breeding, foraging, resting or migration**.** BIAs are identified by DCCEEW; however, they have no legal status, but are designed to assist decision making under the EPBC Act. They are not designed to identify protected areas but may inform such processes. Table 3 below provides an overview of BIAs in the EMBA for fish.

The DCCEEW may make recovery plans for threatened fauna listed under the EPBC Act. The EPBC Act requires that 'habitat critical to the survival of the listed threatened species' is identified in recovery plans, and summary of relevant recovery plans is listed in Section 13**.** BIAs may overlap these sites but may be identified for other purposes. DCCEEW state that the criteria used to identify 'habitat critical to the survival of the species' are more complex than those used to identify BIA. Specifically, the Sawfish and River Sharks Multispecies Recovery Plan (DoEE 2015) cites that *"all areas where aggregations of individuals have been recorded displaying biologically important behaviour such as breeding, foraging, resting or migrating, are considered critical to the survival of the species unless population survey data suggests otherwise"*.

In addition, both the EPBC Act and WA BC Act and associated regulations (2018) provide for the listing of critical habitat - habitat 'critical to the survival of the threatened species'. To date no critical habitat in WA has been listed under either Act. No provision is made under the TPWC Act for listing critical habitat.

Table 3: Biologically important areas – Fishes and Sharks

Species	Scientific name	Aggregation area and use	Specific geographic locations for species
Whale shark	*Rhincodon typus*	Foraging (high density prey) – Ningaloo Reef Foraging – Wider Ningaloo Region	Ningaloo Marine Park and adjacent Commonwealth waters Northward from Ningaloo along 200 m isobath
Dwarf sawfish	*Pristis clavata*	Foraging – Eighty Mile Beach, King Sound, Camden Sound Nursing - Eighty Mile Beach, King Sound, Fitzroy River and May Robinson River Pupping – Eighty Mile Beach, King Sound, Fitzroy River and May Robinson River Juvenile – King Sound, Fitzroy River and May Robinson River	Eighty Mile Beach Camden Sound - eastern shore Fitzroy River Mouth, May and Robinson River - tidal tributaries King Sound (inshore waters)
Freshwater sawfish	*Pristis pristis*	Nursing – King Sound Foraging – King Sound, Roebuck Bay, Eighty Mile Beach Pupping – Roebuck Bay, Eighty Mile Beach Juvenile – Roebuck Bay	Eighty Mile Beach King Sound - tidal tributaries Roebuck Bay
Green sawfish	*Pristis zijsron*	Pupping – Cape Keraudren, Eighty Mile Beach, Roebuck Bay, Willie Creek, Cape Leveque Foraging - Cape Keraudren, Roebuck Bay, Cape Leveque, Camden Sound Nursing - Cape Keraudren, Eighty Mile Beach	Eighty Mile Beach Camden Sound Cape Keraudren Cape Leveque Roebuck Bay Willie Creek

6. Marine Reptiles

Twenty-one species of listed marine reptiles under the Commonwealth EPBC Act are known to occur in Australian waters in the EMBA, according to the Protected Matters search Appendix C of VGCN-VGA-4HGI ST1 Well Decommissioning EP An examination of the species profile and threats database (DoEE 2019) showed that some listed reptile species are not expected to occur in significant numbers in the marine and coastal environments in the combined EMBA due to their terrestrial distributions. Hence, these species are not discussed further. Of the remaining ten reptile species considered potentially occurring within the EMBA, these, nine are listed as threatened and one is listed as migratory. These species are show in Table 4 along with their WA conservation listings (as applicable)[2]. BIAs within the EMBA area discussed in Table 6.

[2] An overview of WA fauna conservation codes is provided in **Section 5** (fish and sharks).

Table 4: EPBC listed marine reptile species in the EMBA

Value/Sensitivity		Conservation Status			Socio-economic EMBA		BIA[3] in EMBA
Common name	Scientific name	Migratory Status	EPBC Act Status	BC Act Status	Presence	Type of Presence	
Dusky Sea Snake	*Aipysurus fuscus*	-	Endangered	P4	✓	Species or species habitat known to occur within area	None - BIA not found in EMBA
Flatback Turtle	*Natator depressus*	Migratory	Vulnerable	Vulnerable	✓	Breeding known to occur within area	Yes – refer to Table 6
Green Turtle	*Chelonia mydas*	Migratory	Vulnerable	Vulnerable	✓	Breeding known to occur within area	Yes – refer to Table 6
Hawksbill Turtle	*Eretmochelys imbricata*	Migratory	Vulnerable	Vulnerable	✓	Breeding known to occur within area	Yes – refer to Table 6
Leaf-scaled Sea Snake, Leaf-scaled Seasnake	*Aipysurus foliosquama*	-	Critically Endangered	Critically Endangered	✓	Species or species habitat known to occur within area	None - BIA not found in EMBA
Leatherback Turtle	*Dermochelys coriacea*	Migratory	Endangered	Vulnerable	✓	Foraging, feeding or related behaviour known to occur within area	None - BIA not found in EMBA
Loggerhead Turtle	*Caretta caretta*	Migratory	Endangered	Endangered	✓	Breeding known to occur within area	Yes – refer to Table 6
Olive Ridley Turtle	*Lepidochelys olivacea*	Migratory	Endangered	Endangered	✓	Breeding likely to occur within area	None - BIA not found in EMBA
Salt-water Crocodile, Estuarine Crocodile	*Crocodylus porosus*	Migratory	-	Migratory	✓	Species or species habitat may occur within area	None - BIA not found in EMBA
Short-nosed Sea Snake, Short-nosed Seasnake	*Aipysurus apraefrontalis*	-	Critically Endangered	Critically Endangered	✓	Species or species habitat known to occur within area	None - BIA not found in EMBA

[3] Biologically Important Area

6.1. Marine Turtles

Six species of marine turtle occur in, use the waters, and nest on sandy beaches, in and around the EMBA. These are the green turtle (*Chelonia mydas*), flatback turtle (*Natator depressus*), hawksbill turtle (*Eretmochelys imbricata*), loggerhead turtle (*Caretta caretta*), olive ridley turtle (*Lepidochelys olivacea)* and leatherback turtle (*Dermochelys coriacea*) (Table 4).

These six species are listed on the EPBC Act List of Threatened Species as either ‘endangered’ or ‘vulnerable’ and all six species are also listed as ‘migratory’. They are also listed as threatened species under the BC Act.

A summary of the different habitat types used during the various life stages of marine turtle species identified in the EMBA is given in Table 5**.**

Table 5: Summary of habitat types for the life stages of the six marine turtle species in the EMBA (DSEWPaC, 2012b)

Life Stage		Green turtle	Flatback turtle	Hawksbill turtle	Loggerhead turtle	Olive ridley turtle	Leatherback turtle
Post-hatchling		Open ocean pelagic habitats (poorly studied for Australian populations)	Coastal waters (poorly studied for Australian populations)	Open ocean pelagic habitats (poorly studied for Australian populations)	Pelagic (poorly studied for Australian populations)	Pelagic (poorly studied for Australian populations)	Pelagic (no data for Australian populations)
Adult	Mating	Offshore from nesting beaches.	Currently unknown for North West Shelf region.	Offshore from nesting beaches.	Little is known for North West Shelf region but expected to occur either en-route or adjacent to nesting beaches.	Not recorded within North West Shelf region.	Not recorded within North West Shelf region.
	Nesting	Typically, high energy, steeply sloped beaches with deep sand and deep-water approach.	Typically, low-energy beaches that are narrow with a low to moderate slope. Beach approach obstructed by broad intertidal mud or limestone platforms.	Typically beaches close to nearshore coral reefs and sediment comprised of coarse sand and coral rubble.	Poorly studied for North West Shelf region by generally prefer high energy, relatively narrow, steeply sloped, coarse-grained beaches.	Not recorded within North West Shelf region.	Not recorded within North West Shelf region.
	Internesting	Shallow coastal waters within several km of nesting beach. Internesting buffers of 20 km identified around all nesting habitats.	Shallow nearshore waters within 5-60 km of nesting beach. Internesting buffers of 40-60 km identified around all nesting habitats.	Shallow coastal waters within several kilometres of nesting beach. Internesting buffers of 20 km identified around all nesting habitats.	Shallow coastal waters within several kilometres of nesting beach. Internesting buffers of 20 km identified around all nesting habitats.	Not recorded within North West Shelf region. Internesting buffers of 20 km identified around all nesting habitats.	Danger Point, Cobourg Peninsula. 20 km internesting buffer around nesting sites
	Foraging	Neritic habitats associated with seagrass and algae, and mangrove habitats.	Turbid, shallow inshore waters, subtidal, soft-bottomed habitats of the continental shelf.	Subtidal and intertidal coral and rocky reef habitats of the continental shelf.	Subtidal and intertidal coral and rocky reefs, seagrass and deeper soft-bottomed habitats of the continental shelf.	Many feed within continental shelf waters, however it is not known if others are pelagic, as with the east Pacific population.	Mostly pelagic but will forage close to shore and over continental shelf in temperate waters.

6.1.1. Loggerhead Turtle

The loggerhead turtle (*Caretta caretta*) has a worldwide distribution, living and breeding in subtropical to tropical locations (Limpus 2008b). Breeding aggregations in Australia occur on both the east coast (Queensland and NSW) and the west. The annual nesting population in Western Australia is thought to be 3,000 females annually (Baldwin et al. 2003), and this is considered to support the third largest population in the world (Limpus 2008b). Loggerhead turtles have one genetic breeding stock within Western Australia (Commonwealth of Australia 2017a).

The WA distribution of sandy beach nesting areas extends from Shark Bay to the southern area of the North West Shelf, with occasional late summer nesting crawls recorded as far north as Barrow and Varanus Islands and the Lowendal and Rosemary Islands (DSEWPaC 2012d). Major nesting locations include the Muiron Islands, the Ningaloo Coast south to Carnarvon and the islands around Shark Bay, which includes Dirk Hartog Island, one of the principal nesting and internesting sites in WA (Limpus 2008). The Recovery Plan for Marine Turtles in Australia (2017) identifies the Muiron Islands (as a principal rookery), and all waters within a 20 km radius as habitat critical to the survival of loggerhead turtles (Commonwealth of Australia 2017a).

Estimates of up to 5,000 female loggerhead turtles have been predicted within the Ningaloo Marine Park and Muiron Islands Marine Management Area (Waayers 2010). Earlier surveys found higher proportions of nesting loggerheads in the southern areas of the reserves (CALM 2005a). Aerial surveys conducted in 2000 and 2001 in the Exmouth region recorded only 12 sightings in Commonwealth waters and these turtles were most likely loggerheads (BHP 2005). In a survey commissioned by Santos around the islands in the Exmouth Region, loggerhead turtles were recorded nesting on Flat Island north of the Exmouth Gulf which was the first time they had been recorded in that location (Astron 2014). Loggerhead nesting and breeding occurs from November to March, with a peak in late December/early January (Limpus 2008b).

Foraging areas are widespread for loggerhead turtle populations and migrations from nesting to feeding grounds can stretch thousands of kilometres, including feeding grounds as far north as the Java Sea of Indonesia for the WA population (Limpus 2008b). Loggerhead turtles have also been sighted in the Christmas and Cocos (Keeling) Islands. Shark Bay has been identified as an important foraging habitat for loggerhead turtles (Commonwealth of Australia 2017a). Loggerhead turtles are carnivorous and feed primarily on benthic invertebrates from depths of up to approximately 50 m to near shore tidal areas including areas of rocky and coral reef, muddy bays, sand flats, estuaries and seagrass meadows (Limpus 2008b).

Loggerhead turtles from both WA and eastern Australian have been recorded foraging in the NT, and further afield in Indonesia and Papua New Guinea (Perez et al., 2022; Pendoley, 2023). In the Kimberley region, loggerhead turtles are thought to be transient or end-of-migration foragers with no documented nesting sites in the area (Tucker et al., 2021).

Figure 6 illustrates the BIAs and habitat critical (draft) for loggerhead turtles (as defined in the Recovery Plan for Marine Turtles in Australia (Commonwealth of Australia 2017a).

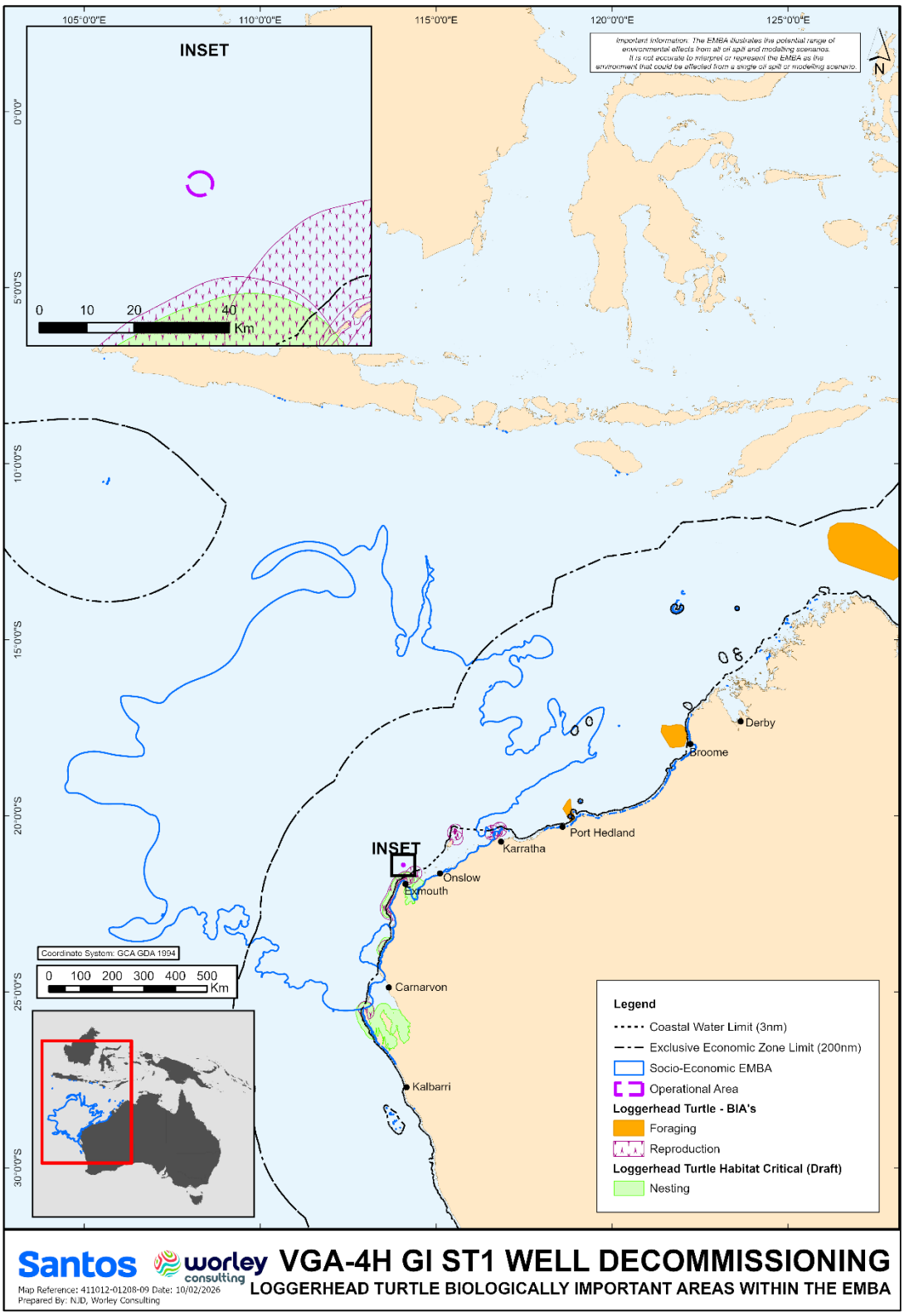


Figure 6: Biologically Important Areas and Habitat Critical – Loggerhead Turtle

6.1.2. Green Turtle

Australian population of green turtles is estimated to be approximately 70,000 and is divided into seven genetically distinct breeding aggregations. The species is widespread and abundant in WA and NT waters with an estimated 20,000 individuals occurring, arguably the largest population in the Indian Ocean (Limpus 2008a). There are three distinct breeding stocks in WA waters which include: the North west Shelf stock, the Scott-Browse stock and the Ashmore Stock (Commonwealth of Australia 2017a).

The North west Shelf population is one of the largest in the world and the most significant rookery is the western side of Barrow Island (Prince 1994, Limpus 2008a). Other principal rookeries include the Lacepede Islands, Montebello Islands, Dampier Archipelago, Browse Island and North West Cape (Prince 1994, Limpus 2008a, DSEWPaC 2012b). See Table 6 for a complete list.

Surveys by Waayers (2010) within the Ningaloo Marine Park and Muiron Islands Marine Management Area estimated up to 7,500 female green turtles used these areas. In 2014, Santos commissioned a survey of the islands in the Exmouth Region which found that North and South Muiron Islands were significant nesting sites for green turtles with over 100 green turtles nesting overnight on one beach at North Muiron Island (Astron 2014). The green turtle is also known to breed in large numbers in the dunes above the extensive beaches found on Serrurier Island, with counts indicating the island supports the second largest rookery in the Pilbara (Oliver 1990).

Lower density green turtle nesting has also been recorded on Jurabi coast, Thevenard Island, Lowendal Islands and in Exmouth Gulf (Limpus 2008a). Only low numbers of green turtles have been observed nesting on Varanus Island, as well as Airlie Island (Pendoley Environmental 2011). From monitoring undertaken in 2016/17 by Santos on Varanus Island; three green turtles were observed to nest over a four-week tagging effort (Astron 2017).

Green turtles have also been recorded nesting in the Bonaparte or Van Diemen Gulf bioregions and some nesting has been recorded on the west coast of Bathurst Island in the Tiwi Islands and Melville Island. BIAs for Green turtles occur on the north coast of the Tiwi Islands and an internesting buffer has been defined 20 km from the Tiwi Islands with internesting expected between October and April (DoEE, 2017).

Green turtle nesting abundance and timing fluctuates significantly from year to year depending on environmental variables, locality and food availability (Pendoley Environmental 2011). Nesting of green turtles has been recorded from August to March on Serrurier Island (Woodside 2002), from December to March along coast adjacent to Ningaloo (CALM 2005a) and from October to February on Varanus Island (Pendoley Environmental 2011). On Barrow Island, mating aggregations may commence from October with peak nesting from December to January, with hatchlings emerging through summer and early autumn. However, nesting on Barrow Island has been recorded all year round (Chevron 2005 and 2008, Pendoley 2005). Nesting on the Scott Reef-Sandy Islet and Browse Island has been observed all year round with peaks between December and January (Commonwealth of Australia 2017a).

In northern and eastern Australia, fluctuations in green nesting numbers have been linked the Southern Oscillation Index (Limpus & Nicholls, 1994, Limpus & Nicholls, 1988) and sea surface temperatures (Solow et al., 2002). In the NT nesting sites occur mostly from the western end of Melville Island to near the border with Queensland (Northern Territory Government, n.d). There are also four nationally significant nesting sites in the NT being the Cobourg Peninsula, the mainland from Gove to the northern edge of Blue Mud Bay, the southeast of Groote Eylandt and the northern beaches of islands in the Sir Edward Pellew group (Northern Territory Government, n.d). The Cobourg Peninsula genetic stock of green turtles is the closest to those found within the EMBA on the Tiwi Islands. The nesting period for these are between October and April with the peak nesting period occurring between December and January.

Green turtles' nest on both Christmas and Cocos (Keeling) Islands, though in low densities on Christmas Island. Up to 100 green turtles nest per year on Cocos (Keeling) Islands, mainly on the north atoll. Green turtles nesting on both Christmas and Cocos (Keeling) Islands are likely to be unique genetic stocks. They also use shallow reef habitats on both islands to forage (Brewer et al., 2009).

The re-nesting period for female green turtles is approximately five years (Hamann et al. 2002).

Green turtles spend the first five to ten years of their life drifting on ocean currents, before moving to reside in shallower benthic habitats, including tropical coral and rocky reefs and seagrass beds. Green turtles have been known to migrate more than 2,600 km between feeding and breeding grounds (Limpus 2008a).

Green turtles are omnivores, mainly feeding in shallow benthic habitats on seagrass and/ or algae, but are also known to feed on sponges, jellyfish and mangroves (Limpus 2008a). Green turtles are unlikely to forage or dwell

within deeper offshore waters due to the water depths; however, they may occasionally migrate through it with 86 % of post-nesting turtles being found to migrate to neritic foraging grounds and 14 % having local residency to their rookery in Western Australia (Ferriera et al., 2020).

Ferriera et al. (2020) spatial examination of inter-nesting green turtles found the existing BIA for encompassed the spatial extent, however the BIA is likely largely underestimated for foraging areas.

Figure 7 illustrates the BIAs and habitat critical (draft) for green turtles (as defined in the Recovery Plan for Marine Turtles in Australia (Commonwealth of Australia 2017a).

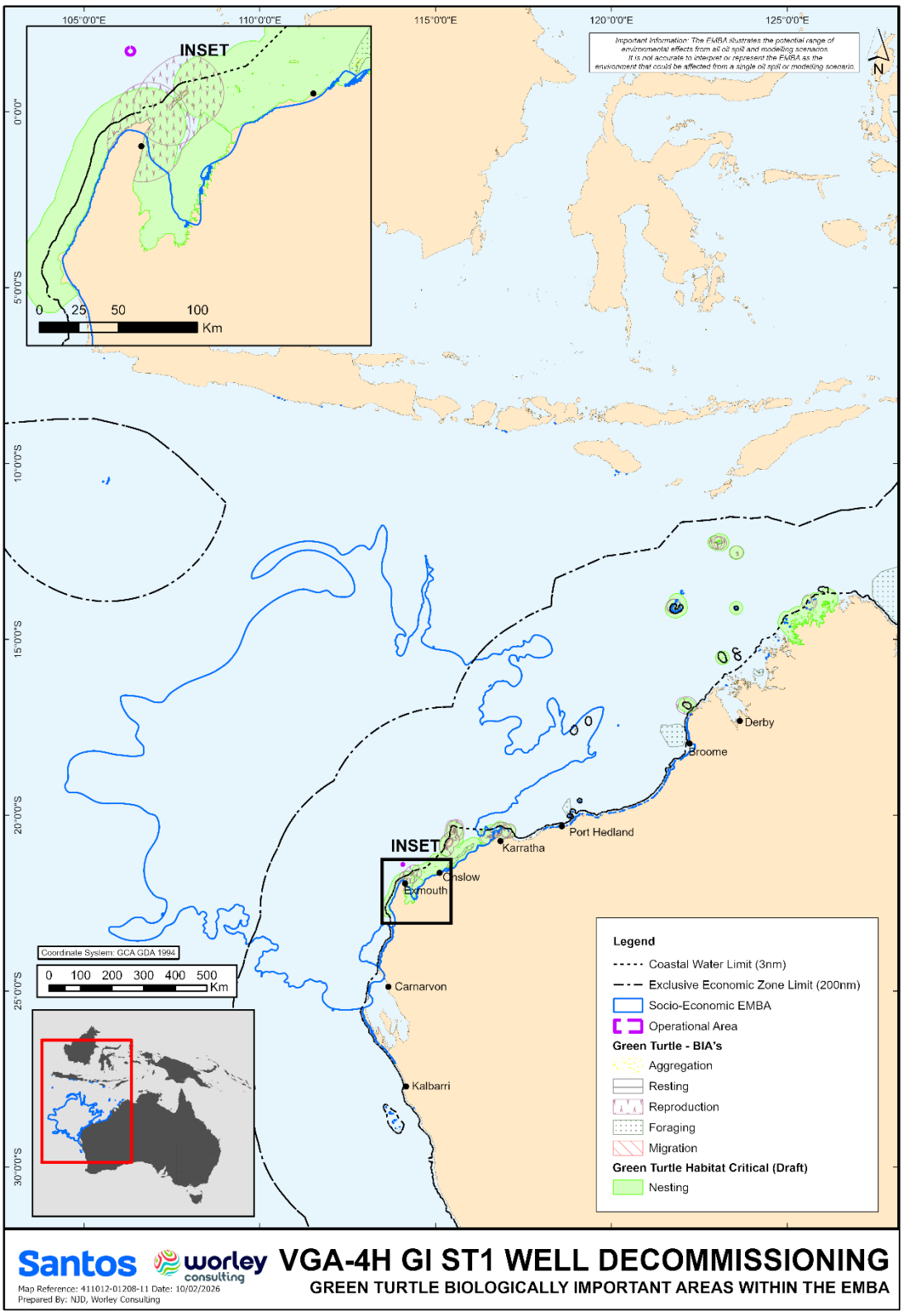


Figure 7: Biologically Important Areas and Habitat Critical – Green Turtle

6.1.3. Hawksbill Turtle

Hawksbill turtles (*Eretmochelys imbricata*) have a global distribution throughout tropical and sub-tropical marine waters. The Western Australian stock is concentrated on the North West Shelf (Dampier Archipelago) (Limpus 2009a) and is considered to be one of the largest hawksbill populations remaining in the world. The estimated number of nesting hawksbill turtles in WA waters is between 2,000 and 4,500 individuals (Morris 2004). There is a second major population of Hawksbill turtles in Australia, which is genetically isolated from the North West Shelf population located along the Northern Territory coast and north-eastern Queensland (Northern Territory Government, n.d).

In WA, their nesting range is relatively small and extends from the Muiron Islands to the Dampier Archipelago, a distance of approximately 400 km. The most significant breeding areas, that support hundreds of nesting females annually, are around sandy beaches within the Dampier Archipelago, Montebello Islands, Lowendal Islands and Barrow Island (Pendoley 2005, Limpus, 2009a).

The largest known nesting area for the North West Shelf population is the sandy shoreline of Rosemary Island, within the Dampier Archipelago, particularly on the north-western side of the Island. It is believed that the Rosemary Island rookery may support up to 1,000 nesting females annually (Limpus 2009). Low density nesting is also known from Barrow Island, Airlie Island, Muiron Islands and North West Cape/ Ningaloo coast (Cape Range) (Limpus 2009a). Nesting hawksbills have also been found on NE Regnard Island and SW Regnard Island, confirming the Regnard Islands as hawksbill rookeries (Pendoley Environmental 2009).

The hawksbill turtle nesting population within the Exmouth region is also considered important as the populations in Western Australia represent the largest remaining population in the Indian Ocean (CALM 2005). The best estimate of numbers within the Ningaloo Marine Park and Muiron Islands Marine Management Area is between 20–700 individuals (Waayers 2010).

A snapshot survey of Varanus Island and the Lowendal Islands conducted for Santos during October 2012 found the five most frequented beaches by hawksbills, based on the track counts, were Beacon Island *(n*=43), Parakeelya (*n*=41), Kaia (*n*=40), Rose (*n*=30) and Pipeline (*n*=28). Results of the October 2012 three-day track census program showed that Beacon Island also hosted the highest daily number of overnight emergences by hawksbills and is therefore an important nesting beach for hawksbill turtles (Pendoley Environmental 2013).

On Varanus Island, hawksbill turtle nesting activity is predominantly distributed on the island's east coast, including Pipeline, Harriet, and Andersons beaches (Pendoley Environmental 2019). Individual hawksbill turtles appear to show a strong fidelity to these beaches, often returning to the same beach to nest within the season (Pendoley Environmental 2019). Between 1986 and 2019, a total of 571 individual hawksbill turtles were tagged on Varanus Island. Recent baseline data was collected at the Montebello and Dampier AMPs by Keesing, 2019 showing that only one hawksbill turtle was identified during the survey at the Dampier AMP only. No marine turtle species were identified during the survey at Montebello AMP.

In the NT, nesting occurs on islands rather than on mainland beaches. In particular, NT nesting sites are concentrated around north-eastern Arnhem land and Groote Eylandt (Northern Territory Government, n.d). Within the EMBA, nesting is known to occur at Ashmore Reef. Although Scott Reef has been described as a nesting beach for hawksbill turtles, this is based on the tagging and recapture of a single hawksbill at this location (Guinea, 2009). Small numbers of Hawksbill turtles also nest on Cocos (Keeling) Islands (mainly the north island). However, thousands of individuals forage in the shallow reef environments feeding on encrusting algae and sessile invertebrates (Brewer et al., 2009).

Nesting is reported to occur between October and February in WA (Commonwealth of Australia 2017a). Hawksbill turtles have been observed breeding on the North West Shelf between July and March with peak nesting activity around the Lowendal Islands between October and December (Limpus 2009a). In the NT nesting is reported to occur from July – December (Chatto, 1997, 1998).

Female hawksbills skip annual breeding opportunities (Kendall & Bjorkland 2001), presumably due to high energy demands of breeding (Chaloupka & Prince 2012).

Individuals may migrate up to 2,400 km between their nesting and foraging grounds (DSWEPaC 2012a), however a recent tagging study showed that turtles migrating from WA rookeries remain on the continental shelf (< 200 m depth) and within Australian waters during their inter-nesting, migrating and foraging phases (Fossette et al. 2021). Satellite tracking of nesting turtles on Varanus Island (32 km) and Rosemary Island has shown adult turtles to feed between 50 and 450 km from their nesting beaches (DSWEPaC 2012a).

Adults tend to forage in tropical tidal and sub-tidal coral and rocky reef habitat where they feed on an omnivorous diet of sponges, algae, jelly fish and cephalopods (DSWEPaC 2012a). Hawksbill turtles are unlikely to spend significant time within offshore waters as it is too deep to act as a feeding ground. However, it is likely they may migrate through those areas.

In order to better quantify and map the important areas used by Hawksbill turtles, AIMS was engaged in 2020 to lead the North West Shoals to Shores Research Program. During this program, AIMS combined available existing satellite tracking data for 20 adult turtles with data from newly deployed satellite tags on 20 adults in the Lowendal Islands and Dampier Archipelago (AIMS, 2021). Results showed that critical habitat designated by the Australian Government for inter-nesting largely protects the nesting areas calculated (AIMS, 2021), however the existing foraging BIAs do not include the majority of foraging areas calculated (AIMS, 2021). While approximately 23% of the hawksbill turtles foraging distribution occurred within MPAs, the existing BIAs are largely underestimating the important foraging areas for the turtles (AIMS, 2021). This supports the results of a joint study conducted by Fossette et al. (Fossette et al. 2021), which found only 10% of foraging areas utilised by 42 nesting turtles (between 2000 and 2017) were encompassed by the designated foraging BIA. Fossette et al. (2021) found that the highest overlap of individual turtles occurred within the Migratory BIA corridor.

Figure 8 illustrates the BIAs and habitat critical (draft) for hawksbill turtles (as defined in the Recovery Plan for Marine Turtles in Australia (Commonwealth of Australia 2017a).

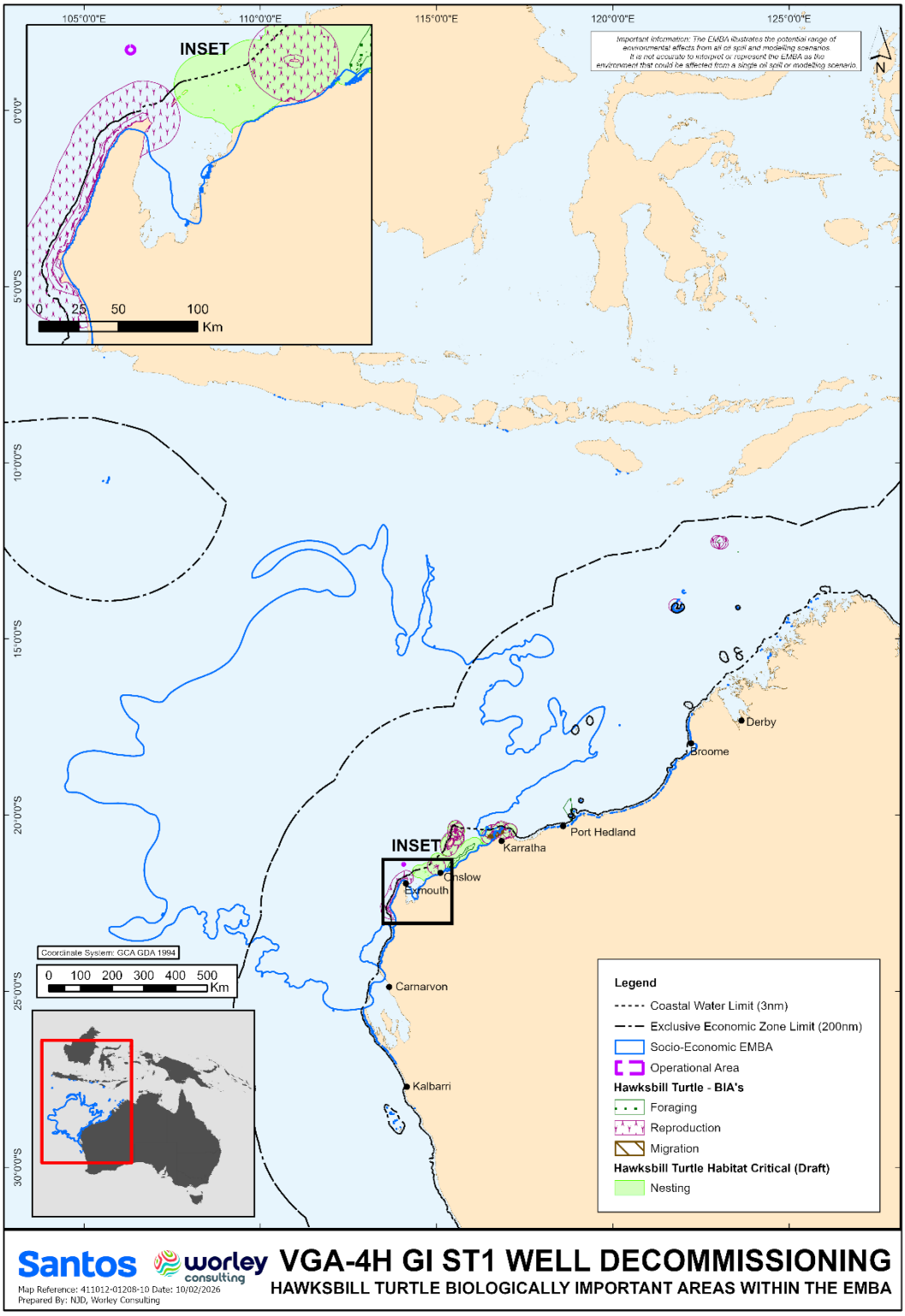


Figure 8: Biologically Important Areas and Habitat Critical – Hawksbill Turtle

6.1.4. Flatback Turtle

The flatback turtle (*Natator depressus*) has an Australasian distribution, with all recorded nesting beaches occurring within tropical to sub-tropical Australian waters. One third of the total breeding for the species occurs in Western Australia (WA) (Limpus, 2007). The management of the flatback turtle in Australia is broken up into five stocks currently described around Australia; eastern Queensland, Arafura Sea, Cape Domett, South-west Kimberley and Pilbara stocks (Commonwealth of Australia 2017). The Pilbara stock nests throughout the North West Shelf and is characterised by summer nesting (October to March), and the northern stock at Cape Domett breeds mainly in winter (July to September) (Commonwealth of Australia 2017a). The South-west Kimberley stock is also characterised by summer nesting. Populations in western NT are thought to nest all year round with nesting density reaching its peak in July. Populations in northern Australia also nest all year round, with nesting density reaching its peak between June and August (Limpus, 2007).

The southern WA nesting population of flatback turtles occurs from Exmouth to the Lacepede Islands off the Kimberley coast (DSEWPaC 2012c). On the North West Shelf, significant rookeries are centred on Barrow Island especially the east coast beaches (DSEWPaC 2012b). NT populations are typically found in the Gulf of Carpentaria, western Torres Strait, Wellesley Islands Group and Sand Islet.

Montebello Islands, Thevenard Island, Varanus Island, the Lowendal Islands, King Sound and Dampier Archipelago are also significant rookeries (Pendoley 2005, Limpus 2007, Pendoley Environmental 2011). Nesting is also widespread along the mainland beaches from Mundabullangana on the Pilbara coast north, including Cemetery Beach near Port Hedland, Eighty Mile Beach and to Broome (Limpus 2007, DSEWPaC 2012b).

Long term monitoring of flatback turtles nesting in the Port Hedland area, specifically at Cemetery Beach and Pretty Pool Beach, was undertaken between 2004 and 2014. Monitoring results indicated the main nesting season of flatback turtles in the area was between mid-October and January, which is consistent with other rookeries in the Pilbara region including Barrow Island, Mundabullangana, Karratha and Onslow (Waayers and Stubbs 2016). The onset of the nesting season appears to be relatively consistent each year and is thought to be associated with the southern movement of warmer sea surface temperatures along the northern WA coast.

There have been occasional records of nesting by flatback turtles on the Jurabi Coast and Muiron Islands (CALM 2005). During turtle surveys for Santos, WA flatback turtle nesting was recorded on Bessieres Islands (Astron 2014), Serrurier, Flat, Table and Round Island in previous surveys (Pendoley Environmental 2009). Flatback turtle tracks have been seen on Forty Mile beach and evidence of flatback nesting was recorded on the same beach the next day (Pendoley Environmental 2009). Previously the status of the flatback population(s) was undetermined and although not well quantified, it was estimated to be many thousands of females (Limpus 2007). However, Pendoley et al. (2014a, b) reported both Barrow Island and Mundabullangana flatback turtles as substantial reproductive populations with estimates of 1,512 and 1,461 nesting females annually respectively. . Thevenard Island and Port Hedland were also identified as rookeries, but turtle nesting numbers are not known. .

Satellite tracking of adult (female) flatback turtles shows they use a variety of inshore and offshore marine areas off the east and west coasts of Barrow Island. Females inter-nest close to their nesting beaches, typically in 0–10 m of water (Chevron 2008). However, flatback turtles also travel approximately 70 km and inter-nest in shallow nearshore water off the adjacent mainland coast, before returning to Barrow Island to lay another clutch of eggs. The average inter-nesting period is 13–16 days.

From long-term tagging studies on Varanus Island and Pendoley's observations, it appears that the nesting season for flatback turtles peaks in December and January with subsequent peak hatchling emergence in February and March. Flatbacks have been observed to nest on Varanus Island between November and February (Chevron 2008, Pendoley Environmental 2011 & 2013). Population monitoring of flatback turtles on Varanus Island, calculated from 16 seasons, indicates a mean population estimate of 226 (+/- 97). Modelled flatback turtle populations have shown a slight decline from 2008/09 to 2016/17, which is considered to be part of fluctuations in the natural cycle (Astron 2017). Flatback turtles tend to nest on all beaches on Varanus Island (Astron 2017). Flatback hatching and emergence success is noted as higher compared to that reported for other Western Australian rookeries (Pendoley et al. 2014; cited Astron 2017).

Flatback turtles nesting within the NT are from the Arafura Sea breeding and genetic stock, with unknown long-term trends for this stock (Commonwealth of Australia, 2017). Nesting has been recorded on the Tiwi Islands, with flatback turtles the predominant nesting species on the southern and south-western beaches that fall within the EMBA (Pendoley, 2023). The greatest proportion of activity occurs on the west coast of Bathurst Island (Chatto & Baker, 2008) with nesting females numbering around 11 to 100 per year, which is comparable to or smaller than other nesting sites of the Arafura Sea genetic stock. Nesting and internesting occurs year-round with a peak

during June and August, and hatchling emergence peaking between July and September (Commonwealth of Australia, 2017).

Unlike other sea turtles, the flatback turtle lacks a wide oceanic dispersal phase and adults tend to be found in soft sediment habitats within the continental shelf of northern Australia (DSEWPaC 2012b). Despite having geographically large foraging ranges (>1500 km), genetic differentiation suggests strong natal homing for both males and females (Turner Tomaszewicz et al., 2022). Little information is known on the diets of flatback turtles (DSEWPaC 2012b); however, they are believed to forage on primarily soft-bodied invertebrates (Commonwealth of Australia 2017a). Flatback turtles also differ from other species of sea turtles in maturing at a larger size and a likely younger age (<20 years) in comparison to other sea turtle species, indicating they may have a more rapid growth rate in their juvenile (similar to the leatherback turtle, a species with their own family) (Turner Tomaszewicz et al., 2022). This information from Turner Tomaszewicz et al., 2022 may provide valuable insight for ongoing population assessments and future recovery plans (Turner Tomaszewicz et al., 2022).

Figure 9 illustrates the BIAs and habitat critical (draft) for flatback turtles (as defined in the Recovery Plan for Marine Turtles in Australia (Commonwealth of Australia 2017a).

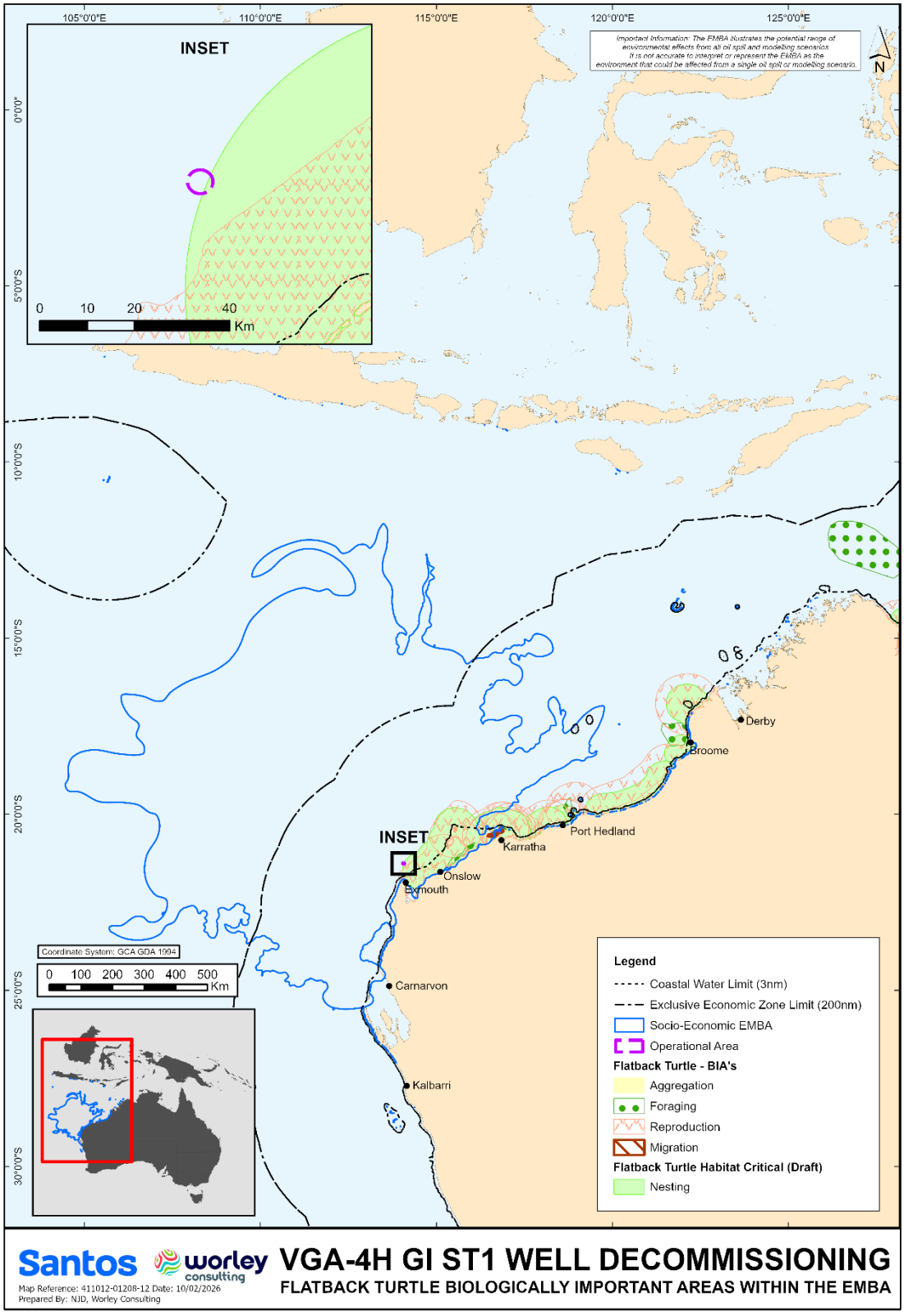


Figure 9: Biologically Important Areas and Habitat Critical – Flatback Turtle

6.1.5. Leatherback Turtle

The leatherback turtle *(*Dermochelys coriacea) has the widest distribution of any marine turtle and can be found from tropical to temperate waters throughout the world (Márquez 1990). There are no major leatherback turtle centres of nesting activity that have been recorded in Australia, although scattered isolated nesting (one to three nests per annum) occurs in southern Queensland and the Northern Territory (Limpus and McLachlin 1994).

There have been several records of leatherback turtles off the coast of WA and NT, but no confirmed nesting sites (Limpus 2009c). Turtle observations have mainly occurred south of the North West Shelf area and in open waters (>200 m deep) (Limpus 2009c). Due to the lack of nesting sites around Australian coastal waters, it is presumed that leatherback turtles observed in Australian waters are migrating from neighbouring countries to utilise feeding grounds in Australia (Limpus 2009c).

The leatherback turtle will feed at all levels of the water column and is carnivorous feeding mainly on pelagic, soft-bodied marine organisms such as jellyfish, which occur in greatest concentrations in areas of upwelling or convergence (DSEWPaC 2012d). The leatherback turtle is a highly pelagic species with adults only going ashore to breed.

No BIAs for the leatherback turtle occur within the EMBA.

6.1.6. Olive Ridley Turtle

Olive ridley turtles (*Lepidochelys olivacea*) are the least common turtle species encountered with critical nesting habitat occurring near Vulcan Island, Darcy Island, Prior Point and Llanggi and Cape Leveque (Commonwealth of Australia 2017). They are also known to nest on Tiwi Islands, specifically on the west coast of Bathurst Island and the north coast of Melville Island. The turtles found nesting on the Tiwi Islands is the NT genetic stock whereby the long-term trends of this genetic stock are currently unknown (Commonwealth of Australia 2017). However, the number of females nesting on the Tiwi Islands are considered significant at the genetic stock, national and international level. Nesting of the NT genetic stock can occur year-round with a peak between April and June, and hatchling emergence peaking between June and August (Commonwealth of Australia, 2017).

Internesting habitat, critical to the survival of the olive ridley turtle, encompasses nearshore waters along the north, west and east coasts of the Tiwi Islands. Satellite tracking on a small sample of internesting olive ridley turtles in the region recorded that the individuals remained close to shore (waters depths typically less than 55 m deep) and within 37 km of the nesting beach during the internesting interval (Whiting et al. 2007, Whiting et al. 2005).

The species is known to forage within the shallow benthic habitats of northern WA, the NT and Timor Sea (Limpus 2009), however, it displays unusual behaviour patterns compared to other sea turtles, in being capable of deeper (up to 140 m), benthic and exceptionally long (>2 hour) dives (McMahon et al*.,* 2007). This trait, combined with their long-distance movement patterns (Polovina et al., 2004) is thought to be indicative of less specialist foraging (McMahon et al*.,* 2007). Olive Ridley turtles forage as far south as the Dampier Archipelago-Montebello Islands and have also been sighted in the Christmas and Cocos (Keeling) Islands in the north of the EMBA and is thought to feed primarily on gastropods and small crabs within the benthic, soft-bottomed communities of the continental shelf (Limpus 2009). Their extensive movements and variability in migration patterns suggest this species may be susceptible to a wide range of human activities (McMahon et al*.,* 2007).

No BIAs for the olive ridley turtle occur within the EMBA.

6.2. Seasnakes

Storr et al. (1986) estimate nine genera and 22 species of sea snakes occur in WA waters, with three listed marine seasnake species being recorded in the EMBA Appendix C of **VGCN-VGA-4HGI ST1 Well Decommissioning EP**). Little is known of the distribution of individual species, population sizes or aspects of their ecology. Seasnakes are essentially tropical in distribution, and habitats reflect influences of factors such as water depth, nature of seabed, turbidity and season (Heatwole and Cogger 1993). Seasnakes are widespread throughout waters of the North West Shelf in offshore and nearshore habitats. They can be highly mobile and cover large distances or they may be restricted to relatively shallow waters and some species must return to land to eat and rest. In the north-west region of Western Australia, no BIAs have been designated for seasnakes. However, both Ashmore Reef and Cartier Island are characterised for both a high density and high diversity of seasnakes (DSEWPaC 2012b). Few sea snake sightings have been recorded in the waters of the Christmas Island territory (Brewer et al*.,* 2009).

Three species of seasnakes listed as threatened under the EPBC Act were identified in the Protected Matters search within the EMBA

- Short-nosed seasnake (*Aipysurus apraefrontalis*)
- Leaf-scaled seasnake (*Aipysurus foliosquama*).
- Dusky seasnake (*Aipysurus fuscus*)

6.2.1. Short-nosed Seasnake

The short-nosed seasnake (*Aipysurus apraefrontalis*) is listed as critically endangered under the EPBC Act and the BC Act. It is a fully aquatic, small snake and is endemic to WA. It has been recorded from Exmouth Gulf, WA to the reefs of the Sahul Shelf, in the eastern Indian Ocean. This species is believed to show strong site fidelity to shallow coral reef habitats in less than 10 m of water, with most specimens having been collected from Ashmore and Hibernia reefs (Minton & Heatwole 1975, Guinea and Whiting 2005).

The species prefers the reef flats or shallow waters along the outer reef edge in water depths to 10 m (McCosker 1975, Cogger 2000). The species has been observed during daylight hours, resting beneath small coral overhangs or coral heads in 1–2 m of water (McCosker 1975). Guinea and Whiting (2005) reported that very few short-nosed seasnakes moved even as far as 50 m away from the reef flat and are therefore unlikely to be expected in high numbers in offshore, deeper waters.

6.2.2. Leaf-scaled Seasnake

The leaf-scaled seasnake *(Aipysurus foliosquama)* is listed as critically endangered under the EPBC Act and the BC Act. It occurs in shallow water (less than 10 m in depth), in the protected parts of the reef flat, adjacent to living coral and on coral substrates (DoE 2014). The species is found only on the reefs of the Sahul Shelf in WA, especially on Ashmore and Hibernia Reefs (Minton and Heatwole 1975). The leaf-scaled seasnake forages by searching in fish burrows on the reef flat (DoE 2014).

6.2.3. Dusky Sea Snake

The dusky sea snake (*Aipysurus fuscus)* is listed as Endangered under the EPBC Act from 2024. The Dusky Sea snake inhabits inner coral reef lagoons and occurs amongst corals and on a substrate of sand at depths of less than 10 m (McCosker 1975) and is primarily restricted to the reefs of the Sahul Shelf in Western Australia, in particular Ashmore, Hibernia and Scott Reefs (Cogger 1975, 2000; Smith 1926; Storr et al. 1986).

6.3. Crocodiles

The salt-water crocodile (*Crocodylus porosus*) is a migratory species under the EPBC Act and is also listed as a specially protected species (other specially protected fauna) under the BC Act. In WA, the species is found in most major river systems of the Kimberley, including the Ord, Patrick, Forrest, Durack, King, Pentecost, Prince Regent, Lawley, Mitchell, Hunter, Roe and Glenelg Rivers. The largest populations occur in the rivers draining into the Cambridge Gulf and the Prince Regent River and Roe River systems. There have also been isolated records in rivers of the Pilbara region, around Derby near Broome and as far south as Carnarvon on the mid-west coast (DEC 2009a).

6.4. Biologically Important Areas/Habitat Critical – Marine Reptiles

Table 6 provides an overview of BIAs in the EMBA for marine reptiles, as identified by the DAWE (Commonwealth) and critical habitats identified in associated recovery plans. The DAWE may make recovery plans for threated fauna listed under the EPBC Act. The EPBC Act requires that 'habitat critical to the survival of the listed threatened species' is identified in recovery plans, relevant recovery plans are listed in Section 13 .In addition, both the EPBC Act and WA BC Act and associated regulations (2018) provide for the listing of habitat critical - habitat 'critical to the survival of the threatened species. To date no habitat critical in WA has been listed under either Act.

Table 6: Biologically Important Areas/Habitat Critical and geographic locations - reptiles

Species	Scientific name	Aggregation area and use	BIAs within EMBA	Habitat Critical within EMBA
Loggerhead turtle	*Caretta caretta*	Nesting, migration, foraging and internesting – islands and coastline of the Kimberley region and islands of the North West Shelf, Ningaloo coast and Jurabi coast	Cohen Island De Grey River to Bedout Island Dirk Hartog Island Gnarloo Bay James Price Point Lowenthal Island Montebello Island Muiron Island Ningaloo Coast and Jurabi coast Rosemary Island	Exmouth and Ningaloo coast. 20 km internesting buffer Gnaraloo Bay and beaches. 20 km internesting buffer Shark Bay, all coastal and island beaches out the to the northern tip of Dirk Hartog Island. 20 km internesting buffer
Green turtle	*Chelonia mydas*	Nesting, migration foraging, aggregation, mating, basking and internesting – Offshore islands in the Browse Basin, North West Shelf and Kimberley/Pilbara coastlines Mating/nesting – Dampier Archipelago Basking – Middle Island	Ashmore Reef Barrow Island Browse Island Coral reef habitat west of the Montebello group. Extends the entire length of Montebellos Dampier Archipelago (islands to the west of the Burrup Peninsula) De Grey River area to Bedout Island Delambre Island Dixon Island Greens - inshore tidal and shallow subtidal areas around Barrow Island Hawksbills - shallow water coral reef and artificial reef (pipeline) habitat James Price Point Lacepede Island Legendre Island, Huay Island Middle Is. West Coast Barrow Island West Coast and North Coast Montebello Island - Hermite Island, NW Island, Trimouille Island Montebello Islands Montgomery Reef North and South Muiron Island North Turtle Island North West Cape Scott Reef Seringapatam Reef String of islands between Cape Preston and Onslow, inshore of Barrow Island	Ashmore Reef and Cartier Reef. 20 km internesting buffer Browse Island. 20 km internesting buffer Scott Reef. 20 km internesting buffer Adele Island Lacepede Island Dampier Archipelago. 20 km internesting buffer Barrow Island, Montebello Islands, Serrier Island and Thevenard Island. 20 km internesting buffer Exmouth Gulf and Ningaloo coast. 20 km internesting buffer
Hawksbill turtle	*Eretmochelys imbricata*	Nesting, migration, mating, foraging and internesting – Offshore islands in the Browse Basin, North West Shelf and Kimberley/Pilbara coastlines Mating/ nesting/ internesting – Lowendal group, Montebello Islands	Barrow Island Dampier Archipelago (islands to the west of the Burrup Peninsula) De Grey River area to Bedout Island Delambre Island Delambre Island (and other Dampier Archipelago Islands) Dixon Island Greens - inshore tidal and shallow subtidal areas around Barrow Island Hawksbills - shallow water coral reef and artificial reef (pipeline) habitat Lowendal Island Group Montebello Island - Hermite Island, NW Island, Trimouille Island Montebello Island, Trimoulle and NW islands Ningaloo coast and Jurabi coast Rosemary Island Scott Reef String of islands between Cape Preston and Onslow, inshore of Barrow Island Thevenard Island Varanus Island	Cape Preston to mouth of Exmouth Gulf (including Montebello Islands and Lowendal Islands). 20 km internesting buffer Dampier Archipelago (including Delambre Island and Rosemary Island). 20 km internesting buffer
Flatback turtle	*Natator depressus*	Nesting, migration, mating, aggregation, foraging, internesting – Islands of the North West Shelf and the Pilbara/ Kimberley coastlines Mating, nesting – Barrow Island	Eighty Mile beach Barrow Island Cape Domett Cape Thouin/ Mundabullangana/ Cowrie Beach Coral reef habitat west of the Montebello group. Extends the entire length of Montebellos Dampier Archipelago (islands to the west of the Burrup Peninsula) De Grey River area to Bedout Island Delambre Island Dixon Island Lacepede Island Legendre Island, Huay Is Montebello Island - Hermite Island, NW Island, Trimouille Island	Cape Domett and Lacrosse Island in the Cambridge Gulf. 60 km internesting buffer Lacepede Islands. 60 km internesting buffer Eighty mile Beach - coastal beach. 60 km internesting buffer Cemetary Beach, Port Hedland. 60 km internesting buffer Eco Beach - coastal beach near Broome. 60 km internesting buffer Mundabullangana Beach. 60 km internesting buffer

Species	Scientific name	Aggregation area and use	BIAs within EMBA	Habitat Critical within EMBA
			North Turtle Island Port Hedland, Cemetery Beach Port Hedland, Paradise Beach Port Hedland, Pretty Pool String of islands between Cape Preston and Onslow, inshore of Barrow Is Thevenard Island - South coast West of Cape Lambert Western Joseph Bonaparte Depression	Dampier Archipelago, including Delambre Island and Hauy Island. 60 km internesting buffer Barrow Island, Montebello Islands, coastal islands from Cape Preston to Locker Island.

7. Marine Mammals

Fourty-one species of listed marine mammals are known to occur in Australian waters in the EMBA, according to the Protected Matters search (Appendix C of the VGCN-VGA-4HGI ST1 Well Decommissioning EP**)**). An examination of the species profile and threats database (DAWE 2020a) showed that some listed mammal species are not expected to occur in significant numbers in the marine and coastal environments in the EMBA due to their terrestrial distributions. Hence, these species are not discussed further.

Of the remaining fifteen listed species considered to potentially occur within the EMBA, six are listed as threatened and eight are listed as migratory under the Commonwealth EPBC Act. These species are shown in Table 7 along with their conservation listing under the WA BC Act.

The section below gives further details on marine mammal species listed as threatened and migratory and a summary is presented in Table 8. Identified BIAs are presented in Table 9.

Table 7: Marine mammals listed as threatened or migratory under the EPBC Act

Value/Sensitivity		Conservation Status			Socio-economic EMBA		BIA[4] in EMBA
Common name	Scientific name	Migratory Status	EPBC Act Status	BC Act Status	Presence	Type of Presence	
Antarctic Minke Whale, Dark-shoulder Minke Whale	Balaenoptera bonaerensis	Migratory	-	Migratory	✓	Species or species habitat likely to occur within area	None - No BIA defined
Australian Humpback Dolphin	Sousa sahulensis	Migratory	Vulnerable	P4 Migratory	✓	Species or species habitat known to occur within area	Yes – Refer to Table 9
Australian Sea-lion, Australian Sea Lion	Neophoca cinerea	-	Endangered	Endangered	✓	Breeding known to occur within area	None - No BIA defined
Australian Snubfin Dolphin	Orcaella heinsohni	Migratory	Vulnerable	P4 Migratory	✓	Breeding known to occur within area	Yes – Refer to Table 9
Blue Whale	Balaenoptera musculus	Migratory	Endangered	Endangered	✓	Migration route known to occur within area	Yes – Refer to Table 9
Bryde's Whale	Balaenoptera edeni	Migratory	-	Migratory	✓	Species or species habitat likely to occur within area	None - No BIA defined
Dugong	Dugong dugon	Migratory	-	Migratory	✓	Breeding known to occur within area	Yes – Refer to Table 9
Fin Whale	Balaenoptera physalus	Migratory	Vulnerable	Endangered	✓	Foraging, feeding or related behaviour likely to occur within area	None - No BIA defined
Humpback Whale	Megaptera novaeangliae	Migratory	-	Conservation Dependent Migratory	✓	Breeding known to occur within area	Yes – Refer to Table 9

[4] Biologically Important Area

Killer Whale, Orca	Orcinus orca	Migratory	-	Migratory	✓	Species or species habitat may occur within area	None - No BIA defined
Omura's Whale	Balaenoptera omurai	Migratory	-	-	✓	Species or species habitat likely to occur within area	None - No BIA defined
Sei Whale	Balaenoptera borealis	Migratory	Vulnerable	Endangered	✓	Foraging, feeding or related behaviour likely to occur within area	None - No BIA defined
Southern Right Whale	Eubalaena australis	Migratory	Endangered	Vulnerable	✓	Species or species habitat likely to occur within area	Yes – Refer to Table 9
Sperm Whale	Physeter macrocephalus	Migratory	-	Vulnerable	✓	Species or species habitat may occur within area	None - No BIA defined
Spotted Bottlenose Dolphin (Arafura/Timor Sea populations)	Tursiops aduncus (Arafura/Timor Sea populations)	Migratory	-	Migratory	✓	Species or species habitat known to occur within area	Yes – Refer to Table 9

7.1. Threatened and Migratory Species

7.1.1. Sei Whale

Sei whales have a worldwide, oceanic distribution and migrate between low-latitude tropical and subtropical regions during the winter and temperate and subpolar latitudes in summer (Leaper et al. 2008). Sei whales tend to be found further offshore than other species of large whales (Bannister et al. 1996).

Sei whales move between Australian waters and Antarctic feeding areas; however, they are only infrequently recorded in Australian waters (Bannister et al. 1996) and their movements and distribution in Australian waters is not well known (DAWE 2020a). There are no known mating or calving areas in Australian waters (Parker 1978 in DAWE 2020a). The National Conservation Values Atlas currently record no BIAs for this species (DAWE 2020b). Surveys of the Bonney Upwelling (outside of the EMBA) between 2000 and 2003 recorded sightings of sei whales feeding during summer and autumn, indicating that this is potentially an important feeding ground (DAWE 2020b).

7.1.2. Blue Whale

Two sub-species of blue whale are recorded in Australian waters: the southern (or true) blue whale (*Balaenoptera musculus intermedia*) and the pygmy blue whale (*Balaenoptera musculus brevicauda*). Southern blue whales are believed to occur in waters south of 60°S and pygmy blue whales occur in waters north of 55°S (i.e. not in the Antarctic) (DEWHA 2008a). By this definition all blue whales in waters from Busselton to the NT are assumed to be pygmy blue whales and are discussed below.

Pygmy blue whale populations are distinguishable only acoustically as they do not display morphological differences (Leroy et al. 2021). Prior to 2020 there were believed to be three populations of the pygmy blue whale (B. m. brevicauda), however, evidence for a fourth pygmy blue whale acoustic population were found by Cerchio, S. et al. (2020), and a fifth was identified by Leroy et al. (2021).

Pygmy blue whales have a southern hemisphere distribution, migrating from tropical water breeding grounds in winter to temperate and polar water feeding grounds in summer (Bannister et al. 1996, Double et al. 2014), such as the Perth Canyon and adjacent waters (Rennie et al., 2009) and the Great Southern Australian Coastal Upwelling System (Möller et al., 2020). The WA migration path takes pygmy blue whales down the WA coast to coastal upwelling areas along southern Australia (Gill 2002) and south at least as far as the Antarctic convergence zone (Gedamke et al. 2007).

Tagging surveys have shown pygmy blue whales migrating northward relatively near to the Australian coastline (100 km) until reaching North West Cape after which they travelled offshore (240 km) to Indonesia (Double et al., 2014). Passive acoustic data documented pygmy blue whales migrating along the Western Australian shelf break (Woodside 2012). Tagging data collected by Gales et al. (2010) has provided the first definitive link between the blue whales that feed off the Perth Canyon and those that occur around Indonesia. This is movement is concordant with the proposed ‘Tasmania to Indonesia’ population described by Branch et al. (2007).

The northern migration passes the Perth Canyon from January to May and north bound animals have been detected off Exmouth and the Montebello Islands between April and August (Double et al. 2012a, McCauley & Jenner 2010). A noise monitoring study conducted in 2014-15 recorded pygmy blue whales moving in a northward direction in August 2014 and between late-May to early July 2015 (JASCO Applied Sciences, 2016; McPherson, Craig et al., 2015). During the southern migration, pygmy blue whales pass south of the Montebello Islands and Exmouth from October to the end of January, peaking in late November to early December (Double et al. 2012b). No detections of the species were made during the period of their southward migration during the noise monitoring study.

Generally, they appear to travel as individuals or in small groups based on acoustic data. For example, analysis of pygmy blue whale calls from noise loggers deployed around Scott Reef (2006 to 2009) for the Woodside Browse project showed that 78% of the calls were from lone whales, 18% were from two whales and 4% were from three or more whales (McCauley 2011; Woodside 2014).

Pygmy blue whales appear to feed regularly along their migration route (i.e. at least once per week or more frequently) and are likely to have multiple food caches along their migratory route (e.g. Rowley Shoals and Ningaloo Reef) (ConocoPhillips 2018).

Recognised feeding areas of significance to this species, located within the EMBA include Ningaloo Reef and the Perth Canyon (DoE 2015a). The Ningaloo Reef area has the capacity to offer feeding opportunities to pygmy blue

whales through unique biophysical conditions able to support large biomasses of marine species (Double et al. 2014).

Surface lunge feeding of pygmy blue whales has been observed at North West Cape and Ningaloo Reef in June (C. Jenner & M-N Jenner, unpublished data, 2001 in Double et al. 2014). Outside of the recognised feeding areas, possible foraging areas for pygmy blue whales include the greater region around the Perth Canyon, off Exmouth and Scott Reef in WA (DoE 2015a). These steep gradient features tend to stimulate upwelling and, therefore increased productivity (seasonally variable) (ConocoPhillips 2018). Hence, they provide a favourable foraging area.

Breeding areas have not yet been identified; however, it is likely that pygmy blue whales calve in tropical areas of high localised production such as deep offshore waters of the Banda and Molucca Seas in Indonesia (Double et al. 2014, DAWE 2020a). There are no known breeding areas of significance to blue whales in waters from Busselton to the NT.

The BIAs for blue whale and pygmy blue whale are detailed in Table 9 and depicted in Figure 10**.** However, a recent study by Thums et al. (2022) used a combination of passive acoustic monitoring of the Northwest Australian coast (46 instruments from 2006 to 2019) and satellite telemetry data (22 tag deployments from 2009 to 2021) to model the spatial extent of pygmy blue whale high use areas for foraging and migration and compared these areas to the BIAs. The synthesis of data indicated that pygmy blue whales extensively use the continental slope habitat rather than the continental shelf habitat off Western Australian coast compared to southern Australia.

Thums et al. (2022) described three important foraging (and/or resting/breeding) areas, including; The Perth Canyon and vicinity, the shelf edge off Geraldton and; the shelf edge from Ningaloo Reef to the Rowley Shoals (not continuous).The study found that the Foraging BIA off the south-west of Western Australia encompassed 83 % of the most important areas in that region, however; the ‘Annual High Use Foraging’ BIA within that BIA only encompassed 7 % of the most important area.

The most significant overlaps were seen with the Migration BIAs, whereby the most important migration area had an 82 % overlap with the part of the Migration BIA that occurs in Australia. Thums et al. (2022) also stated that the available data indicated that the East Indian Ocean pygmy blue whales spent up to 124 days in Indonesian and Timorese waters (34 % of annual cycle) and this area may also be the calving ground for this population.

The Australian Government may now have to consider this quantitative assessment of important areas in future reviews of the BIAs (Thums et al. 2022).

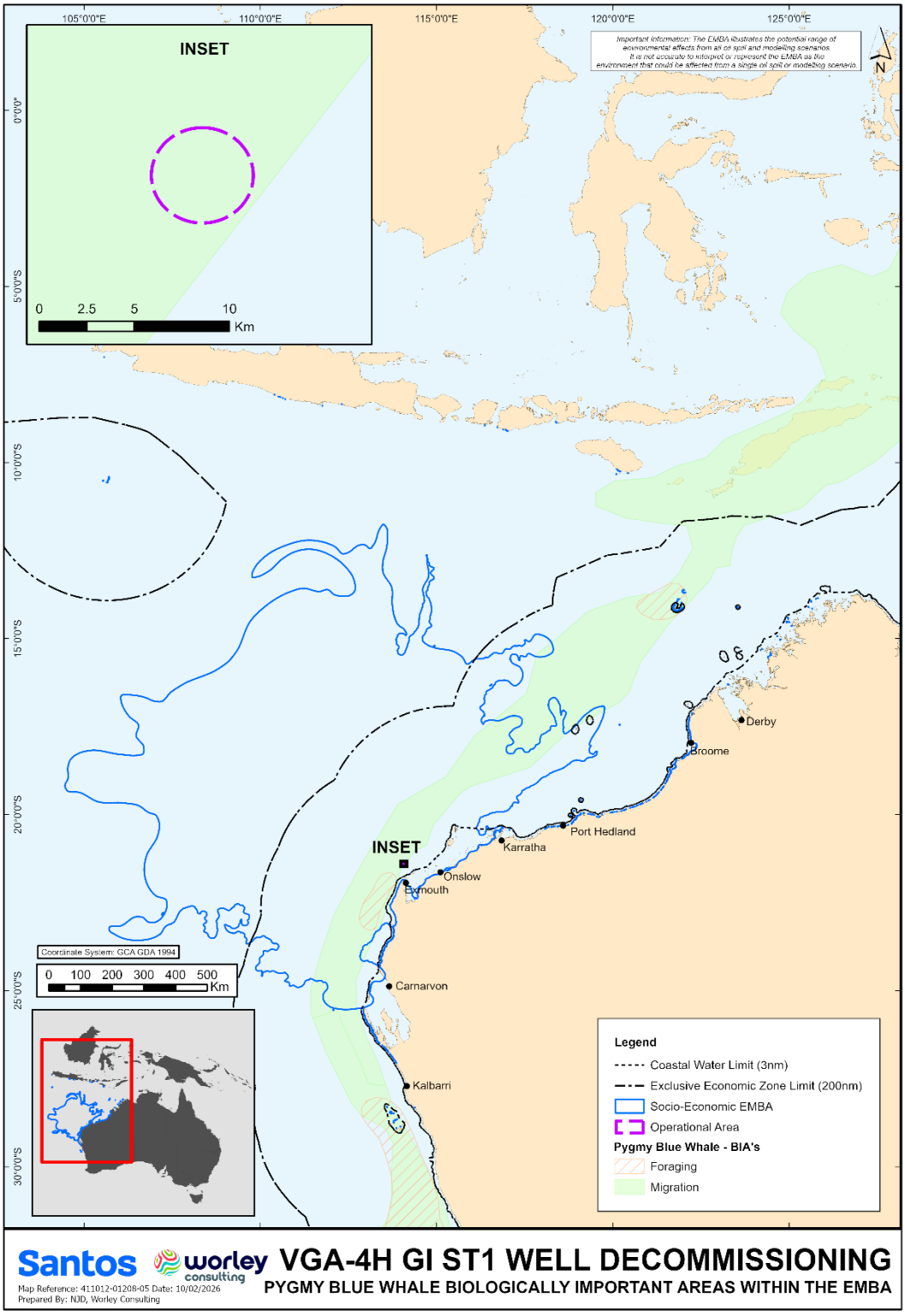


Figure 10: Biologically Important Areas – Pygmy Blue Whale

7.1.3. Fin Whale

Fin whales have a worldwide distribution generally in deeper waters, with oceanic migrations between warm water breeding grounds and cold-water feeding grounds.

The fin whale distribution in Australia is not clear due to the sparsity of sightings. Information is known primarily from stranding events and whaling records. According to the Species Profile and Threats database (DAWE 2020a); fin whales are thought to be present from Exmouth, along the southern coastline, to southern Queensland.

Migration paths are uncertain but are not thought to follow Australian coastlines (Bannister et al. 1996). There is insufficient data to prescribe migration times for fin whales. During summer and autumn this species has been recorded acoustically at the Rottnest Trench.

There are no known mating or calving areas in Australian waters (DoEE 2019a) and no BIAs for the fin whale are currently identified by the National Conservation Values Atlas (DAWE 2020b).

7.1.4. Southern Right Whale

The southern right whale is present in the southern hemisphere between approximately 30° and 60°S. The species feeds in the Southern Ocean in summer, moving close to shore in winter.

In Australian waters, southern right whales range from Perth, along the southern coastline, to Sydney. Sightings have been recorded as far north as Exmouth although these are rare (Bannister et al. 1996).

BIAs including calving aggregation and migration areas are recorded for this species within the EMBA. Migration occurs along the WA coastline between April and October, with a couple of emerging aggregation areas at Flinders Bay and Hassell Beach (DSEWPaC 2012). Calving occurs within the Exmouth Gulf region (DAWE 2020). Further details on the BIA for southern right whale are provided in Table 9 and depicted in Figure 11.

7.1.5. Humpback Whale

Humpback whales have a worldwide distribution, migrating along coastal waters from polar feeding grounds to subtropical breeding grounds. Geographic populations are distinct and at least six southern hemisphere populations are thought to exist based on Antarctic feeding distribution and the location of breeding grounds on either side of each continent (Bannister et al. 1996). The largest known population of humpback whales breeds along the coast of Western Australia (Branch, 2011, Salgado Kent et al., 2012, IWC, 2014) and has a recognised resting ground in the Exmouth Gulf (Ivine & Kent 2018). The population of humpback whales migrating along the WA coastline was recently estimated to be greater than 33,000 whales and likely increasing at exceptionally high growth rates between 10–12 % (Hedley et al. 2011, Salgado Kent et al. 2012).

Humpback whale populations have increased since being placed on the threatened species list for exploitation from whaling, resulting in a higher abundance of species off our Western Australian coastline. Effective from 26/02/2022, Humpback whales are no longer classed as vulnerable under the EPBC Act, however; they remain a Matter of National Environmental Significance as a listed Migratory Species and Cetacean under EPBC Act Division 3, where it is an offence to kill, injure, take, trade, keep, move or interfere with a cetacean. Humpback whales have been able to thrive and increase in numbers despite the heavy oil and gas exploration. A study presented by Bejder et al. (2016) has prompted a review of the species being down listed under Commonwealth legislation and regulations, as they are not eligible for listing as a threatened species under all statutory criteria. The west coast Australian humpback whale population migrates from Southern Polar Ocean ‘summer’ feeding grounds to their northern tropical ‘winter’ calving/ breeding grounds in coastal waters of the Kimberley. The northern migration tends to follow deeper waters of the continental shelf, whilst the southward migration concentrates whales closer to the mainland (Jenner et al. 2001; Irvine et al., 2018). Recent satellite tagging of southbound humpback whales indicate that whales generally migrated close to the coastline, within a few tens of kilometres of shore and in a corridor frequently less than 100 km (Double et al. 2010). Aerial surveys and noise logger recordings undertaken for Chevron’s Wheatstone Project indicated that the main distribution of humpback whales was sighted at an average distance of 50 km from the mainland during the northern migration and 35 km during the southbound migration (RPS 2010a). Woodside have conducted aerial surveys that have confirmed that the reported distribution of migrating humpback whales off the North West Cape is consistent with baseline surveys first conducted in 2000 to 2001 (RPS, 2010 in Woodside 2020).

The precise timing of the migration varies between years by up to six weeks, influenced by water temperature, sea ice distribution, predation risk, prey abundance and the location of feeding grounds (DEWR 2007).

Peak northward migration across the North West Shelf is identified as from late July to early August, and peak southward migration from late August to early September (DoEE 2015c). Data collected between 1995 and 1997 by the Centre for Whale Research indicates that the period for peak northern migration into the calving grounds in the Kimberley is mid to late July. The peak for southern migration is in the first half of September (Jenner et al. 2001). Actual timing of annual migration may vary by as much as three weeks from year to year due to food availability in the Antarctic (DMP 2003).

Satellite tagging data collected for migrating northbound humpback whales identified a consistent narrow inshore distribution, unlike the southward migration. There was little evidence that the whales tended to venture further from shore and into deeper water at any point on their northward migration. Whales were seen with calves off the North West Cape outside the 'calving grounds; of Lacepede Islands to Camden Sound. This indicates some potential for this area being used as a 'calving site' as well as a migratory corridor. Consequently, the region from the Lacepede Islands to Camden Sound should not be seen as the exclusive 'calving ground' for this population (Double et al. 2012b).

Details on the BIA for humpback whales are provided in Table 9 and depicted in Figure 12.

7.1.6. Sperm Whale

Sperm whales typically occur in WA along the southern coastline between Cape Leeuwin and Esperance (Bannister et al. 1996). Sperm whales are distributed worldwide in deep waters (greater than 400 m) off continental shelves and sometimes near shelf edges, averaging 20 to 30 nautical miles offshore (Hooker et al.1999, Pirotta et al., 2011). The sperm whale is known to migrate northwards in winter and southwards in summer, however, detailed information on the distribution of sperm whales is not available for the timing of migrations. Sperm whales have been recorded in deep water off the North West Cape on the west coast of Western Australia (RPS 2010b) and appear to occasionally venture into shallower waters in other areas (RPS 2010b).

No BIAs for sperm whales occur within the EMBA.

7.1.7. Antarctic Minke Whale

The Antarctic minke whale is distributed throughout the Southern Hemisphere from 55°S to the Antarctic ice edge during the austral summer and has been recorded in all Australian States (Bannister et al. 1996; Perrin & Brownell 2002). Detailed information on timing and location of migrations and breeding grounds on the west coast of Australia is largely unknown. However, it is believed that the Antarctic minke whale migrates up the WA coast to approximately 20°S during Australian winter to feed and possibly breed (Bannister et al. 1996).

7.1.8. Bryde's Whale

Bryde's whales (*Balaenoptera edeni;* Migratory) are distributed year-round across tropical and warm temperate waters with individuals recorded in all Australian states, except the NT (Ceccarelli et al., 2011; Kato 2002). The species typically moves between 40 °N and 40 °S, with these movements seeming to be primarily linked to prey availability (DoE, 2023k). Two forms are recognised: inshore and offshore Bryde's whales. It appears that the inshore form is restricted to the 200 m depth isobar whilst the offshore form is found in deeper waters of 500-1,000 m (DoEE 2019c). Both forms are expected to be found in zones of upwelling where they feed on shrimp like crustaceans (Bannister et al. 1996). Little is known about the population abundance of Bryde's whale, the location of exact breeding and calving grounds and large-scale migration patterns (DoEE 2019c). It is however, suggested that the offshore form migrates seasonally, heading towards warmer tropical waters during the winter.

7.1.9. Killer Whale

The killer whale has a widespread global distribution and has been recorded in waters of all Australian states/territories (Bannister et al. 1996). Whilst more commonly found in cold, deeper waters, killer whales have been observed along the continental slope, shelf and shallower coastal areas. Killer whales are known to make seasonal movements and are most likely to follow the migratory routes of their prey, however, little is known about these movements (DoEE, 2019). They are more likely to be observed around seal colonies, with a significant seal colony within the EMBA being located in WA at the Abrolhos Islands.

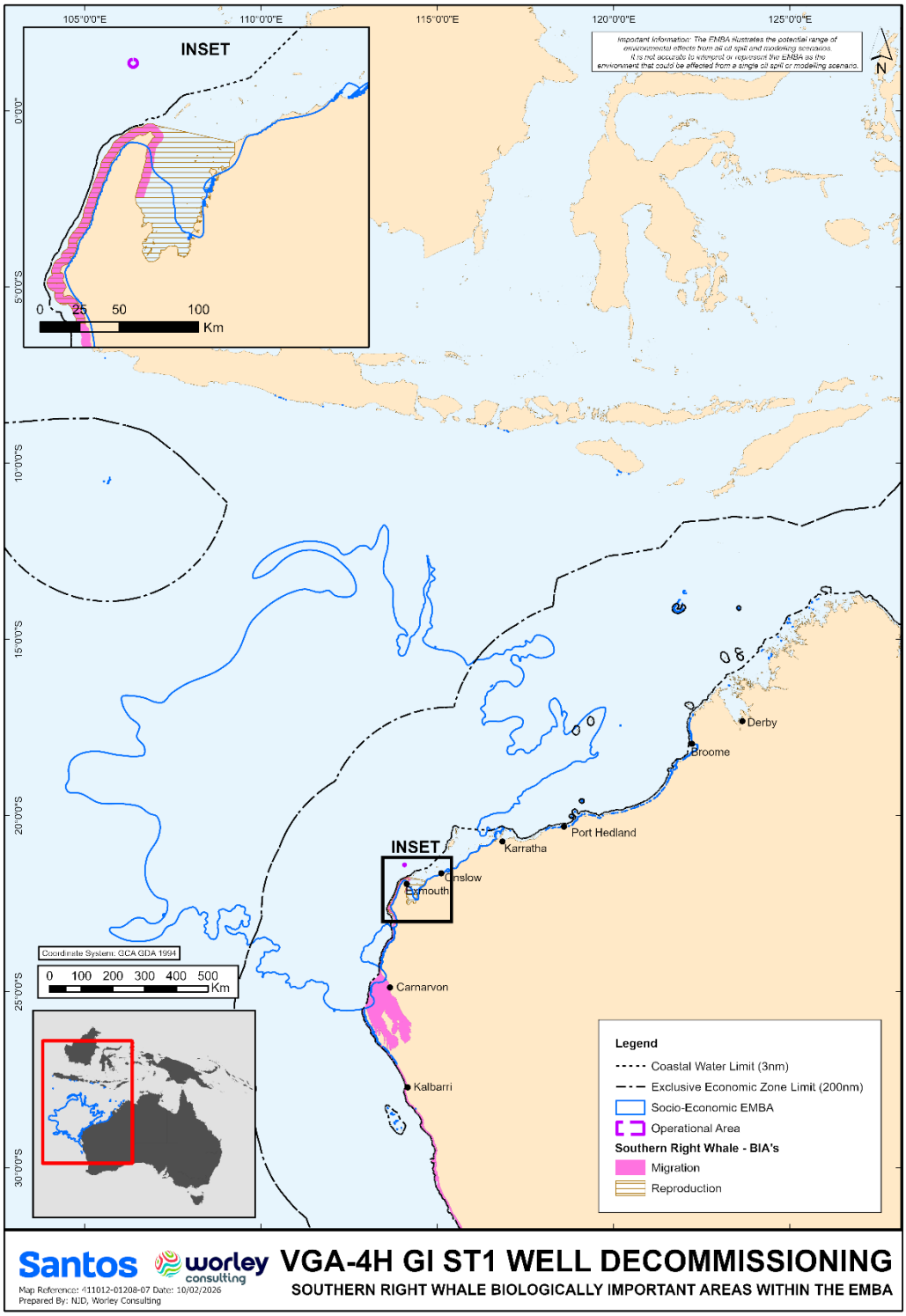


Figure 11: Biologically Important Areas – Southern Right Whale

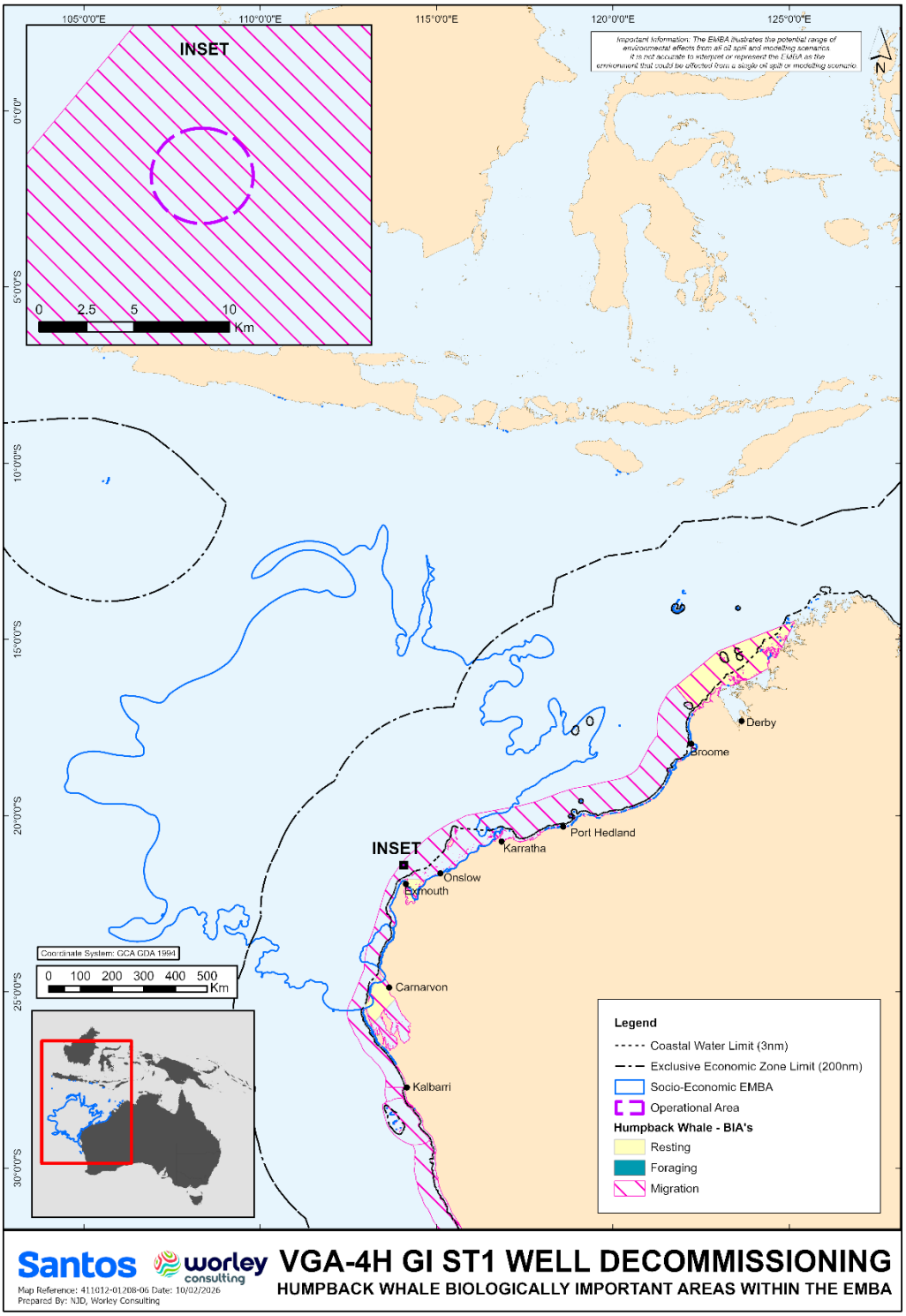


Figure 12: Biologically Important Areas – Humpback Whale

7.1.10. Indo-Pacific Humpback Dolphin

The Indo-pacific humpback dolphin is typically found in water less than 20 m deep but has been recorded in waters up to 40 m deep. This species is generally found in association with river mouths, mangroves, tidal channels and inshore reefs (DoEE 2016a). This species of dolphin is known to have resident groups that forage, feed, breed and calve in the state waters of Roebuck Bay, Dampier Peninsula, King Sound north, Talbot Bay, Anjo Peninsula, Vansittart Bay, Napier Broome Bay and Deception Bay (DoEE 2016a).

No BIAs for the Indo-Pacific humpback dolphin occur in the EMBA.

7.1.11. Spotted Bottlenose Dolphin (Indo-Pacific bottlenose dolphin)

The spotted bottlenose dolphin (*Tursiops aduncus*) (Arafura/ Timor Sea populations) is generally considered to be a warm water subspecies of the spotted bottlenose dolphin, occurring in shallow (often <10 m deep) inshore waters (Bannister et al., 1996; Hale et al., 2000). The known distribution of the spotted bottlenose dolphin extends from Shark Bay north to the western edge of the Gulf of Carpentaria in Australia (DoEE 2016b).

No BIAs for the spotted bottlenose dolphin occur in the EMBA.

7.1.12. Irrawaddy Dolphin (Australian Snubfin Dolphin)

The Irrawaddy dolphin, also known as the snubfin dolphin (*Orcaella heinsohni*) is known to occur within the waters off northern Australia, extending north from Broome in Western Australia to the Brisbane River in Queensland (DoEE 2016c). Surveys have indicated that the species is typically found in protected shallow nearshore waters, generally less than 20 m deep, adjacent to river and creek mouths close to seagrass beds (DoEE 2016c). The snubfin dolphin was not recorded during any of the aerial surveys undertaken along the Dampier Peninsula coastline in the vicinity of James Price Point but were observed in Roebuck Bay from vessels on several occasions (RPS, 2010b). Based on the extensive survey effort and amenable conditions within the James Price Point coastal area during the survey, it is concluded that this species is seldom found outside of shallow and sheltered bays and inlets (DSD 2010).

No BIAs for the Irrawaddy dolphin occur in the EMBA.

7.1.13. Australian Sea Lion

The Australian sea lion is endemic to Australia. Breeding colonies are found only in South Australian and Western Australian waters. There are currently 76 known Australian sea lion pupping locations along the coast and offshore islands between the Houtman Abrolhos Islands in Western Australia to the Pages Islands in South Australia (DSEWPaC 2013c). The species has also been recorded at Shark Bay (DoE 2014a).

No BIAs the Australian sea lion occur in the EMBA.

7.1.14. Dugong

The dugong (*Dugong dugon*) is a large herbivorous marine mammal (up to 3 m) that feeds off seagrass and generally inhabits coastal areas. Key populations along the WA coast are principally located at: Shark Bay (the largest resident population in Australia), Ningaloo Marine Park and Exmouth Gulf, the Pilbara coast and offshore areas including Montebello/ Barrow/ Lowendal Islands, and further north at Eighty Mile Beach and off the Kimberley Coast, particularly Roebuck Bay and Dampier Peninsula (Marsh et al. 2002; DSEWPaC 2012). Populations are also present at Ashmore Reef, and the north coast of the Tiwi Islands is recognised as a key site for the conservation of dugongs. A well-known major dugong aggregation of approximately 4,400 individuals occurs in waters seaward (within approximately 50 km) of the Tiwi Islands and ranks in the top eight of dugong populations in the world.

Dugong distribution and movement is based on the abundance, size and species of seagrass meadow. Dugongs can migrate hundreds of kilometres between seagrass habitats. Dugongs have been tracked moving long distances of up to 300 km between the Australia mainland and the Tiwi Islands (Whiting et al., 2009). Satellite-tracking data from dugongs tagged as part of the INPEX Ichthys Project baseline surveys observed that dugongs around the Vernon Islands, south of Melville Island, spent time in Darwin Harbour and around the Tiwi Islands (INPEX, 2010). Routine sightings occur in various locations along the NT coastline, including within Darwin Harbour, to the south of Melville Island.

The dugong BIAs in the EMBA are detailed in Table 9 and shown in Figure 13.

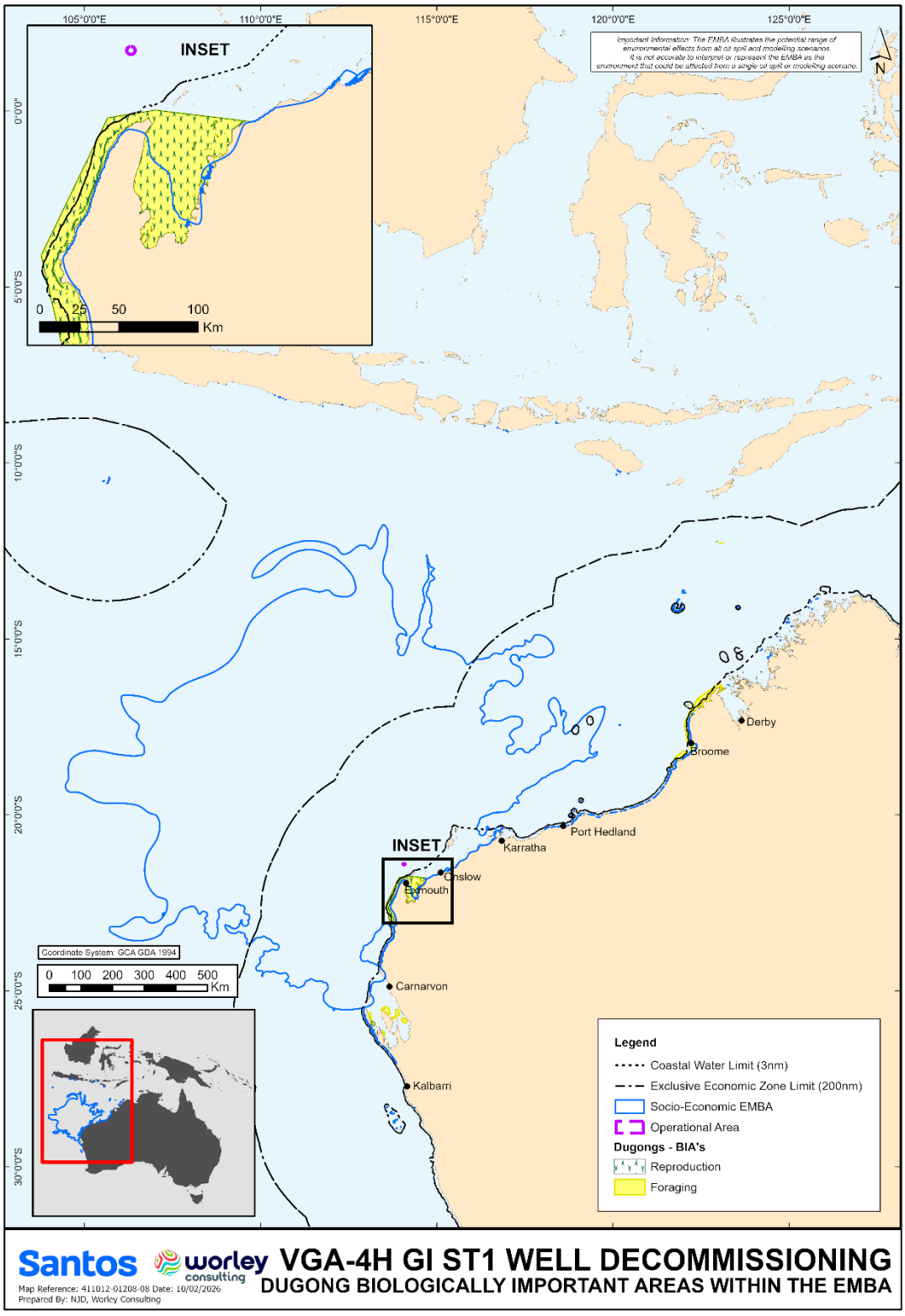


Figure 13: Biologically Important Areas – Dugong

Table 8: Summary of information for marine mammals listed as threatened under the EPBC Act

Aspect	Sei whale	Blue and pygmy blue whales	Fin whale	Southern right whale	Humpback whale	Australian sea lion
Species expected in area	Unknown	Yes	Unknown	Unlikely, southern distribution	Yes	Unlikely, southern distribution
Migration depth (m)	Unknown, prefers offshore waters	500-1,000	Unknown	n/a	Up to 100	n/a
Migration seasonality	Unknown	Apr to Aug (north), Oct to Jan (south)	Unknown	Apr to Oct	Jun to Nov	n/a

7.2. Biologically Important Areas / Critical Habitat – Marine Mammals

Table 9 below provides an overview of BIAs in the EMBA for marine mammals.

The DCCEEW may also make recovery plans for threated fauna listed under the EPBC Act. The EPBC Act requires that 'habitat critical to the survival of the listed threatened species' is identified in recovery plans, relevant recovery plans are listed in Section 13.

In addition, both the EPBC Act and WA BC Act and associated regulations (2018) provide for the listing of critical habitat - habitat 'critical to the survival of the threatened species.

Table 9: Biologically Important Areas – marine mammals

Species	Scientific name	Aggregation area and use	BIAs within EMBA
Blue and pygmy blue whales	*Balaenoptera musculus*	Migration – along the continental shelf edge off the WA coastline, extending offshore near Scott Reef and into Indonesian waters Foraging – along Ningaloo reef, around Scott Reef, around the Perth canyon Distribution – along the WA coastline towards and beyond Indonesia.	Pygmy blue whale - Augusta to Derby. Tend to pass along the shelf edge at depths of 500 m to 1000 m; appear close to coast in the Exmouth-Montebello Islands area on southern migration. Indonesia- Banda Sea Ningaloo Scott Reef
Southern right whale	*Eubalaena australis*	Breeding/calving – along the south west and southern coastline of WA/SA, Exmouth Gulf Migration – along south west coast up to Exmouth Gulf	Exmouth Gulf
Humpback whale	*Megaptera novaeangliae*	Breeding/calving/nursing/resting – Kimberley/Coastal North Lacepede Island, Campden Sound, Exmouth Gulf, Shark Bay Migration - northern migration deeper waters of the continental shelf, southward migration – along the WA mainland	Cape Leeuwin to Houtman Abrolhos Exmouth Gulf Houtman Abrolhos Islands Kimberley/Coastal North Lacepede Island, Camden Sound North of Houtman Abrolhos Shark Bay The migration corridor extends from the coast to out to approximately 100 km offshore in the Kimberley region extending south to North West Cape. From North West Cape to south of Shark Bay the migration corridor is reduced to approximately 50 km.
Indo-Pacific humpback dolphin	*Sousa chinensis*	Breeding, calving, foraging – Kimberley coastal waters and islands Significant habitat – unknown behavior – Admiralty Gulf & Parry Harbour and Bougainville Peninsula Significant habitat - Vansittart Bay, Anjo Peninsula	Camden Sound Area - Walcott Inlet, Doubtful Bay, Deception Bay, Augustus Island (Kuri Bay) Carnot & Beagle Bay King Sound North and Yampi Sound and Talbot Bay Fjord area near Horizontal Falls King Sound Southern Sector Maret and Biggee Island

Species	Scientific name	Aggregation area and use	BIAs within EMBA
			Pender bay Port Nelson, York Sound, Prince Frederick Harbour Prince Regent River Roebuck Bay
Indo-Pacific/ spotted bottlenose dolphin	*Tursiops aduncus*	Breeding, calving, foraging – Kimberley coastal waters and islands Migration – Pender Bay	Camden Sound Area - Walcott Inlet, Doubtful Bay, Deception Bay, Augustus Island (Kuri Bay) King Sound North and Yampi Sound and Talbot Bay Fjord area near Horizontal Falls King Sound Southern Sector Pender bay Roebuck Bay
Irrawaddy dolphin (Australian snubfin dolphin)	*Orcella heinsohni*	Breeding, calving, foraging, resting– Kimberley coastal waters and islands	Camden Sound Area - Walcott Inlet, Doubtful Bay, Deception Bay, Augustus Island (Kuri Bay) Cape Londonderry and King George River Carnot and Beagle Bay King Sound North and Yampi Sound and Talbot Bay Fjord area near Horizontal Falls King Sound Southern Sector Maret and Biggee Island Ord River Pender bay Port Nelson, York Sound, Prince Frederick Harbour Prince Regent River Roebuck Bay
Dugong	*Dugong dugon*	Foraging –Dampier Peninsula, Roebuck Bay, Shark Bay, Exmouth and Ningaloo coastline Migration – Roebuck Bay and North East Peron Peninsula, Shark Bay	Between Peron Peninsula and Faure Island, Shark Bay Dirk Hartog Island, Shark Bay East of Faure Island, Shark Bay Exmouth Gulf

Species	Scientific name	Aggregation area and use	BIAs within EMBA
		Breeding/calving/nursing – Exmouth and the Ningaloo coastline	Kimberley coast, Dampier Peninsula Middle Island, Kimberley coast North East Peron Peninsula, Shark Bay North of Faure Island, Shark Bay Pilbara and Kimberley coast near Dampier Peninsula Pilbara and Kimberley coast near James Price Point Roebuck Bay, Broome South Passage, Shark Bay Useless Loop, Shark Bay

8. Birds

Marine waters and coastal habitats in the EMBA contain key habitats that are important to birds, including offshore islands, sandy beaches, tidal flats, mangroves, and coastal and pelagic waters. These habitats support a variety of birds which utilise the area in different ways and at different times of the year (DSEWPaC 2012a). Birds can be broadly grouped according to their preferred foraging habitat as coastal/ terrestrial birds, seabirds, and shorebirds.

Coastal or terrestrial species inhabit the offshore islands and coastal areas of the mainland throughout the year. These species are either primarily terrestrial, or they may forage in coastal waters. Resident coastal and terrestrial species include osprey (*Pandion cristatus*), white-bellied sea eagle (*Haliaeetus leucogaster*), silver gull (*Larus novaehollandiae*) and eastern reef egret (*Egreta sacra*) (DEWHA 2008a).

Seabirds include those species whose primary habitat and food source is derived from pelagic waters. These species spend the majority of their lives at sea, ranging over large distances to forage over the open ocean. Seabirds present in the area include terns, noddies, petrels, shearwaters, tropicbirds, frigatebirds boobies and albatrosses (DEWHA 2008a).

Shorebirds, including waders, inhabit the intertidal zone and adjacent areas. Some shorebird species, including oystercatchers are resident (Surman & Nicholson 2013). Other shorebirds are migratory and include species that utilise the East Asian–Australasian Flyway, a migratory pathway for millions of migratory shorebirds that travel from Northern Hemisphere breeding grounds to Southern Hemisphere resting and foraging areas. Shorebirds that regularly migrate through the area include the Scolopacidae (curlews, sandpipers etc.) and Charadriidae (plovers and lapwings) families.

Surveys in the area by Santos and other agencies have built a picture of diverse avifauna. A summary of research is discussed below, followed by information on threatened and migratory birds. Wetlands of international importance are discussed in Section 9.2.

8.1. Regional Surveys

8.1.1. Abrolhos Islands

The Abrolhos Islands are one of the most significant seabird nesting areas in the eastern Indian Ocean with over two million birds breeding on the islands and small rocky atolls in the Abrolhos (DoF 2012). The mixture of species is unique, as subtropical and tropical species, and littoral and oceanic foragers, share the breeding islands. A total of 95 bird species have been recorded as residents or visitors to the Abrolhos Islands. Of these 35 species are known to breed at the Abrolhos (DoF, 2012):

- Common noddy (rookery – Pelseart Island): The Abrolhos supports 80% of the Australian breeding population of the common noddy (*Anous stolidus*) with up to 250,000 common noddies breed at Pelsaert Island. These birds lay their eggs in spring, but the actual month can vary, depending on their food supply and the weather conditions existing in offshore waters (DoF 2012)
- Caspian tern (rookeries – Leo Island, West Wallabi Island and Pelsaert Island): Unlike other more social terns, Caspian terns (*Hydroprogne caspia*) are usually solitary nesters. There are less than 150 of these breeding at the Abrolhos, across 22 islands (DoF 2012)
- Wedge-tailed shearwaters (rookeries): The Abrolhos are the most important breeding sites in Australia for the wedge tailed shearwater (*Ardenna pacifica*), with between 500,000 and 1,000,000 of these birds breeding there every year, predominantly on West Wallabi Island. The wedge-tailed shearwater breeding colonies at the Abrolhos are the largest in Australia (DoF 2012)
- Bridled tern (rookeries – Gun Island, Leo Island, Pelsaert Island, Little North Island, Fisherman Islands, Beagle Islands and Penguin Island): Bridled terns (*Onychoprion anaethetus*) breed on 90 islands throughout the Abrolhos. These birds fly north for the winter, through Indonesia to waters around the Philippines. There are approximately 4,000 bridled terns who return to the Abrolhos around October every year to lay their eggs. Bridled terns nest on more islands in the Abrolhos than any other bird species (DoF, 2012)

- Osprey (nesting area – Pelseart Island): Up to 100 eastern ospreys (*Pandion cristatus*) nest at a number of sites throughout all three island groups at the Abrolhos, including nesting platforms made from converted rock lobster pots and stacked fishing equipment on jetties (DoF 2012)
- White-bellied Sea eagle (nesting area – West Wallabi Island): At the Abrolhos, there are up to 50 breeding white-bellied sea eagles (*Haliaeetus leucogaster*), spread across all three island groups (DoF 2012)
- Australian lesser noddy (feeding area and rookeries Morley Island, Wooded Island and Pelseart Island): In Australia the Australian lesser noddy is only known to breed in this area and is known to forage between the islands and the continental shelf edge
- Other areas rookeries identified for both the wedge-tailed shearwater and bridled tern within the south west area include Lancelin Island, Rottnest Island and Safety Bay.

8.1.2. North West Cape

Avifauna surveys of the North West Cape have recorded 144 bird species, one third of which are seabirds and shorebirds (resident and migratory) (May et al. 1983). Approximately 33 species of seabirds and shorebirds are found in the Ningaloo Marine Park with the main breeding areas at Mangrove Bay, Mangrove Point, Point Maud, the Mildura wreck site and Fraser Island (CALM & MPRA 2005a).

8.1.3. Muiron Islands and Exmouth Gulf Islands

Muiron Islands and Exmouth Gulf Islands are generally lacking in published bird observations data. Early indications from surveys commissioned by Santos in 2013/14 indicate that South and North Muiron Islands are regionally significant in terms of wedge-tailed shearwater (*Ardenna pacifica*) nesting, whilst Bessiers and Fly islands are also significant (Surman pers comm. 2013). Nine coastal/terrestrial species and 21 shorebirds were identified on the Muiron and Exmouth Gulf Islands during the first of these surveys and seven bird species were recorded nesting (Surman 2013).

8.1.4. Dampier Archipelago/Cape Preston Region

The Dampier Archipelago/Cape Preston region is a nesting area for at least 16 species of seabirds. Many of the islands and rocks in the area are known breeding grounds for birds, including wedge-tailed shearwaters (*Ardenna pacifica*), Caspian terns (*Sterna caspia*), bridled terns (*Onychoprion anaethetus*) and roseate terns (*Sterna dougallii*). Small islands and islets such as Goodwyn Island, Keast Island and Nelson Rocks provide important undisturbed nesting and refuge sites, and Keast Island provides one of the few nesting sites for pelicans in WA (CALM & MPRA 2005).

8.1.5. Barrow Island Group

Barrow Island and surrounding islands have a diverse avifauna comprising at least 119 species (Chevron 2010), including 11 resident land birds, eight resident seabirds, 17 seabirds, 22 species of migratory waders, six resident shorebirds and 43 irregular visitors (Surman 2003). The avifauna of Barrow Island is thus poor in terms of land birds and waterfowl compared to mainland areas of the Pilbara, but rich in migratory waders and seabirds. Compared to other nearby offshore islands, Barrow Island has substantially more migratory waders but fewer breeding seabirds (Surman 2003).

8.1.6. Lowendal Island Group and Airlie and Serrurier Islands

The Lowendal Island Group has a diverse avifauna comprising 89 recorded species (Dinara Pty Ltd. 1991, Burbidge et al. 2000). Six species of resident land birds and six species of raptors have been recorded at the Lowendal Islands (Surman & Nicholson 2012). Up to fourteen seabird species have been observed at any one time during annual surveys of the Lowendal Islands between 2004 and 2012. Surveys at the Montebello Islands have recorded 70 bird species. This includes 12 species of seabirds and 14 species of migratory shorebirds (Burbidge et al. 2000). Wedge-tailed shearwaters have been identified to nest on Varanus, Airlie, Serrurier and Bridled Islands (Astron 2017a). Breeding participation on the islands appears to be largely influenced by pre-breeding oceanographic conditions (Astron 2017a). Monitoring in 2016/17 was undertaken by Santos and demonstrated the colony sizes for wedge-tailed shearwaters to be within or above previously reported ranges (Astron 2017a). This is informed though monitoring that has been undertaken under the Integrated Shearwater Monitoring Program (ISMP), established in 1994.

In 2016/17, areas of potential wedge-tailed shearwater nesting habitat were recorded on Varanus Island (5.53 ha) and Airlie Island (12.47 ha) and surrounding islands of Bridled (2.94 ha), Serrurier (130.89 ha), Abutilon (2.02 ha) and Parakeelya (1.66 ha) (Astron 2017a). The number of wedge-tailed shearwater breeding pairs was also estimated for each of Varanus (1,492 +/- 702), Airlie (600 +/- 124), Bridled (1,039 +/- 342), Serrurier (23,240 +/- 4,341), Abutilon (317 +/- 210) and Parakeelya (172 +/- 138) islands (Astron 2017a).

Other seabird species utilising Abutilon, Beacon, Bridled and Parakeelya islands for nesting include bridled terns, silver gulls, crested terns and lesser crested terns. Monitoring for these seabirds in 2016/17 was also completed by Santos, with monitoring results concluded to support previous trends for all species. Bridled terns mainly utilise Abutilon, Bridled and Parakeelya islands for breeding, with smaller numbers noted on Beacon and Varanus Islands. The bridled terns have not been recorded on Airlie Island and only in very small numbers on Varanus Island (Astron 2017b).

Silver gull numbers appear to be growing across the region (2010/2011). However, reasons for this are unknown but considered possibly to be due to greater prey availability or immigration from the mainland (Astron 2017b). Silver gulls have been found to utilise Bridled, Parakeelya, Abutilon and Beacon islands longer term for breeding. Silver gulls have not been identified to nest on Varanus island and were only recorded nesting on Airlie island for the first time in 2016/17 since monitoring commencement in 2004/05 (Astron 2017b).

The crested tern and lesser crested tern are noted as nomadic breeders that appear to use a consistent subset of islands for breeding. In 2016/17, Beacon Island was the favourable nesting site for the crested tern and lesser crested tern (Astron 2017b). Surveys in the vicinity of Port Hedland (Bennelongia 2011) recorded 23 species of migratory shorebird between 2002 and 2011. Terrestrial/coastal and seabird species were not targeted. A total of 4,248 migratory shorebirds of 18 species were observed during the field survey in April 2011.

8.2. Threatened Species

A Protected Matters search of the EMBA identified 95 bird species (Appendix C of the VGCN-VGA-4HGI ST1 Well Decommissioning EP**)** listed as threatened or migratory under the EPBC Act. An examination of the Species Profile and Threats database (DAWE 2020a) and The Action Plan for Australian Birds (Garnet 2011) showed that some listed bird species are not expected to occur in significant numbers in the marine and coastal environments in the EMBA due to their terrestrial or southern distributions. Hence, these species are not discussed further.

Of the remaining 78 bird species identified as potentially occurring within the EMBA, 35 bird species were threatened. The EPBC Act threatened species expected to occur in the area are listed in Table 10 along with their WA conservation status (as applicable) and discussed below.

There are an additional 43 bird species listed as migratory only under the EPBC Act, with these detailed in Section 8.3 (Table 12).

BIAs for birds are detailed in Table 16 and depicted in Figure 14**.**

Table 10: Birds listed as threatened under the EPBC Act

Value/Sensitivity		Conservation Status			Socio-economic EMBA		BIA[5] in EMBA
Common name	Scientific name	Migratory Status	EPBC Act Status	BC Act Status	Presence	Type of Presence	
Abbott's Booby	*Papasula abbotti*	-	Endangered	-	✓	Species or species habitat known to occur within area	None - No BIA defined
Amsterdam Albatross	*Diomedea amsterdamensis*	Migratory	Endangered	Critically Endangered	✓	Species or species habitat may occur within area	None - No BIA defined
Asian Dowitcher	*Limnodromus semipalmatus*	Migratory	Vulnerable	Migratory	✓	Species or species habitat known to occur within area	None - No BIA defined
Australian Fairy Tern	*Sternula nereis nereis*	-	Vulnerable	Vulnerable	✓	Breeding known to occur within area	Yes – refer to Table 16
Australian Lesser Noddy	*Anous tenuirostris melanops*	-	Vulnerable	Endangered	✓	Breeding known to occur within area	Yes – refer to Table 16
Australian Painted Snipe	*Rostratula australis*	-	Endangered	Endangered	✓	Species or species habitat likely to occur within area	None - No BIA defined
Black-browed Albatross	*Thalassarche melanophris*	Migratory	Vulnerable	Endangered	✓	Species or species habitat may occur within area	None - No BIA defined
Black-tailed Godwit	*Limosa limosa*	Migratory	Endangered	Migratory	✓	Species or species habitat known to occur within area	None - No BIA defined
Campbell Albatross, Campbell Black-browed Albatross	*Thalassarche impavida*	Migratory	Vulnerable	Vulnerable	✓	Species or species habitat may occur within area	None - No BIA defined
Christmas Island Frigatebird, Andrew's Frigatebird	*Fregata andrewsi*	Migratory	Endangered	Migratory	✓	Breeding known to occur within area	None - No BIA defined
Christmas Island White-tailed Tropicbird, Golden Bosunbird	*Phaethon lepturus fulvus*	-	Endangered	-	✓	Species or species habitat may occur within area	None - No BIA defined
Common Greenshank, Greenshank	*Tringa nebularia*	Migratory	Endangered	Migratory	✓	Species or species habitat known to occur within area	None - No BIA defined
Curlew Sandpiper	*Calidris ferruginea*	Migratory	Critically Endangered	Critically Endangered	✓	Species or species habitat known to occur within area	None - No BIA defined
Eastern Curlew, Far Eastern Curlew	*Numenius madagascariensis*	Migratory	Critically Endangered	Critically Endangered	✓	Species or species habitat known to occur within area	None - No BIA defined
Great Knot	*Calidris tenuirostris*	Migratory	Vulnerable	Critically Endangered	✓	Species or species habitat known to occur within area	None - No BIA defined
Greater Sand Plover, Large Sand Plover	*Charadrius leschenaultii*	Migratory	Vulnerable	Vulnerable	✓	Species or species habitat known to occur within area	None - No BIA defined
Grey Falcon	*Falco hypoleucos*	-	Vulnerable	Vulnerable	✓	Species or species habitat known to occur within area	None - No BIA defined
Grey Plover	*Pluvialis squatarola*	Migratory	Vulnerable	Migratory	✓	Species or species habitat known to occur within area	None - No BIA defined
Indian Yellow-nosed Albatross	*Thalassarche carteri*	Migratory	Vulnerable	Endangered	✓	Species or species habitat may occur within area	None - No BIA defined

[5] Biologically Important Area

Lesser Sand Plover, Mongolian Plover	*Charadrius mongolus*	Migratory	Endangered	Endangered	✓	Species or species habitat known to occur within area	None - No BIA defined
Little Tern	*Sternula albifrons*	Migratory	Vulnerable	Migratory	✓	Breeding known to occur within area	Yes – refer to Table 16
Northern Giant Petrel	*Macronectes halli*	Migratory	Vulnerable	Migratory	✓	Species or species habitat may occur within area	None - No BIA defined
Northern Siberian Bar-tailed Godwit, Russkoye Bar-tailed Godwit	*Limosa lapponica menzbieri*	-	Endangered	Critically Endangered	✓	Species or species habitat known to occur within area	None - No BIA defined
Red Goshawk	*Erythrotriorchis radiatus*	-	Endangered	Vulnerable	✓	Species or species habitat may occur within area	None - No BIA defined
Red Knot, Knot	*Calidris canutus*	Migratory	Vulnerable	Endangered	✓	Species or species habitat known to occur within area	None - No BIA defined
Red-tailed Tropicbird (Indian Ocean), Indian Ocean Red-tailed Tropicbird	*Phaethon rubricauda westralis*	-	Endangered	-	✓	Species or species habitat known to occur within area	None - No BIA defined
Ruddy Turnstone	*Arenaria interpres*	Migratory	Vulnerable	Migratory	✓	Species or species habitat known to occur within area	None - No BIA defined
Sharp-tailed Sandpiper	*Calidris acuminata*	Migratory	Vulnerable	Migratory	✓	Species or species habitat known to occur within area	None - No BIA defined
Shy Albatross	*Thalassarche cauta*	Migratory	Endangered	Vulnerable	✓	Species or species habitat may occur within area	None - No BIA defined
Soft-plumaged Petrel	*Pterodroma mollis*	-	Vulnerable	-	✓	Foraging, feeding or related behaviour likely to occur within area	None - No BIA defined
Southern Giant-Petrel, Southern Giant Petrel	*Macronectes giganteus*	Migratory	Endangered	Migratory	✓	Species or species habitat may occur within area	None - No BIA defined
Southern Royal Albatross	*Diomedea epomophora*	Migratory	Vulnerable	Vulnerable	✓	Species or species habitat may occur within area	None - No BIA defined
Terek Sandpiper	*Xenus cinereus*	Migratory	Vulnerable	Migratory	✓	Species or species habitat known to occur within area	None - No BIA defined
Wandering Albatross	*Diomedea exulans*	Migratory	Vulnerable	Vulnerable	✓	Species or species habitat may occur within area	None - No BIA defined
White-capped Albatross	*Thalassarche steadi*	Migratory	Vulnerable	-	✓	Species or species habitat may occur within area	None - No BIA defined
Abbott's Booby	*Papasula abbotti*	-	Endangered	-	✓	Species or species habitat known to occur within area	None - No BIA defined

8.2.1. Shorebirds

8.2.1.1. Red Knot (New Siberian Islands and north-eastern Siberia)

The red knot is a migratory shorebird, and the species includes five subspecies, including two found in Australia, *Calidris canutus piersmai* and *Calidris canutus rogersi*. The red knot breeds in Siberia and spends the non-breeding season in Australia and New Zealand. During the non-breeding season, the species spends the majority of its time on tidal mudflats or sandflats where they feed on intertidal invertebrates, especially shellfish (Garnet et al. 2011).

8.2.1.2. Curlew Sandpiper

This species is a migratory shorebird that breeds in north Siberia and spends the non-breeding season from western Africa to Australia (Bamford et al. 2008). The curlew sandpiper occurs around coastal Australia and preferred habitats include coastal brackish lagoons, tidal mud and sand flats, estuaries, saltmarshes and less often inland. Their diet is mainly comprised of polychaete worms, molluscs and crustaceans (Higgins & Davies 1996 in Garnet et al. 2011).

8.2.1.3. Great Knot

The great knot is a migratory shorebird with a global distribution, breeding in north-east Siberia and spending the non-breeding season along coasts from Arabia to Australia. Non-breeding birds migrate to inlets, bays, harbours, estuaries and lagoons with large intertidal mud and sand flats where they feed on bivalves, gastropods, crustaceans and other invertebrates (Higgins & Davies 1996 in Garnet et al. 2011).

8.2.1.4. Greater Sand Plover and Lesser Sand Plover

The greater sand plover and lesser sand plover are congeners that breed in China, Mongolia and Russia. The greater sand plover spends the non-breeding season along coasts from Japan through southeast Asia to Australasia, while the lesser sand plover spends the non-breeding season along coasts from Taiwan to Australasia (Banford et al. 2008). Non-breeding birds occur along all Australian coasts, especially in the north for the greater sand plover and in the east for the lesser sand plover (DAWE 2020a).

Non-breeding birds forage on beaches, saltmarshes, coastal bays and estuaries, and feed on marine invertebrates including molluscs, worms, crustaceans and insects (Marchant & Higgins 1993 in Garnet et al. 2011).

8.2.1.5. Bar-tailed Godwit (Western Alaskan and Northern Siberian Subspecies)

Two subspecies of the bar-tailed godwit exist, as determined by their breeding locations in Siberia and Alaska (Bamford et al. 2008). Non-breeding birds migrate to the coasts of Australia. The western Alaskan subspecies occurs especially on the north and east coasts of Australia whilst the northern Siberian subspecies occurs especially along the coasts of north Western Australia (DAWE 2020a).

Non-breeding birds are found on muddy coastlines, estuaries, inlets, mangrove-fringed lagoons and sheltered bays, feeding on annelids, bivalves and crustaceans (Higgins and Davies 1996 in Garnet et al. 2011).

8.2.1.6. Eastern Curlew

The eastern curlew is a migratory shorebird that breeds in Siberia, Kamchatka and Mongolia and migrates to coastal East Asia and Australia. The South Korean Yellow Sea is an important staging post for this species. Non-breeding birds occur around coastal Australia, are more common in the north and have disappeared or become much rarer at many sites along the south coast (Garnet 2011).

Non-breeding birds are present at estuaries, mangroves, saltmarshes and intertidal flats, particularly those with extensive seagrass (Zosteraceae), where they feed on marine invertebrates, especially crabs and small molluscs (Higgins & Davies 1996 in Garnet 2011).

8.2.1.7. Australian Painted Snipe

The Australian painted snipe has been recorded at wetlands in all states of Australia (DoE 2014g). The Australian painted snipe generally inhabits shallow terrestrial freshwater (occasionally brackish) wetlands, including

temporary and permanent lakes, swamps and claypans. They also use inundated or waterlogged grassland or saltmarsh, dams, rice crops, sewage farms and bore drains. Typical sites include those with rank emergent tussocks of grass, sedges, rushes or reeds, or samphire; often with scattered clumps of lignum Muehlenbeckia or canegrass or sometimes tea-tree (*Melaleuca*). The Australian painted snipe sometimes utilises areas that are lined with trees, or that have some scattered fallen or washed-up timber (DoE 2014g).

8.2.2. Seabirds

8.2.2.1. Australian Lesser Noddy

This species is usually found only around its breeding islands in the Houtman Abrolhos Islands in Western Australia (Storr et al. 1986). The Australian lesser noddy occupies coral-limestone islands that are densely fringed with white mangrove *Avicennia marina*, and it occasionally occurs on shingle or sandy beaches (Higgins & Davies 1996 in DAWE 2020a). This species is thought to be sedentary or resident, staying near to its breeding islands in the non-breeding season. It may leave nesting islands for short periods during the non-breeding season, and probably forages widely (Higgins & Davies 1996 in DAWE 2020a).

Breeding apparently occurs only on Morley, Wooded and Pelsaert Islands at the Houtman Abrolhos Islands (Higgins and Davies 1996 in DoE 2014b). Mangrove stands support approximately 68,000 breeding pairs spread over the three islands (Surman & Nicholson 2006). Breeding may also occur on Ashmore Reef (Stokes & Hinchey 1990). The breeding season extends from mid-August to early April (Higgins & Davies 1996 in DoE 2014b).

The National Conservation Values Atlas identifies BIAs for this species in the area of the Houtman Abrolhos islands (Table 16). The Species Group Report Card – Seabirds (DSEWPaC 2012b) states that the entire Australian population of this species breeds in the South-west Marine Region, south of Busselton.

8.2.2.2. Albatrosses

A Protected Matters search of the waters in the EMBA identified several albatross species that may occur in the area, comprising of the southern royal albatross, northern royal albatross, Amsterdam albatross, Antipodean albatross, Tristan albatross, sooty albatross, wandering albatross, Indian yellow-nosed albatross, shy albatross, white-capped albatross, black-browed albatross and Campbell albatross. All these species predominantly occur in subantarctic to subtropical waters and breed on islands in the southern oceans (DAWE 2020a).

The National Conservation Values Atlas (DAWE 2020b) and the National Recovery Plan for Threatened Albatrosses and Giant Petrels 2011-2016 (DSEWPaC 2011) do not identify any BIAs for these species in the area from Busselton to the NT border. However, a BIA for the Indian yellow-nosed albatross is identified for foraging north to Shark bay and extending east into Bass Strait.

8.2.2.3. Christmas Island Frigatebird

The Christmas Island frigatebird is a very large seabird. Breeding colonies of the Christmas Island frigatebird is currently confined to Christmas Island in the Indian Ocean (Birdlife International 2019) but forages and roosts widely in south-east Asia and Indian Ocean No breeding colonies have ever been found away from Christmas Island. The Christmas Island Frigatebird predominantly nests in forests on shore terraces that are protected from prevailing south-east trade winds (TSSC 2020a). All forest containing nesting and roosting sites, including currently known nesting and roosting colonies and any other smaller groups of nests and roosts on Christmas Island is considered critical habitat (TSSC 2020a).

8.2.2.4. Christmas Island Goshawk

The Christmas Island Goshawk is considered to be the rarest endemic bird on Christmas Island, where it occurs in all habitats from primary and marginal rainforests to suitable areas of secondary regrowth vegetation. The total population size is thought to be very small, perhaps as few as 100 adults, and is probably limited by the availability of suitable rainforest habitat.

Crazy Ants pose an unknown but potentially critical threat to the survival of this bird. The National recovery plan for the Christmas Island Goshawk (*Accipiter fasciatus natalis*) aims to downgrade the Christmas Island Goshawk from Endangered to Conservation Dependent, primarily through successful implementation of the Invasive Ants on Christmas Island Action Plan and protection of habitat critical to the survival of the species from clearance. An assessment of goshawk population dynamics is the most essential requirement of this recovery plan, and community awareness and participation in the conservation of this endemic raptor are also important actions.

8.2.2.5. Southern Giant Petrel

The southern giant petrel is a highly migratory bird with a large natural range. This species occurs from Antarctic to subtropical waters and breeds on the Antarctic continent, peninsular and islands and on subantarctic islands and South America. Breeding occurs annually between August and March (DAWE 2020a).

The National Conservation Values Atlas (DAWE 2020b) and the National Recovery Plan for Threatened Albatrosses and Giant Petrels 2011-2016 (DSEWPaC 2011) do not identify any BIAs for this species in the area from Busselton to the NT border.

8.2.2.6. Northern Giant Petrel

The northern giant petrel occupies the Antarctic Polar Front. In summer, it occurs predominantly in sub-Antarctic to Antarctic waters, usually between 40 and 64° The northern giant-petrel breeds on sub-Antarctic islands. Its breeding range extends into the Antarctic zone at South Georgia. It nests in coastal areas where vegetation or broken terrain offers shelter, on sea-facing slopes, headlands, in the lee of banks, under or against vegetation clumps, below cliffs or overhanging rocks, or in hollows. On Campbell Island, it nests on the edge of the coastal plateau. Tussock-grass is widespread at many breeding sites. Its nests are built in secluded, coastal sites, sheltered by heavy vegetation. On Antipodes Island, it nests under *Senecio antipoda* (DoE 2014d).

The National Conservation Values Atlas (DAWE 2020b) does not identify any BIAs for this species in the area spanning SW WA to the NT border.

8.2.2.7. Soft-Plumaged Petrel

The soft-plumaged petrel is generally found over temperate and subantarctic waters in the South Atlantic, Southern Indian and western South Pacific Oceans. The species breeds colonially on islands in the southern oceans. Breeding occurs from August to May (Marchant & Higgins 1990 in DAWE 2020a).

A BIA for this species is identified for foraging in seas north to 21°30'S off WA.

8.2.2.8. Blue Petrel

The blue petrel is marine species of the Sub Antarctic and Antarctic seas. In summer, it occurs mainly over waters of -2 to 2° C in surface temperature, but it also ranges south to the edge of the pack-ice and north to approximately 30° south, or further north over cool currents (DoE 2014e). In the Antarctic, it generally avoids the pack-ice, and only occasionally approaches the edge of the ice. Given the location of the EMBA, this species is unlikely to occur.

The National Conservation Values Atlas (DAWE 2020b) does not identify any BIAs for this species in the area spanning SW WA to the NT border.

8.2.2.9. Abbott's Booby

Currently, Abbott's booby is only known to breed on Christmas Island and to forage in the waters surrounding the island and south-east Asia (TSSC 2020b). Within Christmas Island, most nests are found in the tall plateau forest on the central and western areas of the island, and in the upper terrace forest of the northern coast.

The National Conservation Values Atlas (DoEE 2019b) does not identify any BIAs for this species in the area spanning SW WA to the NT border. Critical habitat is considered all known nesting trees and all forest vegetation within a 200m radius of known nesting trees on Christmas Island (TSSC 2020).

8.2.2.10. Australian Fairy Tern

The Australian fairy tern is distributed in a large geographic range between Australia, New Zealand and New Caledonia. Three subspecies have been identified, one of which is found in Australia. The Australian fairy tern occurs along the coasts of Victoria, Tasmania, South Australia and WA; occurring as far north as the Dampier Archipelago (DAWE 2020a). The subspecies has been found in embayments of a variety of habitats including offshore, estuarine or lacustrine islands, wetlands and mainland coastline (Higgins & Davies 1996 in DoE 2014b, Lindsey 1986).

Australian fairy terns nest on sheltered sandy beaches, spits and banks above the high tide line and below vegetation. The Australian fairy tern breeds from August to February depending on the location of the breeding

colony (Higgins & Davies 1996 in DAWE 2020a). They generally nest in small colonies of up to 100 birds, although larger colonies of more than 1400 pairs have been reported in Western Australia (Hill et al. 1988).

The National Conservation Values Atlas (DAWE 2020b) identifies the vicinity of the lower north-west coast (north to Dampier Archipelago) and west coast (south to Peel inlet) as BIAs for foraging. Biologically important breeding areas were also identified scattered along the coast between Shark Bay and the Pilbara (Table 16).

8.2.2.11. Christmas Island White-tailed Tropicbird

The Christmas Island white-tailed tropicbird is endemic to Christmas Island and leaves the island to forage in the warm waters of the Indian Ocean (Garnett 2011). The white-tailed tropicbird roots at sea; only incubating or brooding adults remain on nests on the island at night (Stokes 1988).

The National Conservation Values Atlas (DAWE 2020b) does not identify any BIAs for this species within the EMBA.

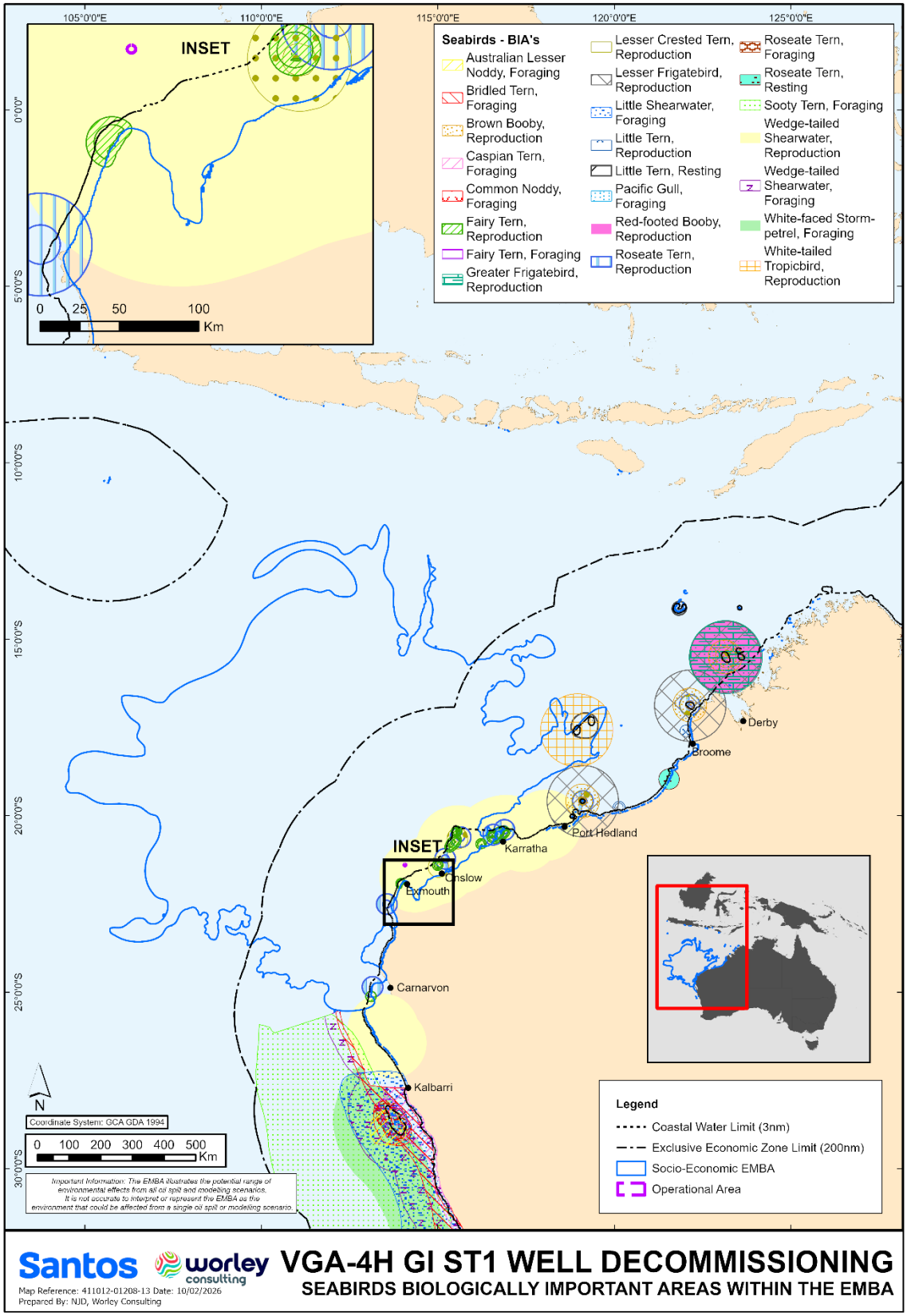


Figure 14: Biologically Important Areas – Seabirds

Table 11: Summary of information for birds listed as threatened under the EPBC Act that may be in the EMBA

Species	Species Expected in EMBA	Breeding in the Area/ Seasonality	Foraging
Shorebirds			
Asian Dowitcher	Yes	No	Polychaete worms and larvae, also insect larvae and molluscs. The species feeds on inter-tidal mudflats
Australian painted snipe	Yes	No	Seeds and small invertebrates
Bar-tailed godwit	Yes	No	Annelids, bivalves and crustaceans taken from shorelines
Common greenshank	Yes	No	Molluscs, crustaceans, insects, and occasionally fish and frogs
Curlew sandpiper[8]	Yes	No	Polychaete worms, molluscs and crustaceans taken from shorelines
Eastern curlew[8]	Yes	No	Marine invertebrates associated with seagrass
Grey Plover	Yes	No	Molluscs (especially gastropods), insects and their larvae, crustaceans (especially crabs) and polychaete worms
Great knot[8]	Yes	No	Bivalves, gastropods, crustaceans and other invertebrates taken from shorelines
Greater sand plover/lesser sand plover	Yes	No	Marine invertebrates taken from shorelines
Northern Siberian bar-tailed godwit	Yes	No	Worms, molluscs, crustaceans, insects and some plant material
Red knot[8]	Yes	No	Intertidal invertebrates
Ruddy turnstone	Yes	No	Insects, worms, crustaceans, molluscs, and spiders
Sharp tailed sandpiper	Yes	No	Seeds, worms, molluscs, crustaceans and insects
Terek sandpiper			
Western Alaskan bar-tailed godwit	Yes	No	Worms, molluscs, crustaceans, insects
Seabirds			
Abbott's booby	Low densities	No	Fish and squid
Amsterdam albatross	Low densities	No	Cephalopods, fish and crustaceans taken from marine and coastal waters.
Australian fairy tern	Yes	Yes Aug to Feb	Bait fish taken from coastal waters

Species	Species Expected in EMBA	Breeding in the Area/ Seasonality	Foraging
Australian lesser noddy	May forage from Kalbarri to Shark Bay	No	Small fish taken from marine and coastal waters (DoE 2014b)
Black-browed albatross	Low densities	No	Cephalopods, fish and crustaceans taken from marine and coastal waters.
Blue petrel	Low densities	No	Crustaceans, small fish and squid
Campbell albatross	Low densities	No	Cephalopods, fish, salps, jellyfish and crustaceans taken from marine and coastal waters.
Christmas Island frigatebird	Low densities	No	Planktonic crustaceans, fish and squid
Christmas Island white-tailed tropicbird	Very low densities	No	Squid and flying fish
Indian yellow-nosed albatross	Low densities	No	Cephalopods, and fish taken from marine and coastal waters.
Little Tern	Yes	Yes	Small fish (< 10 cm in length), but also eat crustaceans, insects, annelids and molluscs
Shy albatross	Low densities	No	Cephalopods, fish and crustaceans taken from marine and coastal waters.
Soft-plumaged petrel	Low densities	No	Cephalopods, fish and crustaceans taken from marine and coastal waters (DoE 2014b)
Sooty albatross	Low densities	No	Cephalopods, fish, crustaceans, siphonophores and penguin carrion taken from marine waters.
Southern & Northern giant petrel	Low densities	No	Scavenges penguin, seal and whale carcasses. Hunts live birds, penguin chicks' cephalopods and krill. Marine and coastal waters (DoE 2014b)
Southern royal albatross	Low densities	No	Cephalopods, and fish taken from marine and coastal waters.
Wandering albatross	Low densities	No	Cephalopods, fish and crustaceans taken from marine and coastal waters.
White-capped albatross	Low densities	No	Cephalopods and fish taken from marine and coastal waters.

[8] Species listed under the East Asian-Australasian Flyway Partnership

8.3. Migratory Species

The EPBC PMST search identified an additional 43 species listed as migratory under the EPBC Act that may occur within the EMBA. These species are listed in Table 12**.** All of these species are also listed as migratory under the BC Act, with the exceptions of:

- the flesh-footed shearwater, which is listed as vulnerable under the BC Act.
- the grey-tailed tattler and red-tailed tropicbird which are listed as Priority 4 under the BC Act.
- the broad-billed sandpiper, which is not listed under the BC Act.

Those species that are listed as both migratory and threatened under either the EPBC Act and/or BC Act are outlined in Table 10 and are not repeated within Table 12.

Table 12: Summary of migratory birds that may occur within the EMBA

Species	Common Name	Likelihood of occurrence in EMBA
Hirundo rustica	Barn Swallow	Species or species habitat known to occur within area
Limosa lapponica	Bar-tailed Godwit	Species or species habitat known to occur within area
Onychoprion anaethetus	Bridled Tern	Breeding known to occur within area
Limicola falcinellus	Broad-billed Sandpiper	Species or species habitat known to occur within area
Sula leucogaster	Brown Booby	Breeding known to occur within area
Hydroprogne caspia	Caspian Tern	Breeding known to occur within area
Anous stolidus	Common Noddy	Species or species habitat likely to occur within area
Tringa totanus	Common Redshank, Redshank	Species or species habitat known to occur within area
Actitis hypoleucos	Common Sandpiper	Species or species habitat known to occur within area
Charadrius bicinctus	Double-banded Plover	Roosting known to occur within area
Ardenna carneipes	Flesh-footed Shearwater, Fleshy-footed Shearwater	Foraging, feeding or related behaviour likely to occur within area
Apus pacificus	Fork-tailed Swift	Species or species habitat likely to occur within area
Fregata minor	Great Frigatebird, Greater Frigatebird	Breeding known to occur within area
Thalasseus bergii	Greater Crested Tern	Breeding known to occur within area
Motacilla cinerea	Grey Wagtail	Species or species habitat may occur within area
Tringa brevipes	Grey-tailed Tattler	Species or species habitat known to occur within area
Fregata ariel	Lesser Frigatebird, Least Frigatebird	Species or species habitat known to occur within area
Numenius minutus	Little Curlew, Little Whimbrel	Roosting known to occur within area
Calidris subminuta	Long-toed Stint	Species or species habitat known to occur within area
Tringa stagnatilis	Marsh Sandpiper, Little Greenshank	Species or species habitat known to occur within area
Sula dactylatra	Masked Booby	Breeding known to occur within area
Charadrius veredus	Oriental Plover, Oriental Dotterel	Species or species habitat known to occur within area
Glareola maldivarum	Oriental Pratincole	Species or species habitat known to occur within area
Acrocephalus orientalis	Oriental Reed-Warbler	Species or species habitat known to occur within area
Pandion haliaetus	Osprey	Breeding known to occur within area
Pluvialis fulva	Pacific Golden Plover	Species or species habitat known to occur within area
Calidris melanotos	Pectoral Sandpiper	Species or species habitat known to occur within area

Species	Common Name	Likelihood of occurrence in EMBA
Gallinago stenura	Pin-tailed Snipe	Roosting likely to occur within area
Sula sula	Red-footed Booby	Breeding known to occur within area
Phalaropus lobatus	Red-necked Phalarope	Species or species habitat known to occur within area
Calidris ruficollis	Red-necked Stint	Species or species habitat known to occur within area
Cecropis daurica	Red-rumped Swallow	Species or species habitat known to occur within area
Phaethon rubricauda	Red-tailed Tropicbird	Species or species habitat known to occur within area
Sterna dougallii	Roseate Tern	Breeding known to occur within area
Calidris pugnax	Ruff	Roosting known to occur within area
Calidris alba	Sanderling	Species or species habitat known to occur within area
Calonectris leucomelas	Streaked Shearwater	Species or species habitat likely to occur within area
Gallinago megala	Swinhoe's Snipe	Roosting likely to occur within area
Ardenna pacifica	Wedge-tailed Shearwater	Breeding known to occur within area
Numenius phaeopus	Whimbrel	Species or species habitat known to occur within area
Phaethon lepturus	White-tailed Tropicbird	Species or species habitat known to occur within area
Tringa glareola	Wood Sandpiper	Species or species habitat known to occur within area
Motacilla flava	Yellow Wagtail	Species or species habitat may occur within area
Sula leucogaster	Brown Booby	Species or species habitat known to occur within area

[8] Listed under the East Asian- Australasian Flyway Partnership

Australia is signatory to three international treaties with China, Japan and the Republic of Korea to safeguard migratory bird species, predominantly shorebirds. To facilitate observance of the three agreements, 36 species of migratory shorebirds have been listed as specially protected under both the Commonwealth EPBC Act and the WA BC Act.

Eleven internationally recognised areas that can support shorebird migrations are protected as wetlands of international importance. These wetlands are discussed further in Section 9.2.

The EPBC Act Policy Statement 3.21 sets out criteria for determining the significance of sites to migratory shorebirds based on the number of migratory species and the proportion of a species population that is supported by the site (Commonwealth of Australia 2017b). Site significance can be difficult to assess, particularly for ephemeral inland wetlands. These areas may be used rarely, depending on weather conditions, but still provide important habitat for migratory shorebird species.

Migratory shorebirds require a particular conservation approach due to their migration patterns that take them across international boundaries (Bamford et al. 2008). These species and their habitats are sensitive to threats due to their high site fidelity, tendency to aggregate, high energy demands and the need for habitat networks containing both roosting and foraging sites (Commonwealth of Australia 2017b). Migratory shorebirds are known to use networks of connected sites (also known as site complexes). They move within these networks depending on the time of day, availability of resources and environmental conditions at the site (Commonwealth of Australia 2017b).

The types of habitat used by migratory shorebirds in Australia vary across the species identified in the PMST search. Migratory shorebirds use both coastal and inland habitats that most commonly include:

- Coastal habitats: coastal wetlands, estuaries, mudflats, rocky inlets, reefs and sandy beaches, sometimes supporting mangroves.
- Inland habitats: inland wetlands, floodplains and grassland areas, often with ephemeral water sources (Commonwealth of Australia 2017b).

Feeding guilds provide an explanation for much of the shorebird distribution pattern in the north Western Australia. For example, Rogers (1999) classified shorebirds (and others) in Roebuck Bay as belonging to seven guilds on the basis of prey choice and foraging method. In order of abundance, these are summarised in Table 13.

Table 13: Feeding guilds based on prey choice and foraging method (Rogers 1999) adapted from DEC (2003) and Bennelongia (2008)

Feeding habitat	Feeding guild	Species
Sea edge	Tactile hunters of macrobenthos	Great knot, red knot, bar-tailed godwit, black-tailed godwit, Asian dowitcher
Along sandy sea edges or near tidal creeks	Tactile hunters of microbenthos	Curlew sandpiper, red-necked stint, broad-billed sandpiper, marsh sandpiper, sharp-tailed sandpiper
Reefs or mangrove fringes	Visual hunters of slow surface-dwelling prey	Common sandpiper, sooty oystercatcher, pied oystercatcher, silver gull, ruddy turnstone
Sandier western parts of Roebuck Bay, often near-shore	Visual hunters of small fast prey	Grey plover, red-capped plover, greater sand plover, lesser sand plover, grey-tailed tattler, terek sandpiper
Soft mudflats in north-east Roebuck Bay	Visual hunters of fast large prey	Eastern curlew, whimbrel, greenshank, striated heron and black-necked stork
Soft mudflats in north-east Roebuck Bay	Kleptoparasites	Gull-billed tern (robs large crabs from whimbrels)
Creek-lines in eastern Roebuck Bay	Pelagic hunters of nekton (animals of the pelagic zone) and neuston (animals that live on the surface film)	Black-winged stilt, red-necked avocet, reef egret, little egret, great white egret, white-faced heron, royal spoonbill

The Wildlife Conservation Plan for Migratory Shorebirds (DoE 2015) provides a framework to guide the conservation of migratory shorebirds and their habitat in Australia and, in recognition of their migratory habits, outlines national activities to support their appreciation and conservation throughout the East Asian-Australasian Flyway.

The following migratory shorebird species are subject to the Wildlife Conservation Plan for Migratory Shorebirds 2015 (DoE 2015).

Table 14: Birds subject to the Wildlife Conservation Plan for Migratory Shorebirds 2015

Migratory species	DCCEEW SPRAT information on distribution within the area of interest
Asian dowitcher[8]	The Asian dowitcher is a regular visitor to the north-west between Port Hedland and Broome. Elsewhere they are sporadic and rare. In the NT, the Asian dowitcher is found in Darwin and Arnhem Land. In WA, the species has been recorded at Albany, Lake McLarty, Lake McLeod, north-east Pilbara and the south-west Kimberley division. It has also been recorded at the Port Hedland Saltworks, Roebuck Bay, Ashmore Reed and Eighty Mile Beach. The Australian population is approximately 500 (Bamford et al. 2008).
Bar-tailed godwit	The bar-tailed godwit has been recorded in the coastal areas of all Australian states. In WA, it is widespread around the coast, from Eyre to Derby, with a few scattered records elsewhere in the Kimberley. In the NT populations have been recorded from Darwin and Melville Island. Sites of international importance from WA and the NT include: • Eighty Mile Beach, WA (110,290 individuals) • Roebuck Bay, WA (65,000 individuals) • Milingimbi coast, NT (7,000 individuals) • Elcho Island, NT (5,000 individuals).
Black-tailed godwit[8]	The black-tailed godwit is found in all states and territories of Australia; however, it prefers coastal regions and the largest populations are found on the north coast between Darwin and Weipa. The population that inhabits Roebuck Bay is approximately 7,374 (>1% of the species total population).
Broad-billed sandpiper	In WA, few records occur in the south-west, but the broad-billed sandpiper may be regular in small numbers at scattered locations, from Warden Lake Nature Reserve and Coramup Creek to Guraga Lake Nature Reserve and Hurstview Lake. Individuals mostly occur on the coasts of the Pilbara and Kimberley between Onslow and Broome but are also recorded north to the mouth of Lawley River, and inland at Lake Daley.
Common greenshank	The common greenshank occurs around most of the coast from Cape Arid in the south to Carnarvon in the north-west. In the Kimberley region, it is recorded in the south-west and the north-east, with isolated records from the Bonaparte Archipelago. WA has three sites of international importance for the common greenshank which include: • Eighty Mile Beach (2,240 individuals) • Wilson Inlet (568 individuals) • Roebuck Bay (560 individuals). The NT does not have any sites of international importance.
Common redshank	In Western Australia (WA), the species is vagrant to the south-west with records at Peel Inlet, Coodanup, the Gascoyne region, Coral Bay and Carnarvon.
Common sandpiper	WA distribution includes: • Roebuck Bay • Nuytsland Nature Reserve • NT distribution includes: • Kakadu National Park • Darwin area.
Double-banded plover	The double-banded plover can be found in both coastal and inland areas. There are no nationally significant sites within WA.
Great knot[8]	The great knot has been recorded around the entirety of the Australian coast, with a few scattered records inland. The greatest numbers are found in northern Australia; where the species is common on the coasts of the Pilbara and Kimberley, from the Dampier Archipelago to the Northern Territory border. Important sites for great knot in Western Australia include: • Eighty Mile Beach (169,044 individuals) • Roebuck Bay (22,600 individuals).
Greater sand plover	In Australia, the greater sand plover occurs in coastal areas in all states, though the greatest numbers occur in northern Australia, especially the north-west. In northern Australia, the species is especially widespread between North West Cape and Roebuck Bay in Western Australia and are sparsely scattered records from the largely inaccessible area between Roebuck Bay and Darwin. Internationally important sites within Western Australia include: • Eighty Mile Beach (64,548 individuals) • Roebuck Bay (26,900 individuals) • Ashmore Reef (1,196 individuals).
Grey plover	In Australia, the grey plover has been recorded in all states, where it is found along the coasts and are recorded frequently between Albany and the northern Kimberley coast. Internationally important sites include: • Eighty Mile Beach (1,650 individuals) • Roebuck Bay (1,300 individuals) • Peel Inlet (600 individuals) • Nuytsland Nature Reserve (409 individuals).
Grey-tailed tattler	A recent review of the species indicated an estimated 90% of the East Asian-Australasian Flyway population (approximately 45 000 individuals) spend the non-breeding season in Australia (Bamford et al. 2008). There are a few scattered records for the species along the south coast near the Eyre Bird Observatory, Point Malcolm, Rossiter Bay, Shark Lake Nature Reserve and surrounding swampland. It is found in the south-west between Augusta and Cervantes. The grey-tailed tattler is widespread from Houtman Abrolhos and the mainland adjacent to the Kimberley Division. It has also been recorded inland at Lake Argyle and on islands off the coast.
Lesser sand plover	Within Australia, the lesser sand-plover is widespread in coastal regions and has been recorded in all states. It mainly occurs in northern and eastern Australia, in south-eastern parts of the Gulf of Carpentaria, western Cape York Peninsula and islands in Torres Strait, and along the entire east coast, though it occasionally also occurs inland. In Western Australia, the following are important sites: • Eighty Mile Beach (1,575 individuals) • Roebuck Bay (1,057 individuals) • Broome (745 individuals) • Port Hedland Saltworks (668 individuals).
Little curlew	Little Curlews generally spend the non-breeding season in northern Australia from Port Hedland in Western Australia to the Queensland coast. There are records of the species from inland Australia, and widespread but scattered records on the east coast. The species has also been recorded on Lord Howe Island, Cocos-Keeling Island and Christmas Island. The species is recorded in Australia between September and April and there are few winter records. Sites of international importance for the Little Curlew within Australia, with maximum counts, include (Bamford et al. 2008): • Kakadu National Park, Northern Territory (NT), 180 000 • Roebuck Plains, Western Australia (WA), 52 000 • Anna Plains, WA, 12 000 • Derby Sewage Ponds, WA, 5000

Migratory species	DCCEEW SPRAT information on distribution within the area of interest
	• Parry floodplain, Wyndham, WA, 3000.
Little greenshank/ Marsh sandpiper	The marsh sandpiper is found on coastal and inland wetlands throughout Australia found mainly on the coast in Western Australia. National sites of importance within Western Australia include: • Port Hedland Saltworks (500 individuals) • Peel inlet (276 individuals) • Eighty Mile Beach (140 individuals).
Little ringed plover	Discrete populations around Perth (WA) and Darwin (NT).
Long-toed stint	In Western Australia, the species is found mainly along the coast, with a few scattered inland records. On the south coast the Long-toed Stint is found from Esperance to Albany and inland to Lake Cassencarry and Dumbleyung. On the south-west coast the species is known from the Vasse River estuary, Guraga Lake and the Namming Nature Reserve. The species has occasionally been recorded in the Gascoyne Region, around Lake Wooleen, Meeberrie Station and McNeill Claypan. It is widespread around the Pilbara region and the Kimberley Division between Karratha and Wyndham-Kununurra. Inland records include Lake Brown, Hannan Lake, Lake Biolet, Newman Sewage Farm and Lake Gregory.
Oriental plover	Internationally important marine sites: • Eighty Mile Beach, WA (approximately 57 619 individuals) • Roebuck Bay, WA (Approximately 8 750 individuals).
Oriental pratincole	Internationally important site: • Eighty Mile Beach, WA (2.88 million birds). The species occurs at numerous and widespread sites in northern Australia, especially near the Pilbara and Kimberley coasts of northern WA, and throughout the entire coastline of the NT.
Pacific golden plover	In Western Australia, the species is seldom recorded along the southern or south-western coasts but is more widespread along the Pilbara and Kimberley coasts between North-West Cape.
Pectoral sandpiper	In Australasia, the pectoral sandpiper prefers shallow fresh to saline wetlands. The species is found at coastal lagoons, estuaries, bays, swamps, lakes, inundated grasslands, saltmarshes, river pools, creeks, floodplains and artificial wetlands. The species is usually found in coastal or near coastal habitat but occasionally found further inland. It prefers wetlands that have open fringing mudflats and low, emergent or fringing vegetation, such as grass or samphire.
Pin-tailed snipe	The Pin-tailed Snipe breeds in Russia from the northern Ural Mountains, south to the Yamal Peninsula, south-east to Transbaikalia and northern Mongolia (between Tannu-Ola and Lake Baikal. The species also breeds in the north-east, through southern Amur to the coast west of the sea of Okhotsk (it is absent from the Kamchatka Peninsula). The species breeding range also extends from north to west along the Chukotsky Peninsula as well as the Kolyma River delta. The non-breeding distribution occurs mostly in south and south-east Asia, from eastern Pakistan, through the Indian subcontinent and the Indian Ocean islands. It is also found east through Bangladesh, Burma, Thailand and Indochina, south through the Malay Peninsula through to Indonesia. The species is rare in the Philippines. The species is vagrant to east Africa and rare in Japan (Higgins & Davies 1996)
Red knot[8]	The red knot large numbers are regularly recorded in north-west Australia, with 80 Mile Beach and Roebuck Bay being particular strongholds. The Australian population during the non-breeding period is estimated to be 135 000 (Hansen et al. 2016).
Red-necked phalarope	The red-necked phalarope is a regular at the Port Hedland Saltworks and Rottnest Island, Western Australia. The species is also found at the ICI Saltworks in South Australia.
Red-necked stint	The red-necked stint has been recorded in all coastal regions and found inland in all states when conditions are suitable. The red-necked stint probably travels in flocks and has been observed to feed in dense flocks. The Australian population was estimated at 353,000. Internationally important sites include: • Eighty Mile Beach (60,000 individuals) • Port Hedland Salt Works (23,000 individuals) • Roebuck Bay (19,800 individuals) • Wilson Inlet (15,252 individuals) • Alfred Cove Nature Reserve (10,000 individuals) • Lake Macleod (8,312 individuals) • Peel Inlet (8,063 individuals).
Ruddy turnstone	The ruddy turnstone is widespread within Australia during its non-breeding period of the year. Australian sites of international importance include: • Eighty Mile Beach (3,480 individuals) • Ashmore Reef (2,230 individuals) • Roebuck Bay (2,060 individuals) • Barrow Island (1,733 individuals) • Lacepede Islands (1,050 individuals).
Ruff (reeve)	In Western Australia, the species has been recorded at the lower King River and it is mostly found in the south-west region of the state. It has been sighted at the Vasse River estuary, north to Namming Lake and Lake McLarty. It has been periodically recorded at Port Hedland, Kununurra and the Argyle Diamond Mine. There are unconfirmed reports at Curlewis Camp, Millstream Chichester, Broome and Roebuck Bay.
Sanderling	They occur on most of the coast from Eyre to Derby, and also around Wyndham. They are more often recorded on the south and southwest coasts, north to around southern Shark Bay, with more sparsely scattered records further north in Gascoyne and Pilbara Regions and the Kimberley Division. Important sites include: • Eighty Mile Beach (2,230 individuals) • Ashmore Reef (1,132 individuals) • Roebuck Bay (1,510 individuals).
Sharp-tailed sandpiper	They are widespread from Cape Arid to Carnarvon, around coastal and subcoastal plains of Pilbara Region to south-west and east Kimberley Division (Higgins & Davies 1996). Internationally important sites include: • Eighty Mile Beach (25 000 individuals) • Port Hedland Saltworks (20 000 individuals) • Lake Gregory (10 000 individuals) • Peel-Harvey system (4 030 individuals).
Swinhoe's snipe	No conclusive records exist for this species in Australia so the number of individuals that appear in Western Australia are unknown. In WA the species has been recorded in parts of the Pilbara, the Kimberley, Mount Goldsworthy, Mount Blaize. It has also been found in the north west-regions around the Mitchell Plateau

Migratory species	DCCEEW SPRAT information on distribution within the area of interest
Terek sandpiper	In Western Australia (WA), the terek sandpiper is rarely seen on the south coast: occasionally around Eyre and several records around Albany. On Swan River plain, it has been recorded between Bunbury and the mouth of the Moore River. The species is widespread in the Pilbara region and Kimberley Division, from Dampier to Wyndham, with occasional records around Shark Bay. Internationally important sites include: • Eighty Mile Beach (8,000 individuals) • Roebuck Bay (1,840 individuals).
Wandering tattler	Discrete population in Darwin (NT).
Whimbrel	It is common and widespread from Carnarvon to the north-east Kimberley Division, Western Australia. It is occasionally seen on the south coast of Western Australia and has occasionally been recorded in south-west Western Australia and further north to Shark Bay. Internationally important sites include: • Roebuck Bay (1,020 individuals).
Wood sandpiper	The wood sandpiper has its largest numbers recorded in north-west Australia, with all areas of national importance located in Western-Australia: • Parry Floodplain (Wyndham) (355 individuals) • Camballin (185 individuals) • Lake Argyle (90 individuals) • Shark Bay area, (80 individuals) • Vasse-Wonnerup estuary (61 individuals) • Lake McLarty (64 individuals) • Kogolup Lakes (60 Individuals)

[8] Listed under the East Asian-Australasian Flyway Partnership (EAAFP)
NB Fork tailed swift and Streaked shearwater were not on the list of migratory bird subject to the Wildlife Conservation Plan for Migratory birds 2015 so were removed in Rev11 2023
Latham's Snipe was not included in this list as it does not occur within the EMBA

Shorebird migration patterns are seasonal and vary according to species (DSEWPaC 2012). Generally, shorebirds migrate to northern Australia in August to November. Many birds remain in northern Australia but others disperse southwards (Bennelongia 2011). Migratory shorebird numbers on northern beaches peak in November then again in March as the majority of birds begin their return to the northern hemisphere between March and May. Most migratory shorebirds do not breed in Australia and juvenile birds may spend several years in Australia before reaching maturity and returning north to breed (DEWHA 2009).

The Wildlife Conservation Plan for Migratory Seabirds (DoE 2020) seeks to facilitate a nationally coordinated effort to protect and conserve EPBC Act listed seabirds and provides an over-arching framework for their research and management, while encouraging an effort to address threats to seabirds and their habitats.

The following seabird species found within the EMBA are subject to the Wildlife Conservation Plan for Migratory Shorebirds 2020 (DoE 2020).

Table 15: Birds (migratory) subject to the Wildlife Conservation Plan for Seabirds 2020

Migratory species	DCCEEW SPRAT information on distribution within the area of interest
Red-tailed tropicbird	The Australian population is poorly known owing to the numerous breeding sites and protracted and asynchronous breeding season making an accurate census difficult. The largest population breeds on Christmas Island (>2,000 pairs) with additional key breeding locations on Cocos (Keeling) Group, islands of Ashmore Reef Marine Park, Lord Howe Island, Norfolk Island, Coral Sea Marine Park and two known islands and cays in the Great Barrier Reef Marine Park.
White-tailed tropicbird	In Australia, the white-tailed tropicbird (Indian Ocean) breeds in the Cocos-Keeling Islands, at Ashmore Reef and Rowley Shoals off the northern coast of Western Australia. Over the past few years, birds have been sighted with increased frequency on West Island and Home Island (also in the main atoll) in the Cocos-Keeling Islands. The White-tailed Tropicbird (Indian Ocean) ranges widely over the oceans surrounding its breeding locations (Marchant & Higgins 1990). The breeding population of the white-tailed tropicbird (Indian Ocean) in Australia is estimated at 120 birds.
Broad-billed prion	The species has an extremely large range extending from the Southern Ocean to the South Atlantic Ocean. Adults are thought to remain in waters adjacent to breeding colonies, however, young birds seem to occur farther north to Australia and South Africa. The global population has been estimated to exceed 15 million individuals (Brooke 2004). The population is suspected to be decreasing owing to predation from invasive species.
Fairy prion	Two subspecies breed in Australia, *turtur* and *subantarctica*. The subspecies *subantarctica* has previously been detected breeding on two rock stacks off Macquarie Island in 1979 and Bishop and Clerk Island in 1993.
Wedge-tailed shearwater	The wedge-tailed shearwater breeds on the east and west coasts of Australia and on off-shore islands. The species is common in the Indian Ocean, the Coral Sea and the Tasman Sea (Lindsey 1986). In Western Australia breeding occurs on islands off the west coast of WA including the Cocos-Keeling Island. At WA breeding sites there are at least one million breeding pairs.
Flesh-footed shearwater	The flesh-footed shearwater is a locally common visitor to waters of the continental shelf and continental slope off south-western Western Australia to south-eastern Queensland and around Lord Howe Island. Pairs breed on 41 islands off the coast of south-western Western Australia and Lord Howe Island in south-western Western Australia. Flesh-footed Shearwaters have been recorded as vagrants at Norfolk Island and are possibly regular visitors to Norfolk from breeding colonies on Lord Howe Island and around New Zealand (Moore 1985).
Sooty shearwater	In Australia, there are known colonies on 17 islands, all of which contain fewer than 1,000 pairs, however; Population estimates and trends are unknown.

Migratory species	DCCEEW SPRAT information on distribution within the area of interest
Short-tailed shearwater	This species breeds on Tasmanian offshore islands and off the coast of southern Australia, with the bulk of the population in the south-east. National trends are unknown; however the species is monitored at some locations in Tasmania, Victoria and NSW.
Streaked shearwater	The streaked shearwater undergoes trans-equatorial migration traveling south during winter, to the coasts of Vietnam, New Guinea, the Philippines, Australia, southern India and Sri Lanka. The global population has been estimated to number 3 million individuals.
Lesser frigatebird	It has been suggested that lesser frigatebird roost at Weipa and survey data suggests Ashmore Reef Marine Park comprises significant numbers and is believed to account for ≥1% of the global population.
Great frigatebird	Important populations in Western Australian seas include those at North Keeling Island,the islands of Ashmore Reef Marine Park and Adele Island.
Masked booby	In Australia, the masked booby ranges from the Dampier Archipelago in Western Australia (WA), along the entire north coast and east coast to Brisbane. Individuals regularly occur on islands off Australia, including Lord Howe, Norfolk, Kermadec and the Cocos-Keeling Islands. The total Australian masked booby population is estimated to be between 3,750–4,270 breeding pairs.
Red-footed booby	This red-footed booby is found in tropical islands in most oceans, excluding the eastern Atlantic. It winters at sea in the same area, ranging north of the Tropic of Cancer and south of the Tropic of Capricorn. This species is largely pelagic occurring farther from land than other booby species. The most important breeding population in Australia occurs in Pulu Keeling National Park in the Indian Ocean, which regularly supports more than 30,000 pairs.
Brown booby	In Australia, the brown booby is found from Bedout Island in Western Australia, around the coast of the Northern Territory to the Bunker Group of islands in Queensland with occasional reports further south in New South Wales (NSW) and Victoria. The species is reported further south to Tweed Heads, NSW, and to near Onslow, Western Australia and may be becoming more common in these areas. Within Australian seas, including Christmas and Cocos-Keeling Islands in the eastern Indian Ocean, the total breeding population was 59 940–73 900 pairs in a 1996–97 survey. The global population estimate for the species is 200 000.
Common noddy	In Australia, the common noddy occurs mainly in ocean off the Queensland coast, but the species also occurs off the north-west and central Western Australia coast. The species is also rarely encountered off the coast of the Northern Territory, where only one breeding location with about 100-130 birds is known. In 1996, the total Australian population of the Common Noddy was estimated to be between 174 480 and 214 130 breeding pairs.
Bridled tern	In Western Australia, bridled terns are breeding at Cape Leeuwin (extending round the southern coast to Seal Rocks) north to Shark Bay and in Pilbara region and Kimberley Division. At sea, distribution extends from Cape Leeuwin north to Dirk Hartog Island, with isolated mainland coastal records at Point Maud and Ningaloo, and from Barrow Island to the Dampier Archipelago, and at sea off the Kimberley coast from waters west of the Dampier Peninsula to Ashmore Reef and Joseph Bonaparte Gulf. The total population in Western Australia is estimated to be at least 30 000–40 000 pairs and apparently increasing.
Little tern	The Australian breeding population can be divided into two major subpopulations (northern and eastern) with the northern subpopulation that breeds across northern Australia, from about Broome in north-western Western Australia through coastal Northern Territory to the Gulf of Carpentaria and eastern Cape York Peninsula.

Migratory species	DCCEEW SPRAT information on distribution within the area of interest
Caspian tern	Within Western Australia, the Caspian tern is widespread in coastal regions, from the Great Australian Bight to the Dampier Peninsula. There are sparse records on the coasts east of King Sound and in eastern regions. Breeding occurs from the Recherche Archipelago to Dirk Hartog Island and Faure Island in Shark Bay, and also in the Pilbara region from around Point Cloates to North Turtle Island, and more rarely, in the Kimberley.
Roseate tern	In Western Australia, the subspecies is regularly recorded north from Mandurah to around Eighty Mile Beach, in the Pilbara Region. Around the Kimberley coastline, the subspecies occurs at scattered sites, north to the Bonaparte Archipelago and possibly further. Records in south-west Western Australia indicate that the subspecies used to be a sporadic visitor to the region, but occurs regularly at present. In addition, breeding colonies have been established on Lancelin Island and Second Rock, off Western Australia (Higgins & Davies 1996). In the Northern Territory, the subspecies has a scattered occurrence along the north coast, mainly from Darwin to Gove Peninsula, though birds have been recorded west to North Peron Island and east to the Sir Edward Pellow Islands (Chatto 2001). The subspecies is more widespread in the west and south-west of the Gulf of Carpentaria (Higgins & Davies 1996).I
Osprey	The breeding range of the eastern osprey around the northern coast of Australia (including many offshore islands) extends from Albany in Western Australia to Lake Macquarie in NSW; with a second isolated breeding population on the coast of South Australia. The species is most abundant in northern Australia, where high population densities occur in remote areas. A population on Barrow Island was estimated at 20 pairs in 1978.

Like many birds, seabirds often migrate after the breeding season. Of these, the migration taken by the Arctic tern (*Sterna paradisaea*) is the farthest of any bird, crossing the equator in order to spend the Austral summer in Antarctica (Egevang et al. 2010; Fijim et al. 2013). Other species also undertake trans-equatorial trips, both from the north to the south, and from south to north (DoE 2020).

Other species migrate shorter distances away from the breeding sites, their distribution at sea determined by the availability of food. If oceanic conditions are unsuitable, seabirds will immigrate to more productive areas, sometimes permanently if the bird is young (Oro et al. 2004). After fledging, juvenile birds often disperse further than adults, and to different areas, so are commonly sighted far from a species' normal range. Some species, such as some of the storm petrels, diving petrels and cormorants, rarely disperse at all, staying near their breeding colonies year-round (DoE 2020).

8.4. Biologically Important Areas / Critical Habitat– Birds

Table 16 below provides an overview of BIAs in the EMBA for birds. The DCCEEW may make recovery plans for threated fauna listed under the EPBC Act. The EPBC Act requires that ‘habitat critical to the survival of the listed threatened species’ is identified in recovery plans, relevant recovery plans are listed in Section 13.

In addition, both the EPBC Act and WA BC Act and associated regulations (2018) provide for the listing of critical habitat - habitat ‘critical to the survival of the threatened species. No provision is made under the TPWC Act for listing critical habitat.

Table 16: Critical habitat/ biologically important areas - birds

Species	Scientific name	Aggregation area and use	Specific geographic locations for species
Australian fairy tern	*Sternula nereis*	Foraging – lower north-west coast, west coast, south coast including islands. Breeding – Pilbara and Gascoyne coasts and islands	Found in the vicinity of lower north-west coast (north to Dampier Archipelago), west coast (south to Peel Inlet) and south coast (from Flinders Bay east to Israelite Bay), including islands (as far offshore as Trimouille Island and Houtman Abrolhos). Pilbara and Gascoyne coasts and islands
Australian lesser noddy	*Anous tenuirostris melanops*	Foraging - Houtman Abrolhos Islands	Houtman Abrolhos Islands
Bridled tern	*Onychoprion anaethetus*	Foraging - West coast of Western Australia and around to Recherche Archipelago	West coast of WA and around to Recherche Archipelago including offshore waters
Brown booby	*Sula leucogaster*	Breeding, foraging - Kimberley and northern Pilbara coasts and islands also Ashmore Reef.	Kimberley and northern Pilbara coasts and islands also Ashmore Reef.
Caspian tern	*Sterna caspia*	Foraging (provisioning young) - mainly islands (as far offshore as Adele, Bedout, Trimouille and the Houtman Abrolhos)	In WA found on most coasts, mainly islands (as far offshore as Adele, Bedout, Trimouille and the Houtman Abrolhos) and at Lake Argyle, Lake Gregory and Lake MacLeod; accidental elsewhere in the interior.
Common noddy	*Anous stolidus*	Foraging – Lancelin Island Foraging (provisioning young) – Houtman Abrolhos Islands	Around Houtman Abrolhos Islands Around Lancelin Island
Flesh-footed shearwater	*Ardenna carneipes*	Foraging, aggregation (pre-migration)	Foraging from Cape Naturaliste to Eyre, 1-150 km offshore. Pre-departure zone in some years from Rottnest Island to Bunbury.
Greater crested tern (“Crested tern”)	*Thalasseus bergii*	Breeding (high numbers)	Seagull Island, off NW of Cape Van Diemen, Melville Island No. 2 Sandy Island (Cobourg) Haul Round Island (Boucat Bay) NW Crocodile, NE of Milingimbi (Large Island)
Greater frigatebird	*Fregata minor*	Breeding, foraging - Kimberley and Ashmore Reef	Kimberley and Ashmore Reef
Great-winged petrel	*Pterodroma macroptera*	Foraging - Offshore south of Shark Bay	Offshore south of Shark Bay, extending around south-west corner of WA and east past Kangaroo Island
Indian yellow-nosed Albatross	*Thalassarche carteri*	Foraging - south-west marine region, north to Shark Bay and extending east into Bass Strait	Throughout offshore waters of south-west marine region, north to Shark Bay and extending east into Bass Strait
Lesser crested tern	*Sterna bengalensis*	Breeding, foraging - Kimberley, Pilbara and Gascoyne coasts and islands including Ashmore Reef	Kimberley, Pilbara and Gascoyne coasts and islands including Ashmore Reef
Lesser frigatebird	*Fregata ariel*	Breeding, foraging – Kimberley and Pilbara coasts and islands also Ashmore Reef.	Kimberley and Pilbara coasts and islands also Ashmore Reef.
Little penguin	*Eudyptula minor*	Foraging - Perth to Bunbury	Perth to Bunbury
Little shearwater	*Puffinus assimilis*	Foraging - From Kalbarri to Eucla	From Kalbarri to Eucla including offshore waters
Little tern	*Sternula albifrons*	Breeding, foraging, resting - Kimberley, Pilbara and Gascoyne coasts and islands including Ashmore Reef Resting - Roebuck Bay	Kimberley, Pilbara and Gascoyne coasts and islands including Ashmore Reef Roebuck Bay Ramsar site
Pacific gull	*Larus pacificus*	Foraging –west coast and islands	West coast and islands from Point Quobba (24º30’S) south to Wedge Island (formerly south to Warnbro Sound and at Cape Naturaliste); casual further north (Point Cloates and Lake MacLeod).
Red-footed booby	*Sula sula*	Breeding, foraging - northwest Kimberley and Ashmore reef	Northwest Kimberley and Ashmore reef
Roseate tern	*Sterna dougallii*	Breeding, foraging – Islands and coastline in the Kimberley, Pilbara and Gascoyne regions Resting – Eighty Mile Beach Foraging & provisioning young– North-western and west coasts and islands from Sir Graham Moore Is (13º50’S), south to Mandurah (32º32’S) and as far offshore as Ashmore Reef, Bedout Island and the Houtman Abrolhos.	Eighty Mile Beach (northern end) Kimberley, Pilbara and Gascoyne coasts and islands including Ashmore Reef Low Rocks and Stern Island in Admiralty Gulf North-east and North-west Twin Islets near the mouth of King sound North-western and west coasts and islands from Sir Graham Moore Is (13º50’S), south to Mandurah (32º32’S) and as far offshore as Ashmore Reef, Bedout Island and the Houtman Abrolhos.
Soft plumage petrel	*Pterodroma mollis*	Foraging - seas north to 21º30’S	In WA found in seas north to 21º30’S.
Sooty tern	Onychoprion fuscata (previously *Sterna fuscata)*	Foraging – Timor Sea	Timor Sea S to 14º30, off northwest coast from Lacepede I SW to 117ºE including Abrolhos, Fisherman & Lancelin Is, accidental on lower west coast to Hamelin Bay. Breeding visitor (late Aug - early May) Abrolhos & Lancelin Is; casual winter (Nov - Apr) to Fisherman
Wedge-tailed shearwater	*Ardenna pacifica*	Breeding, foraging – west coast from Ashmore Reef to Carnac I. Kimberley, Pilbara, Gascoyne coasts, Ashmore reef	Breeding (in hundreds of thousands) off west coast from Ashmore Reef (12º15’S) to Carnac Island (32º07’S), and ranging in western seas between 12º00’S and 33º20’S. Kimberley, Pilbara and Gascoyne coasts and islands including Ashmore Reef
White-faced storm petrel	*Pelagodroma marina*	Foraging (in high numbers) - Offshore areas of the south-west marine region and into the adjacent south-east marine region and the north-west marine region to north of Shark Bay	Offshore areas of the south-west marine region and into the adjacent south-east marine region and the north-west marine region to north of Shark Bay

Species	Scientific name	Aggregation area and use	Specific geographic locations for species
White-tailed tropic bird	*Phaethon lepturus*	Breeding, foraging - Kimberley, Pilbara and Gascoyne coasts and islands including Ashmore Reef	Kimberley, Pilbara and Gascoyne coasts and islands including Ashmore Reef

9. Protected Areas

A number of areas in the EMBA are protected under state and federal legislation. Protected areas include World Heritage Areas, Wetlands of International Importance (Ramsar), Wetlands of National Importance, National and Commonwealth Heritage Places, and terrestrial conservation reserves (National Parks, Nature Reserves and Conservation Parks) that bound marine waters. These areas are listed in Table 17, and shown in Figure 16 and Figure 17 and discussed below. Other protected areas include Key Ecological Features (discussed in Section 10) and State and Commonwealth Marine Parks/Reserves (discussed in Section 11 and Section 12). A Protected Matters search of the EMBA (Appendix C of the VGCN-VGA-4HGI ST1 Well Decommissioning EP)identified several protected areas which were deemed to be irrelevant to Santos' petroleum activities due to their terrestrial location.

Table 17: Summary of protected areas in waters within the EMBA

Area type	Title
World Heritage Area	Shark Bay
	The Ningaloo Coast
	Murujuga Cultural Landscape
Wetland of International Importance (Ramsar)	Eighty Mile Beach
	Roebuck Bay
	Hosnies Spring
	The Dales
Wetlands of National Importance	Mermaid Reef
	"The Dales", Christmas Island
	Eighty Mile Beach System
	Exmouth Gulf East
	Hosnies Spring, Christmas Island
	Lake Macleod
	Learmonth Air Weapons Range – Saline Coastal Flats
	Leslie (Port Hedland) Saltfields System
	Roebuck Bay
	Shark Bay East
	Cape Range Subterranean Waterways
National Heritage Place	Batavia Shipwreck Site and Survivor Camps Area 1629- Houtman Abrolhos (Historic)
	Dampier Archipelago (including Burrup Peninsula) (Indigenous)
	The West Kimberley (Natural)
	The Ningaloo Coast (Natural)
	Shark Bay (Natural)
Commonwealth Heritage Place	Ningaloo Marine Area - Commonwealth Waters
	Learmonth Air Weapons Range Facility

Area type	Title
Terrestrial Conservation Reserves e.g. national parks, nature reserves, and conservation parks.	Numerous bounding marine waters – refer to Section 9.6.

9.1. World Heritage Areas

There are three World Heritage Areas (WHA) located in marine waters off WA: the Ningaloo Coast, Shark Bay and the Murujuga Cultural Landscape.

9.1.1. Shark Bay

Shark Bay was included on the World Heritage List in 1991 and is one of the few properties inscribed for all four outstanding natural universal values:

- An outstanding example representing the major stages in the earth's evolutionary history
- An outstanding example representing significant ongoing ecological and biological processes
- An example of superlative natural phenomena
- Containing important and significant habitats for in situ conservation of biological diversity.

Since 1997, an agreement established the joint management of the Shark Bay WHA by the Australian Commonwealth government and the Western Australian state government, with the operational responsibility by the Western Australian agencies (DEWHA 2008a). This agreement also created a Community Consultative Committee and a Scientific Advisory Committee, both of which provide advice as required. The entire WHA encompasses islands and peninsulas, with an area of approximately 2.2 million ha (70 % of which is marine waters), and includes the following areas (UNESCO 2020):

- Hamelin Pool Marine Nature Reserve
- Francois Peron National Park
- Shell Beach Conservation Park
- Monkey Mia Reserve
- Monkey Mia Conservation Park
- Zuytdorp Nature Reserve
- Bernier, Dorre and Koks Islands Nature Reserves
- Dirk Hartog Island National Park
- Various pastoral leases.

The marine environment of the Shark Bay World Heritage Area is protected as a State Marine Reserve and is discussed further in Section 11.

9.1.2. The Ningaloo Coast

The Ningaloo Coast was included on the World Heritage List in 2011 and was inscribed for outstanding natural universal values as follows:

- An example of superlative natural phenomena and areas of exceptional natural beauty and aesthetic importance

- outstanding examples representing major stages of Earth's history, including the record of life, significant on-going geological processes in the development of landforms, or significant geomorphic or physiographic features.
- the most important and significant natural habitats for in situ conservation of biological diversity, including those containing threatened species of outstanding universal value from the point of view of science or conservation.

The Ningaloo Coast WHA includes (DEWHA 2010b):

- Ningaloo Marine Park (Commonwealth waters)
- Ningaloo Marine Park (Western Australia state waters)
- Muiron Island Marine Management Area (including the Muiron Islands)
- Jurabi Coastal Park
- Bundegi Coastal Park
- Cape Range National Park
- Learmonth Air Weapons Range.

The Ningaloo Coast World Heritage Area (including the Muiron Islands) is managed under a plan that is consistent with the World Heritage Convention and Australia's World Heritage management principles. World Heritage Management principles are set out in regulations and cover matters relevant to the preparation of management plans, the environmental assessment of actions that may affect the property and community consultation processes.

The Australian World Heritage management principles are outlined under Schedule 5 of the EPBC regulations (2000). The objective is to ensure that any likely impact of an action on the World Heritage values of the property should be considered. Any action should be consistent with the protection, conservation, presentation or transmission to future generations of the World Heritage values of the property.

The marine environment of the Ningaloo Coast World Heritage Area is protected as a State Marine Park, a Commonwealth Marine Park, and is discussed further in **Section 11** and **Section 12**, respectively.

9.1.3. Murujuga Cultural Landscape

The Murujuga Cultural Landscape was included on the World Heritage List in 2025 and is described as an outstanding example of a continuing cultural landscape.

Murujuga Cultural Landscape is situated in the Pilbara region of Western Australia and holds deep cultural importance for First Nations communities. Traditionally the homeland of the Yaburara people, Murujuga is now cared for by five language groups: Yaburara, Ngarluma, Yindjibarndi, Mardudhunera, and Wong-Goo-Tt-Oo. These groups collectively identify as Ngarda-Ngarli, the Traditional Owners and Custodians of the area.

Murujuga spans approximately 100,000 hectares, comprising 42 islands, islets, and rocky formations ranging in size from 2 to 3,290 hectares. It is renowned for its extraordinary concentration of petroglyphs—rock carvings estimated to number between 1 and 2 million, making it one of the most significant sites of its kind globally.

These petroglyphs serve as a visual archive of over 50,000 years of cultural expression. They depict:

- social and life sustaining activities
- ceremonies and rituals
- animals and plants
- complex spiritual beliefs and social systems.

The petroglyphs also represent:

- movement of ancestral creation spirits
- interaction between generations of ancestors and the landscape
- the connection between First Nations People and their history, identity and sacred beliefs.

The Murujuga Cultural Landscape, otherwise known as the Dampier Archipelago, is also included on the National Heritage List.

9.2. Wetlands of International Importance (Ramsar)

There are four wetlands of international importance (Ramsar wetlands) in the EMBA, further discussed below.

9.2.1. Eighty Mile Beach

The Eighty Mile Beach Ramsar site comprises a 220 km beach between Port Hedland and Broome with extensive intertidal mudflats and Mandora Salt Marsh, located 40 km east (Hale & Butcher 2009) totalling 175,487 ha. Eighty Mile Beach is characterised by extensive mudflats supporting an abundance of macroinvertebrates which provide food for large numbers of shorebirds.

Eighty Mile Beach is one of the most important sites for migratory shorebirds in the East Asian Australasian Flyway, with 42 migratory shorebird species recorded at this location. It is estimated that 500,000 shorebirds use Eighty Mile Beach as a migration terminus annually (Hale and Butcher 2009), and more than 472,000 migratory waders have been counted on the mudflats during the September to November period. The location of Eighty Mile Beach makes it a primary staging area for many migratory shorebirds on their way to and from Alaska and eastern Siberia (Hale & Butcher 2009). Although many birds move further on their journey, others remain at the site for the non-breeding period.

Eighty-mile Beach supports more than one per cent of the flyway population (or one per cent of the Australian population for resident species) of 21 waterbirds, including 17 migratory species and four Australian residents. It is one of the most important sites in the world for the migration of Great Knot.

Eighty Mile Beach also supports a high diversity and abundance of wetland birds. A total of 97 wetland bird species have been recorded within the beach portion of the Ramsar site (Hale & Butcher 2009). This includes 42 species that are listed under international migratory agreements CAMBA (38), JAMBA (38) and ROKAMBA (32) as well as an additional 22 Australian species that are listed under the EPBC Act. In addition, there is a single record for Nordmann's Greenshank (*Tringa guttifer*) from the beach, which is listed as endangered under the IUCN Red List (IUCN 2019).

The Mandora Salt Marsh area contains an important and rare group of wetlands (Lake Walyarta and East Lake), including raised peat bogs, a series of small permanent mound springs and the most inland occurrence of mangroves in WA (Hale & Butcher 2009). A small number of tidal creeks dissect the beach, including Salt Creek which is fed partly from groundwater and has permanent surface water. The Mandora Salt Marsh lakes fill predominantly from rainfall and runoff in the wet season then dry back to clay beds. The mound springs likely come from water deep within the Broome sandstone aquifer rising through fractures in the rock and resulting in permanent mostly freshwater surface water. Flatback turtles (*Natator depressus*), listed as vulnerable under the EPBC Act, regularly nest at scattered locations along Eighty Mile Beach.

Eighty Mile Beach is used for beach-based recreation, including four-wheel driving, motorcycling, fishing and shell collecting. Mandora Salt Marsh is mainly used for cattle grazing. The site is traditionally part of Karajarri Country in the north, Nyangumarta Country in the south and Ngarla Country in the southern end of Eighty Mile Beach. The site has artefacts such as middens, pinka (large baler shells used to scoop and carry water for drinking), wilura (used for sharpening spear heads), axes, and flakes, and kurtanyanu and jungari (grinding stones). The Ramsar wetland is managed under the Eighty Mile Beach Marine Park Management Plan 2014-2024 (DPAW, 2014).

9.2.2. Roebuck Bay

The Roebuck Bay Ramsar site is located at Roebuck Bay near Broome in northern WA totalling 34,119 ha. Roebuck Bay has a large tidal range which exposes around 160 km^2 of mudflat, covering most of the Ramsar site (DoE 2014c). Waters more than 6 m deep at low tide are excluded from the site (Bennelongia 2009). The eastern edge of the site is made up of microscale linear tidal creeks (DoE 2014c).

The intertidal mud and sand flats support a high abundance of bottom dwelling invertebrates (between 300—500 benthic invertebrate species), which are a key food source for waterbirds (Bennelongia 2009). The site is one of the most important migration stop-over areas for shorebirds in Australia and globally. For many shorebirds, Roebuck Bay is the first Australian landfall they reach on the East Asian Australasian Flyway. The total numbers of waders using the site each year is estimated at over 300,000 (DoE 2014c). The northern beaches and Bush Point provide important high tide roost sites.

The site receives tidal seawater as well as fresh surface and groundwater, and the balance between the two influences the residual groundwater salinity and the distribution of plants and animals (DoE 2014c). Mangrove swamps line the eastern and southern edges of the site and extend up into the linear tidal creeks (DoE 2014c). They are important nursery areas for marine fishes and crustaceans, particularly prawns.

Extensive seagrass beds occur in the bay, providing an important feeding ground for dugongs and loggerhead and green turtles (Bennelongia 2009). Flatback turtles nest in small numbers, while marine fish (including sawfish) regularly breed in the tidal creeks and mangroves. Dolphins also regularly use the site (DoE 2014c).

The site is used for recreational or tourism activities such as fishing, crabbing, sightseeing and bird watching. Broome Bird Observatory, a small reserve at the northern end of the site, engages in shorebird research and public education.

Roebuck Bay lies in the traditional estate of Indigenous people belonging to both Jukun and Yawuru groups. The site was an important area for seasonal meetings, exchanging gifts, arranging marriages and settling disputes. Numerous shellfish middens, marking former camping places, can still be seen along coastal cliffs and dunes. Indigenous people continue to make extensive use of Roebuck Bay's natural resources for activities such as gathering shellfish, fishing and hunting. The Ramsar wetland is currently managed under the Preliminary Draft Roebuck Bay Ramsar Site Management Plan (RBWG, 2010).

9.2.3. Hosnies Spring

The Hosnies Spring Ramsar site is located on Christmas Island and is a small area of shallow freshwater streams and seepages, 20–45 metres above sea-level on the shore terrace of the east coast of the island covering an area of approximately 199 ha. The site includes surrounding terrestrial areas with rainforest grading to coastal scrub and includes an area of shoreline and coral reef (DoEE 2019).

The Hosnies Spring Ramsar site supports a unique wetland of Christmas Island with the mangrove forest present at the site unique within the bioregion and possibly worldwide. The two species of mangroves that make up the stand, which normally grow intertidally, grow to a height of 24–37 m above sea level that have been estimated to have persisted for 120,000 years. Additionally, the site is important to blue crabs which rely on the freshwater provided by the spring and as a likely migratory route for the endemic red crab during breeding migrations (DoEE 2019). The Ramsar site is managed under the Christmas Island National Park Management Plan (DNP, 2002).

9.2.4. The Dales

The Dales Ramsar site is located on Christmas Island and is comprised of a near-pristine system of seven watercourses collectively known as The Dales and covers an area of 585 ha. The Dales includes permanent and perennial streams, permanent springs, and include the majority of surface water on the Island. Most rainfall on Christmas Island filters down through the soil and limestone, and surface runoff only occurs after heavy rain. The Dales contain numerous wetland types including surface and karst features, and inland and coastal wetlands (DoEE 2019a).

The Dales support a number of unique ecological and geomorphic features including anchialine cave communities, surface karst including the unique stepped tufa deposits at Hugh's waterfall, a stand of Tahitian chestnuts, a large number of endemic terrestrial species and a significant number of seabirds including Abbott's booby, red-footed booby and the brown booby, all of which breed at the site, and provide essential habitat for the Christmas Island frigatebird (DoEE 2019a). This Ramsar site is also managed under the Christmas Island National Park Management Plan (DNP, 2002).

9.3. Wetlands of National Importance

There are fourteen wetlands of national importance in the EMBA, further discussed below.

9.3.1. Mermaid Reef

See the Mermaid Reef Marine Park (**Section 12**).

9.3.2. “The Dales”, Christmas Island

See The Dales Ramsar site (Section 9.2.4).

9.3.3. Eighty Mile Beach System

See Eighty Mile Beach Ramsar site (Section 9.2.1).

9.3.4. Exmouth Gulf East

The Exmouth Gulf East wetlands are located in the eastern section of Exmouth Gulf from Giralia Bay to Urala Creek Locker Point. The wetland comprises of numerous tidal creeks, indentations and islands of dry land, mudflats, saline coastal flats and extensive mangroves (DAWE 2020a).

The site is one of the major population centres for dugongs in WA and its seagrass beds and extensive mangroves provide nursery and feeding areas for marine fishes and crustaceans in the Gulf. In addition, there are at least 29 species of birds which utilise the wetland, including 16 migratory shorebirds and several terns (DAWE 2020a).

9.3.5. Hosnies Spring, Christmas Island

See Hosnie's Spring Ramsar site (Section 9.2.3).

9.3.6. Lake Macleod

The Lake Macleod wetland (150,000 ha) is located in the Carnarvon bioregion and includes distinct "inner wetlands" (sinkholes, channels, lakes, marshes) in the west and "floodout marshes" at river mouths in the north-east. The wetland also includes a lakebed that is infrequently inundated. The lake lies parallel to the Indian Ocean, north of the Gascoyne River and located 30 km away from Shark Bay East wetland (DAWE 2020c).

The Lake Macleod is a major migration stop-over and drought refuge area for shorebirds; it is one of the most important non-tidal stop-over sites in Australia. It also supports Australia's largest inland community of mangroves and associated fauna. Fifty-eight species have been identified within the wetland with 29 being shorebirds and eight gulls and terns, with seven species found breeding (DAWE 2020c).

9.3.7. Learmonth Air Weapons Range – Saline Coastal Flats

The Learmonth Air Weapons Range – Saline Coastal Flats wetland (300 ha) represents typical saline coastal flats subject to inundation and ponding. The vegetation typically has a low species richness, but its floristic composition and structure is highly distinctive and supports habitat specific fauna (DAWE 2020e).

Species composition of the wetland has little information however it is likely to possess a relatively diverse community (DAWE 2020e).

9.3.8. Leslie (Port Hedland) Saltfields System

The Leslie (Port Hedland) Saltfields System (13,000 ha) comprises a large saltfield, fringing coastal flats, tidal creeks and mudflats between the saltfields and the Indian Ocean.

The wetland is likely a major migration stop-over area for shorebirds in the East Asia-Australasia Flyway. It is possibly the most important stop-over site in the Flyway for the broad-billed sandpiper (*Limicola falcinellus*) and an important site for oriental plover (*Charadrius veredus*). It is also likely to be the most important site in Australia for Asian dowitcher (*Limnodromus semipalmatus*) and red-necked phalarope (*Phalaropus lobatus*) (DAWE 2020f).

9.3.9. Roebuck Bay

See Roebuck Bay Ramsar site (Section 9.2.2).

9.3.10. Shark Bay East

The Shark Bay East wetland site extends along 250 km of coastline in the east arm of Shark Bay, from the mouth of the Gascoyne River (Carnarvon) south to latitude 26 S. The site comprises tidal wetlands and marine waters that are less than 6 m deep at low tide (up to approximately 10 km from shore). The wetland is a large, shallow marine embayment that support extensive seagrass beds and substantial areas of intertidal mud/sand-flats and mangrove swamp (DAWE 2020i).

The mangroves, algae and seagrasses present at the side are important for both dugongs and green turtles. A total of 69 species have been identified within the wetland including the threatened little tern (*Sterna albifrons*) and 33 shorebirds. A total of six species have been identified to be breeding within the wetland (Australian pelican, great egret, little egret, unidentified cormorants and striated herons). The site is also a stop-over for 24 species of migratory shorebirds (DAWE 2020i).

9.3.11. Cape Range Subterranean Waterways

The Cape Range Subterranean Waterways wetland site comprises of the subterranean waterways, sinkholes, general groundwater and artificial wells of the coastal plain and foothills of Cape Range north of a line between Norwegian Bay, at the foot of the peninsula on the west coast, and the Bay of Rest in Exmouth Gulf (DAWE 2020l).

The site is one of the only examples of subterranean karst wetland system (apart from Barrow Island) in arid north-western Australia. Two threatened species have been identified within the wetland and include the blind cave eel and the blind gudgeon (DAWE 2020l).

9.4. National Heritage Places

Natural, historic and indigenous places that are of outstanding heritage value to the Australian nation are recorded as National Heritage Places. Five National Heritage Places are found in WA waters.

9.4.1. Batavia Shipwreck site and Survivor Camps Area 1629 - Houtman Abrolhos

The Batavia was included on the National Heritage List in 2006. This shipwreck is the oldest of the known Verenigde Oost-Indische Compagnie (VOC) wrecks on the WA coast and has a unique place in Australian shipwrecks. Because of its relatively undisturbed nature the archaeological investigation of the wreck itself has revealed a range of objects of considerable value to the artefact specialist and historian. The recovered sections of the hull of the Batavia that have been reconstructed in the Western Australian Maritime Museum and provides information on 17th century Dutch ship building techniques, while the remains of the cargo carried by the vessel have provided economic, and social evidence of the operation of the Dutch port at Batavia (now Jakarta) in the early 17th century (DoE 2014d).

9.4.2. The West Kimberley

The West Kimberley was included on the National Heritage List in 2011 and has numerous values which contribute to the significance of the property, including indigenous, historic, aesthetic, cultural and natural heritage values (DoE 2014d). Of these values, the most relevant to the marine environment is Roebuck Bay as a migratory hub for shorebirds. These values are discussed in Section 9.2.2. The area is characterised by a diversity of landscapes and biological richness found in its cliffs, headlands, sandy beaches, rivers, waterfalls and islands.

9.4.3. The Ningaloo Coast

See the Ningaloo Coast World Heritage Area (Section 9.1.2).

9.4.4. Shark Bay

See Shark Bay World Heritage Area (Section 9.1.1).

9.4.5. Dampier Archipelago (including Burrup Peninsula)

The Dampier Archipelago (including the Burrup Peninsula) contains one of the densest concentrations of rock engravings in Australia, with some sites containing thousands or tens of thousands of images. At a national level it has an exceptionally diverse and dynamic range of schematised human figures and provides an unusual and outstanding visual record of the Aboriginal responses to the rise of sea levels at the end of the last Ice Age (DoEE 2019c).

The site is about 36,860 ha at Dampier and comprises of nine distinct areas of the Burrup Peninsula Areas and part of the following surrounding islands: West Intercourse Island, West Mid Intercourse Island, Enderby Island, Goodwin Island, West Lewis Island and East Lewis Island, Rosemary Island, Brigadier Island, Miller Rocks, Lady

Nora Island and Elphick Nob, Malus Islands, Angel Island, Gidley Island, Cohen Island, Keast Island and Collier Rocks, Tozer Island, Dolphin Island, and Unnamed Island (DoEE 2019c).

9.5. Commonwealth Heritage Places

The Commonwealth Heritage Places List comprises natural, indigenous and historic heritage places which are either entirely within a Commonwealth area, or outside the Australian jurisdiction and owned or leased by the Commonwealth or a Commonwealth Authority. Two Commonwealth Heritage Places are found in or adjacent to the EMBA.

9.5.1. Ningaloo Marine Area – Commonwealth Waters

See the Ningaloo Coast World Heritage Area (Section 9.1.2).

9.5.2. Learmonth Air Weapons Range Facility

The Learmonth Air Weapons Range Facility is located 30 km south west of Learmonth within Cape Range and Adjacent Coastal Plain, which is listed on the Register of the National Estate. As the Learmonth Air Weapons Range Facility is located within Cape Range it is of considerable importance of showing the sea level and landform changes for the past 1.8 million years (DoEE 2019h).

The area is important to a number of cave fauna of Cape Range and is considered of exceptional biogeographical importance. It hosts a high number of endemic aquatic stygofauna with ecosystems found within this area are considered rare within Western Australia and are considered to be of considerable scientific interest. The area also supports several species of terrestrial fauna that are isolated populations, populations at the extent of their range and a number of fauna and flora species that are endemic to southern WA and restricted to sandy coastal habitats along the western coast (DoEE 2019h).

9.6. Coastal Terrestrial Conservations Reserves – bound by marine waters

Conservation reserves are created under the Land Administration Act 1997, and once reserved and set aside for conservation purposes are regulated under the *Conservation and Land Management Act (CALM) 1984*. Most conservation reserves in WA are vested in (owned) by the WA Conservation and Parks Commission, an independent statutory body established by the CALM Act 1984, and most are managed by the Department of Biodiversity, Conservation and Attractions – Parks and Wildlife Service.

In WA there are three main types of terrestrial conservation reserves with legislative protection:

- Nature reserves – established for wildlife and landscape conservation; scientific study; and preservation of features of archaeological, historic or scientific interest.
- National parks – as above but also to be used for enjoyment by the public. Have national or international significance.
- Conservation parks – as above but have local or regional significance.

Nature reserves can have an extra classification applied to them and become ‘A class’ reserves, which generally require an Act of Parliament to alter.

There are numerous terrestrial conservation reserves located adjacent to the coast in the EMBA. The oceanward boundary of the reserves varies. In some cases, the reserves extend to the low water mark, i.e. including the inter-tidal zone (particularly applicable to older gazetted reserves and terrestrial reserves not surrounded by a marine reserve). While in other cases, the terrestrial reserves extend to the high-water mark e.g. Lowendal Islands Nature Reserve (particularly applicable to terrestrial reserves adjacent to more recently gazetted marine parks). In other cases, the seaward boundary of the reserves is not defined. Management plans also contain the caveat for further consideration of the most appropriate tenure for intertidal areas and management arrangements.

Further information on coastal terrestrial reserves is provided below in Section 9.6.1 (national parks) and Section 9.6.2 (nature reserves and conservations parks).

9.6.1. Coastal National Parks

Protected coastal national parks managed under the CALM Act 1984 in the EMBA are listed in Table 18. The table also includes: any applicable management plan; whether the park includes the inter-tidal area; and the name of any adjacent state marine reserve. All WA National Parks are WA Class A reserves and IUCN Class 2.

Table 18: Coastal National Parks – coastal boundary in relation to inter-tidal zone

National Park	IBRA bioregion[6]	Management plan	Includes inter-tidal zone	Adjacent Marine Management Park (see Section 11)
Reserves of North-West WA				
Murujuga	Pilbara	Murujuga National Park management plan 78 (DEC 2013)	Yes [7]	-
Cape Range	Carnarvon	Cape Range National Park Management Plan (DEC 2010a)	No	Ningaloo Marine Park
Nyinggulara	Carnarvon	Nyinggulu (Ningaloo) Coastal Reserves Joint Management Plan (DBCA 2022b)	No	Ningaloo Marine Park
Reserves of Southern WA –				
Dirk Hartog	Yalgoo	Shark Bay Terrestrial Reserves and Proposed Reserve Additions Management Plan (2012)	Yes – intertidal zone on western side of Dirk Hartog is included (as no marine park on western side of island)	Shark Bay Marine Park and Hamelin Pool Marine Nature Reserve
Houtman Abrolhos Islands	Geraldton Sandplains	Houtman Abrolhos Islands National Park Management Plan 97 2022 (DBCA 2022)	No - extends to the high-water mark only.	Abrolhos Commonwealth Marine Park

9.6.2. Coastal Nature Reserves and Conservation Parks

Protected coastal nature reserves and conservation parks managed under the CALM Act 1984 in the EMBA are listed in Table 19. The table also includes reserve class; IUCN classification; any applicable management plan; whether the reserve includes the inter-tidal area; and the name of any adjacent state marine reserve (may also describe inter-tidal areas values).

The CALM Act does not require management plans to be in place for conservation reserves at all times, instead they are required to be made as is reasonably practicable regarding resources. This means some conservation reserves do not have a management plan, or do not have a recent management plan.

[6] IBRA classifies Australia's landscapes into large geographically distinct bioregions based on common climate, geology, landform, native vegetation and species information (DoEE 2012).

Table 19: Nature Reserves (NR), Conservation Parks (CP), Regional Parks (RP) and Coastal Reserves (CR) in the EMBA

Reserve name and type	Reserve class	IUCN	Management Plan	Includes inter-tidal zone	Adjacent Marine Park (see Section 11)
Reserves of northern WA					
Browse Island NR	A	1a	-	Yes [7]	-
Scott Reef NR	-	1a	-	Yes [7]	-
Coulomb Point NR	A	1a	-	Yes [7]	-
Jinmarnkur CP	C	-	Parks and reserves of the south-west Kimberley and north-west Pilbara Joint Management Plan (DBCA 2019b). *Covers 80 Mile Beach coastal reserves*	No	Eighty Mile Beach Marine Park
Jinmarnkur Kulja NR	A	-			
Kujungurru Warrarn NR	A	1a			
Kujungurru Warrarn CP	C	-			
Unnamed	A	-			
Jarrkunpungu NR	A				
Bedout Island NR	A	1a	-	Yes [7]	-
North Turtle Island NR	A	1a	-	Yes [7]	-
Reserves of north-west WA					
Unnamed (Dampier Archipelago) NR	A	1a	Dampier Archipelago Management Plan (CALM 1990). *Covers 25 of the islands*	Yes	-
Swan Island NR	A	1a	-	Yes[7]	Kimberly Marine Park
Unnamed NR		1a	-	Yes [7]	-
North Sandy Island NR	A	1a	-	Yes [7]	-
Montebello Islands CP	A	2	-	Partially [8]	Montebello Islands Marine Park
Lowendal Island NR		1a	-	No	Barrow Island Marine Management Area and Marine Park. Lowendal Island NR only partially bounded
Barrow Island NR	A	1a	Barrow Island Group Nature Reserves (DPAW 2015)	Yes	
Boodie, Double and Middle Islands NR	-	1a		Yes	
Great Sandy Island NR	B	1a	-	Yes	Barrow Island Marine Management Area
Weld Island NR	-	1a	-	Yes [7]	-
Little Rocky Island NR	A	1a	-	Yes [7]	-
Airlie Island NR	-	1a	-	Yes [7]	-
Thevenard Island Nature	-	1a	-	Yes [7]	-
Bessieres Island NR	A	1a	-	Yes [7]	-
Serrurier Island NR	-	1a	-	Yes [7]	-
Round Island NR	-	1a	-	Yes [7]	-
Locker Island NR	A	1a	-	Yes [7]	-
Rocky Island NR	-	1a	-	Yes [7]	-
Gnandaroo Island NR	A	1a	-	Yes [7]	-
Victor Island NR	-	1a	-	Yes [7]	-
Y Island NR	-	1a	-	Yes [7]	-
Tent Island NR	-	1a	-	Yes [7]	-
Burnside and Simpson Island NR	-	1a	-	Yes [7]	-
Whalebone Island NR		1a	-	Yes [7]	-
Whitmore, Roberts, Doole Islands & Sandalwood Landing NR	-	1a	-	Yes [7]	-

[7] Conservatively inferred as no adjacent Marine Park.
[8] Reserve R42197 includes the inter-tidal zone and reserve R42196 does not.

Reserve name and type	Reserve class	IUCN	Management Plan	Includes inter-tidal zone	Adjacent Marine Park (see Section 11)
Muiron Islands NR	-	1a	Jarabi and Bundegi Coastal Parks and Muiron Islands (CALM 1999)	No	Muiron Islands Marine Management Area
Nyinggulu CR	-	-	Nyinggulu (Ningaloo) Coastal Reserves Joint Management Plan (DBCA 2022b)	No	Ningaloo Marine Park
One Tree Point NR	A	1a	-	Yes [7]	
Reserves of southern WA					
Koks Island NR	A	1a	Shark Bay Terrestrial Reserves and Proposed Reserve Additions Management Plan (DPAW 2012)	Yes [7]	-
Bernier and Dorre Islands NR	A	4			
Freycinet, Double Islands etc. NR	A	1a			Shark Bay Marine Park

Lowendal Islands Nature Reserve - Varanus Island

Varanus Island is part of the Lowendal Islands group, a Nature Reserve (Class C). The Lowendal Islands comprise more than 40 limestone islands, islets and rocky stacks. There is not currently a DBCA Management Plan covering the Lowendal Islands Nature Reserve. Varanus Island is the largest island in the Lowendal Islands and is approximately 2.5 km long and 600m wide at its widest point. Its highest point is approximately 30m above sea level.

Described ecological conservation values of marine relevance include: wedge-tailed shearwater nesting (see **Section 8.2.2**); loggerhead and hawksbill turtle nesting (see Section 6.1.1 and Section 6.1.3), flatback turtle nesting (Section 6.1.4). The Lowendal Islands are described as particularly important for tern breeding (DEC 2002), further information on terns is provided in Section 8.2.2.10.

Airlie Island Nature Reserve

Airlie Island Nature Reserve is an ungazetted 'C' class nature (Reserve identifier: 40323, Crown Lease 1901/100) located on Airlie Island. Airlie Island is a small sand cay (26 ha) located 35 km NNE of Onslow. It is part of the Pilbara Inshore Islands chain. A management plan for the nature reserves of the Pilbara Inshore Islands is currently under development (DBCA 2019) i.e. there is not currently a DBCA Management Plan covering Airlie Island Nature Reserve.

9.7. Threatened Ecological Communities

An ecological community is a naturally occurring group of plants, animals and other organisms interacting in a unique habitat. Ecological communities are listed under the EPBC Act as threatened if the community is at risk of extinction.

No TECs were identified within the EMBA.

10. Key Ecological Features

10.1. Introduction

Key ecological features (KEFs) are elements of the Commonwealth marine environment that are considered to be of regional importance for either a region's biodiversity or its ecosystem function and integrity. KEFs meet one or more of the following criteria (DSEWPaC 2012a):

- A species, group of species or a community with a regionally important ecological role
- A species, group of species or a community that is nationally or regionally important for biodiversity
- An area or habitat that is nationally or regionally important for:
  - Enhanced or high biological productivity
  - Aggregations of marine life; or
  - Biodiversity and/or endemism
- A unique sea floor feature with ecological properties of regional significance.

Thirteen key ecological features of the Commonwealth waters in the EMBA have been identified in the protected matters search and are discussed in this section (Figure 15). Sections 1 and 2 provide an overview of the geomorphology and oceanography of the Indian Ocean.

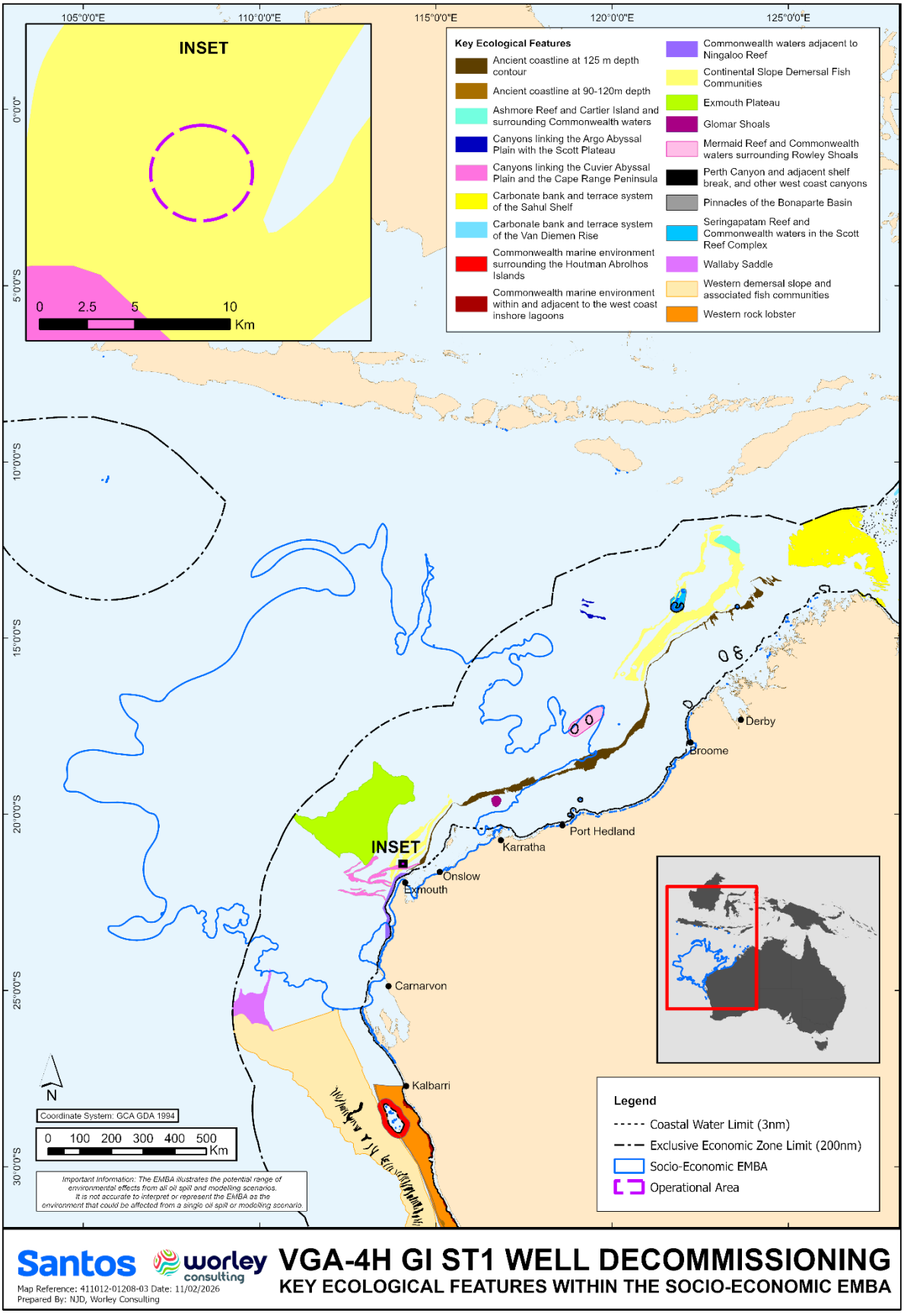


Figure 15: Key ecological features in the EMBA

10.1.1. Commonwealth Marine Environment Surrounding the Houtman Abrolhos Islands (and Adjacent Shelf Break)

The Commonwealth marine environment surrounding the Houtman Abrolhos Islands (and adjacent shelf break) is defined as a KEF for its high levels of biodiversity and endemism in benthic and pelagic habitats. The Houtman Abrolhos Islands and surrounding reefs support a unique mix of temperate and tropical species, resulting from the southward transport of species by the Leeuwin Current over thousands of years. The reefs are composed of 184 known species of corals that support about 400 known species of demersal fish, 492 known species of molluscs, 110 known species of sponges, 172 known species of echinoderms and 234 known species of benthic algae (DEWHA 2008b). The Houtman Abrolhos Islands are the largest seabird breeding station in the eastern Indian Ocean (DSEWPaC 2012a). They support more than one million pairs of breeding seabirds. The Houtman Abrolhos Islands and surround waters are also BIAs for Australian sea lions for foraging and breeding (DEWHA 2010b).

This KEF is located partially within the EMBA.

10.1.2. Commonwealth Marine Environment within and adjacent to the West-Coast Inshore Lagoons

This key ecological feature is composed by a chain of inshore lagoons of limestone reef (as deep as 30 m) extending along the Western Australian coast from south of Mandurah to Kalbarri. The mix of sheltered and exposed seabeds form a complex mosaic of habitats. The lagoons are dominated by seagrass and epiphytic algae (Dambacher et al. 2009). Although macroalgae (principally Ecklonia spp.) and seagrass appear to be the primary source of production, scientists suggest that groundwater enrichment may supplement the supply of nutrients to the lagoons. The lagoons are associated with high biodiversity and endemism, containing a mix of tropical, subtropical and temperate flora and fauna.

The inshore lagoons are important areas for the recruitment of the commercially and recreationally important western rock lobster, dhufish, pink snapper, breaksea cod, baldchin and blue gropers, abalone and many other reef species. The area includes breeding and nursery aggregations for many temperate and tropical marine species (Goldberg & Collings 2006 in McClatchie et al. 2006). Extensive schools of migratory fish visit the area annually, including herring, garfish, tailor and Australian salmon.

This KEF is located partially within the EMBA.

10.1.3. Western Demersal Slope and associated Fish Communities

The Western Demersal Slope and associated Fish Communities, also known as the Demersal Slope and associated Fish Communities of the Central Western Province, is defined as a key ecological community for its high levels of biodiversity and endemism. It is located on the edge of the shelf to the limit of the exclusive economic zone from Perth to the northern boundary of the SWMR. The western demersal slope provides important habitat for demersal fish communities, with a high level of diversity and endemism. A diverse assemblage of demersal fish species below a depth of 400 m is dominated by relatively small benthic species such as grenadiers, dogfish and cucumber fish. Unlike other slope fish communities in Australia, many of these species display unique physical adaptations to feed on the sea floor (such as a mouth position adapted to bottom feeding), and many do not appear to migrate vertically in their daily feeding habits (DSEWPaC 2012a, Williams et al. 2001). A total of 480 fish species have been described that inhabit the slope of this bioregion with 31 considered to be endemic to the bioregion (DoEE 2019a). Demersal fish communities within the area have recorded higher diversity when compared to other oceanic regions which have been more intensively sampled. The increased diversity within the area has been attributed to the overlap of ancient and extensive Indo-west Pacific and temperate Australasian fauna (Williams et al. 2001).

This KEF is located wholly within the EMBA.

10.1.4. Western Rock Lobster

The Western Rock Lobster KEF is defined due to its presumed ecological role on the West Coast Continental Shelf. This species is the dominant large benthic invertebrate in the region. The lobster plays an important trophic role in many of the inshore ecosystems of the South-west Marine Region. Western rock lobsters are an important part of the food web on the inner shelf, particularly as juveniles as they are preyed upon by octopus, cuttlefish, baldchin groper, dhufish, pink snapper, wirrah cod and breaksea cod (DEWHA 2008b, DSEWPaC 2012a). The

high biomass of western rock lobsters and their vulnerability to predation suggest that they are an important trophic pathway for a range of inshore species that prey upon juvenile lobsters (DEWHA 2008b).

This KEF is located partially within the EMBA.

10.1.5. Wallaby Saddle

The Wallaby Saddle is defined as a KEF for its high productivity and aggregations of marine life. The Wallaby Saddle is an abyssal geomorphic feature located on the upper continental slope at a depth of 4,000–4,700 m (DSEWPaC 2012a). The feature connects the north-west margin of the Wallaby Plateau with the margin of the Carnarvon Terrace (Falkner et al. 2009 in DSEWPaC 2012a). The Wallaby Saddle is situated within the Indian Ocean water mass and is thus differentiated from systems to the north that are dominated by transitional fronts or the Indonesian Throughflow (DSEWPaC 2012a). Little is known about the Wallaby Saddle; however, the area is considered one of enhanced productivity and low habitat diversity (Brewer et al. 2007). The Wallaby Saddle is associated with historical aggregations of sperm whales (DEWHA 2008c).

This KEF is located partially within the EMBA.

10.1.6. Commonwealth Waters Adjacent to Ningaloo Reef

The Commonwealth Waters adjacent to Ningaloo Reef KEF is defined for high productivity and aggregations of marine life. The Ningaloo Reef extends almost 300 km along the Cape Range Peninsula to the Red Bluff and is globally significant as the only extensive coral reef in the world that fringes the west coast of a continent. Commonwealth waters adjacent to the reef are thought to support the rich aggregations of marine species at Ningaloo Reef through upwellings associated with canyons on the adjacent continental slope and interactions between the Ningaloo and Leeuwin currents (Brewer et al. 2007, DEWHA 2008d, DSEWPaC 2012a). The narrow continental shelf (10 km at its narrowest) means that the nutrients channelled to the surface via canyons are immediately available to reef species. Terrestrial nutrient input is low; hence this deep-water source is a major source of nutrients for Ningaloo Reef and therefore very important in maintaining this system (DEWHA 2008c).

The reef is known to support an extremely abundant array of marine species including over 200 species of coral and more than 460 species of reef fish, as well as molluscs, crustaceans and other reef plants and animals (DEWHA 2008c). Marine turtles, dugongs and dolphins frequently visit the reef lagoon. The Commonwealth waters around Ningaloo include areas of potentially high and unique sponge biodiversity (DEWHA 2008c). Upwellings on the seaward side support aggregations such as whale sharks and manta rays (these waters are the main known aggregation area for whale sharks in Australian waters). Humpback whales are seasonal visitors to the outer reef edge and seasnakes, sharks, large predatory fish and seabirds also utilise the reef and surrounding waters.

This KEF is located wholly within the EMBA.

The Ningaloo Marine Park includes this Key Ecological Feature and is discussed in Section 12.3.4.

10.1.7. Canyons Linking the Cuvier Abyssal Plain with the Cape Range Peninsula

The Canyons linking the Cuvier Abyssal Plain and the Cape Range Peninsula are defined as a KEF as they are unique sea floor features with ecological properties of regional significance.

Cape Range Peninsula and the Cuvier Abyssal Plain are linked by canyons, the largest of which are the Cape Range Canyon and Cloates Canyon. These two canyons are located along the southerly edge of Exmouth Plateau adjacent to Ningaloo Reef and are unique due to their close proximity to the North West Cape (DSEWPaC 2012a). The Leeuwin Current interacts with the heads of the canyons to produce eddies resulting in delivery of higher nutrient, cool waters from the Antarctic intermediate water mass to the shelf (Brewer et al. 2007). Strong internal tides also create upwelling at the canyon heads (Brewer et al. 2007). Thus, the canyons, the Exmouth Plateau and the Commonwealth waters adjacent to Ningaloo Reef interact to create the conditions for enhanced productivity seen in this region (Sleeman et al. 2007 in DSEWPaC 2012a). The canyons are also repositories for particulate matter deposited from the shelf and sides of the canyons and serve as conduits for organic matter between the surface, shelf and abyssal plains (DSEWPaC 2012a).

The soft bottom habitats within the canyons themselves are likely to support important assemblages of epibenthic species. Biological productivity at the head of Cape Range Canyon in particular, is known to support species aggregations, including whale sharks, manta rays, humpback whales, sea snakes, sharks, large predatory fish

and seabirds. The canyons are thought to be significant contributors to the biodiversity of the adjacent Ningaloo Reef, as they channel deep water nutrients up to the reef, stimulating primary productivity (DEWHA 2008c).

This KEF is located wholly within the EMBA.

10.1.8. Exmouth Plateau

The Exmouth Plateau is defined as a KEF as it is a unique sea floor feature with ecological properties of regional significance. The Exmouth Plateau covers an area of 49,310 km^2 and is located approximately 150 km northwest of Exmouth. The plateau ranges in water depths from 800 to 4,000 m (Heap & Harris 2008 in DSEWPaC 2012a). The plateau's surface is rough and undulating at 800–1,000 m depth. The northern margin is steep and intersected by large canyons (e.g. Montebello and Swan canyons) with relief greater than 50 m. The western margin is moderately steep and smooth, and the southern margin is gently sloping and virtually free of canyons (Falkner et al. 2009 in DSEWPaC 2012a).

The Exmouth Plateau is a regionally and nationally unique tropical deep-sea plateau. It that may serve an important ecological role by acting as a topographic obstacle that modifies the flow of deep waters that generate internal tides, causing upwelling of deeper water nutrients closer to the surface (Brewer et al. 2007). Sediments on the plateau suggest that biological communities include scavengers, benthic filter feeders and epifauna. Whaling records from the 19th century suggest that the Exmouth Plateau may have supported large populations of sperm whales (Bannister et al. 2007). Fauna in the pelagic waters above the plateau are likely to include small pelagic species and nekton (Brewer et al. 2007).

This KEF is located wholly within the EMBA.

10.1.9. Mermaid Reef and Commonwealth Waters surrounding Rowley Shoals

Mermaid Reef and Commonwealth waters surrounding Rowley Shoals is defined as a KEF for its enhanced productivity and high species richness. The Rowley Shoals are a group of three atoll reefs—Clerke, Imperieuse and Mermaid reefs—located about 300 km north-west of Broome. Mermaid Reef lies 29 km north of Clerke and Imperieuse reefs and is totally submerged at high tide. Mermaid Reef and Commonwealth Waters surrounding Rowley Shoals are regionally important in supporting high species richness, higher productivity and aggregations of marine life associated with the adjoining reefs themselves (Done et al. 1994). Rowley shoals contain 214 coral species and approximately 530 species of fishes (Gilmour et al. 2007), 264 species of molluscs and 82 species of echinoderms (Done et al. 1994; Gilmour et al. 2007). Both coral communities and fish assemblages differ from similar habitats in eastern Australia (Done et al. 1994).

Mermaid Reef falls under Commonwealth jurisdiction and forms the Mermaid Reef Commonwealth Marine Park. Clerke and Imperieuse reefs constitute the Rowley Shoals Marine Park, which falls under Western Australian Government jurisdiction (EA 2000). The Rowley Shoals are discussed with the Commonwealth and State Marine Park (Sections 11 and 12).

This KEF is located predominantly within the EMBA.

10.1.10. Glomar Shoals

The Glomar Shoals are a submerged feature situated at a depth of 33–77 m, approximately 150 km north of Dampier on the Rowley Shelf (Falkner et al. 2009 in DSEWPaC 2012a). They consist of a high percentage of marine-derived sediments with high carbonate content and gravels of weathered coralline algae and shells (McLoughlin & Young 1985 in DSEWPaC 2012a). The area's higher concentrations of coarse material compared to surrounding areas are indicative of a high energy environment subject to strong sea floor currents (Falkner et al. 2009 in DSEWPaC 2012a).

Biological communities found at the Glomar Shoals have not been comprehensively studied, however the shoals are known to be an important area for a number of commercial and recreational fish species such as rankin cod, brown striped snapper, red emperor, crimson snapper, bream and yellow-spotted triggerfish. Catch rates at the Glomar Shoals are high, indicating that the area is a region of high productivity (Falkner et al. 2009, Fletcher & Santoro 2009 in DSEWPaC 2012a). It is unclear whether the removal of non-target species due to the commercial fishing over the shoals is having an impact on its value (DSEWPaC 2012a).

The Glomar Shoals are regionally important for their potentially high biological diversity and localised productivity. Biological data specific to the Glomar Shoals is limited, however the fish of the shoals are probably a subset of reef-dependent species and anecdotal evidence suggests they are particularly abundant (DSEWPaC 2012a).

This KEF is located wholly within the EMBA.

10.1.11. Ancient Coastline at 125 m Depth Contour

The shelf of the North-west Marine Region contains several terraces and steps which reflect changes in sea level that occurred over the last 100,000 years. The most prominent of these features occurs at a depth of 125 m as an escarpment along the North West Shelf and Sahul Shelf (DSEWPaC 2012a). Where the ancient, submerged coastline provides areas of hard substrate it may contribute to higher biological diversity in areas otherwise dominated by soft sediments. Little detailed knowledge was available at the time of its designation, but it was thought that the hard substrate of the escarpment is likely to support sponges, crinoids, molluscs, echinoderms (DSEWPaC 2012a) and that changes in topography at these depths are critical points for the generation of internal waves (Holloway et al. 2001 cited in DEWHA 2008c), playing a minor role in aiding localised upwelling or at least regional mixing associated with the seasonal changes in currents and winds. It was hypothesised that this prominent floor feature could be important as a migratory pathway for cetaceans and pelagic species such as the whale shark and humpback whale, as they move north and south between feeding and breeding grounds (DEWHA 2008c). Enhanced productivity could potentially be attracting baitfish, which in turn provide food for the migratory species. The pressures of potential concern on the biodiversity value of this feature generally include ocean acidification as a result of climate change (DoEE 2019a).

Currey-Randall et al. (2021) investigated drivers of fish species richness and assemblage composition spanning six degrees of latitude along sections of the ancient coastline, categorised as ‘on’ and ‘off’ the ancient coastline at 125m KEF (AC125) based on depth, across a range of habitats and seafloor complexity (~60–180 m depth). While some surveyed sections of the AC125 had hard bottom substrate and supported enhanced fish diversity, including over half of the total species observed, species richness and abundance overall were not greater on the AC125 than immediately adjacent to the AC125. Instead, depth, seafloor complexity and habitat type explained patterns in richness and abundance, and structured fish assemblages at both local and broad spatial scales. Fewer fishes were associated with deep sites characterized by negligible complexity and soft-bottom habitats, in contrast to shallower depths that featured benthic biota and pockets of complex substrate. Drivers of abundance of common species were species-specific and primarily related to sampling areas, depth and substrate. Fishes of the ancient coastline and adjacent habitats are representative of mesophotic fish communities of the region, included species important to fisheries and conservation, and several species were observed deeper than their currently known distribution.

Wakeford et al. (2023) investigated the bathymetry, sedimentology and benthic habitats at 5 locations across the AC125 using multibeam sonar, sediment samples and towed video imagery. Approximately 98% of the seabed surveyed was comprised of unconsolidated soft sediment habitat (mud/sand/silt) supporting negligible epibenthic biota. The prevalence of soft sediment suggests that post-glacial sediments have infilled parts of the ancient coastline), with cross-shelf, probably tidal currents in the northern section of the study area responsible for some of the sediment mobilisation and southern study areas more influenced by oceanic conditions. Within study areas, total biotic cover ranged from 0.02% to 1.07%. Of the biota encountered, most comprised filter feeder organisms (including gorgonians, sponges, and whip corals) whose distribution was associated with pockets of consolidated hard substrate. Benthic community composition varied with both study area and position in relation to the predicted AC125. In general, consolidated substrate was proportionally higher in water shallower than the AC125 compared to on the AC125 or deeper than the AC125. Spatially continuous maps of predicted benthic habitat classes (pre-determined benthic communities) in each study area were developed to characterise biodiversity. Spatial modelling corroborated depth and large-scale structural complexity of the seafloor as surrogates for predicting likely habitat class. The study provided an important assessment of the AC125 and concluded that if a distinct coastline exists in the areas surveyed, it is now largely buried and as such does not provide a unique hard substrate habitat.

This KEF is located partially within the EMBA.

10.1.12. Continental Slope Demersal Fish Communities

The Australian Continental Slope provides important habitat for demersal fish communities, characterised by high endemism and species diversity. Specifically, the continental slope between North West Cape and the Montebello Trough is the most diverse slope bioregion in Australia with more than 500 fish species, 76 of which are endemic (Last et al. 2005 in DSEWPaC 2012).

The Continental Slope consists of two distinct community types, associated with the upper and mid slope, 225 – 500 m and 750 – 1000 m respectively. The Timor Province and Northwest Transition bioregions are the second-

richest areas for demersal fish across the entire continental slope (DSEWPaC 2012). The bacteria and fauna that is present in the system on the Continental Slope are the basis for the food web for demersal fish and higher order consumers in the system. Further information of this system has been poorly researched, though it has been suggested that it is a detritus-based system, where infauna and epifauna become prey for a range of teleost fish, molluscs and crustaceans (Brewer et al. 2007). The higher order consumers supported by this system are likely to be carnivorous fish, deep water sharks, large squid and toothed whales (Brewer et al. 2007). The pelagic production is known to be phytoplankton based, with hotspots located around oceanic reefs and islands (Brewer et al. 2007).

It is believed that the loss of the benthic habitat along this continental shelf region would likely lead to a decline in the species diversity and endemism that this feature is associated with (DoEE 2019a). The endemism of the region is not supported by large data sets and is scarce. It is consequently not well understood what interactions exist between the physical processes and trophic structures that lead to this high diversity of fish and the suggested presence of endemic species in the region (DoEE 2019a).

This KEF is located partially within the EMBA.

10.1.13. Seringapatam Reef and Commonwealth Waters in the Scott Reef Complex

Scott and Seringapatam reefs are part of a series of submerged reef platforms that rise steeply from the sea floor between the 300–700 m contours on the north-west continental slope and lie in the Timor Province (Falkner et al. 2009). Scott Reef consists of two separate reef formations, North Reef and South Reef. The total area of the key ecological feature is approximately 2,418 km². As two of the few offshore reefs in the north-west, they provide an important biophysical environment in the region.

Scott and Seringapatam reefs and the waters surrounding them attract aggregations of marine life including humpback whales on their northerly migration, Bryde's whales, pygmy blue whales, Antarctic minke whales, dwarf minke whales, minke whales, dwarf sperm whales and spinner dolphins (Jenner et al. 2008; Woodside 2009). Whale sharks and several species of sea snakes have also been recorded in this area (Donovan et al. 2008). Green and hawksbill turtles nest during the summer months on Sandy Islet on South Scott Reef. These species also internest and forage in the surrounding waters (Guinea 2006). Scott Reef is a particularly biologically diverse system and includes more than 300 species of reef-building corals, approximately 400 mollusc species, 118 crustacean species, 117 echinoderm species and around 720 fish species (Woodside 2009). Corals and fish at Scott Reef have higher species diversity than the Rowley Shoals (Done et al. 1994).

This KEF is located partially within the EMBA.

Scott Reef is listed as Commonwealth Heritage Places and is discussed in Section 9.5.

11. State Marine Conservation Reserves

11.1. Introduction

Marine parks and reserves have been progressively established in Western Australia since 1987. The Conservation and Parks Commission (CPC) is the vesting authority for marine parks and reserves under the provisions of the *Conservation and Land Management Act 1984*. Parks and Wildlife, within the Department of Biodiversity, Conservation and Attractions (DBCA), is responsible for day-to-day management of the parks.

There are three categories of state marine conservation reserves: marine parks; marine management areas; and marine nature reserves.

Marine parks are created to protect natural features and aesthetic values while allowing recreational and commercial uses that do not compromise conservation values. There are currently 24 marine parks wholly or partially within the combined EMBA (Figure 16 and Figure 17).

Marine parks are multiple-use reserves that cater for a wide range of activities. Within marine parks there may be four types of management zones: recreation zones: general use zones; no-take areas known as sanctuary zones; and special purpose zones.

Each marine park has a 'management plan' that contains strategies to protect the high value assets in the park, as well as permitted activities tables. These tables provide explicit regulatory management.

Sanctuary zones are ‘no-take' areas created primarily for conservation and scientific research and are designed to protect a particular significant ecosystem or habitat. Low-impact tourism may be permitted, but no recreational or commercial fishing, aquaculture, pearling, petroleum drilling or production is allowed.

Marine management areas provide an integrated management structure over areas that have high conservation value and intensive multiple-use. There are two marine management areas within the EMBA (described below).

11.1.1. Shark Bay Marine Park

The Shark Bay Marine Reserves comprise the Shark Bay Marine Park and the Hamelin Pool Marine Nature Reserve. The Shark Bay Marine Park was gazetted on 30 November 1990 as A Class Marine Park Reserve No. 7 and vested in the National Park and Nature Conservation Authority (NPNCA) under the CALM Act. The marine park encompasses an area of 748,725 ha (CALM 1996).

The Bay is located near the northern limit of a transition region between temperate and tropical marine fauna. Of the 323 fish species recorded from Shark Bay, 83 % are tropical species with 11 % warm temperate and 6 % cool temperate species. Similarly, of the 218 species of bivalves recorded in Shark Bay, 75 % have a tropical range and 10 % a southern Australian range, with 15% being endemic to the west coast (CALM 1996).

Key features of Shark Bay Marine Park include (CALM 1996, DSEWPaC 2013b):

- 12 species of seagrass making it one of the most diverse seagrass assemblages in the world
- Seagrass that covers over 4,000 km^2 of the bay. The 1,030 km^2 Wooramel Seagrass Bank is the largest structure of its type in the world.
- An estimated population of about 11,000 dugongs, one of the largest populations in the world
- Humpback and southern right whales use the bay as a migratory staging post
- Bottlenose dolphins occur in the bay, and green turtle and loggerhead turtle nest on the beaches
- Large numbers of sharks including whaler, tiger shark and hammerhead are present as well as an abundant population of rays, including the manta ray.
- Hamelin Pool in Shark Bay contains the most diverse and abundant examples of stromatolite forms in the world, representative of life-forms which lived some 3,500 million years ago
- Shark Bay Marine Park does not cover Bernier and Dorre Islands and only coastal waters inshore of Dirk Hartog Island (east of eastern shoreline).

Shark Bay was included on the World Heritage List in 1991 primarily on the basis of three natural features: vast seagrass beds; dugong population; and stromatolites (microbial colonies that form hard, dome-shaped deposits and are among the oldest forms of life on Earth) (DSEWPaC 2013b; see Section 9.1).

Shark Bay marine reserves are located partially within the EMBA.

11.1.2. Ningaloo Marine Park

The Ningaloo Marine Park was declared in May 1987 under the National Parks and Wildlife Conservation Act 1975 (Commonwealth). The Ningaloo Coast, incorporating both key marine and terrestrial values was later granted World Heritage Status in June 2011. In November 2012, the Ningaloo Marine Park (Commonwealth Waters) was renamed to be incorporated in the North-west Commonwealth Marine Reserves Network. The park covers an area of 263,343 km^2, including both State and Commonwealth waters, extending 25 km offshore.

The park protects a large portion of Ningaloo Reef, which stretches over 300 km from North West Cape south to Red Bluff. It is the largest fringing coral reef in Australia, forming a discontinuous barrier that encloses a lagoon that varies in width from 200 m to 7 km. Gaps that regularly intercept the main reef line provide channels for water exchange with deeper, cooler waters (CALM 2005). The Ningaloo Marine Park forms the backbone of the nature-based tourism industry, and recreational activities in the Exmouth region. Seasonal aggregations of whale sharks, manta rays, sea turtles and whales, as well as the annual mass spawning of coral attract large numbers of visitors to Ningaloo each year (CALM 2005).

The reef is composed of partially dissected basement platform of Pleistocene marine or Aeolian sediments or tertiary limestone, covered by a thin layer of living or dead coral or macroalgae. Key features that characterise the Ningaloo Reef include (CALM 2005):

- Over 217 species of coral (representing 54 genera)
- Over 600 species of mollusc (clams, oysters, octopus, cuttlefish, snails)
- Over 460 species of fish
- Ninety-seven species of echinoderms (sea stars, sea urchins, sea cucumbers)
- Habitat for numerous threatened species, including whales, dugong, whale sharks and turtles
- Habitat for over 25 species of migratory wading birds listed in CAMBA and JAMBA.

Ningaloo marine park is located wholly within the EMBA.

11.1.3. Muiron Islands Marine Management Area

The Ningaloo Marine Park Management Plan (CALM 2005) created a marine management area (MMA) for the Muiron Islands, immediately adjacent to the northern end of the Park. This is managed as an integrated area together with the Ningaloo Marine Park, but its status as an MMA means that some activities, including oil and gas exploration, are still permitted under a strict environmental assessment process involving DMIRS.

The Muiron Islands located 15 km north-east of the North West Cape, comprise the North and South Muiron Islands and cover an area of 1,400 ha (AHC 2006). They are low limestone islands (maximum height of 18 m above sea level (ASL)) with some areas of sandy beaches, macroalgae and seagrass beds in the shallow waters (particularly on the eastern sides) and coral reef up to depths of 5 m, which surrounds both sides of South Muiron Island and the eastern side of North Muiron Island. The Muiron Islands MMA was WA's first MMA, gazetted in November 2004. It covers an area of 28,616 ha and occurs entirely within state waters (CALM 2005).

Muiron Islands are located wholly within the EMBA.

11.1.4. Barrow Island Marine Park

The Barrow Island Marine Park covers 4,169 ha, all of which is zoned as sanctuary zone (the Western Barrow Island Sanctuary Zone) (DEC 2007). It includes Biggada Reef, an ecologically significant fringing reef, and Turtle Bay, an important turtle aggregation and breeding area (DEC 2007). Representative areas of seagrass, macroalgal and deep-water habitat are also represented within the marine park (DEC 2007). Passive recreational activities (such as snorkelling, diving and boating) are permitted but extractive activities such as fishing and hunting are not.

Barrow Island marine park is located wholly within the EMBA.

11.1.5. Barrow Island Marine Management Area

The Barrow Island MMAis the largest reserve within the Montebello/ Barrow Islands marine conservation reserves, covering 114,693 ha (DEC 2007). The MMA includes most of the waters around Barrow Island, the Lowendal Islands and the Barrow Island Marine Park, with the exclusion of the port areas of Barrow Island and Varanus Island.

The MMA is not zoned apart from one specific management zone: the Bandicoot Bay Conservation Area. This conservation area is on the southern coast of Barrow Island and has been created to protect benthic fauna and seabirds. It includes the largest intertidal sand/mudflat community in the reserves, is known to be high in invertebrate diversity and is an important feeding area for migratory birds.

As for the other reserves in the Montebello/Barrow Islands marine conservation reserves, the Barrow Island MMA includes significant breeding and nesting areas for marine turtles and the waters support a diversity of tropical marine fauna, important coral reefs and unique mangrove communities (DEC 2007). Green, hawksbill and flatback turtles regularly use the island's beaches for breeding, and loggerhead turtles are also occasionally sighted.

Barrow Island MMA is located wholly within the EMBA.

11.1.6. Montebello Islands Marine Park

Montebello/ Barrow/ Lowendal Islands are part of a shallow submarine ridge, which extends north from the mainland near Onslow. The ridge contains extensive areas of intertidal and shallow subtidal limestone pavement

surrounding the numerous, mostly small islands which are found in the region. The seabed is generally less than 5 m deep and consists of sand veneered limestone pavement with patches of fringing coral reef (DEC 2007).

The island chain lies entirely within WA State waters, with the State-Commonwealth boundary extending out to encompass the islands and waters 3 nm west of Barrow Island and north of the Montebello Islands. These islands are protected within as marine conservation reserves: Montebello Islands Marine Park, Barrow Islands Marine Park and Barrow Island Marine Management Area.

The Montebello Islands Marine Park (58,331 ha) consists of two sanctuary zones, two recreation zones, one special purpose zone for benthic protection, 11 special purpose zones for pearling and general use zones.

The Montebello Islands comprise over 100 islands, the majority of which are rocky outcrops; rocky shore accounts for 81 % of shoreline habitat (DEC 2007a).

The ecological and conservation values of the Montebello and Barrow Islands Marine Conservation Reserve (MCR) include important habitats including corals reefs and bommies, mangroves, seagrass and macroalgae meadows, rocky shorelines and hard substrate, intertidal sand and mudflat communities. These habitats provide protection, food and habitat for a large diversity of species, including dugongs, turtles, whales, other protected cetaceans and birds as well as sea snakes and fish. The area is considered to have a high biodiversity. The islands also provide feeding and resting areas for migrating shorebirds and seabird nesting areas.

Socio-economic values of the Montebello and Barrow Islands MCR include hydrocarbon exploration and production, pearling, nature-based tourism, commercial and recreational fishing, water sports, European history and maritime heritage and scientific research (DEC 2007)

Special purpose zones for pearling are established for the existing leaseholder to allow pearling to be the priority use of these areas (DEC 2007a). Commercial fishing includes a trap fishery for reef fishes, mainly in water depths of 30–100 m, and wet lining for reef fish and mackerel. Fish trawling also occurs in the waters near to the Montebello Islands. A tourist houseboat operates out of Claret Bay, at the southern end of Hermite Island, during the winter months. The Montebello Islands are becoming more frequently used by recreational boaters for camping, fishing and diving activities.

Montebello Islands marine park is located wholly within the EMBA

11.1.7. Rowley Shoals Marine Park

The Rowley Shoals (including the Commonwealth-managed Mermaid Reef Marine National Nature Reserve) are located approximately 300 km west-northwest of Broome, lying between 17°07’S, 119°36’E and 17°35’S, 118°56’E and encompassing approximately 87,674 ha (DEC 2007b).

The Rowley Shoals is ecologically significant in that the reefs form part of a series of important ecological “stepping stones” for a range of reef biota originating in Indonesian/west Pacific waters. Their position off the north-west Australian coast, an area of few offshore reef systems, provides an important upstream source for recruitment to reefs further south (DEC 2007b). Marine wildlife includes 184 species of corals, primarily Indo-West Pacific species, indicating the strong affinity of the Rowley Shoals communities with Indonesia. In terms of other species, at least 264 species of molluscs, 82 species of echinoderms and 389 species of finfish were also identified (DEC 2007b). The faunal assemblages of the Rowley Shoals Marine Park are regionally significant as they contain large numbers of species not found in the more turbid coastal environments of tropical Western Australia (DEC 2007b). There is a relatively low level of recreational and commercial activity, mostly attributed to the remoteness of the Shoals with access difficult from both Indonesia and mainland Australia (DEC 2007b).

Rowley Shoals marine park is located wholly within the EMBA.

11.1.8. Eighty Mile Beach Marine Park

The Eighty Mile Beach Marine Park, located between Port Hedland and Broome, was gazetted on 29 January 2013. It covers an area of approximately 200,000 ha stretching for some 220 km from Cape Missiessy to Cape Keraudren, and includes sanctuary, recreation, general use and special purpose zones. The park is managed under the Eighty Mile Beach Marine Park Management Plan 2014-20124 (DPaW, 2014).

The listed ecological values of the Eighty Mile Beach Marine Park include the high sediment and water quality, the juxtaposition of the beach, coastal topography and seabed and the diverse and ecologically important habitats and marine/coastal flora and fauna. The listed habitat values of the marine park are as follows:

- The intertidal sand and mudflat communities supporting a high abundance and diversity of invertebrate life and providing a valuable food source for shorebirds (including migratory species) and other fauna.
- The diverse subtidal filter-feeding communities
- Macroalgal and seagrass communities providing habitat and feeding opportunities for fish, invertebrates and dugongs.
- High diversity intertidal and subtidal coral reef communities
- Mangrove communities and adjacent saltmarshes provide nutrients to the surrounding waters and habitat for fish and invertebrates.

The listed marine and coastal fauna values are as follows:

- A high diversity and abundance of nationally and internationally important shorebirds and waders (including migratory species) are found in the marine park.
- Flatback turtles are endemic to northern Australia and nest at Eighty Mile Beach
- Dugongs and several whale and dolphin species inhabit or migrate through the marine park.
- A highly diverse marine invertebrate fauna provides an important food source for a variety of animals, including birds, fish and turtles, along with recreational and commercial fishing opportunities.
- A diversity of fish species provides recreational and commercial fishing opportunities.
- A diversity of sharks and rays, including several protected species, are found in the park.

In addition to these natural values, the marine park contains land and sea important to traditional Indigenous owners through identity and place, family networks, spiritual practice and resource gathering. The marine park also has a history of European activity including exploration, pastoralism and commercial fishing (e.g. the pearl oyster fishery). The park contains a historical WWII plane wreck (*Dornier Do-24 X-36*) and shipwrecks (two pearl luggers). The marine park provides tourism opportunity and recreational value through its remoteness, diversity and abundance of habitats and marine fauna and the pristine nature of the marine and coastal environment.

The marine park contains vast intertidal sand and mudflats that extend up to 4 km wide at low tide and provide a rich source of food for many species. Eighty Mile Beach Marine Park is one of the world's most important feeding grounds for small wading birds that migrate to the area each summer, travelling from countries thousands of kilometres away (DPaW 2014) (see Section 9.2.1).

Eighty Mile Beach marine park is located partially within the EMBA

11.1.9. North Kimberley Marine Park

The North Kimberley Marine Park was established in December 2016 as a Class A marine park under the CPC (DPaW 2016a). The marine park comprises four separate management areas including, Uunguu, Balanggarra, Miriuwung Gajerrong, and Wilinggin. It is a multiple zone marine park that includes: eight sanctuary zones, nine special purpose zones (recreation and conservation), two special use zone (cultural heritage), and general use areas (DPaW 2016a). The marine park is managed in accordance with the provisions of the CALM Act with joint management between the Department of Parks and Wildlife and Traditional Owners of the area.

The area within the marine park is recognised for its natural values including coral reefs, marine turtle species, dugongs, seagrass and macroalgal communities, mangroves and saltmarshes, finfish, and water and sediment quality, as well as for its social values (i.e. recreation, tourism and community values) and commercial values and resource use (e.g. commercial fishing). The marine park lies within the Indian Ocean and Timor Sea of Western Australia's Kimberley region, covering an area of approximately 1,845,000 ha (DPaW 2016a). The south-western boundary is approximately 270 km north-east of Derby.

North Kimberley marine park is located partially within the EMBA.

11.1.10. Yawuru Nagulagun/ Roebuck Bay Marine Park

The Yawuru Nagulagun/Roebuck Bay Marine Park was approved by the State Minister for Environment in October 2016 and declared as a Class A reserve over the subtidal and intertidal areas of Roebuck Bay (excluding the Kimberley Ports Authority waters), (DBCA, 2017a). The Marine Park is managed with a joint management

framework between Parks and Wildlife and Yawuru Registered Native Title Body Corporation (RNTBC). The intent is to manage the areas from the offshore waters around Roebuck and Broome, collectively referred to as the Yawuru conservation estate, as one ecological system (DPaW 2016b). The development of the joint management plan is in accordance with the Conservation and Land Management Act 1984 (Yawuru Organisation 2017) as well as contributes to the State Governments commitment under the Kimberly Science and Conservation Strategy, released in June 2011.

The Yawuru people have lived along the foreshores of Roebuck Bay for thousands of years, the Bay is part of the Yawuru traditional estate (DPaW 2016b). Roebuck Bay is an internationally significant Ramsar wetland, declared in 1990, and an important feeding ground for many species of migratory shorebirds. It hosts possibly the greatest diversity of shorebird species at any site across the globe (DBCA 2017b). The Bay has some of the most productive tropical intertidal flats in the world, and is consequently an important ground for Yawuru fishing, hunting and gathering of sea food. The Bay hosts communities of seagrass and macroalgae, providing food for protected species such as the dugong and flatback turtle. Marine mammals also pass through the waters of the Bay such as the Australian snubfin dolphin and the humpback dolphin, the humpback whale can also be found during annual migration (DPaW 2016b).

Roebuck Bay marine park is located partially within the EMBA.

11.1.11. Bardi Jawa Gaarra Marine Park

As part of a network of marine protected areas in state waters, DBCA has established the Bardi Jawa Gaarra Marine Park Joint Management Plan 2022 (DBCA, 2022a). This plan is intended to guide management of the park for ten years, or until a new plan is developed. The plan was jointly developed, and will be jointly implemented, by DBCA and the Bardi and Jawi traditional owners. The plan is expected to come into effect in 2024, with approximately 204,000 ha of protected area. The park forms part of a network of marine protected areas in state waters along the Kimberley coast.

The physical setting for the Bardi Jawa Gaarra Marine Park is in coastal waters, where there is a large tidal range. The climate is tropical, with wet and dry seasons. Most rainfall occurs during the wet season. Water and sediment quality is expected to be high due to a lack of industrial activity within the park. Habitats within the park include (DBCA, 2022a):

- Coral and reef communities
- Mangroves, creeks, and saltmarsh communities
- Seagrass and macroalgal communities
- Subtidal filter-feeding communities
- Intertidal sand and mud flat communities and freshwaters soaks

The Bardi Jawa Gaarra Marine Park hosts a range of biological values, including (DBCA, 2022):

- Marine turtles
- Fish, sharks and rays
- Dugongs
- Whales and dolphins
- Estuarine crocodiles
- Seabirds and shorebirds
- Invertebrates

Other activities that occur within the Bardi Jawa Gaarra Marine Park include research, recreational and commercial fishing, pearl aquaculture, and research.

Bardi Jawa Gaarra marine park is located partially within the EMBA.

11.1.12. Mayala Marine Park

The Mayala Marine Park is a component of the network of marine protected areas in state waters along the Kimberley coastline and lies adjacent to the Bardi Jawa Gaarra Marine Park described above. The park is not yet gazetted, nor has a management plan been finalised. The Proposed Mayala Marine Park Indicative Joint Management Plan (DBCA, 2020) was published for public comment in 2020, and the park is expected to be gazetted by 2024. The park will be jointly managed by the Mayala traditional owners and DBCA.

The Mayala Marine Park contains a range of physical and biological environmental values. The *Proposed Mayala Marine Park Indicative Joint Management Plan* (DBCA, 2020) identifies the same physical and biological environmental values as described above for the Bardi Jawa Gaarra Marine Park (refer to Section 11.1.11).

Mayala marine park is located partially within the EMBA.

11.1.13. Lalang-gaddam Marine Park

The Lalang-gaddam Marine Park is an amalgamation of the Lalang-garram / Camden Sound, Lalang-garram / Horizontal Fall and the North Lalang-garram Marine Park, and the proposed Maiyalam Marine Park. The *Lalang-gaddam amended Joint Management Plan for the Lalang-garram / Camden Sound, Lalang-garram / Horizontal Falls and North Lalang-garram Marine Parks and Indicative Joint Management Plan for the Proposed Maiyalam Marine Park* (DBCA, 2020) states the amalgamation is intended to:

- Provide clearer direction for joint management and governance outcomes
- Aid in communication and engagement with the Dambeemangardee Community and other park users.

The amendment to the plan is expected to come into effect in 2024 and is intended to be in effect for 10 years. The strategic objective of the amendment is to protect and conserve the value of the land for the culture and heritage of Dambeemangardee people.

The Lalang-gaddam Marine Park has a range of physical and biological environmental values. The *Lalang-gaddam amended Joint Management Plan for the Lalang-garram / Camden Sound, Lalang-garram / Horizontal Falls and North Lalang-garram Marine Parks and Indicative Joint Management Plan for the Proposed Maiyalam Marine Park* (DBCA, 2020) identifies the same physical and biological environmental values as described above for the Lalang-gaddam Marine Park (refer to Section 11.1.13). The plan also recognises tourism, recreational fishing, commercial fishing and aquaculture as important values within the park, which are also identified as sources of risk that require management.

Lalang-gaddam marine park is located partially within the EMBA.

12. Australian Marine Parks

12.1. Introduction

In agreement with the state governments, the Australian Commonwealth government committed to establish Commonwealth marine parks as a component of the National Representative System of Marine Protected Areas (DoE 2014). In November 2012, the Commonwealth Marine Reserves Network was proclaimed with the purpose of protecting the biological diversity and sustainable use of the marine environment (Director of National Parks 2012a). Commonwealth Marine Reserves were renamed as Australian Marine Parks in October 2017. Seven marine regions are included in the Australian Marine Parks Network, including the Coral Sea, the South-west, the Temperate East, the South-east, the North, the North-west and Indian Ocean Marine Territories. The South-east network 10-year Management Plan came into effect on 1 July 2013. The remaining networks 10-year Management Plans were approved and came into effect on 1 July 2018. The Indian Ocean Marine Territories draft management plans were open for public consultation from 6 July to 17 August 2023 after Christmas Island Marine Park and Cocos (Keeling) Islands Marine Park were declared in March 2022.The new management plans establish the management and zoning of the designated marine parks. The marine park networks pertinent (i.e. marine parks wholly or partially within the EMBA) to the EMBA include the:

- South-West Marine Parks Network
- North-West Marine Parks Network

- North Marine Parks Network.
- Indian Ocean Marine Territories

The South-West Marine Parks Network comprises 14 marine parks. One of these occur in West Australian waters in the EMBA, including:

- Abrolhos Commonwealth Marine Park (wholly within the EMBA)

The North-West Marine Parks Network comprises 13 marine parks. Of these, 11 occur in West Australian waters pertinent to the EMBA, including:

- Carnarvon Canyon Marine Park (wholly within the EMBA)
- Shark Bay Marine Park (wholly within the EMBA)
- Gascoyne Marine Park (wholly within the EMBA)
- Ningaloo Marine Park (wholly within the EMBA)
- Montebello Marine Park (wholly within the EMBA)
- Dampier Marine Park (partially within the EMBA)
- Eighty Mile Beach Marine Park (partially within the EMBA)
- Argo-Rowley Terrace Marine Park (partially within the EMBA)
- Mermaid Reef Marine Park (wholly within the EMBA)
- Roebuck Marine Park (partially within the EMBA)
- Kimberley Marine Park (partially within the EMBA)

The Indian Ocean Marine Territories Network comprises one relevant marine parks:

- Christmas Island Marine Park (partially within the EMBA)

The sizes of these marine parks range from 300—152,000 km^2, and the water depths within the marine parks vary from approximately 15—1,500 m deep. The EPBC Act requires that each management plan assign an International Union for the Conservation of Nature (IUCN) category to each marine park. Additionally, the Act also allows for the management plan to divide a marine park into zones and to assign a category to each zone, which may differ from the overall category of the marine park. Zoning considers the purposes for which the marine parks were declared, the objectives of the relevant management plans, the values of the marine park and requirements of the EPBC Act and EPBC Regulations.

The North-West Marine Parks Network includes six different types of zoning:

- Sanctuary Zone (IUCN Category Ia)
- National Park Zone (IUCN Category II)
- Recreational Use Zone (IUCN Category IV)
- Habitat Protection Zone (IUCN Category IV)
- Multiple Use Zone (IUCN Category VI)
- Special Purpose Zone (Trawl) (VI).

The South-west Marine Parks Network includes six different types of zoning:

- National Park Zone (IUCN Category II)
- Habitat Protection Zone (IUCN Category IV)
- Multiple Use Zone (IUCN Category VI)
- Special Purpose Zone (Mining Exclusion) (IUCN Category VI)
- Special Purpose Zone (IUCN Category VI)
- Special Purpose Zone (Trawl) (IUCN Category VI).

12.2. South-West Marine Parks Network

The South-West Commonwealth Marine Parks Network is aligned to the South-West Marine Region. The network covers 508,371 km^2 and includes 14 marine parks (Director of National Parks, 2018a). Broad values of the South-west Australian Marine Parks include:

- Natural values
- Cultural values
- Heritage values
- Socio-economic values.

Further detail on each of the relevant marine parks those that fall (wholly or partially) within the EMBA is provided below.

12.2.1. Abrolhos Marine Park

The Abrolhos Marine Park (including zones within the EMBA: Marine National Park Zone – IUCN Category II-2,548 km^2; Habitat Protection Zone – IUCN Category VI-23,239 km^2; Multiple Use Zone – IUCN Category VI-56,545 km^2; Special Purpose Zone – IUCN Category VI-5,729 km^2) covers an area of approximately 88,060 km^2 and protects the following conservation values (Director of National Parks, 2018a):

- Important foraging areas for the:
  - Threatened Australian lesser noddy.
  - Northernmost breeding colony of the threatened Australian sea lion
  - Great white sharks
  - Migratory common noddy, wedge-tailed shearwater, bridled tern, Caspian tern and roseate tern.
- Important migration habitat for the protected humpback whale and pygmy blue whales
- The second largest canyon on the west coast, the Houtman Canyon
- Examples of the northernmost ecosystems of the Central Western Province and South-west Shelf Transition (including the Central West Coast meso-scale bioregion)
- Examples of the deeper ecosystems of the Abrolhos Islands meso-scale bioregion
- Examples of the shallower, southernmost ecosystems of the Central Western Shelf Province provincial bioregion including the Zuytdorp meso-scale bioregion
- Examples of the deeper ecosystems of the Central Western Transition provincial bioregion
- Examples of diversity of sea floor features including southern most banks and shoals of the North-west region; deep holes and valleys; slope habitats; terrace and shelf environments
- Seven KEFs.

The Abrolhos Marine Park is adjacent to the Shark Bay World Heritage Property. The marine park does not contain any Commonwealth or National Heritage listings (Director of National Parks 2018a). The marine park contains 11 known shipwrecks listed under the *Underwater Culture Heritage Act 2018*. Commercial tourism, fishing, recreation (e.g. fishing, snorkelling, diving and boating) and mining are important supported socio-economic activities in the park (Director of National Parks 2018a).

12.3. North-West Marine Park Network

The North-West Marine Parks Network is aligned to the North-west Marine Region. The network covers 335, 341 km^2 and includes 13 marine parks (Director of National Parks, 2018b). Broad values of the North-west Commonwealth Marine Reserves Network include:

- Natural values

- Cultural values
- Heritage values
- Socio-economic values.

Further detail on each of the relevant marine parks within the EMBA is provided below. See Section 12 for extent of marine parks (wholly or partially) within the EMBA.

12.3.1. Carnarvon Canyon Marine Park

The Carnarvon Canyon Marine Park (Habitat Protection Zone – IUCN Category IV) covers an area of approximately 6,177 km^2 and protects the following conservation values (Director of National Parks 2018b):

- The Carnarvon Canyon a single channel canyon with seabed features that include slope, continental rise and deep holes and valleys.
- The Carnarvon Canyon ranges in depth from 1500 m to over 5,000 m, thereby providing habitat diversity for benthic and demersal species.
- Central Western Transition provincial bioregion ecosystem examples are found here, which are characteristic of the biogeographic faunal transition between tropical and temperate species.
- There is limited information about species' use of this Marine Park (Director of National Parks 2018b). The marine park does not contain any international, Commonwealth or National Heritage listings (Director of National Parks 2018b). Commercial fishing, tourism, shipping and mining are important supported socio-economic activities in the marine park.

12.3.2. Shark Bay Marine Park

The Shark Bay Marine Park (Multiple Use Zone – IUCN Category VI) covers an area of approximately 7,443 km^2 and protects the following conservation values (Director of National Parks 2018b):

- Foraging areas adjacent to important breeding areas for several species of migratory seabirds
- Part of the migratory pathway of protected humpback whales
- Internesting habitat for marine turtles
- Waters that are adjacent to the largest nesting area for loggerhead turtles in Australia
- Marine Park and adjacent coastal areas important for shallow-water snapper
- Protection to shelf and slope habitats as well as a terrace feature
- Examples of the shallower ecosystems of the Central Western Shelf Province and Central Western Transition provincial bioregions including the Zuytdorp meso-scale bioregion
- Connectivity between the inshore waters of the Shark Bay World Heritage Area and the deeper waters of the area.

Whilst no listed international, Commonwealth or National Heritage places are within the marine park, the park is adjacent to Shark Bay World Heritage Area (Director of National Parks 2018b). Commercial tourism, fishing, mining and recreation (e.g. fishing) are important socio-economic values of the park (Director of National Parks 2018b).

12.3.3. Gascoyne Marine Park

The Gascoyne Marine Park (Multiple Use Zone – IUCN Category VI-33,652 km^2; Habitat Protection Zone – IUCN Category IV-38,982 km^2; Marine National Park Zone – IUCN Category II-9,132 km^2) covers an area of approximately 81,766 km^2 and protects the following conservation values (Director of National Parks 2018a):

- Important foraging areas for: migratory seabirds threatened and migratory hawksbills and flatback turtles; and vulnerable and migratory whale shark.
- A continuous connectivity corridor from shallow depths around 15 m out to deep offshore waters on the abyssal plain at over 5,000 m in depth

- Sea floor features including canyon, terrace, ridge, knolls, deep hole/valley and continental rise. It also provides protection for sponge gardens in the south of the reserve adjacent to Western Australian coastal waters.
- Ecosystems examples from the Central Western Shelf Transition, the Central Western Transition and the Northwest province provincial bioregions as well as the Ningaloo meso-scale bioregion
- Four KEFs for the region:
  - Canyons on the slope between the Cuvier Abyssal Plain and the Cape Range Peninsula (enhanced productivity, aggregations of marine life and unique sea-floor feature)
  - Exmouth Plateau (unique sea-floor feature associated with internal wave generation)
  - Continental slope demersal fish communities (high species diversity and endemism – the most diverse slope bioregion in Australia with over 500 species found with over 64 of those species occurring nowhere else)
  - Commonwealth waters adjacent to Ningaloo Reef.
- The canyons in this reserve are believed to be associated with the movement of nutrients from deep water over the Cuvier Abyssal Plain onto the slope where mixing with overlying water layers occurs at the canyon heads. These canyon heads, including that of Cloates Canyon, are sites of species aggregation and are thought to play a significant role in maintaining the ecosystems and biodiversity associated with the adjacent Ningaloo Reef
- The reserve therefore provides connectivity between the inshore waters of the existing Ningaloo Commonwealth marine park and the deeper waters of the area.

The park is also adjacent to World Heritage listings associated with the Ningaloo Coast. Commercial tourism, commercial fishing, mining and recreation are important socio-economic values of the park (Director of National Parks 2018b).

12.3.4. Ningaloo Marine Park

Ningaloo Marine Park stretches approximately 300 km along the west coast of the Cape Range Peninsula and is adjacent to the Western Australian Ningaloo Marine Park and Gascoyne Marine Park (Director of National Parks, 2018b). Ningaloo Reef is the longest fringing barrier reef in Australia forming a discontinuous barrier that encloses a lagoon that varies in width from 200 m to 7 km. Gaps that regularly intercept the main reef line provide channels for water exchange with deeper, cooler waters (CALM 2005). It is the only example in the world of extensive fringing coral reef on the west coast of a continent.

The Ningaloo Marine Park (Recreational Use Zone – IUCN Category II) covers an area of approximately 2,435 km^2 and protects the following conservation values (Director of National Parks 2018a):

- Important habitat (foraging areas) for vulnerable and migratory whale sharks
- Areas used for foraging by marine turtles adjacent to important internesting sites
- Part of the migratory pathway of the protected humpback whale
- Foraging and migratory pathway for pygmy blue whales
- Breeding, calving, foraging and nursing habitat for dugong
- Shallow shelf environments which provides protection for shelf and slope habitats, as well as pinnacle and terrace sea floor features
- Sea floor habitats and communities of the Central Western Shelf Transition
- Three KEFs
- The Ningaloo Coast World Heritage Property, the Ningaloo Coast National Heritage listing and Ningaloo Marine Area Commonwealth Heritage Listing.

Commercial tourism and recreation (e.g. fishing) are important socio-economic values of the marine park (Director of National Parks 2018b).

12.3.5. Montebello Marine Park

The Montebello Marine Park is located offshore of Barrow Island and 80 km west of Dampier extending from the Western Australian state water boundary and is adjacent to the Western Australian Barrow Island and Montebello Islands Marine Parks. The Montebello Marine Park (Multiple Use Zone – IUCN Category VI) covers an area of approximately 3,413 km^2 and protects the following conservation values (Director of National Parks 2018b):

- Foraging areas for migratory seabirds that are adjacent to important breeding areas
- Areas used by vulnerable and migratory whale sharks for foraging
- Foraging areas marine turtles which are adjacent to important nesting sites
- Section of the north and south bound migratory pathway of the humpback whale
- Shallow shelf environments with depths ranging from 15–150 m which provides protection for shelf and slope habitats, as well as pinnacle and terrace sea floor features
- Sea floor habitats and communities of the Northwest Shelf Province provincial bioregions as well as the Pilbara (offshore) meso-scale bioregion
- One KEF for the region is the ancient Coastline (a unique sea floor feature that provides areas of enhanced biological productivity).

Commercial tourism, commercial fishing, mining and recreation are important socio-economic values for the park.

12.3.6. Dampier Marine Park

The Dampier Marine Park (Marine National Park Zone – IUCN Category I-73 km^2; Habitat Protection Zone – IUCN Category IV-104 km^2; Multiple Purpose Zone – IUCN Category VI-1,074 km^2) covers an area of approximately 1,252 km^2 and protects the following conservation values (Director of National Parks 2018b):

- Foraging areas for migratory seabirds that are adjacent to important breeding grounds
- Important foraging areas for marine turtles adjacent to significant nesting sites
- Part of the migratory pathway of the protected humpback whale
- Protection for offshore shelf habitats and shallow shelf habitats adjacent to the Dampier Archipelago
- Communities and sea floor habitats of the Northwest Shelf Province provincial bioregion as well as the Pilbara (nearshore) and Pilbara (offshore) meso-scale bioregions are included.

Port activities, commercial fishing and recreation (e.g. fishing) are important activities in the marine park (Director of National Parks 2018b). No heritage listings apply to the marine park.

12.3.7. Eighty Mile Beach Marine Park

The Eighty Mile Beach Marine Park (Multiple Use Zone – IUCN Category VI) is adjacent to the Western Australia Eighty Mile Beach Marine Park, 74 km north-east of Port Hedland and covers an area of approximately 10,785 km^2 and protects the following conservation values (Director of National Parks 2018b):

- Breeding, foraging and resting habitat for seabirds (one of the world's most important feeding grounds for migratory shorebirds and waders and is listed under the Ramsar Convention)
- Internesting and nesting habitat for marine turtles (it supports a significant nesting population of flatback turtles, which are endemic to northern Australia)
- Foraging, nursing and pupping habitat for sawfish
- Migratory pathway for humpback whales
- Coastal waters provide critical habitat for several shark and ray species at varying life stages
- Three known shipwrecks listed under the *Underwater Cultural Heritage Act 2018*: *Lorna Doone* (wrecked in 1923), *Nellie* (wrecked in 1908), and *Tifera* (wrecked in 1923).
- Tourism, commercial fishing, pearling and recreation are important activities in the Marine Park (Director of National Parks 2018b).

12.3.8. Argo-Rowley Terrace Marine Park

The Argo-Rowley Marine Park is located approximately 270 km north-west of Broome, Western Australia, and extends to the limit of Australia's exclusive economic zone. The Marine Park (Multiple Use Zone – IUCN Category VI-108,812 km^2; Marine National Park Zone – IUCN Category II-36,050 km^2; Special Purpose Zone – IUCN Category VI-1,141 km^2) covers an area of approximately 146,003 km^2 and protects the following conservation values (Director of National Parks 2018b):

- Foraging areas that are important for migratory seabirds as well as the endangered loggerhead turtle
- Important habitat and foraging for sharks
- Migratory pathway for pygmy blue whales (Director of National Parks 2018b)
- Protection for communities and habitats of the deeper offshore waters (220 m to over 5,000 m) of the region
- Sea floor features including aprons and fans, canyons, continental rise, knolls/abyssal hills and the terrace and continental slope
- Communities and sea floor habitats of the Northwest Transition and Timor Province provincial bioregions
- Connectivity between the existing Mermaid Reef Marine National Nature Reserve and reefs of the Western Australian Rowley Shoals Marine Park and the deeper waters of the region
- Two KEFs in the reserve include:
  - The canyons linking the Argo Abyssal Plain with the Scott Plateau (unique sea floor feature with enhanced productivity and feeding aggregations of species)
  - Mermaid Reef and the Commonwealth waters surrounding Rowley Shoals (an area of high biodiversity with enhanced productivity and feeding and breeding aggregations).

No heritage listings apply to this marine park (Director of National Parks 2018b). Commercial fishing and mining are important socio-economic values for the park.

12.3.9. Mermaid Reef Marine Park

The Mermaid Reef Marine Park (Multiple Use Zone – IUCN Category VI) lays approximately 280 km north-west of Broome, Western Australia, adjacent to the Argo–Rowley Terrace Marine Park and approximately 13 km from the Western Australian Rowley Shoals Marine Park. It covers an area of 540 km ² and protects the following conservation values (Director of National Parks 2018b):

- Mermaid Reef and Commonwealth waters surrounding Rowley Shoals are valued for its high productivity, aggregations of marine life and high species richness
- Mermaid Reef, Clerke Reef and Imperieuse Reef are biodiversity hotspot and key topographic feature of the Argo Abyssal Plain
- Rowley Shoals present some of the best geological examples of shelf atolls in Australian waters, and are ecologically significant in that they are considered ecological steppingstones for reef species originating in Indonesian/Western Pacific waters, are one of a few offshore reef systems on the north-west shelf, and may also provide an upstream source for recruitment to reefs further south
- Breeding habitat for seabirds
- Migratory pathway for the pygmy blue whale
- One known shipwreck listed under the *Underwater Cultural Heritage Act 2018*: Lively (wrecked in 1810).
- Tourism, recreation, and scientific research are important activities in the Marine Park (Director of National Parks 2018b).

12.3.10. Roebuck Marine Park

The Roebuck Marine Park (Multiple Use Zone – IUCN Category VI) covers an area of approximately 304 km^2 and protects the following conservation values (Director of National Parks 2018b):

- Foraging habitat area for migratory seabirds adjacent to important breeding areas

- Foraging area adjacent to important nesting sites for flatback turtles
- Parts of the migratory pathway of the protected humpback whale
- Habitat adjacent to important foraging, nursing and pupping areas for freshwater, green and dwarf sawfish
- Foraging and calving areas for Australian snubfin, Indo-Pacific humpback and Indo-Pacific bottlenose dolphins
- Foraging habitat for dugong
- Protection for shallow shelf habitats ranging in depth from 15–70 m
- Ecosystems example of **the** Northwest Shelf Province provincial bioregion and **the** Canning meso-scale bioregion

No heritage listings apply to the marine park. Commercial tourism, fishing, pearling and recreation (e.g. fishing) are important socio-economic values of the marine park (Director of National Parks 2018b).

12.3.11. Kimberley Marine Park

The Kimberley Marine Park (Multiple Use Zone – IUCN Category VI) is located approximately 100 km north of Broome, Western Australia, and extends from the Western Australian state water boundary north from the Lacepede Islands to the Holothuria Banks offshore from Cape Bougainville. It is adjacent to the Western Australian Lalanggarram / Camden Sound Marine Park and the North Kimberley Marine Park. It covers an area of 74,469 km², and protects the following conservation values (Director of National Parks 2018b):

- Northwest Shelf Province
  - Diverse benthic and pelagic fish communities
  - Ancient coastline thought to be an important sea floor feature
  - Migratory pathway for humpback whales
- Northwest Shelf Transition
  - High levels of species diversity
  - Endemism occur among demersal fish communities on the continental slope
- Timor Province
  - Reefs and islands of the bioregion are regarded as biodiversity hotspots
  - Endemism in demersal fish communities of the continental slope is high (two distinct communities have been identified on the upper and mid slopes)
  - Ancient coastline at the 125 m depth contour where rocky escarpments are thought to provide biologically important habitats in areas otherwise dominated by soft sediments
  - Continental slope demersal fish communities characterised by high diversity of demersal fish assemblages
  - Breeding and foraging habitat for seabirds
  - Internesting and nesting habitat for marine turtles
  - Breeding, calving and foraging habitat for inshore dolphins
  - Calving, migratory pathway and nursing habitat for humpback whales
  - Migratory pathway for pygmy blue whales
  - Foraging habitat for dugong and whale sharks
  - More than 40 known shipwrecks listed under the *Underwater Cultural Heritage Act 2018*.

Tourism, commercial fishing, mining, recreation, (e.g. fishing), and traditional use are important activities in the Marine Park (Director of National Parks 2018b).

12.4. Indian Ocean Territories

12.4.1. Christmas Island Marine Park

Christmas Island Marine Park was established in 2022 and covers an area of 277,016 km^2. The parks offshore waters are a National Park zone (green zone; IUCN Category II) where activities such as fishing and mining are prohibited. Inshore waters are Habitat Protection Zoned (yellow zone; IUCN Category IV) which allows fishing but prohibits activities which impact the seafloor (e.g. dredging). The marine park adjoins the boundary of Christmas Island National Park (CINP). The port is excluded from the marine park, apart from a small section in the port's western boundary.

It provides habitats for a range of unique, migratory and threatened species, in a region of the world where the ocean is facing increased environmental pressures. The marine park adjoins Christmas Island National Park, connecting and increasing protections across land and sea for species like seabirds, which require both environments for their survival.

The tropical waters and fringing coral reefs that surround Christmas Island contain a mix of coral reef species from both the Indian and Pacific Oceans and over 680 species of fish have been recorded in the region. The overlap of these waters gives rise to varieties of hybrid marine fish and some endemic species, that are found nowhere else on earth. Christmas Island also has the world's greatest diversity and abundance of land crabs, most notably its famous red crab. The island's waters are essential for the crabs, as they migrate to the coast to breed and release their eggs into the ocean. Other important inshore marine habitats include cave systems, which support a mix of distinct species.

The offshore waters and habitats of Christmas Island Marine Park are relatively poorly studied. However, we know that they contain a range of unique seafloor features, habitats and species, particularly seamounts and deep-sea plains. Other marine areas are also considered to be biologically important. These include foraging areas for the endemic Abbott's Booby, Christmas Island Frigatebird and Golden bosun and other seabirds that nest on Christmas Island, as well as whale shark feeding areas and southern bluefin tuna breeding habitat. The marine park also protects species like dolphins, deep sea fish and sharks that are or may be threatened elsewhere in the region.

Whilst the management plans are being developed, the park is under transitional management arrangements (AMP, 2024a)

Table 20 Summary of marine network values, pressures, management programs and actions applicable to the EMBA

Marine network	Values	Pressures	Management programs and actions
South-west	• One bioregions • Key ecological features • EPBC listed species • Biologically important areas • Sea country indigenous values • Historic shipwrecks • Adjacent to Shark Bay World Heritage Area • Shipping and port activities • Commercial fishing • Marine tourism	• Climate change • Hydrological changes from coastal development and agriculture (increase sediment loads and pollutants) • Illegal/unregulated/ unreported fishing • Bycatch of non-target species • Habitat modification from mining • Human presence • Invasive species • Marine pollution	• Communication, education and awareness programs • Promote suitable tourism experience • Facilitate partnerships between tourism operators and Indigenous operators • Indigenous engagement program • Marine monitoring programs • Park management via assessments / authorisation program for marine park activities • Marine park management and development of suitable infrastructure • Compliance planning and surveillance
North-west	• Eight bioregions • Key ecological features • EPBC listed species • Biologically important areas • Sea country indigenous values • Native title determinations • Traditional Indonesian fishers • World Heritage Properties (Ningaloo Coast, Shark Bay) • Ashmore Reef Marine Park and Eighty-Mile Beach Ramsar sites • Shipping and port activities • Commercial fishing, pearling, aquaculture • Marine tourism • Scientific research	• Climate change • Hydrological changes from coastal development and agriculture (increase sediment loads and pollutants) • Illegal/unregulated/ unreported fishing • Bycatch of non-target species • Habitat modification from mining • Human presence • Invasive species • Marine pollution	• Communication, education and awareness programs • Promote suitable tourism experience • Facilitate partnerships between tourism operators and Indigenous operators • Indigenous engagement program • Marine monitoring programs • Park management via assessments / authorisation program for marine park activities • Marine Park management and development of suitable infrastructure • Compliance planning and surveillance
Indian Ocean Territories	• One bioregions • EPBC listed species • Sea country indigenous values • Native title determinations	• Fishing (commercial and IUU) • Climate change • Human activity including seafloor mining	• Marine park management framework are being created • Strong ties with Indigenous people

Marine network	Values	Pressures	Management programs and actions
	• Traditional Indonesian fishers • Several bird species are restricted to Christmas (e.g. Abbotts Booby) or Cocos (Keeling) Islands • Turtle nesting areas		

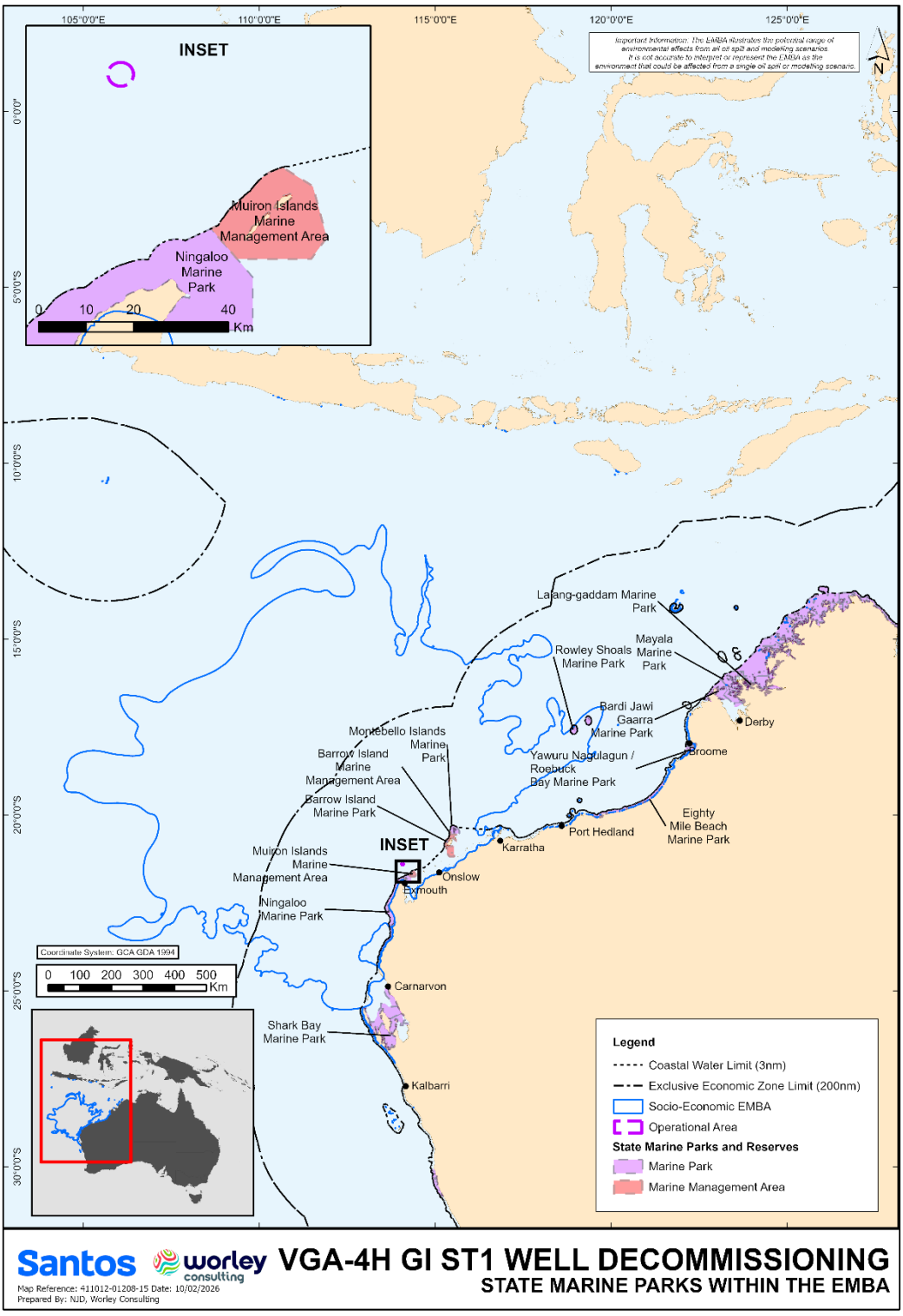


Figure 16: WA State Marine Parks and Management Areas within the EMBA

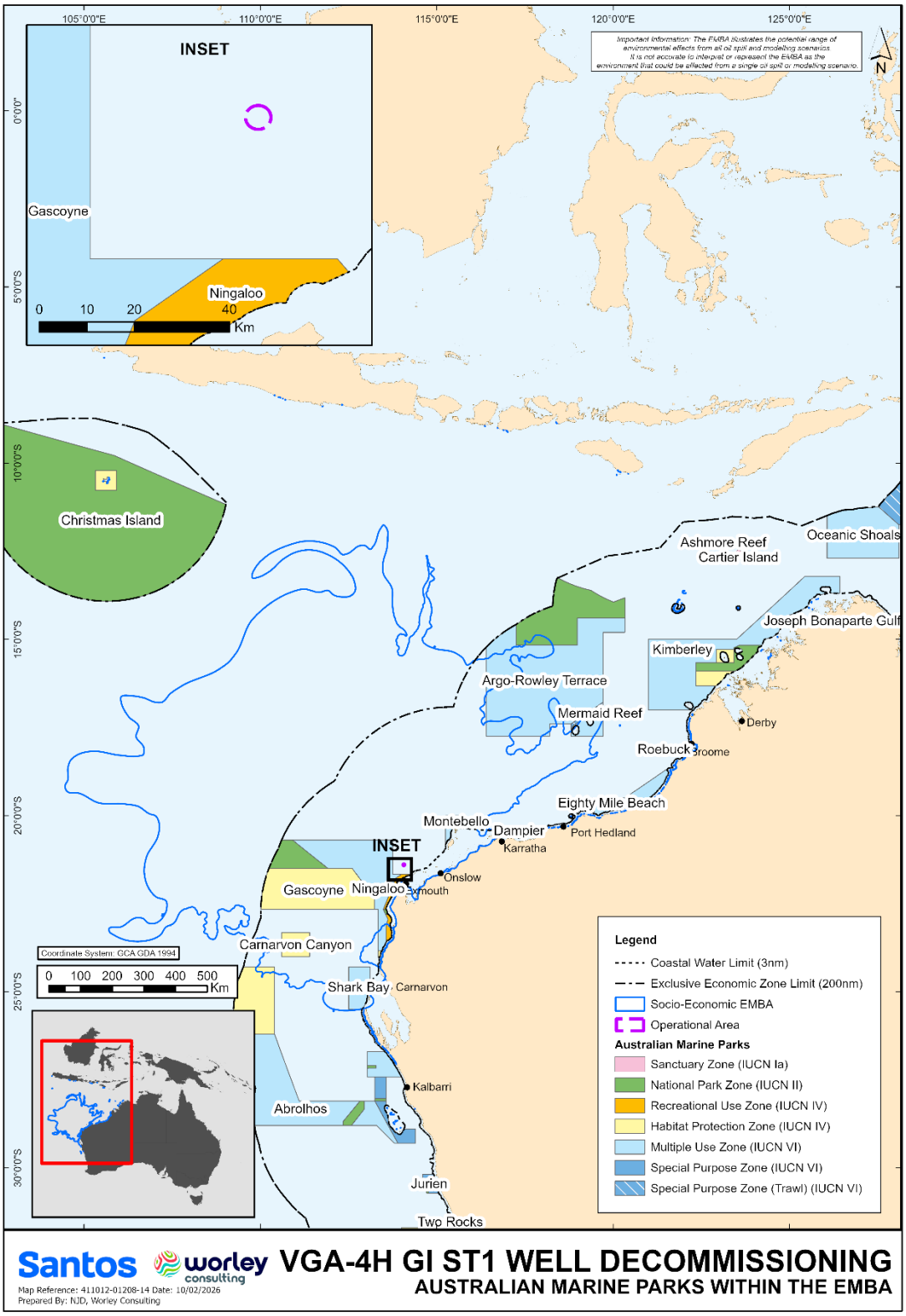


Figure 17: Australian Marine Parks within the EMBA

13. Conservation Management Plans

In order to protect, maintain and enhance recovery of certain threatened species and ecological communities the DAWE may prepare conservation management plans in the form of Conservation Advice or Recovery Plans.

13.1. Conservation Advice

When a native species or ecological community is listed as threatened under the EPBC Act, conservation advice is developed to assist its recovery. Conservation advice provides guidance on immediate recovery and threat abatement activities that can be undertaken to ensure the conservation of a newly listed species or ecological community.

13.2. Recovery Plans

The Australian Government Minister for the Environment may make or adopt and implement recovery plans for threatened fauna, threatened flora (other than conservation dependent species) and threatened ecological communities listed under the Commonwealth EPBC Act. Recovery plans set out the research and management actions necessary to stop the decline of, and support the recovery of, listed threatened species or threatened ecological communities. The aim of a recovery plan is to maximise the long-term survival in the wild of a threatened species or ecological community (DCCEEW, 2024).

Table 21: Summary of EPBC Act recovery plans applicable to the EMBA

Name	Recovery Plan/Conservation Advice/Management Plan	Threats/strategies identified as relevant to the activity	Relevant Conservation Advice	Addressed (where relevant) in EP Section
All vertebrate fauna	Threat Abatement Plan for Impacts of Marine Debris on Vertebrate wildlife of Australia's coasts and oceans (Commonwealth of Australia,2018)	Marine Debris	No explicit management actions for non-fisheries related industries (note that management actions in the plan relate largely to management of fishing waste (for example 'ghost' gear), and State and Commonwealth management through regulation.	7.1
Fish and Sharks				
Dwarf Sawfish	Approved Conservation Advice for Pristis clavata (Dwarf Sawfish) (DEWHA, 2009)	Habitat degradation and modification	Identify risks to important sawfish and river shark habitat and measures needed to reduce those risks.	6.6, 6.7, 7.1, 7.6, 7.7
Green Sawfish	Commonwealth Conservation Advice on *Pristis zijsron* (green sawfish) (TSSC, 2008a)	Habitat degradation and modification	Identify risks to important sawfish and river shark habitat and measures needed to reduce those risks.	6.6, 6.7, 7.1, 7.6, 7.7
Narrow Sawfish	Sawfish and River Sharks Multispecies Recovery Plan (DoE, 2015a)	Habitat degradation and modification	Identify risks to important sawfish and river shark habitat and measures needed to reduce those risks.	6.6, 6.7, 7.1, 7.6, 7.7
Great White Shark	Recovery plan for the White Shark (*Carcharodon carcharias*) (DSEWPaC, 2013)	Ecosystem effects as a result of habitat modification and climate change	No explicit relevant management actions: habitat modification and climate identified as a threat	7.6, 7.7
Grey nurse shark	Recovery Plan for the Grey Nurse Shark (Carcharias taurus) (DoE, 2014)	Pollution and disease	Review and assess the potential threat of introduced species, pathogens and pollutants	7.6, 7.7
		Ecosystem effects – habitat degradation/ modification and climate change	Review the level and spatial extent of protection measures at key aggregation sites to ensure appropriate levels of protection, and a consistent approach to the designation and implementation of protective measures, are applied. Use Biologically Important Areas (BIA) to help inform the development of appropriate conservation measures, including through the application of advice in the marine bioregional plans on the types of actions which are likely to have a significant impact on the species and updating such conservation measures as new information becomes available.	
		Ecosystem effects – climate change	No explicit relevant management actions; climate change identified as a threat.	

Name	Recovery Plan/Conservation Advice/Management Plan	Threats/strategies identified as relevant to the activity	Relevant Conservation Advice	Addressed (where relevant) in EP Section
Whale shark	Approved Conservation Advice for *Rhincodon typus* (whale shark) (TSSC, 2015a)	Vessel strike	Minimise offshore developments and transit time of large vessels in areas close to marine features likely to correlate with Whale Shark aggregations along the northward migration route that follows the northern Western Australian coastline along the 200 m isobath (as set out in the Conservation Values Atlas, DoE, 2014).	6.1, 6.3, 6.6, 6.7, 7.1, 7.3, 7.6, 7.7
		Habitat disruption from mineral exploration, production and transportation	Implement measures to reduce adverse impacts of habitat degradation and/or modification.	
		Marine debris	No explicit relevant management actions; marine debris identified as a threat.	
		Climate change	No explicit relevant management actions; climate change identified as threat.	
Marine Mammals				
Blue whale	Conservation Management Plan for the Blue Whale (Commonwealth of Australia, 2015a)	Noise interference	Assess and address anthropogenic noise: shipping, industrial and seismic noise.	6.1, 6.3, 6.6, 6.7, 7.1, 7.3, 7.6, 7.7
		Vessel disturbance	Minimise vessel collisions: Develop a national vessel strike strategy that investigates the risk of vessel strike on blue whales and also identifies potential mitigation measures. Ensure all vessel strike incidents are reported in the National Ship Strike Database. Ensure the risk of vessel strikes on blue whales is considered when assessing actions that increase vessel traffic in areas where blue whales occur and, if required, appropriate mitigation measures are implemented.	
		Climate change impacts	Understanding impacts of climate variability and change. Continue to meet Australia's international commitments to reduce greenhouse gas emissions and regulate the krill fishery in Antarctica.	
		Marine debris	No explicit management measures for marine debris.	

Name	Recovery Plan/Conservation Advice/Management Plan	Threats/strategies identified as relevant to the activity	Relevant Conservation Advice	Addressed (where relevant) in EP Section
		Habitat degradation including pollution (increasing port expansion and coastal development)	No explicit management actions. Habitat degradation identified as a threat.	
Fin whale	Approved Conservation Advice for *Balaenoptera physalus* (fin whale) (TSSC, 2015b)	Anthropogenic noise and acoustic disturbance	Once the spatial and temporal distribution (including biologically important areas) of Fin Whales is further defined, assess the impacts of increasing anthropogenic noise (including seismic surveys, port expansion, and coastal development).	6.1, 6.3, 6.6, 6.7, 7.1, 7.3, 7.6, 7.7
		Habitat degradation including pollution (increasing port expansion and coastal development)	No explicit management actions. Habitat degradation identified as a threat.	
		Pollution (persistent toxic pollutants)	No explicit management actions. Pollution identified as a threat.	
		Vessel strike	Develop a national vessel strike strategy that investigates the risk of vessel strikes on Fin Whales and identifies potential mitigation measures. Ensure all vessel strike incidents are reported in the National Vessel Strike Database.	
		Climate change impacts	Understanding impacts of climate variability and change. Continue to meet Australia's international commitments to reduce greenhouse gas emissions and regulate the krill fishery in Antarctica.	
		Marine debris	No explicit management measures for marine debris.	
Sei whale	Approved Conservation Advice for *Balaenoptera borealis* (sei whale) (TSSC, 2015c)	Anthropogenic noise and acoustic disturbance	Once the spatial and temporal distribution (including biologically important areas) of Sei Whales is further defined, assess the impacts of increasing anthropogenic noise (including seismic surveys, port expansion, and coastal development).	6.1, 6.3, 6.6, 6.7, 7.1, 7.3, 7.6, 7.7
		Habitat degradation including pollution (increasing port expansion and coastal development)	No explicit management actions. Habitat degradation identified as a threat.	

Name	Recovery Plan/Conservation Advice/Management Plan	Threats/strategies identified as relevant to the activity	Relevant Conservation Advice	Addressed (where relevant) in EP Section
		Pollution (persistent toxic pollutants)	No explicit management actions. Pollution identified as a threat.	
		Vessel strike	Minimising vessel collisions: Develop a national vessel strike strategy that investigates the risk of vessel strikes on Sei Whales and also identifies potential mitigation measures. Ensure all vessel strike incidents are reported in the National Vessel Strike Database.	
		Climate change impacts	Understanding impacts of climate variability and change. Continue to meet Australia's international commitments to reduce greenhouse gas emissions and regulate the krill fishery in Antarctica.	
		Marine debris	No explicit management measures for marine debris.	
Southern right whale	National Recovery Plan for the Southern Right Whale (Eubalaena australis) (DCCEEW, 2024a)	Vessel disturbance	Develop a national ship strike strategy that quantifies vessel movements within the distribution ranges of southern right whales and outlines appropriate mitigation measures that reduce impacts from vessel collisions.	6.1, 6.3, 6.6, 6.7, 7.1, 7.3, 7.6, 7.7
		Marine debris	No explicit relevant management actions; entanglement in marine debris identified as a threat.	
		Noise interference	Assess and address anthropogenic noise: shipping, industrial and seismic noise.	
		Climate change impacts	Understanding impacts of climate variability and change. Continue to meet Australia's international commitments to reduce greenhouse gas emissions and regulate the krill fishery in Antarctica.	
		Habitat degradation including pollution (increasing port expansion and coastal development)	No explicit management actions. Habitat degradation identified as a threat.	

Name	Recovery Plan/Conservation Advice/Management Plan	Threats/strategies identified as relevant to the activity	Relevant Conservation Advice	Addressed (where relevant) in EP Section
Marine reptiles				
All marine turtles	National Light Pollution Guidelines for Wildlife Including Marine Turtles, Seabirds and Migratory Shorebirds (DCCEEW, 2023a)	Light pollution	N/A	6.1, 6.3, 6.6, 6.7, 7.1, 7.3, 7.6, 7.7
	Recovery Plan for Marine Turtles in Australia 2017 to 2027 (DoEE, 2017a)	Habitat degradation / modification	Manage anthropogenic activities to ensure marine turtles are not displaced from identified habitat critical to the survival. Manage anthropogenic activities in Biologically Important Areas to ensure that biologically important behaviour can continue.	
		Vessel disturbance	Vessel interactions identified as a threat; no specific management actions in relation to vessels prescribed in the plan.	
		Light pollution	Minimise light pollution: Artificial light within or adjacent to habitat critical to the survival of marine turtles will be managed such that marine turtles are not displaced from these habitats. Develop and implement best practice light management guidelines for existing and future developments adjacent to marine turtle nesting beaches. Identify the cumulative impact on turtles from multiple sources of onshore and offshore light pollution.	
		Noise interference	Assess and address anthropogenic noise: Understand the impacts of anthropogenic noise on marine turtle behaviour and biology.	
		Pollution (persistent toxic pollutants)	Minimise chemical and terrestrial discharge.	
		Climate change	Adaptively manage turtle stocks to reduce risk and build resilience to climate change and variability. Continue to meet Australia's international commitments to address the causes of climate change.	

Name	Recovery Plan/Conservation Advice/Management Plan	Threats/strategies identified as relevant to the activity	Relevant Conservation Advice	Addressed (where relevant) in EP Section
			Identify, test and implement climate-based adaptation measures.	
		Marine debris	Reduce the impacts from marine debris. Support the implementation of the EPBC Act Threat Abatement Plan for the impacts of marine debris on vertebrate marine life.	
Seabirds and shorebirds				
All migratory seabirds and shorebirds	National Light Pollution Guidelines for Wildlife Including Marine Turtles, Seabirds and Migratory Shorebirds (DCCEEW, 2023a)	Light Pollution	Best practice lighting design incorporates the following design principles: Start with natural darkness and only add light for specific purposes. Use adaptive light controls to manage light timing, intensity and colour. Light only the object or area intended – keep lights close to the ground, directed and shielded to avoid light spill. Use the lowest intensity lighting appropriate for the task. Use non-reflective, dark-coloured surfaces. Use lights with reduced or filtered blue, violet and ultra-violet wavelengths	6.2
All migratory shorebirds	Wildlife Conservation Plan for Migratory Shorebirds (Commonwealth of Australia, 2015c)	Anthropogenic disturbance	Ensure all areas of important habitat for seabirds are considered in the development assessment process. Manage the effects of anthropogenic disturbance to seabird breeding and roosting areas.	6.2, 7.1, 7.6, 7.7
All seabirds	Wildlife Conservation Plan for Seabirds (Commonwealth of Australia, 2020b).	Habitat modification, marine debris	No explicit relevant management actions	7.1, 7.6, 7.7
All albatross and petrels	Threat Abatement Plan for the Incidental Catch (or Bycatch) of Seabirds During Oceanic Longline Fishing Operations (Commonwealth of Australia, 2018a)	Direct mortality from pollution and contamination.	No explicit relevant management actions	7.1,7.4 7.6, 7.7,7.8
	National Recovery Plan for Albatrosses and Petrels	Habitat degradation and modification,		

Name	Recovery Plan/Conservation Advice/Management Plan	Threats/strategies identified as relevant to the activity	Relevant Conservation Advice	Addressed (where relevant) in EP Section
	(Commonwealth of Australia, 2022)	pollution and contamination.		
Abbott's booby	Approved Conservation Advice for *Papasula abbotti* (Abbott's Booby) (TSSC, 2020a)	Habitat loss, disturbance and modifications	No explicit management actions; Habitat loss, disturbance and modifications as threats.	7.6, 7.7
Australian fairy tern	Commonwealth Conservation Advice on *Sternula nereis nereis* (Fairy Tern) (TSSC, 2011)	Habitat degradation and modification, pollution and contamination.	No explicit relevant management actions	7.1,7.4 7.6, 7.7,7.8
Australian lesser noddy	Conservation Advice *Anous tenuirostris melanops* (Australian lesser noddy) (Commonwealth of Australia, 2015d)	Habitat loss, disturbance and modifications	Reduce human disturbance at the Houtman Abrolhos.	7.1,7.4 7.6, 7.7,7.8
Australian painted snipe	Approved Conservation Advice for *Rostratula australis* (Australian Painted Snipe) (TSSC, 2013) National Recovery Plan for the Australian Painted Snipe (Rostratula australis) (CoA, 2022)	Habitat degradation and modification, pollution and contamination.	No explicit relevant management actions	7.1,7.4 7.6, 7.7,7.8
Blue petrel	Approved Conservation Advice *Halobaena caerulea* (Blue petrel) (TSSC, 2015d)	Habitat loss, disturbance and modifications	No explicit management actions that relate to the activity.	7.6, 7.7
Christmas Island frigatebird	Approved Conservation Advice *Fregata andrewsi* (Christmas Island Frigatebird) (TSSC, 2016e) National recovery plan for the Christmas Island Frigatebird (*Fregata andrewsi*) (Hill and Dunn, 2004)	Habitat loss, disturbance and modifications	Preventing activities in habitat critical to the survival that will remove nesting and roosting habitat. Preventing activities in buffer areas identified in Map 1 that may disturb nesting and roosting birds	7.6, 7.7
Christmas Island goshawk	National recovery plan for the Christmas Island Goshawk Accipiter *fasciatus natalis* (Hill, 2004)	Habitat loss, disturbance and modifications	No explicit management actions that relate to the activity.	7.6, 7.7
Christmas Island white-tailed tropicbird (*Golden bosunbird*)	Conservation Advice Phaethon lepturus fulvus white-tailed tropicbird (Christmas Island) (TSSC, 2014)	Habitat degradation and modification, pollution and contamination.	No explicit management actions that relate to the activity.	7.1,7.4 7.6, 7.7,7.8
Curlew sandpiper	Conservation Advice for *Calidris ferruginea* (Curlew Sandpiper) (DCCEEW, 2023b)	Habitat loss and degradation from pollution	No explicit relevant management actions; oil pollution recognised as a threat.	7.1,7.4 7.6, 7.7,7.8

Name	Recovery Plan/Conservation Advice/Management Plan	Threats/strategies identified as relevant to the activity	Relevant Conservation Advice	Addressed (where relevant) in EP Section
Eastern curlew	Conservation Advice for Numenius madagascariensis (far eastern Curlew) (DCCEEW, 2023c)	Habitat loss and degradation from pollution	No explicit relevant management actions	7.1,7.4 7.6, 7.7,7.8
Great knot	Approved Conservation Advice *Calidris tenuirostriss* (Great Knot) (TSSC, 2016b)	Habitat loss and degradation, pollution and climate change	No explicit management actions that relate to the activity.	7.6, 7.7
Greater sand plover	Approved Conservation Advice *Charadrius leschenaultii* (Greater Sand Plover) (TSSC, 2016c)	Habitat loss and degradation and pollution	No explicit relevant management actions; oil pollution recognised as a threat.	7.6, 7.7
Grey falcon	Conservation Advice *Falco hypoleucos* Grey Falcon (TSSC, 2020a)	Habitat loss and degradation, pollution and climate change	No explicit management actions that relate to the activity.	7.6, 7.7
Lesser sand plover	Approved Conservation Advice *Charadrius mongolus* (Lesser Sand Plover) (TSSC, 2016d)	Habitat loss and degradation and pollution	Outlines research and survey priorities and recommends habitat restoration/ maintenance.	7.6, 7.7
Northern Siberian bar-tailed godwit (Russkoye bar-tailed godwit)	Conservation Advice for Limosa lapponica menzbieri (Yakutian bar-tailed Godwit) (DCCEEW, 2024b)	Habitat loss and degradation, pollution and climate change	No explicit management actions that relate to the activity.	7.6, 7.7
Red goshawk	National recovery plan for the red goshawk *Erythrotriurchis radiatus* (DERM, 2012)	Habitat loss and degradation	No explicit management actions that relate to the activity.	7.6, 7.7
Red knot	Approved Conservation Advice for *Calidris canutus* (Red knot) (DCCEEW, 2024c)	Habitat loss, disturbance and degradation, climate change, pollution and direct mortality (oil spills)	No explicit management actions that relate to the activity.	7.6, 7.7
Shy albatross	Conservation Advice Thalassarche cauta (Shy Albatross) (CoA, 2020b) Also refer to National Recovery Plan for Threatened Albatrosses and Giant Petrels 2011-2016 (DSEWPaC, 2011b) detailed under all giant-petrels and albatrosses above	Climate change and marine pollution	No explicit management actions that relate to the activity.	7.4, 7.6, 7.7
Soft-plumaged petrel	Approved Conservation Advice for *Pterodroma mollis* (Soft-Plumaged Petrel) (TSSC, 2015e)	Habitat loss, disturbance and modifications	No explicit management actions; Habitat loss, disturbance and modifications as threats.	7.6, 7.7

14. Social and Economic Features

14.1. Industry

In 2020/21, Western Australia's petroleum industry was worth $23 billion. The petroleum sector accounted for 10.4 % of the total value of WA's mineral and petroleum sales in 2020/21, with 7.5 % of all mineral and petroleum sales coming from Liquefied Natural Gas (LNG). This is a 37 % decrease in prices compared to 2018/19. The decrease was accounted for by a drop in oil prices due to excess supply from the COVID-19 pandemic and related economic shutdowns, operation issues at Gorgon, Prelude remaining offline until January 2021 along with maintenance shutdowns at the North West Shelf and Wheatstone. Currently Western Australia has five operating LNG projects; the North West Shelf, Gorgon, Pluto, Wheatstone and Prelude. Offshore development is focussed on the Carnarvon Basin, Browse Basin and on the North West Shelf (DMP 2014). There are also domestic gas plants on Varanus Island in the North West Shelf, Devil Creek Onshore Gas Plant and Macedon Gas Plant in the Pilbara region and an oil facility near Dongara called Cliff Head. There are several exploration and production permits and leases throughout WA and Commonwealth waters in the EMBA. Existing petroleum infrastructure, permits and licences are shown in Figure 18.

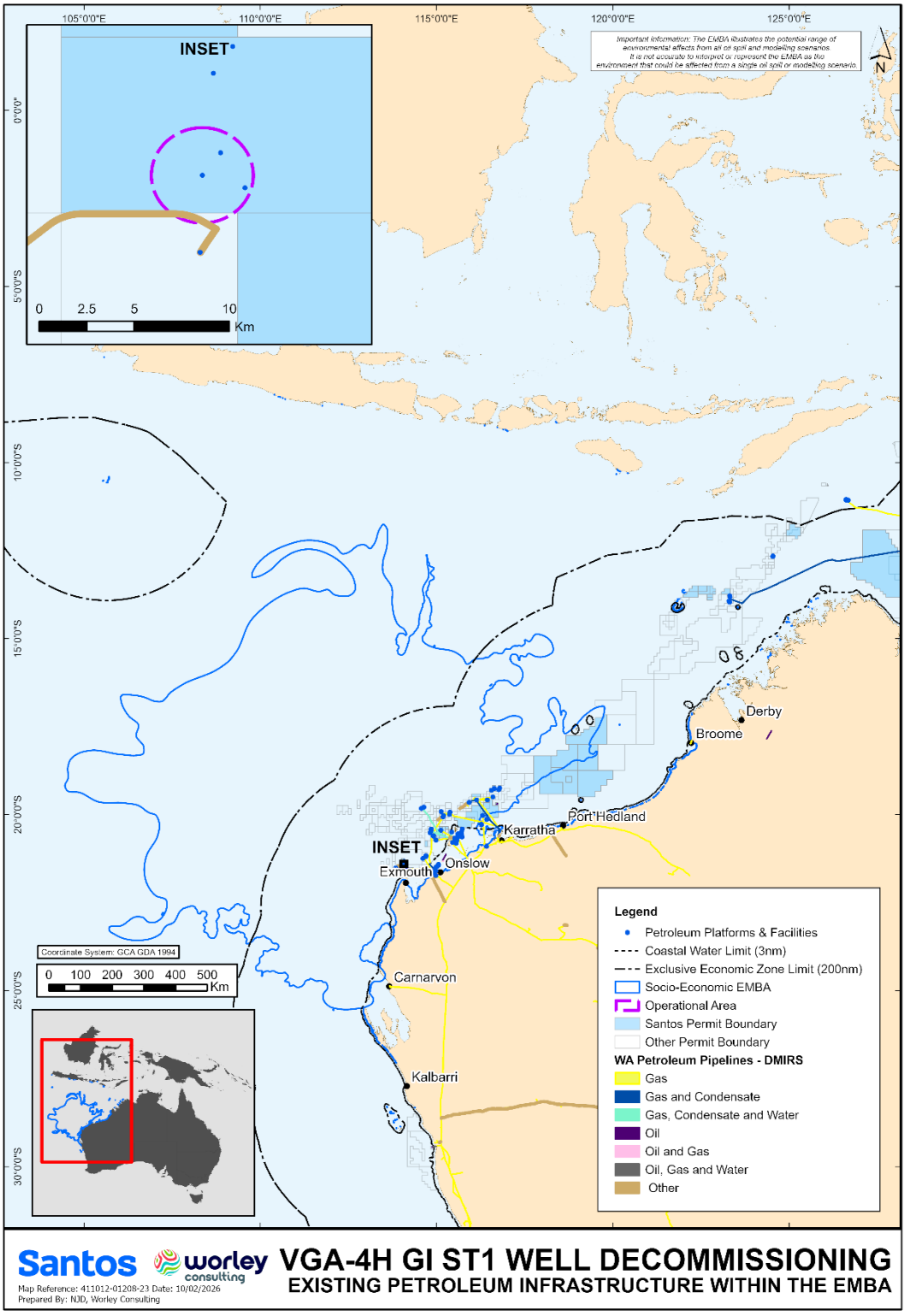


Figure 18: Existing petroleum infrastructure, permits and licences in the EMBA

14.2. Shipping

The Western Australian coastline supports twelve ports including the major ports of Dampier, Port Hedland and Broome which are operated by their respective port authorities. Large cargo vessels move through the region to and from Fremantle, transiting along coastline. Commercial shipping also moves to and from marine terminals associated with the oil and gas industry (see Section 14.1).

The Australian Maritime Safety Authority (AMSA) has established a network of shipping fairways off the north-west coast of Australia to manage traffic patterns (AMSA 2013). The Shipping Fairways are designed to keep shipping traffic away from offshore infrastructure and aims to reduce the risk of collision (AMSA 2013).

Use of the fairways is strongly recommended but not mandatory. The International Regulations for *Preventing Collisions at Sea 1972* apply to all vessels navigating within or outside the shipping fairways. The use of these fairways does not give vessels any special right of way (AMSA 2012).

Under the *Commonwealth Navigation Act 2012*, certain vessels operating in Australian waters are required to report their location on a daily basis to the Rescue Coordination Centre (RCC) in Canberra. This Australian Ship Reporting System (AUSREP) is an integral part of the Australian Maritime Search and Rescue system and is operated by AMSA through the RCC. Vessels recorded in waters in the EMBA through the AUSREP system in 2023 are shown in Figure 19.

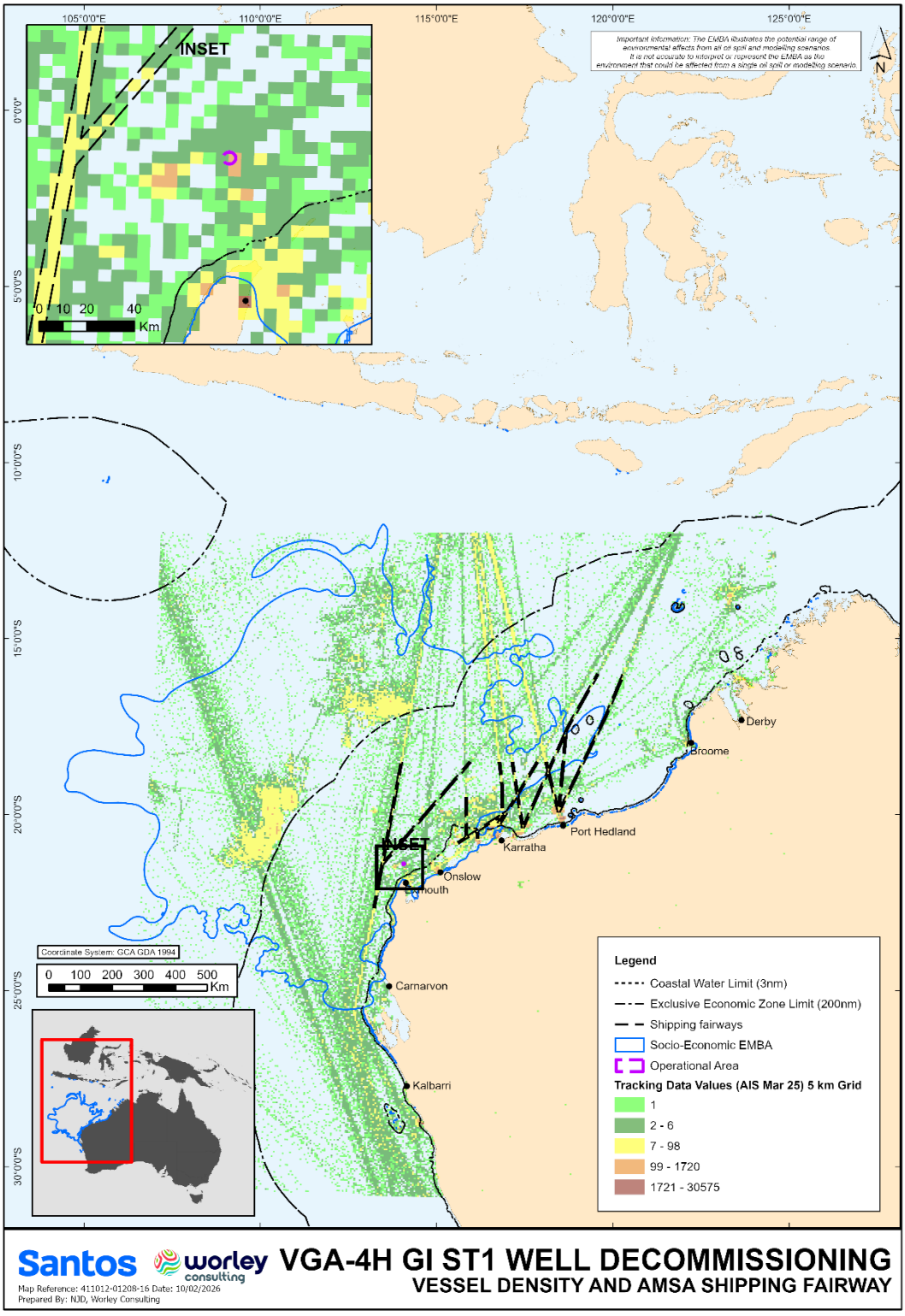


Figure 19: AMSA ship locations and shipping routes within the EMBA

14.3. Defence Activities

Key defence bases and facilities are illustrated in Figure 20.

One Royal Australian Airforce (RAAF) bases are located in the EMBA (Learmonth RAAF Base, near Exmouth).

Designated military exercise areas occur over waters and airspace of the north west of WA and may be activated following the required notifications.

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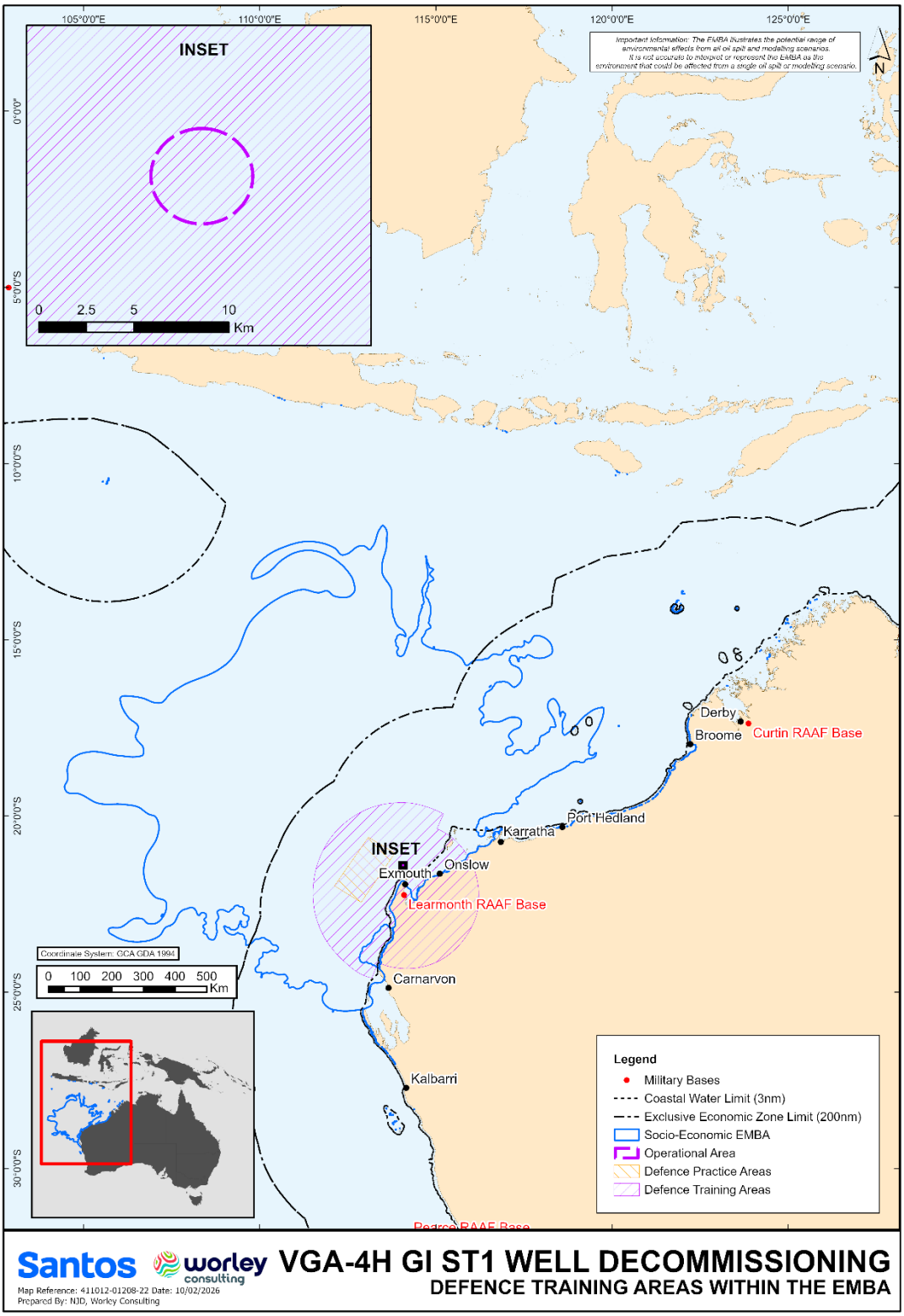

Figure 20: Defence activities in the EMBA

14.4. Tourism

The Kimberley, Pilbara and Gascoyne regions are popular visitor destination for Australian and international tourists. Tourism is concentrated in the vicinity of population centres including Broome, Dampier, Exmouth, Coral Bay and Shark Bay.

Marine tourism to offshore Islands includes various Pilbara nearshore Islands (Muiron, Serrurier, Sholl and Montebello) and the Abrolhos Islands near Geraldton. Currently visitation to the Abrolhos is low because the park is only accessible via recreational boat, charter flight or commercial tour (either on a boat or aircraft); however, there is an increasing number of visitors, with visitations peaking between February and May (DBCA, 2022). The Montebello Islands are ranked among the world's most bio-diverse marine environments (DBCA) and are attracting a growing number of nature-based tourism operators, with people participating in activities such as fishing, diving, wildlife viewing, island exploration and surfing (DEC 2007).

Tourism contributes to local economies in terms of both income and employment and tourists include local, interstate and international visitors. Popular water-based activities include fishing, swimming, snorkelling/ diving, surfing/windsurfing/kiting and boating, while popular land-based activities include bushwalking, camping, bird watching and four-wheel driving.

Seasonal nature-based tourism such as humpback whale watching, whale shark encounters and tours of turtle hatching mainly occurring around Ningaloo Reef, and Cape Range National Park (Tourism Western Australia 2014). Seasonal aggregations of whale sharks, manta rays, sea turtles and whales, as well as the annual mass spawning of coral attract large numbers of visitors to Ningaloo each year (CALM 2005).

14.5. Maritime Heritage

Details of recorded shipwreck sites are available on the Australian National Shipwreck Database are managed by the DCCEEW although precise locations of the wrecks are sometimes unknown. Under the Commonwealth *Underwater Culture Heritage Act 2018* all shipwrecks older than 75 years are protected, while those dated pre-1900 are protected by WA law under the *Maritime Archaeology Act 1973*. Within the EMBA, there are 1123 shipwrecks known to be in excess of 75 years old as of March 2024.Commercial Fisheries

A valuable and diverse commercial fishing industry is supported by both the offshore and coastal waters in the North Coast, Gascoyne, West Coast and South Coast Bioregions between the WA and NT and South Australian borders. The major fisheries in this area target tropical finfish, large pelagic fish species, crustaceans (prawns and scampi), Western Rock Lobster and pearl oysters (Fletcher and Santoro 2013). A number of smaller fisheries also exist in this area including the octopus and beche-de-mer fisheries.

14.5.1. State Fisheries

State fisheries are managed by the WA Department of Primary Industries and Regional Development (DPIRD) (formerly Department of Fisheries (DoF)) with specific management plans, regulations and a variety of subsidiary regulatory instruments under the *Fish Resources Management Act 1994* (WA). The information on State managed fisheries has been derived from '*The State of the Fisheries'* Report 20 (Newman et al. 2023) and direct consultation with DPIRD. Santos consults regularly with State fisheries relevant to activity operational areas, mainly by distribution of an Annual Consultation Update by post (as well as conducting further consultation in preparing an EP under s 25 of the Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2023.

State commercial fisheries that exist within the EMBA are shown in Figure 21 to

Figure 23. A summary of all commercial fisheries wholly or partially operating in the EMBA is also provided in Table 22

Some of the fisheries will be more susceptible to impacts than others, particularly fisheries without the ability to escape impacts. For example, above average water temperatures over the last three years will have had an impact on prawn fisheries in Exmouth and scallops and blue swimmer crabs in Shark Bay which have been significantly affected by the initial heat wave event of 2010/11 (Caputi et al. 2014).

14.5.2. Commonwealth Fisheries

Commonwealth fisheries are those within the 200 nautical mile Australian Fishing Zone (AFZ) managed by Australian Fisheries Management Authority (AFMA) and are, on the high seas, and, in some cases, by agreement with the States and Territory, to the low water mark. Information on Commonwealth managed fisheries has been derived from '*Fishery Status'* Report 2019 (Department of Agriculture 2019).

Commonwealth commercial fisheries between Kalbarri (WA) and the NT Border are shown Figure 24 **a**nd summarised in Table 22**.**

Table 22: Commercial fisheries with permits to operate within the EMBA

Fishery	Fishery Licence Area Overlap			Description[1]	Fishing activity within operational area
	OA	Ecological EMBA	Socio-economic EMBA		
Commonwealth Managed Fisheries					
North West Slope Trawl Fishery	✓	✓	✓	Fishery extends from 114° E to approximately 125° E off the WA coast between the 200 m isobath and the outer limit of the Australian Fishing Zone (AFZ). Demersal crustacean trawl occurs seaward of the 200m isobath.	No active commercial fishing in or near the operational area in the past ten years
Southern Bluefin Tuna Fishery	✓	✓	✓	Consists of all Australian waters to 200 nm from the coast. Fishing activity concentrated off South east Australia and in the Great Australian Bight.	No active commercial fishing effort reported in WA, as fishing efforts are concentrated off South Australia.
Southern Tuna and Billfish Fishery	✗	✓	✓	Covers the sea area west from the tip of Cape York in Queensland, around Western Australia, to the border between Victoria and South Australia. Fishing occurs in both the Australian Fishing Zone and adjacent high seas	There has been no effort in the fishery since the 2008-09 fishing season.
Western Deepwater Trawl Fishery	✗	✓	✓	Extends in the north from the boundary of the AFZ to 114° E, to the southern boundary of the AFZ to 115°08' E. Fishing occurs from the 200 m isobath to the edge of the AFZ.	No active commercial fishing in or near the operational area in the past 5 years
Western Skipjack Tuna Fishery	✓	✓	✓	Separated into two sectors (east and west). Fishery is located in all Australian waters west of 142° 30' 00°E, out to 200 nm from the coast.	No active commercial fishing in or near the operational area in the past ten years

[9] All descriptions based on Newman et al. (2023) and Patterson et al. (2023) unless otherwise cited

Fishery	Fishery Licence Area Overlap			Description[1]	Fishing activity within operational area
	OA	Ecological EMBA	Socio-economic EMBA		
Western Tuna and Billfish Fishery	✓	✓	✓	Extends west from Cape York Peninsula (Queensland) to 34° S off the Western Australian coast. The fishery also extends east across the Great Australian Bight to 141° E. Fishing effort concentrated off south-west Western Australia (WA). Since 2005, there has been fewer than five vessels active in the Western Tuna and Billfish Fishery each year, which has reportedly declined from 50 active vessels in 2000. Fishing activity in the Western Tuna and Billfish Fishery concentrates in waters off southwest Western Australia, and off South Australia.	No active commercial fishing in or near the operational area in the past 5 years
State Managed Fisheries					
Abrolhos Island and Midwest Trawl	✗	✗	✓*	This fishery focused on harvesting saucer scallops (*Ylistrum balloti*) and, to a lesser extent, western king prawns (*Penaeus latisulcatus*) in the waters around the Abrolhos Islands and the mid-west coast.	FishCube data shows no recent active fishing in the operational area
Broome Prawn Fishery	✗	✗	✓*	This trawl fishery operates off Broome and targets western king prawns (*Penaeus latisulcatus*) and coral prawns.	FishCube data shows no recent active fishing in the operational area
Exmouth Gulf Prawn Managed Fishery	✗	✓	✓	This fishery operates in sheltered waters on the western half of the Exmouth Gulf. The Muiron Islands and Point Murat provide western boundary; Serrurier Island provides northern limit.	FishCube data shows no recent active fishing in the operational area

Fishery	Fishery Licence Area Overlap			Description[1]	Fishing activity within operational area
	OA	Ecological EMBA	Socio-economic EMBA		
Gascoyne Demersal Scalefish Managed Fishery	✗	✓	✓	The fishery operates between latitudes 23°07'30"S and 26°30'S in the waters of the Indian Ocean and Shark Bay. Vessels not permitted to fish in inner Shark Bay. Merchandised handlines.	FishCube data shows no recent active fishing in the operational area
Kimberly Crab Fishery	✗	✗	✓*	A small developing fishery that targets the green (giant) mud crab and the brown (orange) mud crab via the use of crab traps, between Broome and Cambridge Gulf near the WA and Northern Territory border. Most fishing effort is concentrated around Cambridge Gulf, Admiralty Gulf, York Sound and King Sound.	FishCube data shows no recent active fishing in the operational area
Kimberly Gilnet and Barramundi	✗	✗	✓*	This fishery targets barramundi and also takes threadfin species, operating in nearshore and estuarine zones from the Northern Territory border to the top end of Eighty Mile Beach, south of Broome.	FishCube data shows no recent active fishing in the operational area
Kimberly Prawn Managed Fishery	✗	✗	✓*	This trawl managed fishery operates off the north of WA between Koolan Island and Cape Londonderry. It predominantly targets banana prawns but also catches tiger prawns, endeavour prawns and western king prawns.	FishCube data shows no recent active fishing in the operational area
Nickol Bay Prawn Managed Fishery	✗	✓	✓	Extends northward from the Exmouth Prawn Fishery and east to the 200 m isobath at 114° 39.9'.	FishCube data shows no recent active fishing in the operational area

Fishery	Fishery Licence Area Overlap			Description[1]	Fishing activity within operational area
	OA	Ecological EMBA	Socio-economic EMBA		
Northern Demersal Scalefish Managed Fishery	✗	✓	✓	This fishery operates off the northwest coast of Western Australia in the waters east of 120° E longitude. These waters extend out to the edge of the Australian Fishing Zone (200 nautical miles). Consists of three zones: Zone A (inshore area), Zone B (most active fishing area) and Zone C (offshore deep slope developmental area). Further divided into two sections consisting of an offshore and inshore sector.	FishCube data shows no recent active fishing in the operational area
Onslow Prawn Managed Fishery	✗	✓	✓	The boundaries of this fishery are 'all the WA waters between the Exmouth Prawn Fishery and the Nickol Bay Prawn Fishery east of 114°39.9' on the landward side of the 200 m depth isobath'. Prawn trawling activities focus on inshore areas between Onslow and Karratha.	FishCube data shows no recent active fishing in the operational area
Pearl Oyster Managed Fishery	✗	✓	✓	The fishery operates in shallow coastal waters along the North Coast Bioregion of WA from Exmouth Gulf to the Northern Territory border. The harvesting of wildstock occurs mainly along Eighty Mile Beach.	FishCube data shows no recent active fishing in the operational area
Pilbara Demersal Scalefish Fisheries (includes trap and trawl fisheries)	✗	✓	✓	Comprised of the: • Pilbara Fish Trawl (Interim) Managed Fishery occupying the waters north of latitude 21°35'S and between longitudes 114°9'36"E and 120°E. Seaward of the 50 m isobath and landward of the 200 m isobath, consists of two zones; • Pilbara Trap Managed Fishery, permitted to operate between 21°56´ S latitude and the high water mark on the western side of the North West Cape; and • Pilbara Line Fishery, limited within Pilbara waters from 21° 56' S to 120 E.	FishCube data shows no recent active fishing in the operational area
Pilbara Developmental Crab Managed Fishery	✓	✓	✓	Concentrated in coastal embayment's and estuaries between Geographe Bay and Nickol Bay. Fishing in the Pilbara coast primarily occurs from Onslow to Port Hedland in inshore waters.	FishCube data shows no recent active fishing in the operational area

Fishery	Fishery Licence Area Overlap			Description[1]	Fishing activity within operational area
	OA	Ecological EMBA	Socio-economic EMBA		
Shark Bay Crab Managed Fishery	✗	✓	✓	Located within the waters of Shark Bay extending from Dirk Hartog Island to Steep Point on the mainland.	FishCube data shows no recent active fishing in the operational area
Shark Bay Prawn Managed Fishery	✗	✓	✓	Located within the waters of Shark Bay extending from south of Denham to north of Koks Island and Carnarvon.	FishCube data shows no recent active fishing in the operational area
Shark Bay Scallop Managed Fishery	✗	✓	✓	Located within the waters of Shark Bay extending between 23°34’ S 26°30’ S to the 200 m isobath.	FishCube data shows no recent active fishing in the operational area
West Coast Deep Sea Crustacean Managed fishery	✓	✓	✓	Targets crystal crabs, giant crabs, and champagne crabs in the shelf edge waters (over 150m) of the West Coast and Gascoyne Bioregions. The fishery's area extends from Cape Leeuwin to WA's border with the Northern Territory, encompassing parts of the Indian Ocean and Timor Sea, within Australia's exclusive economic zone.	FishCube data shows no recent active fishing in the operational area
West Coast Demersal Scalefish	✗	✓	✓	This fishery encompasses the inshore areas (coastline to 250m depth) and the offshore area (250m depth to the 200 nautical mile limit) from north of Kalbarri to Augusta.	FishCube data shows no recent active fishing in the operational area

Fishery	Fishery Licence Area Overlap			Description[1]	Fishing activity within operational area
	OA	Ecological EMBA	Socio-economic EMBA		
West Coast Gilnet/Demersal Longline	✗	✗	✓*	This fishery operates in continental shelf waters along the south and lower west coasts. The main shark species targeted in the TDGDLF are gummy shark (*Mustelus antarcticus*), dusky shark *(Carcharhinus obscurus*), whiskery shark (*Furgaleus macki)* and sandbar shark (*Carcharhinus plumbeus*).	FishCube data shows no recent active fishing in the operational area
West Coast Rock Lobster Managed Fishery	✗	✓	✓	This fishery targets the western rock lobster between Shark Bay and Cape Leeuwin. Baited traps (pots) and with a commercial and recreational fishing season.	FishCube data shows no recent active fishing in the operational area
State Managed Fisheries (whole of the state)					
Abalone Managed Fishery	✗	✗	✓	Shallow coastal waters off the coast of Western Australia. Divided into eight management areas, commercial fishing for greenlip/brownlip abalone is managed in three sectors.	FishCube data shows no recent active fishing in the operational area
Mackerel Managed Fishery	✓	✓	✓	Trolling or handline. Near-surface trolling gear from vessels in coastal areas around reefs, shoals, and headlands.	FishCube data shows no recent active fishing in the operational area
Marine Aquarium Fish Managed Fishery	✓	✓	✓	Operates in Western Australian state waters. Restricted by diving depths. Commercial operators are permitted to take over 250 species of finfish as well as coral, live rock, algae, seagrass, and invertebrates.	FishCube data shows no recent active fishing in the operational area

Fishery	Fishery Licence Area Overlap			Description[1]	Fishing activity within operational area
	OA	Ecological EMBA	Socio-economic EMBA		
Octopus Interim Managed Fishery	✗	✗	✓*	Lines and pots, trawl and trap land octopus as by-product. Fishery is in development phase and occurs between Kalbarri and Esperance.	FishCube data shows no recent active fishing in the operational area
South-West Coast Salmon Fishery	✓	✓	✓	There are currently six licences. Licensees are not restricted to specific beaches but in practice only a few beaches are fished. In 2018 there were three active vessels in this fishery.	FishCube data shows no recent active fishing in the operational area
Specimen Shell Managed Fishery	✓	✓	✓	Dive based fishery, operates all year through Western Australian waters between the high-water mark and the 200m isobath'. Hand harvest method used; an exemption method being employed is using a remote-controlled underwater vehicle between depths of 60-300 m.	FishCube data shows no recent active fishing in the operational area

14.6. Aquaculture

14.6.1. Gascoyne Coast Bioregion

Hatchery production of oysters is the core of the pearling industry in the Gascoyne region. Hatcheries in Carnarvon and Exmouth supply spat to pearl farms in the north-west and several hatcheries supply juveniles to the black-lip pearl oyster to developing black pearl farms in the region. Pearl production is carried out on a small scale in Shark Bay and Exmouth Gulf. The local aquiculture sector is also focussing on the production of aquarium species.

14.6.2. North Coast Bioregion

Aquaculture development in this region is dominated by the production of pearls from the species *Pinctada maxima.* Each year, approximately 500,000 wild individuals are harvested, with the majority being from Eighty Mile Bean in Broome, Western Australia (sourced from Fisheries Research and Development Cooperation in Thomas and Miller 2022). A large number of pearl oysters for seeding is obtained from wild stocks and supplemented by hatchery-produced oysters with major hatcheries operating at Broome and the Dampier Peninsular. Pearl farm sites are located mainly along the Kimberley coast, particularly in the Buccaneer Archipelago, in Roebuck Bay and at the Montebello Islands. Developing marine aquaculture initiatives in this region include growing trochus and barramundi.The - Fishery of Western Australia operates in shallow coastal waters (DoF 2006). All the leases are within the 35m diving depth, with commercial diving predominantly occurring in nearshore habitats of 8-15 m depths (sourced from Fisheries Research and Development Cooperation in Thomas and Miller, 2022). Thomas and Miller (2022) demonstrated high levels of gene flow among inshore (8-15 m water depth) and offshore sites (35 m water depth) and no differences in genetic diversity between depths indicating high levels of dispersal and connectivity among inshore and offshore fishing grounds

The Pearl Producer's Association (PPA) assert that spawning stock for pearl oysters occur out to the 100 m depth contour, however, evidence for this is lacking. Condie et al. (2006) modelled oyster larva transport in the Eighty Mile Beach region and found that while some larvae travelled more than 60 km, most were transported less than 30 km. The model results suggested that spawning in the Eighty Mile Beach region is concentrated around the 8 to 15m depth range, with potential smaller contributions from the northeast. These spawning events are likely to lead to successful recruitment locally and alongshore to the southwest.

However, spat abundances seem to be low in these areas, suggesting that recruitment is strongly limited by habitat availability and possibly high mortality rates in shallow water. High local abundances of broodstock and spat observed occasionally in deeper water (<30 m) seem to be supported by intermittent larval transport from inshore populations. Spawning in this area seems to contribute little to recruitment in the inshore populations.

Whalan et al. (2021) used image-based and acoustic methods to elucidate distribution patterns of *P. maxima* off Eighty Mile Beach, including data from 862 km^2 of multibeam survey and 119 towed video transects spanning an area from the 20 to 100 m contour lines. They quantified habitat characters including depth, substrate, and benthic community composition associated with pearl oyster distribution. Multibeam sonar data was also coupled with towed video data to produce predictive statistical models of *P. maxima* habitat. They found *P. maxima* to depths of 76 m, although more than 90 % of individuals occurred shallower than 40 m and less than 2 % were found deeper than 50 m. Oysters occupied flat, sandy habitats with neighbouring benthic communities of filter feeders (>98 % of observations). These results show *P. maxima* predominantly occurs in depths < 40 m, with no evidence that extensive populations extend into deep water in the region.

Further aquaculture in this region mainly focuses on barramundi farming within Cone Bay, with two aquaculture licences granted in this area located about 200 km north-east of Broome (Gaughan and Santoro 2020).

Further aquaculture operations have expanded in the region with the establishment of the Kimberley Aquaculture Development zone, which encompasses almost 2,000 ha of coastal waters within Cone Bay supporting the production of up to 20,000 t of finfish annually (Gaughan and Santoro 2020).

14.7. Recreational Fisheries

14.7.1. West Coast Bioregion

The marine environment of the West Coast Bioregion which lies between Kalbarri and Augusta is predominantly a temperate oceanic zone, but it is heavily influenced by the Leeuwin current, which transports warm tropical water southward along the edge of the continental shelf. This region contains the state's major population centres and is the most heavily used bioregion for recreational fishing (Fletcher and Santoro 2015). The range of recreational fishing opportunities includes estuarine fishing, beach fishing and boat fishing either in embayments or offshore for demersal and pelagic game species often around the islands and out to the continental shelf (WAFIC 2016).

14.7.2. Gascoyne Coast Bioregion

The Gascoyne Coast Bioregion extends from just north of Kalbarri to the Ashburton River, south of Onslow. The marine environment of this region represents a transition between the fully tropical waters of the north-west shelf of the north coast region and the temperate waters of the west coast region. This region has been identified as one of the 18 world 'hotspots' in terms of tropical reef endemism and the second most divers marine environment in the world in terms of tropical reef species. This region is a focal point for winter recreational fishing and is a key component of many tourist visits. Angling activities include beach and cliff fishing (e.g. Steep Point and Quobba), embayment and shallow-water boat angling (e.g. Shark Bay, Exmouth Gulf and Ningaloo lagoons), and offshore boat angling for demersal and larger pelagic species (e.g. off Ningaloo). The predominant target species include the tropical species such as emperors, tropical snappers, groupers, mackerels, trevallies and other game fish. Temperate species at the northern end of their ranges such as pink snapper, tailor and whiting also provide significant catches, particularly in Shark Bay (WAFIC 2016).

14.7.3. North Coast Bioregion

The North Coast Bioregion (Pilbara/Kimberley) runs from the Ashburton River to the Western Australia/Northern Territory border (WAFIC 2016). The oceanography of this region includes waters of Pacific Ocean origin that enter through the Indonesian archipelago bringing warm, low salinity waters polewards via the Indonesian throughflow and Holloway currents which flow seasonally and interact with Indian ocean waters. Recreational fishing is experiencing a significant growth in this region, with a distinct seasonal peak in winter when the local population increases by significant numbers of metropolitan and inter-state tourists. This has been added to by the increased recreational fishing by those involved in the construction or operation of major developments in this region. Owing to the high tidal range, much of the angling activity is boat-based with beach fishing limited to periods of flood tides and high water. Numerous creek systems, mangroves, rivers and ocean beaches provide shore and small boat fishing for a variety of species including barramundi, tropical emperors, mangrove jack, trevallies, sooty grunter, threadfin, mud crabs and cods. Offshore islands, coral reef systems and continental shelf waters provide species of major recreational interest including saddletail snapper and red emperor, cods, coral and coronation trout, sharks, trevally, tuskfish, mackerels and billfish (WAFIC 2016).

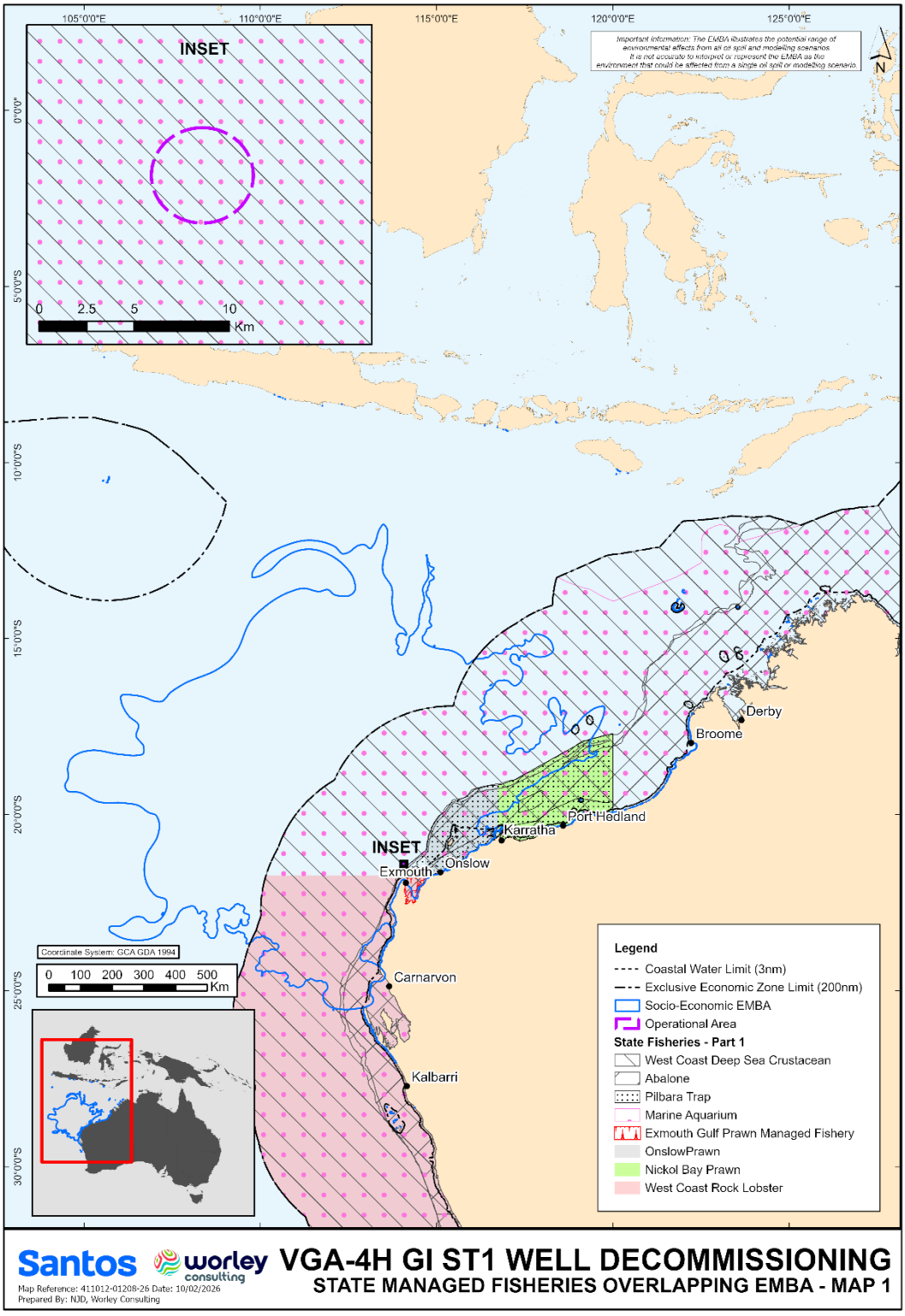

Figure 21: WA state commercial fishing zones (Figure 1 of 3)

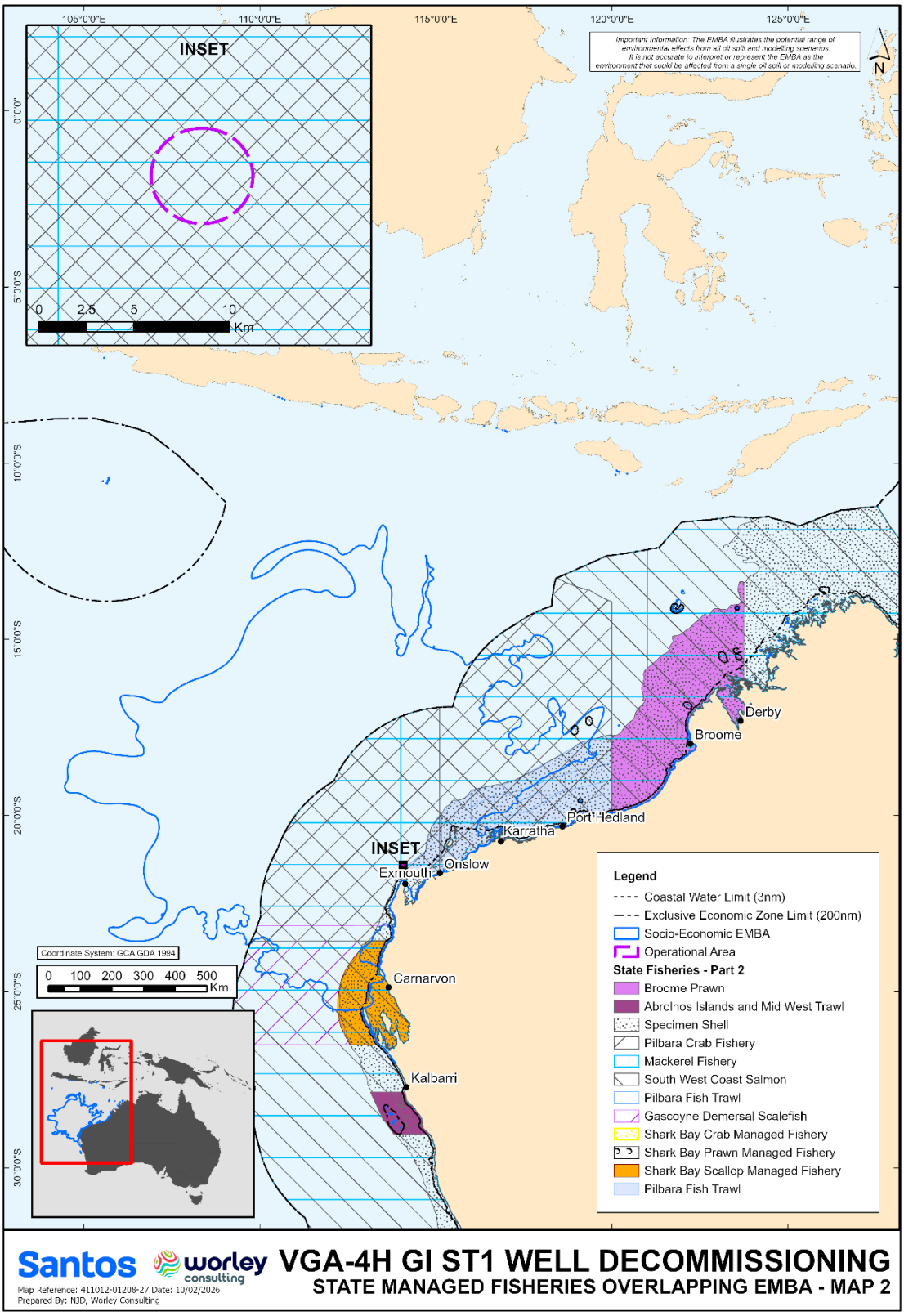

Figure 22: WA state commercial fishing zones (Figure 2 of 3)

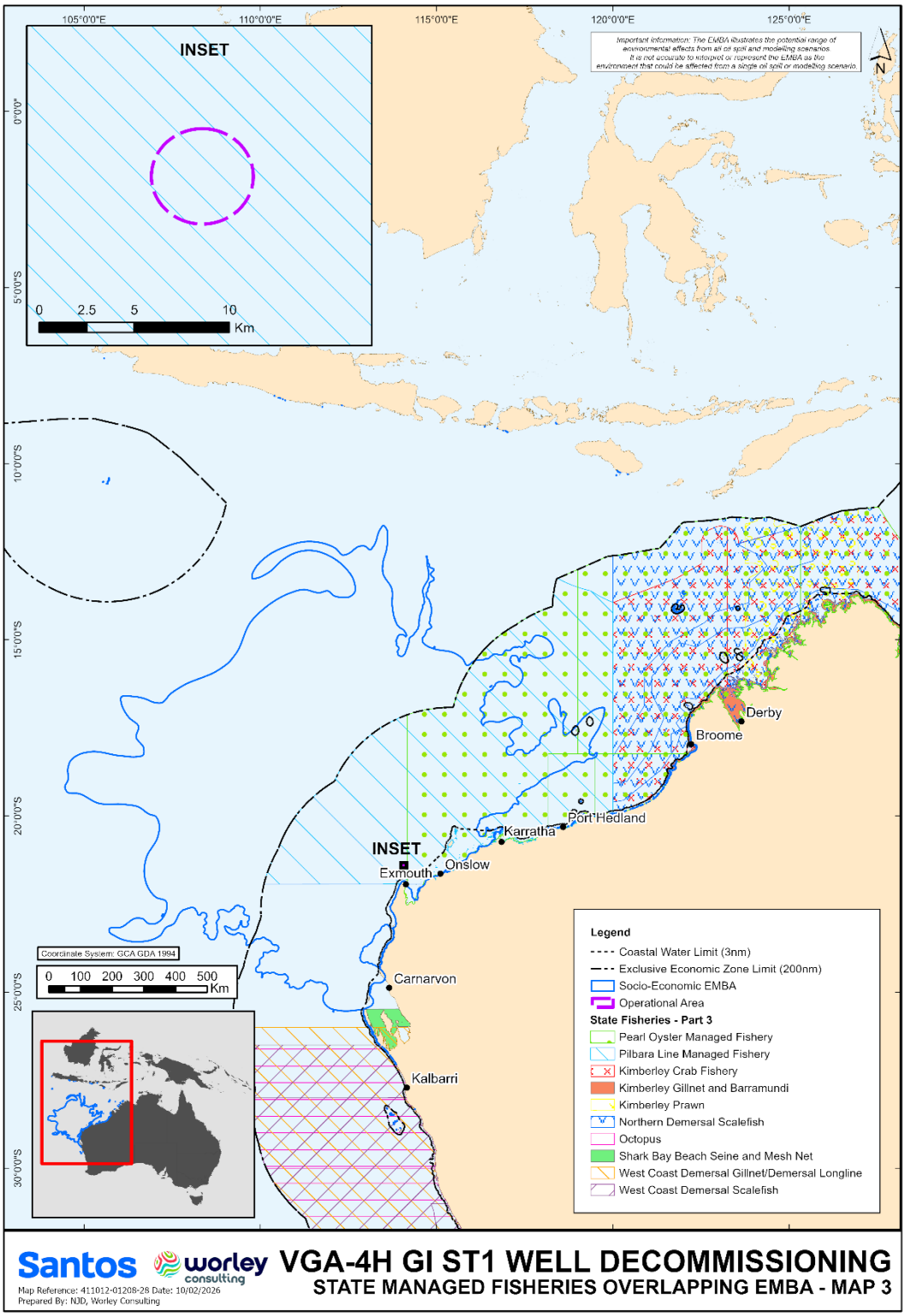

Figure 23: WA state commercial fishing zones (Figure 3 of 3)

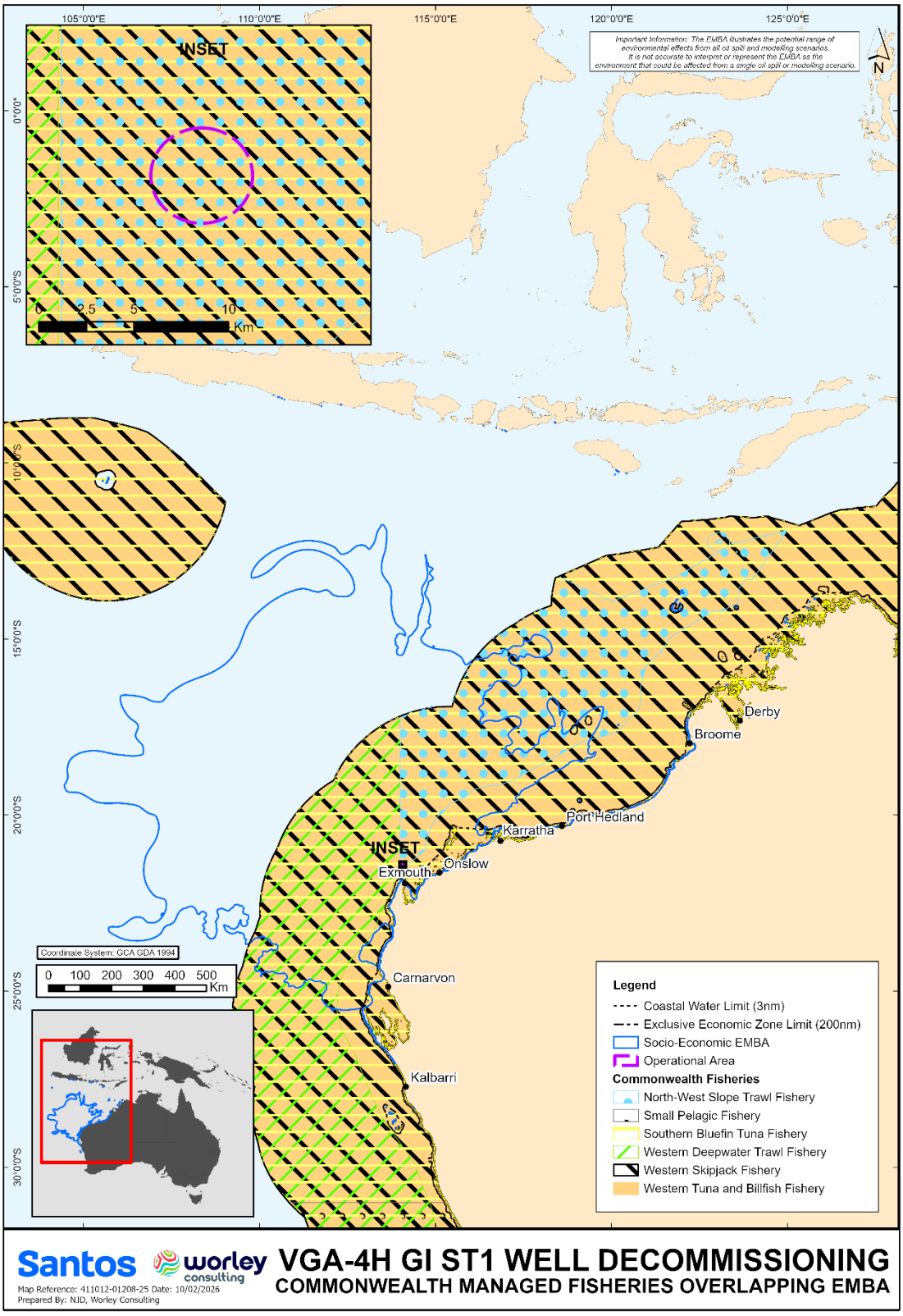

Figure 24: Commonwealth commercial fishing zones

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Appendix D EPBC Protected Matters Search Report

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Please see the caveat for interpretation of information provided here.

Report created: 09-Feb-2026

Summary
Details
- Matters of NES
- Other Matters Protected by the EPBC Act
- Extra Information

Caveat
Acknowledgements

Summary

Matters of National Environment Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance (Ramsar	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	2
Listed Threatened Ecological Communities:	None
Listed Threatened Species:	29
Listed Migratory Species:	46

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at https://www.dcceew.gov.au/parks-heritage/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Lands:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	67
Whales and Other Cetaceans:	31
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	1
Habitat Critical to the Survival of Marine Turtles:	4

Extra Information

This part of the report provides information that may also be relevant to the area you have

State and Territory Reserves:	None
Regional Forest Agreements:	None
Nationally Important Wetlands:	None
EPBC Act Referrals:	47
Key Ecological Features (Marine):	3
Biologically Important Areas:	8
Bioregional Assessments:	None
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

Commonwealth Marine Area [Resource Information]

Approval is required for a proposed activity that is located within the Commonwealth Marine Area which has, will have, or is likely to have a significant impact on the environment. Approval may be required for a proposed action taken outside a Commonwealth Marine Area but which has, may have or is likely to have a significant impact on the environment in the Commonwealth Marine Area.

Feature Name	Buffer Status
Commonwealth Marine Areas (EPBC Act)	In buffer area only
Commonwealth Marine Areas (EPBC Act)	In feature area

Listed Threatened Species [Resource Information]

Status of Conservation Dependent and Extinct are not MNES under the EPBC Act.
Number is the current name ID.

Scientific Name	Threatened Category	Presence Text	Buffer Status
BIRD			
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat may occur within area	In feature area
Calidris canutus Red Knot, Knot [855]	Vulnerable	Species or species habitat may occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In feature area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area	In feature area
Phaethon lepturus fulvus Christmas Island White-tailed Tropicbird, Golden Bosunbird [26021]	Endangered	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Phaethon rubricauda westralis			
Red-tailed Tropicbird (Indian Ocean), Indian Ocean Red-tailed Tropicbird [91824]	Endangered	Species or species habitat may occur within area	In feature area
Pterodroma mollis			
Soft-plumaged Petrel [1036]	Vulnerable	Species or species habitat may occur within area	In feature area
Sternula nereis nereis			
Australian Fairy Tern [82950]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche carteri			
Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat may occur within area	In feature area
MAMMAL			
Balaenoptera borealis			
Sei Whale [34]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Balaenoptera musculus			
Blue Whale [36]	Endangered	Migration route known to occur within area	In feature area
Balaenoptera physalus			
Fin Whale [37]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Eubalaena australis			
Southern Right Whale [40]	Endangered	Species or species habitat likely to occur within area	In feature area
Orcaella heinsohni			
Australian Snubfin Dolphin [81322]	Vulnerable	Species or species habitat may occur within area	In feature area
Sousa sahulensis			
Australian Humpback Dolphin [87942]	Vulnerable	Species or species habitat may occur within area	In feature area
REPTILE			
Aipysurus apraefrontalis			
Short-nosed Sea Snake, Short-nosed Seasnake [1115]	Critically Endangered	Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Caretta caretta](#) Loggerhead Turtle [1763]	Endangered	Congregation or aggregation known to occur within area	In feature area
[Chelonia mydas](#) Green Turtle [1765]	Vulnerable	Congregation or aggregation known to occur within area	In feature area
[Dermochelys coriacea](#) Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area	In feature area
[Eretmochelys imbricata](#) Hawksbill Turtle [1766]	Vulnerable	Congregation or aggregation known to occur within area	In feature area
[Natator depressus](#) Flatback Turtle [59257]	Vulnerable	Congregation or aggregation known to occur within area	In feature area
SHARK			
[Carcharias taurus (west coast population)](#) Grey Nurse Shark (west coast population) [68752]	Vulnerable	Species or species habitat may occur within area	In feature area
[Carcharodon carcharias](#) White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat known to occur within area	In feature area
[Pristis clavata](#) Dwarf Sawfish, Queensland Sawfish [68447]	Vulnerable	Species or species habitat known to occur within area	In feature area
[Pristis pristis](#) Largetooth Sawfish, Freshwater Sawfish, River Sawfish, Leichhardt's Sawfish, Northern Sawfish [60756]	Endangered	Species or species habitat likely to occur within area	In buffer area only
[Pristis zijsron](#) Green Sawfish, Dindagubba, Narrowsnout Sawfish [68442]	Vulnerable	Species or species habitat known to occur within area	In feature area
[Rhincodon typus](#) Whale Shark [66680]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Sphyrna lewini](#) Scalloped Hammerhead [85267]	Conservation Dependent	Species or species habitat likely to occur within area	In feature area

Listed Migratory Species [Resource Information]

Scientific Name	Threatened Category	Presence Text	Buffer Status
null			
[Balaenoptera omurai](#) Omura's Whale [87136]		Species or species habitat likely to occur within area	In feature area
Migratory Marine Birds			
[Anous stolidus](#) Common Noddy [825]		Species or species habitat may occur within area	In feature area
[Ardenna carneipes](#) Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Species or species habitat may occur within area	In feature area
[Calonectris leucomelas](#) Streaked Shearwater [1077]		Species or species habitat likely to occur within area	In feature area
[Fregata ariel](#) Lesser Frigatebird, Least Frigatebird [1012]		Species or species habitat likely to occur within area	In feature area
[Macronectes giganteus](#) Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In feature area
[Phaethon lepturus](#) White-tailed Tropicbird [1014]		Species or species habitat known to occur within area	In feature area
[Phaethon rubricauda](#) Red-tailed Tropicbird [994]		Species or species habitat may occur within area	In feature area
[Thalassarche carteri](#) Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat may occur within area	In feature area
Migratory Marine Species			

Scientific Name	Threatened Category	Presence Text	Buffer Status
Anoxypristis cuspidata Narrow Sawfish, Knifetooth Sawfish [68448]		Species or species habitat may occur within area	In feature area
Balaenoptera bonaerensis Antarctic Minke Whale, Dark-shoulder Minke Whale [67812]		Species or species habitat likely to occur within area	In feature area
Balaenoptera borealis Sei Whale [34]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Balaenoptera edeni Bryde's Whale [35]		Species or species habitat likely to occur within area	In feature area
Balaenoptera musculus Blue Whale [36]	Endangered	Migration route known to occur within area	In feature area
Balaenoptera physalus Fin Whale [37]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Carcharhinus longimanus Oceanic Whitetip Shark [84108]		Species or species habitat likely to occur within area	In feature area
Carcharias taurus Grey Nurse Shark [64469]		Species or species habitat may occur within area	In feature area
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat known to occur within area	In feature area
Caretta caretta Loggerhead Turtle [1763]	Endangered	Congregation or aggregation known to occur within area	In feature area
Chelonia mydas Green Turtle [1765]	Vulnerable	Congregation or aggregation known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Crocodylus porosus](#) Salt-water Crocodile, Estuarine Crocodile [1774]		Species or species habitat may occur within area	In feature area
[Dermochelys coriacea](#) Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area	In feature area
[Eretmochelys imbricata](#) Hawksbill Turtle [1766]	Vulnerable	Congregation or aggregation known to occur within area	In feature area
[Eubalaena australis as Balaena glacialis australis](#) Southern Right Whale [40]	Endangered	Species or species habitat likely to occur within area	In feature area
[Isurus oxyrinchus](#) Shortfin Mako, Mako Shark [79073]		Species or species habitat likely to occur within area	In feature area
[Isurus paucus](#) Longfin Mako [82947]		Species or species habitat likely to occur within area	In feature area
[Megaptera novaeangliae](#) Humpback Whale [38]		Breeding known to occur within area	In feature area
[Mobula alfredi as Manta alfredi](#) Reef Manta Ray, Coastal Manta Ray [90033]		Species or species habitat known to occur within area	In buffer area only
[Mobula birostris as Manta birostris](#) Giant Manta Ray [90034]		Species or species habitat known to occur within area	In feature area
[Natator depressus](#) Flatback Turtle [59257]	Vulnerable	Congregation or aggregation known to occur within area	In feature area
[Orcaella heinsohni](#) Australian Snubfin Dolphin [81322]	Vulnerable	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Orcinus orca Killer Whale, Orca [46]		Species or species habitat may occur within area	In feature area
Physeter macrocephalus Sperm Whale [59]		Species or species habitat may occur within area	In feature area
Pristis clavata Dwarf Sawfish, Queensland Sawfish [68447]	Vulnerable	Species or species habitat known to occur within area	In feature area
Pristis pristis Largetooth Sawfish, Freshwater Sawfish, River Sawfish, Leichhardt's Sawfish, Northern Sawfish [60756]	Endangered	Species or species habitat likely to occur within area	In buffer area only
Pristis zijsron Green Sawfish, Dindagubba, Narrowsnout Sawfish [68442]	Vulnerable	Species or species habitat known to occur within area	In feature area
Rhincodon typus Whale Shark [66680]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Sousa sahulensis as Sousa chinensis Australian Humpback Dolphin [87942]	Vulnerable	Species or species habitat may occur within area	In feature area
Tursiops aduncus (Arafura/Timor Sea populations) Spotted Bottlenose Dolphin (Arafura/Timor Sea populations) [78900]		Species or species habitat known to occur within area	In feature area
Migratory Wetlands Species			
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat may occur within area	In feature area
Calidris canutus Red Knot, Knot [855]	Vulnerable	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Calidris ferruginea			
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area
Calidris melanotos			
Pectoral Sandpiper [858]		Species or species habitat may occur within area	In feature area
Numenius madagascariensis			
Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area	In feature area
Pandion haliaetus			
Osprey [952]		Species or species habitat may occur within area	In feature area

Other Matters Protected by the EPBC Act

Listed Marine Species			[Resource Information]
Scientific Name	Threatened Category	Presence Text	Buffer Status
Bird			
Actitis hypoleucos			
Common Sandpiper [59309]		Species or species habitat may occur within area	In feature area
Anous stolidus			
Common Noddy [825]		Species or species habitat may occur within area	In feature area
Ardenna carneipes as Puffinus carneipes			
Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Species or species habitat may occur within area	In feature area
Calidris acuminata			
Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat may occur within area	In feature area
Calidris canutus			
Red Knot, Knot [855]	Vulnerable	Species or species habitat may occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area overfly marine area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area overfly marine area	In feature area
Calonectris leucomelas Streaked Shearwater [1077]		Species or species habitat likely to occur within area	In feature area
Fregata ariel Lesser Frigatebird, Least Frigatebird [1012]		Species or species habitat likely to occur within area	In feature area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In feature area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area	In feature area
Pandion haliaetus Osprey [952]		Species or species habitat may occur within area	In feature area
Phaethon lepturus White-tailed Tropicbird [1014]		Species or species habitat known to occur within area	In feature area
Phaethon lepturus fulvus Christmas Island White-tailed Tropicbird, Golden Bosunbird [26021]	Endangered	Species or species habitat may occur within area	In feature area
Phaethon rubricauda Red-tailed Tropicbird [994]		Species or species habitat may occur within area	In feature area
Pterodroma mollis Soft-plumaged Petrel [1036]	Vulnerable	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Thalassarche carteri](#) Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat may occur within area	In feature area
Fish			
[Acentronura larsonae](#) Helen's Pygmy Pipehorse [66186]		Species or species habitat may occur within area	In feature area
[Bulbonaricus brauni](#) Braun's Pughead Pipefish, Pug-headed Pipefish [66189]		Species or species habitat may occur within area	In feature area
[Campichthys tricarinatus](#) Three-keel Pipefish [66192]		Species or species habitat may occur within area	In feature area
[Choeroichthys brachysoma](#) Pacific Short-bodied Pipefish, Short-bodied Pipefish [66194]		Species or species habitat may occur within area	In feature area
[Choeroichthys latispinosus](#) Muiron Island Pipefish [66196]		Species or species habitat may occur within area	In feature area
[Choeroichthys suillus](#) Pig-snouted Pipefish [66198]		Species or species habitat may occur within area	In feature area
[Doryrhamphus dactyliophorus](#) Banded Pipefish, Ringed Pipefish [66210]		Species or species habitat may occur within area	In feature area
[Doryrhamphus janssi](#) Cleaner Pipefish, Janss' Pipefish [66212]		Species or species habitat may occur within area	In feature area
[Doryrhamphus multiannulatus](#) Many-banded Pipefish [66717]		Species or species habitat may occur within area	In feature area
[Doryrhamphus negrosensis](#) Flagtail Pipefish, Masthead Island Pipefish [66213]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Festucalex scalaris Ladder Pipefish [66216]		Species or species habitat may occur within area	In feature area
Filicampus tigris Tiger Pipefish [66217]		Species or species habitat may occur within area	In feature area
Halicampus brocki Brock's Pipefish [66219]		Species or species habitat may occur within area	In feature area
Halicampus grayi Mud Pipefish, Gray's Pipefish [66221]		Species or species habitat may occur within area	In feature area
Halicampus nitidus Glittering Pipefish [66224]		Species or species habitat may occur within area	In feature area
Halicampus spinirostris Spiny-snout Pipefish [66225]		Species or species habitat may occur within area	In feature area
Haliichthys taeniophorus Ribboned Pipehorse, Ribboned Seadragon [66226]		Species or species habitat may occur within area	In feature area
Hippichthys penicillus Beady Pipefish, Steep-nosed Pipefish [66231]		Species or species habitat may occur within area	In feature area
Hippocampus angustus Western Spiny Seahorse, Narrow-bellied Seahorse [66234]		Species or species habitat may occur within area	In feature area
Hippocampus histrix Spiny Seahorse, Thorny Seahorse [66236]		Species or species habitat may occur within area	In feature area
Hippocampus kuda Spotted Seahorse, Yellow Seahorse [66237]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Hippocampus planifrons Flat-face Seahorse [66238]		Species or species habitat may occur within area	In feature area
Hippocampus trimaculatus Three-spot Seahorse, Low-crowned Seahorse, Flat-faced Seahorse [66720]		Species or species habitat may occur within area	In feature area
Micrognathus micronotopterus Tidepool Pipefish [66255]		Species or species habitat may occur within area	In feature area
Phoxocampus belcheri Black Rock Pipefish [66719]		Species or species habitat may occur within area	In feature area
Solegnathus hardwickii Pallid Pipehorse, Hardwick's Pipehorse [66272]		Species or species habitat may occur within area	In feature area
Solegnathus lettiensis Gunther's Pipehorse, Indonesian Pipefish [66273]		Species or species habitat may occur within area	In feature area
Solenostomus cyanopterus Robust Ghostpipefish, Blue-finned Ghost Pipefish, [66183]		Species or species habitat may occur within area	In feature area
Syngnathoides biaculeatus Double-end Pipehorse, Double-ended Pipehorse, Alligator Pipefish [66279]		Species or species habitat may occur within area	In feature area
Trachyrhamphus bicoarctatus Bentstick Pipefish, Bend Stick Pipefish, Short-tailed Pipefish [66280]		Species or species habitat may occur within area	In feature area
Trachyrhamphus longirostris Straightstick Pipefish, Long-nosed Pipefish, Straight Stick Pipefish [66281]		Species or species habitat may occur within area	In feature area
Reptile			
Aipysurus apraefrontalis Short-nosed Sea Snake, Short-nosed Seasnake [1115]	Critically Endangered	Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Aipysurus duboisii Dubois' Sea Snake, Dubois' Seasnake, Reef Shallows Sea Snake [1116]		Species or species habitat may occur within area	In feature area
Aipysurus laevis Olive Sea Snake, Olive-brown Sea Snake [1120]		Species or species habitat may occur within area	In feature area
Aipysurus mosaicus as Aipysurus eydouxii Mosaic Sea Snake [87261]		Species or species habitat may occur within area	In feature area
Caretta caretta Loggerhead Turtle [1763]	Endangered	Congregation or aggregation known to occur within area	In feature area
Chelonia mydas Green Turtle [1765]	Vulnerable	Congregation or aggregation known to occur within area	In feature area
Crocodylus porosus Salt-water Crocodile, Estuarine Crocodile [1774]		Species or species habitat may occur within area	In feature area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area	In feature area
Emydocephalus annulatus Eastern Turtle-headed Sea Snake [1125]		Species or species habitat may occur within area	In buffer area only
Ephalophis greyae as Ephalophis greyi Mangrove Sea Snake [93738]		Species or species habitat may occur within area	In feature area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Congregation or aggregation known to occur within area	In feature area
Hydrophis elegans Elegant Sea Snake, Bar-bellied Sea Snake [1104]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Hydrophis kingii as Disteira kingii Spectacled Sea Snake [93511]		Species or species habitat may occur within area	In feature area
Hydrophis major as Disteira major Olive-headed Sea Snake [93512]		Species or species habitat may occur within area	In feature area
Hydrophis ornatus Spotted Sea Snake, Ornate Reef Sea Snake [1111]		Species or species habitat may occur within area	In feature area
Hydrophis peronii as Acalyptophis peronii Horned Sea Snake [93509]		Species or species habitat may occur within area	In feature area
Hydrophis platura as Pelamis platurus Yellow-bellied Sea Snake [93746]		Species or species habitat may occur within area	In feature area
Hydrophis stokesii as Astrotia stokesii Stokes' Sea Snake [93510]		Species or species habitat may occur within area	In feature area
Natator depressus Flatback Turtle [59257]	Vulnerable	Congregation or aggregation known to occur within area	In feature area

Whales and Other Cetaceans			[Resource Information]
Current Scientific Name	Status	Type of Presence	Buffer Status
Mammal			
Balaenoptera acutorostrata Minke Whale [33]		Species or species habitat may occur within area	In feature area
Balaenoptera bonaerensis Antarctic Minke Whale, Dark-shoulder Minke Whale [67812]		Species or species habitat likely to occur within area	In feature area
Balaenoptera borealis Sei Whale [34]	Vulnerable	Species or species habitat likely to occur within area	In feature area

Current Scientific Name	Status	Type of Presence	Buffer Status
Balaenoptera edeni Bryde's Whale [35]		Species or species habitat likely to occur within area	In feature area
Balaenoptera musculus Blue Whale [36]	Endangered	Migration route known to occur within area	In feature area
Balaenoptera omurai Omura's Whale [87136]		Species or species habitat likely to occur within area	In feature area
Balaenoptera physalus Fin Whale [37]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Delphinus delphis Common Dolphin, Short-beaked Common Dolphin [60]		Species or species habitat may occur within area	In feature area
Eubalaena australis Southern Right Whale [40]	Endangered	Species or species habitat likely to occur within area	In feature area
Feresa attenuata Pygmy Killer Whale [61]		Species or species habitat may occur within area	In feature area
Globicephala macrorhynchus Short-finned Pilot Whale [62]		Species or species habitat may occur within area	In feature area
Grampus griseus Risso's Dolphin, Grampus [64]		Species or species habitat may occur within area	In feature area
Kogia breviceps Pygmy Sperm Whale [57]		Species or species habitat may occur within area	In feature area
Kogia sima Dwarf Sperm Whale [85043]		Species or species habitat may occur within area	In feature area

Current Scientific Name	Status	Type of Presence	Buffer Status
Lagenodelphis hosei Fraser's Dolphin, Sarawak Dolphin [41]		Species or species habitat may occur within area	In feature area
Megaptera novaeangliae Humpback Whale [38]		Breeding known to occur within area	In feature area
Mesoplodon densirostris Blainville's Beaked Whale, Dense-beaked Whale [74]		Species or species habitat may occur within area	In feature area
Orcaella heinsohni Australian Snubfin Dolphin [81322]	Vulnerable	Species or species habitat may occur within area	In feature area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat may occur within area	In feature area
Peponocephala electra Melon-headed Whale [47]		Species or species habitat may occur within area	In feature area
Physeter macrocephalus Sperm Whale [59]		Species or species habitat may occur within area	In feature area
Pseudorca crassidens False Killer Whale [48]		Species or species habitat likely to occur within area	In feature area
Sousa sahulensis Australian Humpback Dolphin [87942]	Vulnerable	Species or species habitat may occur within area	In feature area
Stenella attenuata Spotted Dolphin, Pantropical Spotted Dolphin [51]		Species or species habitat may occur within area	In feature area
Stenella coeruleoalba Striped Dolphin, Euphrosyne Dolphin [52]		Species or species habitat may occur within area	In feature area

Current Scientific Name	Status	Type of Presence	Buffer Status
Stenella longirostris Long-snouted Spinner Dolphin [29]		Species or species habitat may occur within area	In feature area
Steno bredanensis Rough-toothed Dolphin [30]		Species or species habitat may occur within area	In feature area
Tursiops aduncus Indian Ocean Bottlenose Dolphin, Spotted Bottlenose Dolphin [68418]		Species or species habitat may occur within area	In buffer area only
Tursiops aduncus (Arafura/Timor Sea populations) Spotted Bottlenose Dolphin (Arafura/Timor Sea populations) [78900]		Species or species habitat known to occur within area	In feature area
Tursiops truncatus s. str. Bottlenose Dolphin [68417]		Species or species habitat may occur within area	In feature area
Ziphius cavirostris Cuvier's Beaked Whale, Goose-beaked Whale [56]		Species or species habitat may occur within area	In feature area

Australian Marine Parks [Resource Information]

Park Name	Zone & IUCN Categories	Buffer Status
Gascoyne	Multiple Use Zone (IUCN VI)	In buffer area only

Habitat Critical to the Survival of Marine Turtles [Resource Information]

Scientific Name	Behaviour	Presence	Buffer Status
All year (Jun - Aug)			
Natator depressus Flatback Turtle [59257]	Nesting	Known to occur	In feature area
Nov-Feb			
Caretta caretta Loggerhead Turtle [1763]	Nesting	Known to occur	In buffer area only
Oct - Feb			
Eretmochelys imbricata Hawksbill Turtle [1766]	Nesting	Known to occur	In buffer area only
Oct - Mar			

Scientific Name	Behaviour	Presence	Buffer Status
Chelonia mydas Green Turtle [1765]	Nesting	Known to occur	In buffer area only

Extra Information

EPBC Act Referrals				[Resource Information]
Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Babylon 3D Marine Seismic Survey, Commonwealth Waters, nr Exmouth WA	2013/7081		Completed	In buffer area only
Deep Water Northwest Shelf 2D Seismic Survey	2007/3260		Completed	In feature area
Action clearly unacceptable				
Highlands 3D Marine Seismic Survey	2012/6680	Action Clearly Unacceptable	Completed	In buffer area only
Controlled action				
'Van Gogh' Petroleum Field Development	2007/3213	Controlled Action	Post-Approval	In feature area
Development of Coniston/Novara fields within the Exmouth Sub-basin	2011/5995	Controlled Action	Post-Approval	In feature area
Development of Stybarrow petroleum field incl drilling and facility installation	2004/1469	Controlled Action	Post-Approval	In feature area
Enfield full field development	2001/257	Controlled Action	Post-Approval	In feature area
Greater Enfield (Vincent) Development	2005/2110	Controlled Action	Post-Approval	In feature area
Pyrenees Oil Fields Development	2005/2034	Controlled Action	Post-Approval	In feature area
Vincent Appraisal Well	2000/22	Controlled Action	Post-Approval	In feature area
Not controlled action				
'Van Gogh' Oil Appraisal Drilling Program, Exploration Permit Area WA-155-P(1)	2006/3148	Not Controlled Action	Completed	In feature area

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action				
Bultaco-2, Laverda-2, Laverda-3 and Montesa-2 Appraisal Wells	2000/103	Not Controlled Action	Completed	In buffer area only
Carnarvon 3D Marine Seismic Survey	2004/1890	Not Controlled Action	Completed	In feature area
Exploration drilling well WA-155-P(1)	2003/971	Not Controlled Action	Completed	In feature area
Exploration Well in Permit Area WA-155-P(1)	2002/759	Not Controlled Action	Completed	In feature area
Exploratory drilling in permit area WA-225-P	2001/490	Not Controlled Action	Completed	In feature area
HCA05X Macedon Experimental Survey	2004/1926	Not Controlled Action	Completed	In feature area
Montesa-1 and Bultaco-1 Exploration Wells	2000/102	Not Controlled Action	Completed	In buffer area only
Subsea Gas Pipeline From Stybarrow Field to Griffin Venture Gas Export Pipeline	2005/2033	Not Controlled Action	Completed	In feature area
Wanda Offshore Research Project, 80 km north-east of Exmouth, WA	2018/8293	Not Controlled Action	Completed	In buffer area only
Not controlled action (particular manner)				
2D and 3D seismic surveys	2005/2151	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
3D Seismic Survey, WA	2008/4428	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Apache Northwest Shelf Van Gogh Field Appraisal Drilling Program	2007/3495	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
CVG 3D Marine Seismic Survey	2012/6654	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Eendracht Multi-Client 3D Marine Seismic Survey	2009/4749	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Enfield M3 & Vincent 4D Marine Seismic Surveys	2008/3981	Not Controlled Action (Particular Manner)	Completed	In feature area

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action (particular manner)				
Enfield M3 4D, Vincent 4D & 4D Line Test Marine Seismic Surveys	2008/4122	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Enfield M4 4D Marine Seismic Survey	2008/4558	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Enfield oilfield 3D Seismic Survey	2006/3132	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Gazelle 3D Marine Seismic Survey in WA-399-P and WA-42-L	2010/5570	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Huzzas MC3D Marine Seismic Survey (HZ-13) Carnarvon Basin, offshore WA	2013/7003	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Huzzas phase 2 marine seismic survey, Exmouth Plateau, Northern Carnarvon Basin, WA	2013/7093	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Laverda 3D Marine Seismic Survey and Vincent M1 4D Marine Seismic Survey	2010/5415	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Macedon Gas Field Development	2008/4605	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Ocean Bottom Cable Seismic Program, WA-264-P	2007/3844	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Ocean Bottom Cable Seismic Survey	2005/2017	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Pyrenees 4D Marine Seismic Monitor Survey, HCA12A	2012/6579	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Pyrenees-Macedon 3D marine seismic survey	2005/2325	Not Controlled Action (Particular	Post-Approval	In feature area

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action (particular manner)				
		Manner)		
Rydal-1 Petroleum Exploration Well, WA	2012/6522	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Stybarrow 4D Marine Seismic Survey	2011/5810	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Stybarrow Baseline 4D marine seismic survey	2008/4530	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Vincent M1 and Enfield M5 4D Marine Seismic Survey	2010/5720	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Warramunga Non-Inclusive 3D Seismic Survey	2008/4553	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Westralia SPAN Marine Seismic Survey, WA & NT	2012/6463	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Referral decision				
CVG 3D Marine Seismic Survey	2012/6270	Referral Decision	Completed	In feature area
Enfield 4D Marine Seismic Surveys, Production Permit WA-28-L	2005/2370	Referral Decision	Completed	In feature area
Stybarrow Baseline 4D Marine Seismic Survey (Permit Areas WA-255-P, WA-32-L, WA-	2008/4165	Referral Decision	Completed	In buffer area only

Key Ecological Features [Resource Information]

Key Ecological Features are the parts of the marine ecosystem that are considered to be important for the biodiversity or ecosystem functioning and integrity of the Commonwealth Marine Area.

Name	Region	Buffer Status
Ancient coastline at 125 m depth contour	North-west	In buffer area only
Canyons linking the Cuvier Abyssal Plain and the Cape Range Peninsula	North-west	In buffer area only
Continental Slope Demersal Fish Communities	North-west	In feature area

Biologically Important Areas			[Resource Information]
Scientific Name	Behaviour	Presence	Buffer Status
Marine Turtles			
Caretta caretta Loggerhead Turtle [1763]	Internesting buffer	Known to occur	In buffer area only
Chelonia mydas Green Turtle [1765]	Internesting buffer	Known to occur	In buffer area only
Eretmochelys imbricata Hawksbill Turtle [1766]	Internesting buffer	Known to occur	In buffer area only
Natator depressus Flatback Turtle [59257]	Internesting buffer	Known to occur	In feature area
Seabirds			
Ardenna pacifica Wedge-tailed Shearwater [84292]	Breeding	Known to occur	In feature area
Sharks			
Rhincodon typus Whale Shark [66680]	Foraging	Known to occur	In feature area
Whales			
Balaenoptera musculus brevicauda Pygmy Blue Whale [81317]	Migration	Known to occur	In feature area
Megaptera novaeangliae Humpback Whale [38]	Migration (north and south)	Known to occur	In feature area

Caveat

1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data is available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance on the contents of this report.

3 DATA SOURCES

Threatened ecological communities

For threatened ecological communities where the distribution is well known, maps are generated based on information contained in recovery plans, State vegetation maps and remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species

Threatened, migratory and marine species distributions have been discerned through a variety of methods. Where distributions are well known and if time permits, distributions are inferred from either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc.) together with point locations and described habitat; or modelled (MAXENT or BIOCLIM habitat modelling) using point locations and environmental data layers.

Where little information is available for a species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc.).

In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More detailed distribution mapping methods are used to update these distributions when time permits.

4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

The following groups have been mapped, but may not cover the complete distribution of the species:

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded breeding sites; and
- seals which have only been mapped for breeding sites near the Australian continent

The breeding sites may be important for the protection of the Commonwealth Marine environment.

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact us page.

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EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Please see the caveat for interpretation of information provided here.

Report created: 10-Feb-2026

Summary
Details
- Matters of NES
- Other Matters Protected by the EPBC Act
- Extra Information

Caveat
Acknowledgements

Summary

Matters of National Environment Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	3
National Heritage Places:	4
Wetlands of International Importance (Ramsar	4
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	6
Listed Threatened Ecological Communities:	1
Listed Threatened Species:	105
Listed Migratory Species:	95

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at https://www.dcceew.gov.au/parks-heritage/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Lands:	22
Commonwealth Heritage Places:	5
Listed Marine Species:	162
Whales and Other Cetaceans:	33
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	1
Australian Marine Parks:	9
Habitat Critical to the Survival of Marine Turtles:	4

Extra Information

This part of the report provides information that may also be relevant to the area you have

State and Territory Reserves:	52
Regional Forest Agreements:	None
Nationally Important Wetlands:	None
EPBC Act Referrals:	193
Key Ecological Features (Marine):	7
Biologically Important Areas:	67
Bioregional Assessments:	None
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

World Heritage Properties		[Resource Information]
Name	State	Legal Status
Murujuga Cultural Landscape	WA	Declared property
Shark Bay, Western Australia	WA	Declared property
The Ningaloo Coast	WA	Declared property

National Heritage Places		[Resource Information]
Name	State	Legal Status
Indigenous		
Dampier Archipelago (including Burrup Peninsula)	WA	Listed place
Natural		
Shark Bay, Western Australia	WA	Listed place
The Ningaloo Coast	WA	Listed place
The West Kimberley	WA	Listed place

Wetlands of International Importance (Ramsar Wetlands)	[Resource Information]
Ramsar Site Name	Proximity
Eighty-mile beach	Within 10km of Ramsar site
Hosnies spring	Within Ramsar site
Roebuck bay	Within Ramsar site
The dales	Within 10km of Ramsar site

Commonwealth Marine Area	[Resource Information]

Approval is required for a proposed activity that is located within the Commonwealth Marine Area which has, will have, or is likely to have a significant impact on the environment. Approval may be required for a proposed action taken outside a Commonwealth Marine Area but which has, may have or is likely to have a significant impact on the environment in the Commonwealth Marine Area.

Feature Name
Commonwealth Marine Areas (EPBC Act)
Commonwealth Marine Areas (EPBC Act)
Commonwealth Marine Areas (EPBC Act)
Commonwealth Marine Areas (EPBC Act)

Feature Name
Commonwealth Marine Areas (EPBC Act)

Commonwealth Marine Areas (EPBC Act)

Listed Threatened Ecological Communities [Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.
Status of Vulnerable, Disallowed and Ineligible are not MNES under the EPBC Act.

Community Name	Threatened Category	Presence Text
Monsoon vine thickets on the coastal sand dunes of Dampier Peninsula	Endangered	Community likely to occur within area

Listed Threatened Species [Resource Information]

Status of Conservation Dependent and Extinct are not MNES under the EPBC Act.
Number is the current name ID.

Scientific Name	Threatened Category	Presence Text
BIRD		
Accipiter hiogaster natalis Christmas Island Goshawk [82408]	Endangered	Species or species habitat known to occur within area
Anous tenuirostris melanops Australian Lesser Noddy [26000]	Vulnerable	Species or species habitat may occur within area
Aphelocephala leucopsis Southern Whiteface [529]	Vulnerable	Species or species habitat likely to occur within area
Arenaria interpres Ruddy Turnstone [872]	Vulnerable	Roosting known to occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Roosting known to occur within area
Calidris canutus Red Knot, Knot [855]	Vulnerable	Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
Calidris tenuirostris Great Knot [862]	Vulnerable	Roosting known to occur within area
Chalcophaps indica natalis Christmas Island Emerald Dove, Emerald Dove (Christmas Island) [67030]	Endangered	Species or species habitat known to occur within area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat known to occur within area
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Roosting known to occur within area
Chloebia gouldiae listed as Erythrura gouldiae Gouldian Finch [90091]	Endangered	Species or species habitat may occur within area
Erythrotriorchis radiatus Red Goshawk [942]	Endangered	Species or species habitat may occur within area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat known to occur within area
Fregata andrewsi Christmas Island Frigatebird, Andrew's Frigatebird [1011]	Endangered	Foraging, feeding or related behaviour known to occur within area
Limnodromus semipalmatus Asian Dowitcher [843]	Vulnerable	Species or species habitat known to occur within area
Limosa lapponica menzbieri Northern Siberian Bar-tailed Godwit, Russkoye Bar-tailed Godwit [86432]	Endangered	Species or species habitat known to occur within area
Limosa limosa Black-tailed Godwit [845]	Endangered	Roosting known to occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Malurus leucopterus edouardi White-winged Fairy-wren (Barrow Island), Barrow Island Black-and-white Fairy-wren [26194]	Vulnerable	Species or species habitat likely to occur within area
Ninox natalis Christmas Island Hawk-Owl, Christmas Boobook [66671]	Vulnerable	Species or species habitat known to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
Papasula abbotti Abbott's Booby [59297]	Endangered	Species or species habitat known to occur within area
Pezoporus occidentalis Night Parrot [59350]	Critically Endangered	Species or species habitat may occur within area
Phaethon lepturus fulvus Christmas Island White-tailed Tropicbird, Golden Bosunbird [26021]	Endangered	Breeding known to occur within area
Phaethon rubricauda westralis Red-tailed Tropicbird (Indian Ocean), Indian Ocean Red-tailed Tropicbird [91824]	Endangered	Breeding known to occur within area
Pluvialis squatarola Grey Plover [865]	Vulnerable	Roosting known to occur within area
Polytelis alexandrae Princess Parrot, Alexandra's Parrot [758]	Vulnerable	Species or species habitat may occur within area
Pterodroma mollis Soft-plumaged Petrel [1036]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area

Scientific Name	Threatened Category	Presence Text
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat known to occur within area
Sternula albifrons Little Tern [82849]	Vulnerable	Breeding known to occur within area
Sternula nereis nereis Australian Fairy Tern [82950]	Vulnerable	Breeding known to occur within area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat may occur within area
Thalassarche cauta Shy Albatross [89224]	Endangered	Species or species habitat may occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Species or species habitat may occur within area
Tringa nebularia Common Greenshank, Greenshank [832]	Endangered	Species or species habitat known to occur within area
Turdus poliocephalus erythropleurus Christmas Island Thrush [67122]	Endangered	Species or species habitat known to occur within area
Tyto novaehollandiae kimberli Masked Owl (northern) [26048]	Vulnerable	Species or species habitat may occur within area
Xenus cinereus Terek Sandpiper [59300]	Vulnerable	Roosting known to occur within area
CRUSTACEAN		

Scientific Name	Threatened Category	Presence Text
Kumonga exleyi		
Cape Range Remipede [86875]	Vulnerable	Species or species habitat known to occur within area
FISH		
Milyeringa justitia		
Barrow Cave Gudgeon [86867]	Endangered	Species or species habitat known to occur within area
Milyeringa veritas		
Cape Range Cave Gudgeon, Blind Gudgeon [66676]	Vulnerable	Species or species habitat known to occur within area
Ophisternon candidum		
Blind Cave Eel [66678]	Vulnerable	Species or species habitat known to occur within area
MAMMAL		
Balaenoptera borealis		
Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Balaenoptera musculus		
Blue Whale [36]	Endangered	Migration route known to occur within area
Balaenoptera physalus		
Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Bettongia lesueur Barrow and Boodie Islands subspecies		
Boodie, Burrowing Bettong (Barrow and Boodie Islands) [88021]	Vulnerable	Species or species habitat known to occur within area
Bettongia lesueur lesueur		
Burrowing Bettong (Shark Bay), Boodie [66659]	Vulnerable	Species or species habitat known to occur within area
Crocidura trichura		
Christmas Island Shrew [86568]	Critically Endangered	Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
Dasyurus hallucatus Northern Quoll, Digul [Gogo-Yimidir], Wijingadda [Dambimangari], Wiminji [Martu] [331]	Endangered	Species or species habitat known to occur within area
Eubalaena australis Southern Right Whale [40]	Endangered	Species or species habitat likely to occur within area
Isoodon auratus barrowensis Golden Bandicoot (Barrow Island) [66666]	Vulnerable	Species or species habitat known to occur within area
Lagorchestes conspicillatus conspicillatus Spectacled Hare-wallaby (Barrow Island) [66661]	Vulnerable	Species or species habitat known to occur within area
Lagorchestes hirsutus bernieri Rufous Hare-wallaby (Bernier Island) [66662]	Vulnerable	Species or species habitat known to occur within area
Lagorchestes hirsutus Central Australian subspecies Mala, Rufous Hare-Wallaby (Central Australia) [88019]	Endangered	Translocated population known to occur within area
Lagorchestes hirsutus dorreae Rufous Hare-wallaby (Dorre Island) [66663]	Vulnerable	Species or species habitat known to occur within area
Lagostrophus fasciatus fasciatus Banded Hare-wallaby, Merrnine, Marnine, Munning [66664]	Vulnerable	Species or species habitat known to occur within area
Macroderma gigas Ghost Bat [174]	Vulnerable	Species or species habitat likely to occur within area
Macrotis lagotis Greater Bilby [282]	Vulnerable	Species or species habitat known to occur within area
Orcaella heinsohni Australian Snubfin Dolphin [81322]	Vulnerable	Breeding known to occur within area

Scientific Name	Threatened Category	Presence Text
Osphranter robustus isabellinus		
Barrow Island Wallaroo, Barrow Island Euro [89262]	Vulnerable	Species or species habitat likely to occur within area
Perameles bougainville		
Shark Bay Bandicoot [278]	Endangered	Species or species habitat known to occur within area
Petrogale lateralis lateralis		
Black-flanked Rock-wallaby, Moororong, Black-footed Rock Wallaby [66647]	Endangered	Species or species habitat known to occur within area
Pseudomys fieldi		
Shark Bay Mouse, Djoongari, Alice Springs Mouse [113]	Vulnerable	Species or species habitat likely to occur within area
Pteropus natalis		
Christmas Island Flying-fox, Christmas Island Fruit-bat [87611]	Critically Endangered	Species or species habitat known to occur within area
Rhinonicteris aurantia (Pilbara form)		
Pilbara Leaf-nosed Bat [82790]	Vulnerable	Species or species habitat known to occur within area
Saccolaimus saccolaimus nudicluniatus		
Bare-rumped Sheath-tailed Bat, Bare-rumped Sheathtail Bat [66889]	Vulnerable	Species or species habitat likely to occur within area
Sousa sahulensis		
Australian Humpback Dolphin [87942]	Vulnerable	Breeding known to occur within area
Trichosurus vulpecula arnhemensis		
Northern Brushtail Possum [83091]	Vulnerable	Species or species habitat known to occur within area
Xeromys myoides		
Water Mouse, False Water Rat, Yirrkoo [66]	Vulnerable	Species or species habitat may occur within area
PLANT		
Asplenium listeri		
Christmas Island Spleenwort [65865]	Critically Endangered	Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
Minuria tridens Minnie Daisy [13753]	Vulnerable	Species or species habitat known to occur within area
Pneumatopteris truncata fern [68812]	Critically Endangered	Species or species habitat may occur within area
Seringia exastia Fringed Fire-bush [88920]	Critically Endangered	Species or species habitat known to occur within area
Tectaria devexa Cave Fern [14767]	Endangered	Species or species habitat likely to occur within area
REPTILE		
Aipysurus apraefrontalis Short-nosed Sea Snake, Short-nosed Seasnake [1115]	Critically Endangered	Species or species habitat known to occur within area
Aipysurus foliosquama Leaf-scaled Sea Snake, Leaf-scaled Seasnake [1118]	Critically Endangered	Species or species habitat known to occur within area
Aipysurus fuscus Dusky Sea Snake [1119]	Endangered	Species or species habitat known to occur within area
Caretta caretta Loggerhead Turtle [1763]	Endangered	Breeding known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Breeding known to occur within area
Cryptoblepharus egeriae Christmas Island Blue-tailed Skink, Blue-tailed Snake-eyed Skink [1526]	Critically Endangered	Species or species habitat may occur within area
Ctenotus zastictus Hamelin Ctenotus [25570]	Vulnerable	Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
Cyrtodactylus sadleiri Christmas Island Giant Gecko [86865]	Endangered	Species or species habitat known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Foraging, feeding or related behaviour known to occur within area
Egernia stokesii badia Western Spiny-tailed Skink, Baudin Island Spiny-tailed Skink [64483]	Endangered	Species or species habitat may occur within area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Breeding known to occur within area
Lepidochelys olivacea Olive Ridley Turtle, Pacific Ridley Turtle [1767]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Lepidodactylus listeri Christmas Island Gecko, Lister's Gecko [1711]	Critically Endangered	Species or species habitat may occur within area
Liasis olivaceus barroni Pilbara Olive Python [66699]	Vulnerable	Species or species habitat known to occur within area
Liopholis kintorei Great Desert Skink, Tjakura, Warrarna, Mulyamiji, Tjalapa, Nampu [83160]	Vulnerable	Species or species habitat may occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Breeding known to occur within area
Ramphotyphlops exocoeti Christmas Island Blind Snake, Christmas Island Pink Blind Snake [1262]	Vulnerable	Species or species habitat likely to occur within area
Tiliqua scincoides intermedia Northern Blue-tongued Skink [89838]	Critically Endangered	Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
Varanus mertensi		
Mertens' Water Monitor [1568]	Endangered	Species or species habitat may occur within area
SHARK		
Carcharias taurus (west coast population)		
Grey Nurse Shark (west coast population) [68752]	Vulnerable	Congregation or aggregation known to occur within area
Carcharodon carcharias		
White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat known to occur within area
Glyphis garricki		
Northern River Shark, New Guinea River Shark [82454]	Endangered	Species or species habitat may occur within area
Pristis clavata		
Dwarf Sawfish, Queensland Sawfish [68447]	Vulnerable	Breeding known to occur within area
Pristis pristis		
Largetooth Sawfish, Freshwater Sawfish, River Sawfish, Leichhardt's Sawfish, Northern Sawfish [60756]	Endangered	Species or species habitat known to occur within area
Pristis zijsron		
Green Sawfish, Dindagubba, Narrowsnout Sawfish [68442]	Vulnerable	Breeding known to occur within area
Rhincodon typus		
Whale Shark [66680]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Sphyrna lewini		
Scalloped Hammerhead [85267]	Conservation Dependent	Species or species habitat known to occur within area

Listed Migratory Species		[Resource Information]
Scientific Name	Threatened Category	Presence Text
null		
Balaenoptera omurai		
Omura's Whale [87136]		Species or species habitat likely to occur within area
Migratory Marine Birds		

Scientific Name	Threatened Category	Presence Text
Anous stolidus Common Noddy [825]		Species or species habitat likely to occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardenna carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Species or species habitat likely to occur within area
Ardenna pacifica Wedge-tailed Shearwater [84292]		Breeding known to occur within area
Calonectris leucomelas Streaked Shearwater [1077]		Species or species habitat known to occur within area
Fregata andrewsi Christmas Island Frigatebird, Andrew's Frigatebird [1011]	Endangered	Foraging, feeding or related behaviour known to occur within area
Fregata ariel Lesser Frigatebird, Least Frigatebird [1012]		Species or species habitat known to occur within area
Fregata minor Great Frigatebird, Greater Frigatebird [1013]		Breeding known to occur within area
Hydroprogne caspia Caspian Tern [808]		Breeding known to occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Onychoprion anaethetus Bridled Tern [82845]		Breeding known to occur within area

Scientific Name	Threatened Category	Presence Text
Phaethon lepturus White-tailed Tropicbird [1014]		Breeding known to occur within area
Phaethon rubricauda Red-tailed Tropicbird [994]		Breeding known to occur within area
Sterna dougallii Roseate Tern [817]		Breeding known to occur within area
Sternula albifrons Little Tern [82849]	Vulnerable	Breeding known to occur within area
Sula leucogaster Brown Booby [1022]		Breeding known to occur within area
Sula sula Red-footed Booby [1023]		Breeding known to occur within area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat may occur within area
Thalassarche cauta Shy Albatross [89224]	Endangered	Species or species habitat may occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Species or species habitat may occur within area
Migratory Marine Species		
Anoxypristis cuspidata Narrow Sawfish, Knifetooth Sawfish [68448]		Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
Balaenoptera bonaerensis Antarctic Minke Whale, Dark-shoulder Minke Whale [67812]		Species or species habitat likely to occur within area
Balaenoptera borealis Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Balaenoptera edeni Bryde's Whale [35]		Species or species habitat likely to occur within area
Balaenoptera musculus Blue Whale [36]	Endangered	Migration route known to occur within area
Balaenoptera physalus Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Carcharhinus longimanus Oceanic Whitetip Shark [84108]		Species or species habitat likely to occur within area
Carcharias taurus Grey Nurse Shark [64469]		Congregation or aggregation known to occur within area
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat known to occur within area
Caretta caretta Loggerhead Turtle [1763]	Endangered	Breeding known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Breeding known to occur within area
Crocodylus porosus Salt-water Crocodile, Estuarine Crocodile [1774]		Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Foraging, feeding or related behaviour known to occur within area
Dugong dugon Dugong [28]		Breeding known to occur within area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Breeding known to occur within area
Eubalaena australis as Balaena glacialis australis Southern Right Whale [40]	Endangered	Species or species habitat likely to occur within area
Isurus oxyrinchus Shortfin Mako, Mako Shark [79073]		Species or species habitat likely to occur within area
Isurus paucus Longfin Mako [82947]		Species or species habitat likely to occur within area
Lamna nasus Porbeagle, Mackerel Shark [83288]		Species or species habitat may occur within area
Lepidochelys olivacea Olive Ridley Turtle, Pacific Ridley Turtle [1767]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Megaptera novaeangliae Humpback Whale [38]		Breeding known to occur within area
Mobula alfredi as Manta alfredi Reef Manta Ray, Coastal Manta Ray [90033]		Species or species habitat known to occur within area
Mobula birostris as Manta birostris Giant Manta Ray [90034]		Species or species habitat known to occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Breeding known to occur within area

Scientific Name	Threatened Category	Presence Text
Orcaella heinsohni Australian Snubfin Dolphin [81322]	Vulnerable	Breeding known to occur within area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat may occur within area
Physeter macrocephalus Sperm Whale [59]		Species or species habitat may occur within area
Pristis clavata Dwarf Sawfish, Queensland Sawfish [68447]	Vulnerable	Breeding known to occur within area
Pristis pristis Largetooth Sawfish, Freshwater Sawfish, River Sawfish, Leichhardt's Sawfish, Northern Sawfish [60756]	Endangered	Species or species habitat known to occur within area
Pristis zijsron Green Sawfish, Dindagubba, Narrowsnout Sawfish [68442]	Vulnerable	Breeding known to occur within area
Rhincodon typus Whale Shark [66680]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Sousa sahulensis as Sousa chinensis Australian Humpback Dolphin [87942]	Vulnerable	Breeding known to occur within area
Tursiops aduncus (Arafura/Timor Sea populations) Spotted Bottlenose Dolphin (Arafura/Timor Sea populations) [78900]		Species or species habitat known to occur within area
Migratory Terrestrial Species		
Cecropis daurica Red-rumped Swallow [80610]		Species or species habitat known to occur within area
Cuculus optatus Oriental Cuckoo, Horsfield's Cuckoo [86651]		Species or species habitat known to occur within area
Hirundo rustica Barn Swallow [662]		Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
[Motacilla cinerea](#) Grey Wagtail [642]		Species or species habitat known to occur within area
[Motacilla flava](#) Yellow Wagtail [644]		Species or species habitat known to occur within area
Migratory Wetlands Species		
[Actitis hypoleucos](#) Common Sandpiper [59309]		Species or species habitat known to occur within area
[Arenaria interpres](#) Ruddy Turnstone [872]	Vulnerable	Roosting known to occur within area
[Calidris acuminata](#) Sharp-tailed Sandpiper [874]	Vulnerable	Roosting known to occur within area
[Calidris alba](#) Sanderling [875]		Roosting known to occur within area
[Calidris canutus](#) Red Knot, Knot [855]	Vulnerable	Species or species habitat known to occur within area
[Calidris falcinellus as Limicola falcinellus](#) Broad-billed Sandpiper [91731]		Roosting known to occur within area
[Calidris ferruginea](#) Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
[Calidris melanotos](#) Pectoral Sandpiper [858]		Species or species habitat known to occur within area
[Calidris ruficollis](#) Red-necked Stint [860]		Roosting known to occur within area
[Calidris tenuirostris](#) Great Knot [862]	Vulnerable	Roosting known to occur within area

Scientific Name	Threatened Category	Presence Text
Charadrius bicinctus Double-banded Plover [895]		Roosting known to occur within area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat known to occur within area
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Roosting known to occur within area
Charadrius veredus Oriental Plover, Oriental Dotterel [882]		Roosting known to occur within area
Gallinago megala Swinhoe's Snipe [864]		Roosting likely to occur within area
Gallinago stenura Pin-tailed Snipe [841]		Roosting likely to occur within area
Glareola maldivarum Oriental Pratincole [840]		Roosting known to occur within area
Limnodromus semipalmatus Asian Dowitcher [843]	Vulnerable	Species or species habitat known to occur within area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area
Limosa limosa Black-tailed Godwit [845]	Endangered	Roosting known to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
Numenius minutus Little Curlew, Little Whimbrel [848]		Roosting known to occur within area
Numenius phaeopus Whimbrel [849]		Roosting known to occur within area

Scientific Name	Threatened Category	Presence Text
Pandion haliaetus Osprey [952]		Breeding known to occur within area
Pluvialis fulva Pacific Golden Plover [25545]		Roosting known to occur within area
Pluvialis squatarola Grey Plover [865]	Vulnerable	Roosting known to occur within area
Thalasseus bergii Greater Crested Tern [83000]		Breeding known to occur within area
Tringa brevipes Grey-tailed Tattler [851]		Roosting known to occur within area
Tringa glareola Wood Sandpiper [829]		Roosting known to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]	Endangered	Species or species habitat known to occur within area
Tringa stagnatilis Marsh Sandpiper, Little Greenshank [833]		Roosting known to occur within area
Tringa totanus Common Redshank, Redshank [835]		Roosting known to occur within area
Xenus cinereus Terek Sandpiper [59300]	Vulnerable	Roosting known to occur within area

Other Matters Protected by the EPBC Act

Commonwealth Lands [Resource Information]

The Commonwealth area listed below may indicate the presence of Commonwealth land in this vicinity. Due to the unreliability of the data source, all proposals should be checked as to whether it impacts on a Commonwealth area, before making a definitive decision. Contact the State or Territory government land department for further information.

Commonwealth Land Name	State
Department of Climate Change, Energy, the Environment and Water	
Christmas Island National Park (Commonwealth) [CAPAD_CWTH_05]	EXT
Christmas Island Natural Areas [CHL_105187]	EXT

Commonwealth Land Name	State
Learmonth Air Weapons Range Facility [CHL_105551]	WA
Mermaid Reef - Rowley Shoals [CHL_105255]	WA
Ningaloo Marine Area - Commonwealth Waters [CHL_105548]	WA
Scott Reef and Surrounds - Commonwealth Area [CHL_105480]	EXT
Department of Defence	
Exmouth Area A VLF Transmitter Station [DD_0083]	WA
Exmouth RAAF Radar Site - Vlaming Head [DD_0974]	WA
Learmonth Air Weapons Range [DD_0961]	WA
Learmonth RAAF base [AGPR4413]	WA
Learmonth RAAF base [AGPR4418]	WA
Learmonth RAAF base [AGPR4466]	WA
Department of Infrastructure, Transport, Regional Development, Communications and the Arts	
Lot 185 P218127 [AGPR5212]	WA
Lot 3051 P046328 [AGPR5204]	WA
Lot 3056 P046329 [AGPR5203]	WA
Lot 3057 P046329 [AGPR5345]	WA
Lot 3058 P046329 [AGPR5346]	WA
Lot 3059 P046329 [AGPR5347]	WA
Lot 3063 P050961 [AGPR5344]	WA
Lot 590 P037942 [AGPR5217]	WA
Director of National Parks	
Lot 112 P243085 [AGPR5764]	WA
Lot 281 P243086 [AGPR5765]	WA

Commonwealth Heritage Places		[Resource Information]
Name	State	Status
Natural		
Christmas Island Natural Areas	EXT	Listed place
Learmonth Air Weapons Range Facility	WA	Listed place
Mermaid Reef - Rowley Shoals	WA	Listed place

Name	State	Status
Ningaloo Marine Area - Commonwealth Waters	WA	Listed place
Scott Reef and Surrounds - Commonwealth Area	EXT	Listed place

Listed Marine Species [Resource Information]

Scientific Name	Threatened Category	Presence Text
Bird		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area
Anous stolidus Common Noddy [825]		Species or species habitat likely to occur within area
Anous tenuirostris melanops Australian Lesser Noddy [26000]	Vulnerable	Species or species habitat may occur within area
Anseranas semipalmata Magpie Goose [978]		Species or species habitat may occur within area overfly marine area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area
Ardenna carneipes as Puffinus carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Species or species habitat likely to occur within area
Ardenna pacifica as Puffinus pacificus Wedge-tailed Shearwater [84292]		Breeding known to occur within area
Arenaria interpres Ruddy Turnstone [872]	Vulnerable	Roosting known to occur within area
Bubulcus ibis as Ardea ibis Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area

Scientific Name	Threatened Category	Presence Text
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Roosting known to occur within area
Calidris alba Sanderling [875]		Roosting known to occur within area
Calidris canutus Red Knot, Knot [855]	Vulnerable	Species or species habitat known to occur within area overfly marine area
Calidris falcinellus as Limicola falcinellus Broad-billed Sandpiper [91731]		Roosting known to occur within area overfly marine area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area overfly marine area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat known to occur within area overfly marine area
Calidris ruficollis Red-necked Stint [860]		Roosting known to occur within area overfly marine area
Calidris tenuirostris Great Knot [862]	Vulnerable	Roosting known to occur within area overfly marine area
Calonectris leucomelas Streaked Shearwater [1077]		Species or species habitat known to occur within area
Cecropis daurica as Hirundo daurica Red-rumped Swallow [80610]		Species or species habitat known to occur within area overfly marine area
Chalcites osculans as Chrysococcyx osculans Black-eared Cuckoo [83425]		Species or species habitat known to occur within area overfly marine area

Scientific Name	Threatened Category	Presence Text
Charadrius bicinctus Double-banded Plover [895]		Roosting known to occur within area overfly marine area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat known to occur within area
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Roosting known to occur within area
Charadrius ruficapillus Red-capped Plover [881]		Roosting known to occur within area overfly marine area
Charadrius veredus Oriental Plover, Oriental Dotterel [882]		Roosting known to occur within area overfly marine area
Chroicocephalus novaehollandiae as Larus novaehollandiae Silver Gull [82326]		Breeding known to occur within area
Fregata andrewsi Christmas Island Frigatebird, Andrew's Frigatebird [1011]	Endangered	Foraging, feeding or related behaviour known to occur within area
Fregata ariel Lesser Frigatebird, Least Frigatebird [1012]		Species or species habitat known to occur within area
Fregata minor Great Frigatebird, Greater Frigatebird [1013]		Breeding known to occur within area
Gallinago megala Swinhoe's Snipe [864]		Roosting likely to occur within area overfly marine area
Gallinago stenura Pin-tailed Snipe [841]		Roosting likely to occur within area overfly marine area
Glareola maldivarum Oriental Pratincole [840]		Roosting known to occur within area overfly marine area

Scientific Name	Threatened Category	Presence Text
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area
Himantopus himantopus Pied Stilt, Black-winged Stilt [870]		Roosting known to occur within area overfly marine area
Hirundo rustica Barn Swallow [662]		Species or species habitat known to occur within area overfly marine area
Hydroprogne caspia as Sterna caspia Caspian Tern [808]		Breeding known to occur within area
Larus pacificus Pacific Gull [811]		Breeding known to occur within area
Limnodromus semipalmatus Asian Dowitcher [843]	Vulnerable	Species or species habitat known to occur within area overfly marine area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area
Limosa limosa Black-tailed Godwit [845]	Endangered	Roosting known to occur within area overfly marine area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area

Scientific Name	Threatened Category	Presence Text
Motacilla cinerea Grey Wagtail [642]		Species or species habitat known to occur within area overfly marine area
Motacilla flava Yellow Wagtail [644]		Species or species habitat known to occur within area overfly marine area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
Numenius minutus Little Curlew, Little Whimbrel [848]		Roosting known to occur within area overfly marine area
Numenius phaeopus Whimbrel [849]		Roosting known to occur within area
Onychoprion anaethetus as Sterna anaethetus Bridled Tern [82845]		Breeding known to occur within area
Onychoprion fuscatus as Sterna fuscata Sooty Tern [90682]		Breeding known to occur within area
Pandion haliaetus Osprey [952]		Breeding known to occur within area
Papasula abbotti Abbott's Booby [59297]	Endangered	Species or species habitat known to occur within area
Phaethon lepturus White-tailed Tropicbird [1014]		Breeding known to occur within area
Phaethon lepturus fulvus Christmas Island White-tailed Tropicbird, Golden Bosunbird [26021]	Endangered	Breeding known to occur within area
Phaethon rubricauda Red-tailed Tropicbird [994]		Breeding known to occur within area

Scientific Name	Threatened Category	Presence Text
Pluvialis fulva Pacific Golden Plover [25545]		Roosting known to occur within area
Pluvialis squatarola Grey Plover [865]	Vulnerable	Roosting known to occur within area overfly marine area
Pterodroma mollis Soft-plumaged Petrel [1036]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Recurvirostra novaehollandiae Red-necked Avocet [871]		Roosting known to occur within area overfly marine area
Rostratula australis as Rostratula benghalensis (sensu lato) Australian Painted Snipe [77037]	Endangered	Species or species habitat known to occur within area overfly marine area
Sterna dougallii Roseate Tern [817]		Breeding known to occur within area
Sternula albifrons as Sterna albifrons Little Tern [82849]	Vulnerable	Breeding known to occur within area
Sternula nereis as Sterna nereis Fairy Tern [82949]		Breeding known to occur within area
Sula leucogaster Brown Booby [1022]		Breeding known to occur within area
Sula sula Red-footed Booby [1023]		Breeding known to occur within area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat may occur within area
Thalassarche cauta Shy Albatross [89224]	Endangered	Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Species or species habitat may occur within area
Thalasseus bengalensis as Sterna bengalensis Lesser Crested Tern [66546]		Breeding known to occur within area
Thalasseus bergii as Sterna bergii Greater Crested Tern [83000]		Breeding known to occur within area
Tringa brevipes as Heteroscelus brevipes Grey-tailed Tattler [851]		Roosting known to occur within area
Tringa glareola Wood Sandpiper [829]		Roosting known to occur within area overfly marine area
Tringa nebularia Common Greenshank, Greenshank [832]	Endangered	Species or species habitat known to occur within area overfly marine area
Tringa stagnatilis Marsh Sandpiper, Little Greenshank [833]		Roosting known to occur within area overfly marine area
Tringa totanus Common Redshank, Redshank [835]		Roosting known to occur within area overfly marine area
Xenus cinereus Terek Sandpiper [59300]	Vulnerable	Roosting known to occur within area overfly marine area
Fish		

Scientific Name	Threatened Category	Presence Text
Acentronura larsonae Helen's Pygmy Pipehorse [66186]		Species or species habitat may occur within area
Bhanotia fasciolata Corrugated Pipefish, Barbed Pipefish [66188]		Species or species habitat may occur within area
Bulbonaricus brauni Braun's Pughead Pipefish, Pug-headed Pipefish [66189]		Species or species habitat may occur within area
Campichthys galei Gale's Pipefish [66191]		Species or species habitat may occur within area
Campichthys tricarinatus Three-keel Pipefish [66192]		Species or species habitat may occur within area
Choeroichthys brachysoma Pacific Short-bodied Pipefish, Short-bodied Pipefish [66194]		Species or species habitat may occur within area
Choeroichthys latispinosus Muiron Island Pipefish [66196]		Species or species habitat may occur within area
Choeroichthys sculptus Sculptured Pipefish [66197]		Species or species habitat may occur within area
Choeroichthys suillus Pig-snouted Pipefish [66198]		Species or species habitat may occur within area
Corythoichthys amplexus Fijian Banded Pipefish, Brown-banded Pipefish [66199]		Species or species habitat may occur within area
Corythoichthys flavofasciatus Reticulate Pipefish, Yellow-banded Pipefish, Network Pipefish [66200]		Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Corythoichthys haematopterus Reef-top Pipefish [66201]		Species or species habitat may occur within area
Corythoichthys intestinalis Australian Messmate Pipefish, Banded Pipefish [66202]		Species or species habitat may occur within area
Corythoichthys schultzi Schultz's Pipefish [66205]		Species or species habitat may occur within area
Cosmocampus banneri Roughridge Pipefish [66206]		Species or species habitat may occur within area
Cosmocampus maxweberi Maxweber's Pipefish [66209]		Species or species habitat may occur within area
Doryrhamphus baldwini Redstripe Pipefish [66718]		Species or species habitat may occur within area
Doryrhamphus dactyliophorus Banded Pipefish, Ringed Pipefish [66210]		Species or species habitat may occur within area
Doryrhamphus excisus Bluestripe Pipefish, Indian Blue-stripe Pipefish, Pacific Blue-stripe Pipefish [66211]		Species or species habitat may occur within area
Doryrhamphus janssi Cleaner Pipefish, Janss' Pipefish [66212]		Species or species habitat may occur within area
Doryrhamphus multiannulatus Many-banded Pipefish [66717]		Species or species habitat may occur within area
Doryrhamphus negrosensis Flagtail Pipefish, Masthead Island Pipefish [66213]		Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Festucalex scalaris Ladder Pipefish [66216]		Species or species habitat may occur within area
Filicampus tigris Tiger Pipefish [66217]		Species or species habitat may occur within area
Halicampus brocki Brock's Pipefish [66219]		Species or species habitat may occur within area
Halicampus dunckeri Red-hair Pipefish, Duncker's Pipefish [66220]		Species or species habitat may occur within area
Halicampus grayi Mud Pipefish, Gray's Pipefish [66221]		Species or species habitat may occur within area
Halicampus macrorhynchus Whiskered Pipefish, Ornate Pipefish [66222]		Species or species habitat may occur within area
Halicampus mataafae Samoan Pipefish [66223]		Species or species habitat may occur within area
Halicampus nitidus Glittering Pipefish [66224]		Species or species habitat may occur within area
Halicampus spinirostris Spiny-snout Pipefish [66225]		Species or species habitat may occur within area
Haliichthys taeniophorus Ribboned Pipehorse, Ribboned Seadragon [66226]		Species or species habitat may occur within area
Hippichthys cyanospilos Blue-speckled Pipefish, Blue-spotted Pipefish [66228]		Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Hippichthys heptagonus Madura Pipefish, Reticulated Freshwater Pipefish [66229]		Species or species habitat may occur within area
Hippichthys penicillus Beady Pipefish, Steep-nosed Pipefish [66231]		Species or species habitat may occur within area
Hippichthys spicifer Belly-barred Pipefish, Banded Freshwater Pipefish [66232]		Species or species habitat may occur within area
Hippocampus angustus Western Spiny Seahorse, Narrow-bellied Seahorse [66234]		Species or species habitat may occur within area
Hippocampus histrix Spiny Seahorse, Thorny Seahorse [66236]		Species or species habitat may occur within area
Hippocampus kuda Spotted Seahorse, Yellow Seahorse [66237]		Species or species habitat may occur within area
Hippocampus planifrons Flat-face Seahorse [66238]		Species or species habitat may occur within area
Hippocampus spinosissimus Hedgehog Seahorse [66239]		Species or species habitat may occur within area
Hippocampus trimaculatus Three-spot Seahorse, Low-crowned Seahorse, Flat-faced Seahorse [66720]		Species or species habitat may occur within area
Lissocampus fatiloquus Prophet's Pipefish [66250]		Species or species habitat may occur within area
Micrognathus brevirostris thorntail Pipefish, Thorn-tailed Pipefish [66254]		Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Micrognathus micronotopterus Tidepool Pipefish [66255]		Species or species habitat may occur within area
Nannocampus subosseus Bonyhead Pipefish, Bony-headed Pipefish [66264]		Species or species habitat may occur within area
Phoxocampus belcheri Black Rock Pipefish [66719]		Species or species habitat may occur within area
Solegnathus hardwickii Pallid Pipehorse, Hardwick's Pipehorse [66272]		Species or species habitat may occur within area
Solegnathus lettiensis Gunther's Pipehorse, Indonesian Pipefish [66273]		Species or species habitat may occur within area
Solenostomus cyanopterus Robust Ghostpipefish, Blue-finned Ghost Pipefish, [66183]		Species or species habitat may occur within area
Stigmatopora argus Spotted Pipefish, Gulf Pipefish, Peacock Pipefish [66276]		Species or species habitat may occur within area
Syngnathoides biaculeatus Double-end Pipehorse, Double-ended Pipehorse, Alligator Pipefish [66279]		Species or species habitat may occur within area
Trachyrhamphus bicoarctatus Bentstick Pipefish, Bend Stick Pipefish, Short-tailed Pipefish [66280]		Species or species habitat may occur within area
Trachyrhamphus longirostris Straightstick Pipefish, Long-nosed Pipefish, Straight Stick Pipefish [66281]		Species or species habitat may occur within area
Mammal		
Dugong dugon Dugong [28]		Breeding known to occur within area
Reptile		

Scientific Name	Threatened Category	Presence Text
Aipysurus apraefrontalis Short-nosed Sea Snake, Short-nosed Seasnake [1115]	Critically Endangered	Species or species habitat known to occur within area
Aipysurus duboisii Dubois' Sea Snake, Dubois' Seasnake, Reef Shallows Sea Snake [1116]		Species or species habitat may occur within area
Aipysurus foliosquama Leaf-scaled Sea Snake, Leaf-scaled Seasnake [1118]	Critically Endangered	Species or species habitat known to occur within area
Aipysurus fuscus Dusky Sea Snake [1119]	Endangered	Species or species habitat known to occur within area
Aipysurus laevis Olive Sea Snake, Olive-brown Sea Snake [1120]		Species or species habitat may occur within area
Aipysurus mosaicus as Aipysurus eydouxii Mosaic Sea Snake [87261]		Species or species habitat may occur within area
Aipysurus pooleorum Shark Bay Sea Snake [66061]		Species or species habitat may occur within area
Aipysurus tenuis Brown-lined Sea Snake, Mjoberg's Sea Snake [1121]		Species or species habitat may occur within area
Caretta caretta Loggerhead Turtle [1763]	Endangered	Breeding known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Breeding known to occur within area
Crocodylus johnstoni Freshwater Crocodile, Johnston's Crocodile, Johnstone's Crocodile [1773]		Species or species habitat may occur within area
Crocodylus porosus Salt-water Crocodile, Estuarine Crocodile [1774]		Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Foraging, feeding or related behaviour known to occur within area
Emydocephalus annulatus Eastern Turtle-headed Sea Snake [1125]		Species or species habitat may occur within area
Ephalophis greyae as Ephalophis greyi Mangrove Sea Snake [93738]		Species or species habitat may occur within area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Breeding known to occur within area
Hydrelaps darwiniensis Port Darwin Sea Snake, Black-ringed Mangrove Sea Snake [1100]		Species or species habitat may occur within area
Hydrophis czeblukovi Fine-spined Sea Snake [59233]		Species or species habitat may occur within area
Hydrophis elegans Elegant Sea Snake, Bar-bellied Sea Snake [1104]		Species or species habitat may occur within area
Hydrophis hardwickii as Lapemis hardwickii Spine-bellied Sea Snake [93516]		Species or species habitat may occur within area
Hydrophis kingii as Disteira kingii Spectacled Sea Snake [93511]		Species or species habitat may occur within area
Hydrophis macdowelli as Hydrophis mcdowelli MacDowell's Sea Snake, Small-headed Sea Snake, [75601]		Species or species habitat may occur within area
Hydrophis major as Disteira major Olive-headed Sea Snake [93512]		Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Hydrophis ornatus Spotted Sea Snake, Ornate Reef Sea Snake [1111]		Species or species habitat may occur within area
Hydrophis peronii as Acalyptophis peronii Horned Sea Snake [93509]		Species or species habitat may occur within area
Hydrophis platura as Pelamis platurus Yellow-bellied Sea Snake [93746]		Species or species habitat may occur within area
Hydrophis stokesii as Astrotia stokesii Stokes' Sea Snake [93510]		Species or species habitat may occur within area
Lepidochelys olivacea Olive Ridley Turtle, Pacific Ridley Turtle [1767]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Breeding known to occur within area

Whales and Other Cetaceans		[Resource Information]
Current Scientific Name	Status	Type of Presence
Mammal		
Balaenoptera acutorostrata Minke Whale [33]		Species or species habitat may occur within area
Balaenoptera bonaerensis Antarctic Minke Whale, Dark-shoulder Minke Whale [67812]		Species or species habitat likely to occur within area
Balaenoptera borealis Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Balaenoptera edeni Bryde's Whale [35]		Species or species habitat likely to occur within area

Current Scientific Name	Status	Type of Presence
[Balaenoptera musculus](#) Blue Whale [36]	Endangered	Migration route known to occur within area
[Balaenoptera omurai](#) Omura's Whale [87136]		Species or species habitat likely to occur within area
[Balaenoptera physalus](#) Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
[Delphinus delphis](#) Common Dolphin, Short-beaked Common Dolphin [60]		Species or species habitat may occur within area
[Eubalaena australis](#) Southern Right Whale [40]	Endangered	Species or species habitat likely to occur within area
[Feresa attenuata](#) Pygmy Killer Whale [61]		Species or species habitat may occur within area
[Globicephala macrorhynchus](#) Short-finned Pilot Whale [62]		Species or species habitat may occur within area
[Grampus griseus](#) Risso's Dolphin, Grampus [64]		Species or species habitat may occur within area
[Indopacetus pacificus](#) Longman's Beaked Whale [72]		Species or species habitat may occur within area
[Kogia breviceps](#) Pygmy Sperm Whale [57]		Species or species habitat may occur within area
[Kogia sima](#) Dwarf Sperm Whale [85043]		Species or species habitat may occur within area

Current Scientific Name	Status	Type of Presence
[Lagenodelphis hosei](#) Fraser's Dolphin, Sarawak Dolphin [41]		Species or species habitat may occur within area
[Megaptera novaeangliae](#) Humpback Whale [38]		Breeding known to occur within area
[Mesoplodon densirostris](#) Blainville's Beaked Whale, Dense-beaked Whale [74]		Species or species habitat may occur within area
[Mesoplodon ginkgodens](#) Gingko-toothed Beaked Whale, Gingko-toothed Whale, Gingko Beaked Whale [59564]		Species or species habitat may occur within area
[Orcaella heinsohni](#) Australian Snubfin Dolphin [81322]	Vulnerable	Breeding known to occur within area
[Orcinus orca](#) Killer Whale, Orca [46]		Species or species habitat may occur within area
[Peponocephala electra](#) Melon-headed Whale [47]		Species or species habitat may occur within area
[Physeter macrocephalus](#) Sperm Whale [59]		Species or species habitat may occur within area
[Pseudorca crassidens](#) False Killer Whale [48]		Species or species habitat likely to occur within area
[Sousa sahulensis](#) Australian Humpback Dolphin [87942]	Vulnerable	Breeding known to occur within area
[Stenella attenuata](#) Spotted Dolphin, Pantropical Spotted Dolphin [51]		Species or species habitat may occur within area
[Stenella coeruleoalba](#) Striped Dolphin, Euphrosyne Dolphin [52]		Species or species habitat may occur within area

Current Scientific Name	Status	Type of Presence
Stenella longirostris Long-snouted Spinner Dolphin [29]		Species or species habitat may occur within area
Steno bredanensis Rough-toothed Dolphin [30]		Species or species habitat may occur within area
Tursiops aduncus Indian Ocean Bottlenose Dolphin, Spotted Bottlenose Dolphin [68418]		Species or species habitat likely to occur within area
Tursiops aduncus (Arafura/Timor Sea populations) Spotted Bottlenose Dolphin (Arafura/Timor Sea populations) [78900]		Species or species habitat known to occur within area
Tursiops truncatus s. str. Bottlenose Dolphin [68417]		Species or species habitat may occur within area
Ziphius cavirostris Cuvier's Beaked Whale, Goose-beaked Whale [56]		Species or species habitat may occur within area

Commonwealth Reserves Terrestrial [Resource Information]

Name	State	Type
Christmas Island	EXT	National Park (Commonwealth)

Australian Marine Parks [Resource Information]

Park Name	Zone & IUCN Categories
Christmas Island	Habitat Protection Zone (IUCN IV)
Gascoyne	Habitat Protection Zone (IUCN IV)
Argo-Rowley Terrace	Multiple Use Zone (IUCN VI)
Argo-Rowley Terrace	Multiple Use Zone (IUCN VI)
Gascoyne	Multiple Use Zone (IUCN VI)
Montebello	Multiple Use Zone (IUCN VI)
Mermaid Reef	National Park Zone (IUCN II)

Park Name	Zone & IUCN Categories
Ningaloo	Recreational Use Zone (IUCN IV)
Argo-Rowley Terrace	Special Purpose Zone (Trawl) (IUCN VI)

Habitat Critical to the Survival of Marine Turtles [Resource Information]

Scientific Name	Behaviour	Presence
All year (Jun - Aug)		
Natator depressus		
Flatback Turtle [59257]	Nesting	Known to occur
Nov-Feb		
Caretta caretta		
Loggerhead Turtle [1763]	Nesting	Known to occur
Oct - Feb		
Eretmochelys imbricata		
Hawksbill Turtle [1766]	Nesting	Known to occur
Oct - Mar		
Chelonia mydas		
Green Turtle [1765]	Nesting	Known to occur

Extra Information

State and Territory Reserves [Resource Information]

Protected Area Name	Reserve Type	State
Airlie Island	Nature Reserve	WA
Barrow Island	Marine Park	WA
Barrow Island	Marine Management Area	WA
Bernier And Dorre Islands	Nature Reserve	WA
Bessieres Island	Nature Reserve	WA
Boodie, Double Middle Islands	Nature Reserve	WA
Burnside And Simpson Island	Nature Reserve	WA
Cape Range	National Park	WA
Cape Range (South)	National Park	WA

Protected Area Name	Reserve Type	State
Gnandaroo Island	Nature Reserve	WA
Great Sandy Island	Nature Reserve	WA
Great Sandy Island	Nature Reserve	WA
Jurabi Coastal Park	5(1)(h) Reserve	WA
Koks Island	Nature Reserve	WA
Little Rocky Island	Nature Reserve	WA
Locker Island	Nature Reserve	WA
Lowendal Islands	Nature Reserve	WA
Montebello Islands	Conservation Park	WA
Montebello Islands	Conservation Park	WA
Montebello Islands	Marine Park	WA
Muiron Islands	Nature Reserve	WA
Muiron Islands	Marine Management Area	WA
Ningaloo	Marine Park	WA
North Sandy Island	Nature Reserve	WA
Nyingguulu (Ningaloo) Coastal Reserve	5(1)(h) Reserve	WA
Rocky Island	Nature Reserve	WA
Round Island	Nature Reserve	WA
Rowley Shoals	Marine Park	WA
Scott Reef	Nature Reserve	WA
Serrurier Island	Nature Reserve	WA
Tent Island	Nature Reserve	WA
Thevenard Island	Nature Reserve	WA
Thevenard Island	Nature Reserve	WA
Unnamed WA36909	5(1)(h) Reserve	WA
Unnamed WA36913	Nature Reserve	WA

Protected Area Name	Reserve Type	State
Unnamed WA36915	Nature Reserve	WA
Unnamed WA37383	5(1)(h) Reserve	WA
Unnamed WA37500	5(1)(g) Reserve	WA
Unnamed WA40322	5(1)(h) Reserve	WA
Unnamed WA40877	5(1)(h) Reserve	WA
Unnamed WA44665	5(1)(h) Reserve	WA
Unnamed WA44667	5(1)(h) Reserve	WA
Unnamed WA44688	5(1)(h) Reserve	WA
Unnamed WA51162	5(1)(h) Reserve	WA
Unnamed WA51932	5(1)(h) Reserve	WA
Unnamed WA52354	5(1)(h) Reserve	WA
Victor Island	Nature Reserve	WA
Weld Island	Nature Reserve	WA
Whalebone Island	Nature Reserve	WA
Yawuru Nagulagun / Roebuck Bay	Marine Park	WA
Y Island	Nature Reserve	WA

EPBC Act Referrals

[Resource Information]

Title of referral	Reference	Referral Outcome	Assessment Status
2 geotechnical surveys - preliminary and final	2006/2886		Completed
Aerial Baiting of Yellow Crazy Ants	2012/6438		Completed
Ashburton Infrastructure Project	2021/9064		Completed
Babylon 3D Marine Seismic Survey, Commonwealth Waters, nr Exmouth WA	2013/7081		Completed
Browse Carbon Capture and Storage Project	2024/10028		Referral Decision
Browse to North West Shelf Development, Indian Ocean, WA	2018/8319		Approval

Title of referral	Reference	Referral Outcome	Assessment Status
DAVROS MC 3D marine seismic survey northwaet of Dampier, WA	2013/7092		Completed
Deep Water Northwest Shelf 2D Seismic Survey	2007/3260		Completed
Gorgon Gas Development	2003/1294		Post-Approval
Ningaloo Lighthouse Development, 17km north west Exmouth, Western Australia	2020/8693		Post-Approval
North West Shelf Project Extension, Carnarvon Basin, WA	2018/8335		Approval
Ocean Barramundi Expansion Project	2022/09272		Assessment
Optimised Mardie Project ? Additional Triodia Grassland Habitat Clearing	2024/10094		Referral Decision
Optimised Mardie Solar Salt Project	2022/9169		Post-Approval
Project Highclere Cable Lay and Operation	2022/09203		Completed
Action clearly unacceptable			
Highlands 3D Marine Seismic Survey	2012/6680	Action Clearly Unacceptable	Completed
Controlled action			
'Van Gogh' Petroleum Field Development	2007/3213	Controlled Action	Post-Approval
2-D seismic survey Scott Reef	2000/125	Controlled Action	Post-Approval
Balmoral South Iron Ore Mine	2008/4236	Controlled Action	Post-Approval
Binowee Iron Ore Project	2001/366	Controlled Action	Proposed Decision
Boating Facility	2002/830	Controlled Action	Completed
Broome Boating Facility	2021/9098	Controlled Action	Referral Decision
Browse FLNG Development, Commonwealth Waters	2013/7079	Controlled Action	Post-Approval
Construct and operate LNG & domestic gas plant including onshore and offshore facilities -	2008/4469	Controlled Action	Post-Approval

Title of referral	Reference	Referral Outcome	Assessment Status
Controlled action			
Wheatston			
Construction and operation of a Solar Salt Project, SW Onslow, WA	2016/7793	Controlled Action	Assessment Approach
Development of Browse Basin Gas Fields (Upstream)	2008/4111	Controlled Action	Completed
Development of Coniston/Novara fields within the Exmouth Sub-basin	2011/5995	Controlled Action	Post-Approval
Development of Stybarrow petroleum field incl drilling and facility installation	2004/1469	Controlled Action	Post-Approval
East Christmas Island Phosphate Mines (9 sites)	2001/487	Controlled Action	Completed
Enfield full field development	2001/257	Controlled Action	Post-Approval
Equus Gas Fields Development Project, Carnarvon Basin	2012/6301	Controlled Action	Completed
Eramurra Industrial Salt Project	2021/9027	Controlled Action	Assessment Approach
Eramurra Industrial Salt Project, near Karratha, WA	2019/8448	Controlled Action	Completed
Exploration for Mineable Phosphate, Christmas Island	2000/43	Controlled Action	Completed
Gorgon Gas Development 4th Train Proposal	2011/5942	Controlled Action	Post-Approval
Gorgon Gas Revised Development	2008/4178	Controlled Action	Post-Approval
Greater Enfield (Vincent) Development	2005/2110	Controlled Action	Post-Approval
Greater Gorgon Development - Optical Fibre Cable, Mainland to Barrow Island	2005/2141	Controlled Action	Completed
Lily Beach Recreational Facilities	2001/395	Controlled Action	Post-Approval
Lily Beach Rock Pool Development	2001/400	Controlled Action	Completed
Mardie Project, 80 km south west of Karratha, WA	2018/8236	Controlled Action	Post-Approval

Title of referral	Reference	Referral Outcome	Assessment Status
Controlled action			
Mauds Landing Marina	2000/98	Controlled Action	Completed
Phosphate Mining in South Point Christmas Island	2012/6653	Controlled Action	Post-Approval
Proposed exploration drilling programme for Christmas Island	2016/7779	Controlled Action	Completed
Proposed West Pilbara Iron Ore Project	2009/4706	Controlled Action	Post-Approval
Pyrenees Oil Fields Development	2005/2034	Controlled Action	Post-Approval
Road Upgrade/Construction between Lily Beach Road and Port Faci	2001/436	Controlled Action	Post-Approval
Salvage, transport and processing of phosphate resource with extended airport si	2003/1217	Controlled Action	Post-Approval
Simpson Development	2000/59	Controlled Action	Completed
Simpson Oil Field Development	2001/227	Controlled Action	Post-Approval
The Scarborough Project - FLNG & assoc subsea infrastructure, Carnarvon Basin	2013/6811	Controlled Action	Post-Approval
Torosa South Initial Appraisal Drilling	2007/3500	Controlled Action	Completed
Vincent Appraisal Well	2000/22	Controlled Action	Post-Approval
Yannarie Solar Salt Project	2004/1679	Controlled Action	Completed
Yardie Creek Road Realignment Project	2021/8967	Controlled Action	Assessment Approach
Yellow Crazy Ant Biological Control	2013/6836	Controlled Action	Post-Approval
Not controlled action			
'Van Gogh' Oil Appraisal Drilling Program, Exploration Permit Area WA-155-P(1)	2006/3148	Not Controlled Action	Completed
Aerial Baiting, Yellow Crazy Ant Supercolonies, Christmas Island, WA	2019/8492	Not Controlled Action	Completed

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action			
Airlie Island soil and groundwater investigations, Exmouth Gulf, offshore Pilbara coast	2014/7250	Not Controlled Action	Completed
Barrow Island 2D Seismic survey	2006/2667	Not Controlled Action	Completed
Boating Facility	2002/832	Not Controlled Action	Completed
Boat Ramp Construction	2001/237	Not Controlled Action	Completed
Bollinger 2D Seismic Survey 200km North of North West Cape WA	2004/1868	Not Controlled Action	Completed
Bultaco-2, Laverda-2, Laverda-3 and Montesa-2 Appraisal Wells	2000/103	Not Controlled Action	Completed
Carnarvon 3D Marine Seismic Survey	2004/1890	Not Controlled Action	Completed
Christmas Island/Construction of a double storey shed/carport at MQ387 Gaze Road	2004/1561	Not Controlled Action	Completed
Community Recreation Centre	2003/1279	Not Controlled Action	Completed
Drilling of exploration wells, Permit areas WA-301-P to WA-305-P	2002/769	Not Controlled Action	Completed
Dwelling demolition, maintenance and carpark/carport/storage shed works	2004/1837	Not Controlled Action	Completed
Expansion of the Sino Iron Ore Mine and export facilities, Cape Preston, WA	2017/7862	Not Controlled Action	Completed
Expansion Proposal, Mineralogy Cape Preston Iron Ore Project, Cape Preston, WA	2009/5010	Not Controlled Action	Completed
Exploration drilling well WA-155-P(1)	2003/971	Not Controlled Action	Completed
Exploration Well in Permit Area WA-155-P(1)	2002/759	Not Controlled Action	Completed
Exploratory drilling in permit area WA-225-P	2001/490	Not Controlled Action	Completed
Extension of a Masonary Brick Wall adjacent to the Poon Saan Club by 500 mm	2004/1564	Not Controlled Action	Completed

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action			
Extension of Simpson Oil Platforms & Wells	2002/685	Not Controlled Action	Completed
Garage and Office Facilities	2004/1919	Not Controlled Action	Completed
Gulf Fishing Lodge	2010/5499	Not Controlled Action	Completed
HCA05X Macedon Experimental Survey	2004/1926	Not Controlled Action	Completed
Hess Exploration Drilling Programme	2007/3566	Not Controlled Action	Completed
Housing and Garden Maintenance Works	2004/1487	Not Controlled Action	Completed
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed
Infill Production Well (Griffin-9)	2001/417	Not Controlled Action	Completed
Internal and external modifications Lot 1014 Gaze Road	2004/1807	Not Controlled Action	Completed
Kimberley Marine Offloading Facility	2020/8736	Not Controlled Action	Completed
Klammer 2D Seismic Survey	2002/868	Not Controlled Action	Completed
Mermaid Marine Australia Desalination Project	2011/5916	Not Controlled Action	Completed
Montesa-1 and Bultaco-1 Exploration Wells	2000/102	Not Controlled Action	Completed
Murujuga archaeological excavation, collection and sampling, Dampier Archipelago, WA	2014/7160	Not Controlled Action	Completed
Power Station Upgrade (South Port Site)	2001/414	Not Controlled Action	Completed
Project Highclere Geophysical Survey	2021/9023	Not Controlled Action	Completed
Proposed sale or lease of Crown land, 11 lots, Christmas Island	2018/8220	Not Controlled Action	Completed
Realignment of Gaze Road Service Road and Gaze Road Junction	2004/1735	Not Controlled Action	Completed

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action			
Spool Base Facility	2001/263	Not Controlled Action	Completed
Subsea Gas Pipeline From Stybarrow Field to Griffin Venture Gas Export Pipeline	2005/2033	Not Controlled Action	Completed
Supermarket Extensions	2006/2515	Not Controlled Action	Completed
Thevenard Island Retirement Project	2015/7423	Not Controlled Action	Completed
To construct and operate an offshore submarine fibre optic cable, WA	2014/7373	Not Controlled Action	Completed
Wanda Offshore Research Project, 80 km north-east of Exmouth, WA	2018/8293	Not Controlled Action	Completed
Not controlled action (particular manner)			
'Kate' 3D marine seismic survey, exploration permits WA-320-P and WA-345-P, 60km	2005/2037	Not Controlled Action (Particular Manner)	Post-Approval
"Leanne" offshore 3D seismic exploration, WA-356-P	2005/1938	Not Controlled Action (Particular Manner)	Post-Approval
2D and 3D seismic surveys	2005/2151	Not Controlled Action (Particular Manner)	Post-Approval
2D marine seismic survey	2012/6296	Not Controlled Action (Particular Manner)	Post-Approval
2D Seismic Survey	2005/2146	Not Controlled Action (Particular Manner)	Post-Approval
3D marine seismic survey	2008/4281	Not Controlled Action (Particular Manner)	Post-Approval
3D Marine Seismic Survey in Permit Areas WA-15-R, WA-18-R, WA-205-P, WA-253-P, WA-267-P and WA-268-P	2003/1271	Not Controlled Action (Particular Manner)	Post-Approval
3D marine seismic Survey - Maxima 3D MSS	2006/2945	Not Controlled Action	Post-Approval

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action (particular manner)			
		(Particular Manner)	
3D Marine Seismic Surveys - Contos CT-13 & Supertubes CT-13, offshore WA	2013/6901	Not Controlled Action (Particular Manner)	Post-Approval
3D seismic survey	2006/2715	Not Controlled Action (Particular Manner)	Post-Approval
3D Seismic Survey, near Scott Reef, Browse Basin	2005/2126	Not Controlled Action (Particular Manner)	Post-Approval
3D Seismic Survey, WA	2008/4428	Not Controlled Action (Particular Manner)	Post-Approval
Acheron Non-Exclusive 2D Seismic Survey	2009/4968	Not Controlled Action (Particular Manner)	Post-Approval
Acheron Non-Exclusive 2D Seismic Survey	2008/4565	Not Controlled Action (Particular Manner)	Post-Approval
Apache Northwest Shelf Van Gogh Field Appraisal Drilling Program	2007/3495	Not Controlled Action (Particular Manner)	Post-Approval
Aperio 3D Marine Seismic Survey, WA	2012/6648	Not Controlled Action (Particular Manner)	Post-Approval
Asbestos Removal from Commonwealth Owned Assests including Commonwealth Heritage	2009/4873	Not Controlled Action (Particular Manner)	Post-Approval
Baiting Efficacy Trial of Feral Cat Bait and PAPP Toxicant	2008/4383	Not Controlled Action (Particular Manner)	Post-Approval
Bonaventure 3D seismic survey	2006/2514	Not Controlled Action (Particular Manner)	Post-Approval

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action (particular manner)			
Cape Preston East - Iron Ore Export Facilities, Pilbara, WA	2013/6844	Not Controlled Action (Particular Manner)	Post-Approval
CGGVERITAS 2010 2D Seismic Survey	2010/5714	Not Controlled Action (Particular Manner)	Post-Approval
Charon 3D Marine Seismic Survey	2007/3477	Not Controlled Action (Particular Manner)	Post-Approval
Consturction & operation of the Varanus Island kitchen & mess cyclone refuge building, compression p	2013/6952	Not Controlled Action (Particular Manner)	Post-Approval
Coverack Marine Seismic Survey	2001/399	Not Controlled Action (Particular Manner)	Post-Approval
Crazy Ant Aerial Baiting Control Program	2002/722	Not Controlled Action (Particular Manner)	Post-Approval
CVG 3D Marine Seismic Survey	2012/6654	Not Controlled Action (Particular Manner)	Post-Approval
Deep Water Drilling Program	2010/5532	Not Controlled Action (Particular Manner)	Post-Approval
Draeck 3D Marine Seismic Survey, WA-205-P	2006/3067	Not Controlled Action (Particular Manner)	Post-Approval
Drilling 35-40 offshore exploration wells in deep water	2008/4461	Not Controlled Action (Particular Manner)	Post-Approval
Earthworks for kitchen/mess, cyclone refuge building & Compression Plant, Varanus Island	2013/6900	Not Controlled Action (Particular Manner)	Post-Approval
Eendracht Multi-Client 3D Marine Seismic Survey	2009/4749	Not Controlled Action (Particular	Post-Approval

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action (particular manner)			
		Manner)	
Endurance 3D Marine Seismic Data Acquisition Survey	2007/3667	Not Controlled Action (Particular Manner)	Post-Approval
Enfield M3 & Vincent 4D Marine Seismic Surveys	2008/3981	Not Controlled Action (Particular Manner)	Completed
Enfield M3 4D, Vincent 4D & 4D Line Test Marine Seismic Surveys	2008/4122	Not Controlled Action (Particular Manner)	Post-Approval
Enfield M4 4D Marine Seismic Survey	2008/4558	Not Controlled Action (Particular Manner)	Post-Approval
Enfield oilfield 3D Seismic Survey	2006/3132	Not Controlled Action (Particular Manner)	Post-Approval
Establishment of AQIS washdown facility, logistics support base and ancillary businesses	2012/6364	Not Controlled Action (Particular Manner)	Post-Approval
Exmouth West 2D Marine Seismic Survey	2008/4132	Not Controlled Action (Particular Manner)	Post-Approval
Gazelle 3D Marine Seismic Survey in WA-399-P and WA-42-L	2010/5570	Not Controlled Action (Particular Manner)	Post-Approval
Geco Eagle 3D Marine Seismic Survey	2008/3958	Not Controlled Action (Particular Manner)	Post-Approval
Glencoe 3D Marine Seismic Survey WA-390-P	2007/3684	Not Controlled Action (Particular Manner)	Post-Approval
Grimalkin 3D Seismic Survey	2008/4523	Not Controlled Action (Particular Manner)	Post-Approval

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action (particular manner)			
Guacamole 2D Marine Seismic Survey	2008/4381	Not Controlled Action (Particular Manner)	Post-Approval
Helicopter baiting of exotic yellow crazy ant supercolonies, Christmas Island, Indian Ocean	2009/5016	Not Controlled Action (Particular Manner)	Post-Approval
Honeycombs MC3D Marine Seismic Survey	2012/6368	Not Controlled Action (Particular Manner)	Post-Approval
Huzzas MC3D Marine Seismic Survey (HZ-13) Carnarvon Basin, offshore WA	2013/7003	Not Controlled Action (Particular Manner)	Post-Approval
Huzzas phase 2 marine seismic survey, Exmouth Plateau, Northern Carnarvon Basin, WA	2013/7093	Not Controlled Action (Particular Manner)	Post-Approval
INDIGO Marine Cable Route Survey (INDIGO)	2017/7996	Not Controlled Action (Particular Manner)	Post-Approval
Kingtree & Ironstone-1 Exploration Wells	2011/5935	Not Controlled Action (Particular Manner)	Post-Approval
Laverda 3D Marine Seismic Survey and Vincent M1 4D Marine Seismic Survey	2010/5415	Not Controlled Action (Particular Manner)	Post-Approval
Leopard 2D marine seismic survey	2005/2290	Not Controlled Action (Particular Manner)	Post-Approval
Lion 2D Marine Seismic Survey	2007/3777	Not Controlled Action (Particular Manner)	Post-Approval
Macedon Gas Field Development	2008/4605	Not Controlled Action (Particular Manner)	Post-Approval
Marine reconnaissance survey	2008/4466	Not Controlled Action (Particular	Post-Approval

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action (particular manner)			
		Manner)	
Moosehead 2D seismic survey within permit WA-192-P	2005/2167	Not Controlled Action (Particular Manner)	Post-Approval
Munmorah 2D seismic survey within permits WA-308/9-P	2003/970	Not Controlled Action (Particular Manner)	Post-Approval
Ocean Bottom Cable Seismic Program, WA-264-P	2007/3844	Not Controlled Action (Particular Manner)	Post-Approval
Ocean Bottom Cable Seismic Survey	2005/2017	Not Controlled Action (Particular Manner)	Post-Approval
Offshore Canning Multi Client 2D Marine Seismic Survey	2010/5393	Not Controlled Action (Particular Manner)	Post-Approval
Offshore Fibre Optic Cable Network Construction & Operation, Port Hedland WA to Darwin NT	2014/7223	Not Controlled Action (Particular Manner)	Post-Approval
Onslow Seawater Desalination Plant Marine Geophysical Investigation	2020/8794	Not Controlled Action (Particular Manner)	Post-Approval
Orcus 3D Marine Seismic Survey in WA-450-P	2010/5723	Not Controlled Action (Particular Manner)	Post-Approval
Outer Canning exploration drilling program off NW coast of WA	2012/6618	Not Controlled Action (Particular Manner)	Post-Approval
Palta-1 exploration well in Petroleum Permit Area WA-384-P	2011/5871	Not Controlled Action (Particular Manner)	Post-Approval
Pyrenees 4D Marine Seismic Monitor Survey, HCA12A	2012/6579	Not Controlled Action (Particular Manner)	Post-Approval

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action (particular manner)			
Pyrenees-Macedon 3D marine seismic survey	2005/2325	Not Controlled Action (Particular Manner)	Post-Approval
Quiberon 2D Seismic Survey, permit area WA-385P, offshore of Carnarvon	2009/5077	Not Controlled Action (Particular Manner)	Post-Approval
Rosebud 3D Marine Seismic Survey in WA-30-R and TR/5	2012/6493	Not Controlled Action (Particular Manner)	Post-Approval
Rydal-1 Petroleum Exploration Well, WA	2012/6522	Not Controlled Action (Particular Manner)	Post-Approval
Salsa 3D Marine Seismic Survey	2010/5629	Not Controlled Action (Particular Manner)	Post-Approval
Scott Reef Seismic Research	2006/2647	Not Controlled Action (Particular Manner)	Post-Approval
Skorpion Marine Seismic Survey WA	2001/416	Not Controlled Action (Particular Manner)	Post-Approval
Sovereign 3D Marine Seismic Survey	2011/5861	Not Controlled Action (Particular Manner)	Post-Approval
Stybarrow 4D Marine Seismic Survey	2011/5810	Not Controlled Action (Particular Manner)	Post-Approval
Stybarrow Baseline 4D marine seismic survey	2008/4530	Not Controlled Action (Particular Manner)	Post-Approval
Tantabiddi Boat Ramp Sand Bypassing	2015/7411	Not Controlled Action (Particular Manner)	Post-Approval
Tortilla 2D Seismic Survey, WA	2011/6110	Not Controlled Action (Particular	Post-Approval

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action (particular manner)			
		Manner)	
Trials of a bait delivery system for the control of Yellow Crazy Ants	2009/4763	Not Controlled Action (Particular Manner)	Post-Approval
Undertake a three dimensional marine seismic survey	2010/5679	Not Controlled Action (Particular Manner)	Post-Approval
Vampire 2D Non Exclusive Seismic Survey, WA	2010/5543	Not Controlled Action (Particular Manner)	Post-Approval
Vincent M1 and Enfield M5 4D Marine Seismic Survey	2010/5720	Not Controlled Action (Particular Manner)	Post-Approval
Warramunga Non-Inclusive 3D Seismic Survey	2008/4553	Not Controlled Action (Particular Manner)	Post-Approval
Water supply upgrade	2005/2269	Not Controlled Action (Particular Manner)	Post-Approval
West Panaeus 3D seismic survey	2006/3141	Not Controlled Action (Particular Manner)	Post-Approval
Westralia SPAN Marine Seismic Survey, WA & NT	2012/6463	Not Controlled Action (Particular Manner)	Post-Approval
Referral decision			
3D Marine Seismic Survey in the offshore northwest Carnarvon Basin	2011/6175	Referral Decision	Completed
Bianchi 3D Marine Seismic Survey, Carnavon Basin, WA	2013/7078	Referral Decision	Completed
CVG 3D Marine Seismic Survey	2012/6270	Referral Decision	Completed
Enfield 4D Marine Seismic Surveys, Production Permit WA-28-L	2005/2370	Referral Decision	Completed
Experimental Study of Behavioural and Physiological Impact on Fish	2006/2625	Referral Decision	Completed

Title of referral	Reference	Referral Outcome	Assessment Status
Referral decision			
of Seismic Ex			
Mardie Salt Project, Pilbara region, WA	2018/8183	Referral Decision	Completed
Stybarrow Baseline 4D Marine Seismic Survey (Permit Areas WA-255-P, WA-32-L, WA-	2008/4165	Referral Decision	Completed
Two Dimensional Transition Zone Seismic Survey - TP/7 (R1)	2010/5507	Referral Decision	Completed
Varanus Island Compression Project	2012/6698	Referral Decision	Completed

Key Ecological Features [Resource Information]

Key Ecological Features are the parts of the marine ecosystem that are considered to be important for the biodiversity or ecosystem functioning and integrity of the Commonwealth Marine Area.

Name	Region
Ancient coastline at 125 m depth contour	North-west
Canyons linking the Cuvier Abyssal Plain and the Cape Range Peninsula	North-west
Commonwealth waters adjacent to Ningaloo Reef	North-west
Continental Slope Demersal Fish Communities	North-west
Exmouth Plateau	North-west
Mermaid Reef and Commonwealth waters surrounding Rowley Shoals	North-west
Seringapatam Reef and Commonwealth waters in the Scott Reef Complex	North-west

Biologically Important Areas [Resource Information]

Scientific Name	Behaviour	Presence
Dolphins		
Orcaella heinsohni Australian Snubfin Dolphin [81322]	Breeding	Known to occur
Orcaella heinsohni Australian Snubfin Dolphin [81322]	Calving	Known to occur
Orcaella heinsohni Australian Snubfin Dolphin [81322]	Foraging (high density prey)	Known to occur

Scientific Name	Behaviour	Presence
Sousa chinensis Indo-Pacific Humpback Dolphin [50]	Breeding	Known to occur
Sousa chinensis Indo-Pacific Humpback Dolphin [50]	Calving	Known to occur
Sousa chinensis Indo-Pacific Humpback Dolphin [50]	Foraging (high density prey)	Known to occur
Tursiops aduncus Indo-Pacific/Spotted Bottlenose Dolphin [68418]	Breeding	Known to occur
Tursiops aduncus Indo-Pacific/Spotted Bottlenose Dolphin [68418]	Calving	Known to occur
Tursiops aduncus Indo-Pacific/Spotted Bottlenose Dolphin [68418]	Foraging	Known to occur
Dugong		
Dugong dugon Dugong [28]	Breeding	Known to occur
Dugong dugon Dugong [28]	Calving	Known to occur
Dugong dugon Dugong [28]	Foraging	Likely to occur
Dugong dugon Dugong [28]	Foraging	Known to occur
Dugong dugon Dugong [28]	Foraging (high density seagrass beds)	Known to occur
Dugong dugon Dugong [28]	Migration likely	Known to occur
Dugong dugon Dugong [28]	Nursing	Known to occur
Marine Turtles		

Scientific Name	Behaviour	Presence
Caretta caretta Loggerhead Turtle [1763]	Foraging	Known to occur
Caretta caretta Loggerhead Turtle [1763]	Internesting buffer	Known to occur
Caretta caretta Loggerhead Turtle [1763]	Nesting	Known to occur
Chelonia mydas Green Turtle [1765]	Aggregation	Known to occur
Chelonia mydas Green Turtle [1765]	Basking	Known to occur
Chelonia mydas Green Turtle [1765]	Foraging	Known to occur
Chelonia mydas Green Turtle [1765]	Internesting	Likely to occur
Chelonia mydas Green Turtle [1765]	Internesting	Known to occur
Chelonia mydas Green Turtle [1765]	Internesting buffer	Known to occur
Chelonia mydas Green Turtle [1765]	Mating	Known to occur
Chelonia mydas Green Turtle [1765]	Migration corridor	Known to occur
Chelonia mydas Green Turtle [1765]	Nesting	Known to occur
Eretmochelys imbricata Hawksbill Turtle [1766]	Foraging	Known to occur
Eretmochelys imbricata Hawksbill Turtle [1766]	Internesting	Known to occur

Scientific Name	Behaviour	Presence
Eretmochelys imbricata Hawksbill Turtle [1766]	Internesting buffer	Known to occur
Eretmochelys imbricata Hawksbill Turtle [1766]	Mating	Known to occur
Eretmochelys imbricata Hawksbill Turtle [1766]	Migration corridor	Known to occur
Eretmochelys imbricata Hawksbill Turtle [1766]	Nesting	Known to occur
Natator depressus Flatback Turtle [59257]	Foraging	Known to occur
Natator depressus Flatback Turtle [59257]	Internesting	Known to occur
Natator depressus Flatback Turtle [59257]	Internesting buffer	Known to occur
Natator depressus Flatback Turtle [59257]	Mating	Known to occur
Natator depressus Flatback Turtle [59257]	Migration corridor	Known to occur
Natator depressus Flatback Turtle [59257]	Nesting	Known to occur
River shark		
Pristis clavata Dwarf Sawfish [68447]	Foraging	Known to occur
Pristis clavata Dwarf Sawfish [68447]	Nursing	Known to occur
Pristis clavata Dwarf Sawfish [68447]	Pupping	Known to occur
Pristis pristis Largetooth Sawfish [60756]	Foraging	Known to occur

Scientific Name	Behaviour	Presence
Pristis pristis Largetooth Sawfish [60756]	Juvenile	Known to occur
Pristis pristis Largetooth Sawfish [60756]	Pupping	Known to occur
Pristis pristis Largetooth Sawfish [60756]	Pupping	Likely to occur
Pristis zijsron Green Sawfish [68442]	Foraging	Known to occur
Pristis zijsron Green Sawfish [68442]	Nursing	Known to occur
Pristis zijsron Green Sawfish [68442]	Pupping	Known to occur
Seabirds		
Ardenna pacifica Wedge-tailed Shearwater [84292]	Breeding	Known to occur
Fregata ariel Lesser Frigatebird [1012]	Breeding	Known to occur
Phaethon lepturus White-tailed Tropicbird [1014]	Breeding	Known to occur
Sterna dougallii Roseate Tern [817]	Breeding	Known to occur
Sterna dougallii Roseate Tern [817]	Resting	Known to occur
Sternula albifrons sinensis Little Tern [82850]	Breeding	Known to occur
Sternula albifrons sinensis Little Tern [82850]	Resting	Known to occur
Sternula nereis Fairy Tern [82949]	Breeding	Known to occur

Scientific Name	Behaviour	Presence
Thalasseus bengalensis Lesser Crested Tern [66546]	Breeding	Known to occur
Sharks		
Rhincodon typus Whale Shark [66680]	Foraging	Known to occur
Rhincodon typus Whale Shark [66680]	Foraging (high density prey)	Known to occur
Whales		
Balaenoptera musculus brevicauda Pygmy Blue Whale [81317]	Foraging	Known to occur
Balaenoptera musculus brevicauda Pygmy Blue Whale [81317]	Migration	Known to occur
Eubalaena australis Southern Right Whale [40]	Migration	
Eubalaena australis Southern Right Whale [40]	Reproduction	
Megaptera novaeangliae Humpback Whale [38]	Migration (north and south)	Known to occur
Megaptera novaeangliae Humpback Whale [38]	Resting	Known to occur

Caveat

1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data is available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance on the contents of this report.

3 DATA SOURCES

Threatened ecological communities

For threatened ecological communities where the distribution is well known, maps are generated based on information contained in recovery plans, State vegetation maps and remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species

Threatened, migratory and marine species distributions have been discerned through a variety of methods. Where distributions are well known and if time permits, distributions are inferred from either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc.) together with point locations and described habitat; or modelled (MAXENT or BIOCLIM habitat modelling) using point locations and environmental data layers.

Where little information is available for a species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc.).

In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More detailed distribution mapping methods are used to update these distributions when time permits.

4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

The following groups have been mapped, but may not cover the complete distribution of the species:

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded breeding sites; and
- seals which have only been mapped for breeding sites near the Australian continent

The breeding sites may be important for the protection of the Commonwealth Marine environment.

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact us page.

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EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Please see the caveat for interpretation of information provided here.

Report created: 09-Feb-2026

Summary
Details
- Matters of NES
- Other Matters Protected by the EPBC Act
- Extra Information

Caveat
Acknowledgements

Summary

Matters of National Environment Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	3
National Heritage Places:	4
Wetlands of International Importance (Ramsar	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	4
Listed Threatened Ecological Communities:	None
Listed Threatened Species:	98
Listed Migratory Species:	89

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at https://www.dcceew.gov.au/parks-heritage/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Lands:	14
Commonwealth Heritage Places:	2
Listed Marine Species:	153
Whales and Other Cetaceans:	33
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	15
Habitat Critical to the Survival of Marine Turtles:	4

Extra Information

This part of the report provides information that may also be relevant to the area you have

State and Territory Reserves:	59
Regional Forest Agreements:	None
Nationally Important Wetlands:	None
EPBC Act Referrals:	191
Key Ecological Features (Marine):	10
Biologically Important Areas:	56
Bioregional Assessments:	None
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

World Heritage Properties [Resource Information]

Name	State	Legal Status
Murujuga Cultural Landscape	WA	Declared property
Shark Bay, Western Australia	WA	Declared property
The Ningaloo Coast	WA	Declared property

National Heritage Places [Resource Information]

Name	State	Legal Status
Historic		
Batavia Shipwreck Site and Survivor Camps Area 1629 - Houtman Abrolhos	WA	Listed place
Indigenous		
Dampier Archipelago (including Burrup Peninsula)	WA	Listed place
Natural		
Shark Bay, Western Australia	WA	Listed place
The Ningaloo Coast	WA	Listed place

Commonwealth Marine Area [Resource Information]

Approval is required for a proposed activity that is located within the Commonwealth Marine Area which has, will have, or is likely to have a significant impact on the environment. Approval may be required for a proposed action taken outside a Commonwealth Marine Area but which has, may have or is likely to have a significant impact on the environment in the Commonwealth Marine Area.

Feature Name
Commonwealth Marine Areas (EPBC Act)
Commonwealth Marine Areas (EPBC Act)
Commonwealth Marine Areas (EPBC Act)
Commonwealth Marine Areas (EPBC Act)

Listed Threatened Species [Resource Information]

Status of Conservation Dependent and Extinct are not MNES under the EPBC Act.
Number is the current name ID.

Scientific Name	Threatened Category	Presence Text
BIRD		

Scientific Name	Threatened Category	Presence Text
Anous tenuirostris melanops Australian Lesser Noddy [26000]	Vulnerable	Breeding known to occur within area
Aphelocephala leucopsis Southern Whiteface [529]	Vulnerable	Species or species habitat known to occur within area
Arenaria interpres Ruddy Turnstone [872]	Vulnerable	Species or species habitat known to occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat known to occur within area
Calidris canutus Red Knot, Knot [855]	Vulnerable	Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
Calidris tenuirostris Great Knot [862]	Vulnerable	Species or species habitat known to occur within area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat known to occur within area
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Species or species habitat known to occur within area
Diomedea amsterdamensis Amsterdam Albatross [64405]	Endangered	Species or species habitat may occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Species or species habitat may occur within area
Erythrotriorchis radiatus Red Goshawk [942]	Endangered	Species or species habitat may occur within area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat known to occur within area
Leipoa ocellata Malleefowl [934]	Vulnerable	Species or species habitat likely to occur within area
Limnodromus semipalmatus Asian Dowitcher [843]	Vulnerable	Species or species habitat known to occur within area
Limosa lapponica menzbieri Northern Siberian Bar-tailed Godwit, Russkoye Bar-tailed Godwit [86432]	Endangered	Species or species habitat known to occur within area
Limosa limosa Black-tailed Godwit [845]	Endangered	Species or species habitat known to occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Malurus leucopterus edouardi White-winged Fairy-wren (Barrow Island), Barrow Island Black-and-white Fairy-wren [26194]	Vulnerable	Species or species habitat likely to occur within area
Malurus leucopterus leucopterus White-winged Fairy-wren (Dirk Hartog Island), Dirk Hartog Black-and-White Fairy-wren [26004]	Vulnerable	Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
Pezoporus occidentalis Night Parrot [59350]	Critically Endangered	Species or species habitat may occur within area
Phaethon lepturus fulvus Christmas Island White-tailed Tropicbird, Golden Bosunbird [26021]	Endangered	Species or species habitat may occur within area
Phaethon rubricauda westralis Red-tailed Tropicbird (Indian Ocean), Indian Ocean Red-tailed Tropicbird [91824]	Endangered	Species or species habitat known to occur within area
Pluvialis squatarola Grey Plover [865]	Vulnerable	Species or species habitat known to occur within area
Pterodroma mollis Soft-plumaged Petrel [1036]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area
Sternula albifrons Little Tern [82849]	Vulnerable	Breeding known to occur within area
Sternula nereis nereis Australian Fairy Tern [82950]	Vulnerable	Breeding known to occur within area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat may occur within area
Thalassarche cauta Shy Albatross [89224]	Endangered	Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Thalassarche impavida		
Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris		
Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche steadi		
White-capped Albatross [64462]	Vulnerable	Species or species habitat may occur within area
Tringa nebularia		
Common Greenshank, Greenshank [832]	Endangered	Species or species habitat known to occur within area
Turnix varius scintillans		
Painted Button-quail (Houtman Abrolhos) [82451]	Endangered	Species or species habitat known to occur within area
Xenus cinereus		
Terek Sandpiper [59300]	Vulnerable	Species or species habitat known to occur within area
Zanda latirostris listed as Calyptorhynchus latirostris		
Carnaby's Black Cockatoo, Short-billed Black-cockatoo [87737]	Endangered	Species or species habitat likely to occur within area
CRUSTACEAN		
Kumonga exleyi		
Cape Range Remipede [86875]	Vulnerable	Species or species habitat known to occur within area
FISH		
Milyeringa justitia		
Barrow Cave Gudgeon [86867]	Endangered	Species or species habitat known to occur within area
Milyeringa veritas		
Cape Range Cave Gudgeon, Blind Gudgeon [66676]	Vulnerable	Species or species habitat known to occur within area
Ophisternon candidum		
Blind Cave Eel [66678]	Vulnerable	Species or species habitat known to occur within area
MAMMAL		

Scientific Name	Threatened Category	Presence Text
Balaenoptera borealis Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Balaenoptera musculus Blue Whale [36]	Endangered	Migration route known to occur within area
Balaenoptera physalus Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Bettongia lesueur Barrow and Boodie Islands subspecies Boodie, Burrowing Bettong (Barrow and Boodie Islands) [88021]	Vulnerable	Species or species habitat known to occur within area
Bettongia lesueur lesueur Burrowing Bettong (Shark Bay), Boodie [66659]	Vulnerable	Species or species habitat known to occur within area
Bettongia penicillata ogilbyi Woylie [66844]	Endangered	Species or species habitat known to occur within area
Dasyurus geoffroii Chuditch, Western Quoll [330]	Vulnerable	Species or species habitat may occur within area
Dasyurus hallucatus Northern Quoll, Digul [Gogo-Yimidir], Wijingadda [Dambimangari], Wiminji [Martu] [331]	Endangered	Species or species habitat known to occur within area
Eubalaena australis Southern Right Whale [40]	Endangered	Species or species habitat likely to occur within area
Isoodon auratus barrowensis Golden Bandicoot (Barrow Island) [66666]	Vulnerable	Species or species habitat known to occur within area
Lagorchestes conspicillatus conspicillatus Spectacled Hare-wallaby (Barrow Island) [66661]	Vulnerable	Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
Lagorchestes hirsutus bernieri Rufous Hare-wallaby (Bernier Island) [66662]	Vulnerable	Species or species habitat known to occur within area
Lagorchestes hirsutus Central Australian subspecies Mala, Rufous Hare-Wallaby (Central Australia) [88019]	Endangered	Translocated population known to occur within area
Lagorchestes hirsutus dorreae Rufous Hare-wallaby (Dorre Island) [66663]	Vulnerable	Species or species habitat known to occur within area
Lagostrophus fasciatus fasciatus Banded Hare-wallaby, Merrnine, Marnine, Munning [66664]	Vulnerable	Species or species habitat known to occur within area
Macroderma gigas Ghost Bat [174]	Vulnerable	Species or species habitat known to occur within area
Neophoca cinerea Australian Sea-lion, Australian Sea Lion [22]	Endangered	Breeding known to occur within area
Orcaella heinsohni Australian Snubfin Dolphin [81322]	Vulnerable	Species or species habitat known to occur within area
Osphranter robustus isabellinus Barrow Island Wallaroo, Barrow Island Euro [89262]	Vulnerable	Species or species habitat likely to occur within area
Perameles bougainville Shark Bay Bandicoot [278]	Endangered	Species or species habitat known to occur within area
Petrogale lateralis lateralis Black-flanked Rock-wallaby, Mororong, Black-footed Rock Wallaby [66647]	Endangered	Species or species habitat known to occur within area
Pseudomys fieldi Shark Bay Mouse, Djoongari, Alice Springs Mouse [113]	Vulnerable	Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
Rhinonicteris aurantia (Pilbara form)		
Pilbara Leaf-nosed Bat [82790]	Vulnerable	Species or species habitat known to occur within area
Sousa sahulensis		
Australian Humpback Dolphin [87942]	Vulnerable	Species or species habitat known to occur within area
PLANT		
Androcalva bivillosa		
Straggling Androcalva [87807]	Critically Endangered	Species or species habitat likely to occur within area
Caladenia barbarella		
Small Dragon Orchid, Common Dragon Orchid [68686]	Endangered	Species or species habitat may occur within area
Caladenia bryceana subsp. cracens		
Northern Dwarf Spider-orchid [64556]	Vulnerable	Species or species habitat likely to occur within area
Caladenia elegans		
Elegant Spider-orchid [56775]	Endangered	Species or species habitat likely to occur within area
Caladenia hoffmanii		
Hoffman's Spider-orchid [56719]	Endangered	Species or species habitat likely to occur within area
Drummondita ericoides		
Morseby Range Drummondita [9193]	Endangered	Species or species habitat may occur within area
Eucalyptus beardiana		
Beard's Mallee [18933]	Vulnerable	Species or species habitat may occur within area
Eucalyptus cuprea		
Mallee Box [56773]	Endangered	Species or species habitat may occur within area
Minuria tridens		
Minnie Daisy [13753]	Vulnerable	Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
Pterostylis sinuata Northampton Midget Greenhood, Western Swan Greenhood [84991]	Endangered	Species or species habitat likely to occur within area
Stachystemon nematophorus Three-flowered Stachystemon [81447]	Vulnerable	Species or species habitat may occur within area
REPTILE		
Aipysurus apraefrontalis Short-nosed Sea Snake, Short-nosed Seasnake [1115]	Critically Endangered	Species or species habitat known to occur within area
Aipysurus foliosquama Leaf-scaled Sea Snake, Leaf-scaled Seasnake [1118]	Critically Endangered	Species or species habitat known to occur within area
Caretta caretta Loggerhead Turtle [1763]	Endangered	Breeding known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Breeding known to occur within area
Ctenotus zastictus Hamelin Ctenotus [25570]	Vulnerable	Species or species habitat known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Foraging, feeding or related behaviour known to occur within area
Egernia stokesii badia Western Spiny-tailed Skink, Baudin Island Spiny-tailed Skink [64483]	Endangered	Species or species habitat known to occur within area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Breeding known to occur within area
Liasis olivaceus barroni Pilbara Olive Python [66699]	Vulnerable	Species or species habitat known to occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Breeding known to occur within area

Scientific Name	Threatened Category	Presence Text
SHARK		
Carcharias taurus (west coast population)		
Grey Nurse Shark (west coast population) [68752]	Vulnerable	Congregation or aggregation known to occur within area
Carcharodon carcharias		
White Shark, Great White Shark [64470]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Centrophorus uyato		
Little Gulper Shark [68446]	Conservation Dependent	Species or species habitat likely to occur within area
Pristis clavata		
Dwarf Sawfish, Queensland Sawfish [68447]	Vulnerable	Species or species habitat known to occur within area
Pristis pristis		
Largetooth Sawfish, Freshwater Sawfish, River Sawfish, Leichhardt's Sawfish, Northern Sawfish [60756]	Endangered	Species or species habitat known to occur within area
Pristis zijsron		
Green Sawfish, Dindagubba, Narrowsnout Sawfish [68442]	Vulnerable	Species or species habitat known to occur within area
Rhincodon typus		
Whale Shark [66680]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Sphyrna lewini		
Scalloped Hammerhead [85267]	Conservation Dependent	Species or species habitat known to occur within area
SPIDER		
Idiosoma nigrum		
Shield-backed Trapdoor Spider, Black Rugose Trapdoor Spider [66798]	Vulnerable	Species or species habitat likely to occur within area

Listed Migratory Species		[Resource Information]
Scientific Name	Threatened Category	Presence Text
null		
Balaenoptera omurai		
Omura's Whale [87136]		Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
Migratory Marine Birds		
Anous stolidus Common Noddy [825]		Species or species habitat likely to occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardenna carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Foraging, feeding or related behaviour likely to occur within area
Ardenna pacifica Wedge-tailed Shearwater [84292]		Breeding known to occur within area
Calonectris leucomelas Streaked Shearwater [1077]		Species or species habitat likely to occur within area
Diomedea amsterdamensis Amsterdam Albatross [64405]	Endangered	Species or species habitat may occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Species or species habitat may occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Species or species habitat may occur within area
Fregata ariel Lesser Frigatebird, Least Frigatebird [1012]		Species or species habitat known to occur within area
Hydroprogne caspia Caspian Tern [808]		Breeding known to occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Onychoprion anaethetus Bridled Tern [82845]		Breeding known to occur within area
Phaethon lepturus White-tailed Tropicbird [1014]		Species or species habitat known to occur within area
Phaethon rubricauda Red-tailed Tropicbird [994]		Species or species habitat known to occur within area
Sterna dougallii Roseate Tern [817]		Breeding known to occur within area
Sternula albifrons Little Tern [82849]	Vulnerable	Breeding known to occur within area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat may occur within area
Thalassarche cauta Shy Albatross [89224]	Endangered	Species or species habitat may occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Species or species habitat may occur within area
Migratory Marine Species		
Anoxypristis cuspidata Narrow Sawfish, Knifetooth Sawfish [68448]		Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
Balaenoptera bonaerensis Antarctic Minke Whale, Dark-shoulder Minke Whale [67812]		Species or species habitat likely to occur within area
Balaenoptera borealis Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Balaenoptera edeni Bryde's Whale [35]		Species or species habitat likely to occur within area
Balaenoptera musculus Blue Whale [36]	Endangered	Migration route known to occur within area
Balaenoptera physalus Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Carcharhinus longimanus Oceanic Whitetip Shark [84108]		Species or species habitat likely to occur within area
Carcharias taurus Grey Nurse Shark [64469]		Congregation or aggregation known to occur within area
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Caretta caretta Loggerhead Turtle [1763]	Endangered	Breeding known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Breeding known to occur within area
Crocodylus porosus Salt-water Crocodile, Estuarine Crocodile [1774]		Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Foraging, feeding or related behaviour known to occur within area
Dugong dugon Dugong [28]		Breeding known to occur within area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Breeding known to occur within area
Eubalaena australis as Balaena glacialis australis Southern Right Whale [40]	Endangered	Species or species habitat likely to occur within area
Isurus oxyrinchus Shortfin Mako, Mako Shark [79073]		Species or species habitat likely to occur within area
Isurus paucus Longfin Mako [82947]		Species or species habitat likely to occur within area
Lamna nasus Porbeagle, Mackerel Shark [83288]		Species or species habitat may occur within area
Megaptera novaeangliae Humpback Whale [38]		Breeding known to occur within area
Mobula alfredi as Manta alfredi Reef Manta Ray, Coastal Manta Ray [90033]		Species or species habitat known to occur within area
Mobula birostris as Manta birostris Giant Manta Ray [90034]		Species or species habitat known to occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Breeding known to occur within area
Orcaella heinsohni Australian Snubfin Dolphin [81322]	Vulnerable	Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
Orcinus orca Killer Whale, Orca [46]		Species or species habitat may occur within area
Physeter macrocephalus Sperm Whale [59]		Species or species habitat may occur within area
Pristis clavata Dwarf Sawfish, Queensland Sawfish [68447]	Vulnerable	Species or species habitat known to occur within area
Pristis pristis Largetooth Sawfish, Freshwater Sawfish, River Sawfish, Leichhardt's Sawfish, Northern Sawfish [60756]	Endangered	Species or species habitat known to occur within area
Pristis zijsron Green Sawfish, Dindagubba, Narrowsnout Sawfish [68442]	Vulnerable	Species or species habitat known to occur within area
Rhincodon typus Whale Shark [66680]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Sousa sahulensis as Sousa chinensis Australian Humpback Dolphin [87942]	Vulnerable	Species or species habitat known to occur within area
Tursiops aduncus (Arafura/Timor Sea populations) Spotted Bottlenose Dolphin (Arafura/Timor Sea populations) [78900]		Species or species habitat known to occur within area
Migratory Terrestrial Species		
Hirundo rustica Barn Swallow [662]		Species or species habitat known to occur within area
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area
Migratory Wetlands Species		

Scientific Name	Threatened Category	Presence Text
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area
Arenaria interpres Ruddy Turnstone [872]	Vulnerable	Species or species habitat known to occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat known to occur within area
Calidris alba Sanderling [875]		Species or species habitat known to occur within area
Calidris canutus Red Knot, Knot [855]	Vulnerable	Species or species habitat known to occur within area
Calidris falcinellus as Limicola falcinellus Broad-billed Sandpiper [91731]		Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat known to occur within area
Calidris ruficollis Red-necked Stint [860]		Species or species habitat known to occur within area
Calidris subminuta Long-toed Stint [861]		Species or species habitat known to occur within area
Calidris tenuirostris Great Knot [862]	Vulnerable	Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat known to occur within area
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Species or species habitat known to occur within area
Charadrius veredus Oriental Plover, Oriental Dotterel [882]		Species or species habitat known to occur within area
Glareola maldivarum Oriental Pratincole [840]		Species or species habitat known to occur within area
Limnodromus semipalmatus Asian Dowitcher [843]	Vulnerable	Species or species habitat known to occur within area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area
Limosa limosa Black-tailed Godwit [845]	Endangered	Species or species habitat known to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
Numenius phaeopus Whimbrel [849]		Species or species habitat known to occur within area
Pandion haliaetus Osprey [952]		Breeding known to occur within area
Phalaropus lobatus Red-necked Phalarope [838]		Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
[Pluvialis fulva](#) Pacific Golden Plover [25545]		Species or species habitat known to occur within area
[Pluvialis squatarola](#) Grey Plover [865]	Vulnerable	Species or species habitat known to occur within area
[Thalasseus bergii](#) Greater Crested Tern [83000]		Breeding known to occur within area
[Tringa brevipes](#) Grey-tailed Tattler [851]		Species or species habitat known to occur within area
[Tringa glareola](#) Wood Sandpiper [829]		Species or species habitat known to occur within area
[Tringa nebularia](#) Common Greenshank, Greenshank [832]	Endangered	Species or species habitat known to occur within area
[Tringa stagnatilis](#) Marsh Sandpiper, Little Greenshank [833]		Species or species habitat known to occur within area
[Tringa totanus](#) Common Redshank, Redshank [835]		Species or species habitat known to occur within area
[Xenus cinereus](#) Terek Sandpiper [59300]	Vulnerable	Species or species habitat known to occur within area

Other Matters Protected by the EPBC Act

Commonwealth Lands [Resource Information]

The Commonwealth area listed below may indicate the presence of Commonwealth land in this vicinity. Due to the unreliability of the data source, all proposals should be checked as to whether it impacts on a Commonwealth area, before making a definitive decision. Contact the State or Territory government land department for further information.

Commonwealth Land Name	State
Department of Climate Change, Energy, the Environment and Water	
Learmonth Air Weapons Range Facility [CHL_105551]	WA

Commonwealth Land Name	State
Ningaloo Marine Area - Commonwealth Waters [CHL_105548]	WA
Department of Defence	
Exmouth Area A VLF Transmitter Station [DD_0083]	WA
Exmouth Area B Admin and HF Transmitter [DD_0082]	WA
Exmouth RAAF Radar Site - Vlaming Head [DD_0974]	WA
Learmonth Air Weapons Range [DD_0961]	WA
Learmonth RAAF base [AGPR4417]	WA
Learmonth RAAF base [AGPR4418]	WA
Learmonth RAAF base [AGPR4419]	WA
Learmonth RAAF base [AGPR4466]	WA
Learmonth RAAF base [AGPR4416]	WA
Learmonth RAAF base [AGPR4413]	WA
Learmonth RAAF base [AGPR4467]	WA
Department of Home Affairs	
120 P017820 [AGPR007602]	WA

Commonwealth Heritage Places [Resource Information]

Name	State	Status
Natural		
Learmonth Air Weapons Range Facility	WA	Listed place
Ningaloo Marine Area - Commonwealth Waters	WA	Listed place

Listed Marine Species [Resource Information]

Scientific Name	Threatened Category	Presence Text
Bird		
Actitis hypoleucos		
Common Sandpiper [59309]		Species or species habitat known to occur within area
Anous stolidus		
Common Noddy [825]		Species or species habitat likely to occur within area
Anous tenuirostris melanops		
Australian Lesser Noddy [26000]	Vulnerable	Breeding known to occur within area

Scientific Name	Threatened Category	Presence Text
[Apus pacificus](#) Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area
[Ardenna carneipes as Puffinus carneipes](#) Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Foraging, feeding or related behaviour likely to occur within area
[Ardenna pacifica as Puffinus pacificus](#) Wedge-tailed Shearwater [84292]		Breeding known to occur within area
[Arenaria interpres](#) Ruddy Turnstone [872]	Vulnerable	Species or species habitat known to occur within area
[Bubulcus ibis as Ardea ibis](#) Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area
[Calidris acuminata](#) Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat known to occur within area
[Calidris alba](#) Sanderling [875]		Species or species habitat known to occur within area
[Calidris canutus](#) Red Knot, Knot [855]	Vulnerable	Species or species habitat known to occur within area overfly marine area
[Calidris falcinellus as Limicola falcinellus](#) Broad-billed Sandpiper [91731]		Species or species habitat known to occur within area overfly marine area
[Calidris ferruginea](#) Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area overfly marine area

Scientific Name	Threatened Category	Presence Text
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat known to occur within area overfly marine area
Calidris ruficollis Red-necked Stint [860]		Species or species habitat known to occur within area overfly marine area
Calidris subminuta Long-toed Stint [861]		Species or species habitat known to occur within area overfly marine area
Calidris tenuirostris Great Knot [862]	Vulnerable	Species or species habitat known to occur within area overfly marine area
Calonectris leucomelas Streaked Shearwater [1077]		Species or species habitat likely to occur within area
Chalcites osculans as Chrysococcyx osculans Black-eared Cuckoo [83425]		Species or species habitat known to occur within area overfly marine area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat known to occur within area
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Species or species habitat known to occur within area
Charadrius ruficapillus Red-capped Plover [881]		Species or species habitat known to occur within area overfly marine area
Charadrius veredus Oriental Plover, Oriental Dotterel [882]		Species or species habitat known to occur within area overfly marine area

Scientific Name	Threatened Category	Presence Text
Chroicocephalus novaehollandiae as Larus novaehollandiae Silver Gull [82326]		Breeding known to occur within area
Diomedea amsterdamensis Amsterdam Albatross [64405]	Endangered	Species or species habitat may occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Species or species habitat may occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Species or species habitat may occur within area
Fregata ariel Lesser Frigatebird, Least Frigatebird [1012]		Species or species habitat known to occur within area
Glareola maldivarum Oriental Pratincole [840]		Species or species habitat known to occur within area overfly marine area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area
Himantopus himantopus Pied Stilt, Black-winged Stilt [870]		Species or species habitat known to occur within area overfly marine area
Hirundo rustica Barn Swallow [662]		Species or species habitat known to occur within area overfly marine area
Hydroprogne caspia as Sterna caspia Caspian Tern [808]		Breeding known to occur within area
Larus pacificus Pacific Gull [811]		Breeding known to occur within area

Scientific Name	Threatened Category	Presence Text
Limnodromus semipalmatus Asian Dowitcher [843]	Vulnerable	Species or species habitat known to occur within area overfly marine area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area
Limosa limosa Black-tailed Godwit [845]	Endangered	Species or species habitat known to occur within area overfly marine area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area overfly marine area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area overfly marine area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
Numenius phaeopus Whimbrel [849]		Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
Onychoprion anaethetus as Sterna anaethetus Bridled Tern [82845]		Breeding known to occur within area
Onychoprion fuscatus as Sterna fuscata Sooty Tern [90682]		Breeding known to occur within area
Pandion haliaetus Osprey [952]		Breeding known to occur within area
Pelagodroma marina White-faced Storm-Petrel [1016]		Breeding known to occur within area
Phaethon lepturus White-tailed Tropicbird [1014]		Species or species habitat known to occur within area
Phaethon lepturus fulvus Christmas Island White-tailed Tropicbird, Golden Bosunbird [26021]	Endangered	Species or species habitat may occur within area
Phaethon rubricauda Red-tailed Tropicbird [994]		Species or species habitat known to occur within area
Phalacrocorax fuscescens Black-faced Cormorant [59660]		Breeding likely to occur within area
Phalaropus lobatus Red-necked Phalarope [838]		Species or species habitat known to occur within area
Pluvialis fulva Pacific Golden Plover [25545]		Species or species habitat known to occur within area
Pluvialis squatarola Grey Plover [865]	Vulnerable	Species or species habitat known to occur within area overfly marine area
Pterodroma mollis Soft-plumaged Petrel [1036]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area

Scientific Name	Threatened Category	Presence Text
Puffinus assimilis Little Shearwater [59363]		Breeding known to occur within area
Puffinus huttoni Hutton's Shearwater [1025]		Foraging, feeding or related behaviour known to occur within area
Recurvirostra novaehollandiae Red-necked Avocet [871]		Species or species habitat known to occur within area overfly marine area
Rostratula australis as Rostratula benghalensis (sensu lato) Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area overfly marine area
Stercorarius antarcticus as Catharacta skua Brown Skua [85039]		Species or species habitat may occur within area
Sterna dougallii Roseate Tern [817]		Breeding known to occur within area
Sternula albifrons as Sterna albifrons Little Tern [82849]	Vulnerable	Breeding known to occur within area
Sternula nereis as Sterna nereis Fairy Tern [82949]		Breeding known to occur within area
Stiltia isabella Australian Pratincole [818]		Species or species habitat known to occur within area overfly marine area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat may occur within area
Thalassarche cauta Shy Albatross [89224]	Endangered	Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Species or species habitat may occur within area
Thalasseus bengalensis as Sterna bengalensis Lesser Crested Tern [66546]		Breeding known to occur within area
Thalasseus bergii as Sterna bergii Greater Crested Tern [83000]		Breeding known to occur within area
Thinornis cucullatus as Thinornis rubricollis Hooded Plover, Hooded Dotterel [87735]		Species or species habitat may occur within area overfly marine area
Tringa brevipes as Heteroscelus brevipes Grey-tailed Tattler [851]		Species or species habitat known to occur within area
Tringa glareola Wood Sandpiper [829]		Species or species habitat known to occur within area overfly marine area
Tringa nebularia Common Greenshank, Greenshank [832]	Endangered	Species or species habitat known to occur within area overfly marine area
Tringa stagnatilis Marsh Sandpiper, Little Greenshank [833]		Species or species habitat known to occur within area overfly marine area
Tringa totanus Common Redshank, Redshank [835]		Species or species habitat known to occur within area overfly marine area

Scientific Name	Threatened Category	Presence Text
[Xenus cinereus](#) Terek Sandpiper [59300]	Vulnerable	Species or species habitat known to occur within area overfly marine area
Fish		
[Acentronura australe](#) Southern Pygmy Pipehorse [66185]		Species or species habitat may occur within area
[Acentronura larsonae](#) Helen's Pygmy Pipehorse [66186]		Species or species habitat may occur within area
[Bulbonaricus brauni](#) Braun's Pughead Pipefish, Pug-headed Pipefish [66189]		Species or species habitat may occur within area
[Campichthys galei](#) Gale's Pipefish [66191]		Species or species habitat may occur within area
[Campichthys tricarinatus](#) Three-keel Pipefish [66192]		Species or species habitat may occur within area
[Choeroichthys brachysoma](#) Pacific Short-bodied Pipefish, Short-bodied Pipefish [66194]		Species or species habitat may occur within area
[Choeroichthys latispinosus](#) Muiron Island Pipefish [66196]		Species or species habitat may occur within area
[Choeroichthys suillus](#) Pig-snouted Pipefish [66198]		Species or species habitat may occur within area
[Doryrhamphus dactyliophorus](#) Banded Pipefish, Ringed Pipefish [66210]		Species or species habitat may occur within area
[Doryrhamphus janssi](#) Cleaner Pipefish, Janss' Pipefish [66212]		Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Doryrhamphus multiannulatus Many-banded Pipefish [66717]		Species or species habitat may occur within area
Doryrhamphus negrosensis Flagtail Pipefish, Masthead Island Pipefish [66213]		Species or species habitat may occur within area
Festucalex scalaris Ladder Pipefish [66216]		Species or species habitat may occur within area
Filicampus tigris Tiger Pipefish [66217]		Species or species habitat may occur within area
Halicampus brocki Brock's Pipefish [66219]		Species or species habitat may occur within area
Halicampus grayi Mud Pipefish, Gray's Pipefish [66221]		Species or species habitat may occur within area
Halicampus nitidus Glittering Pipefish [66224]		Species or species habitat may occur within area
Halicampus spinirostris Spiny-snout Pipefish [66225]		Species or species habitat may occur within area
Haliichthys taeniophorus Ribboned Pipehorse, Ribboned Seadragon [66226]		Species or species habitat may occur within area
Hippichthys penicillus Beady Pipefish, Steep-nosed Pipefish [66231]		Species or species habitat may occur within area
Hippocampus angustus Western Spiny Seahorse, Narrow-bellied Seahorse [66234]		Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Hippocampus breviceps Short-head Seahorse, Short-snouted Seahorse [66235]		Species or species habitat may occur within area
Hippocampus histrix Spiny Seahorse, Thorny Seahorse [66236]		Species or species habitat may occur within area
Hippocampus kuda Spotted Seahorse, Yellow Seahorse [66237]		Species or species habitat may occur within area
Hippocampus planifrons Flat-face Seahorse [66238]		Species or species habitat may occur within area
Hippocampus subelongatus West Australian Seahorse [66722]		Species or species habitat may occur within area
Hippocampus trimaculatus Three-spot Seahorse, Low-crowned Seahorse, Flat-faced Seahorse [66720]		Species or species habitat may occur within area
Lissocampus fatiloquus Prophet's Pipefish [66250]		Species or species habitat may occur within area
Maroubra perserrata Sawtooth Pipefish [66252]		Species or species habitat may occur within area
Micrognathus micronotopterus Tidepool Pipefish [66255]		Species or species habitat may occur within area
Mitotichthys meraculus Western Crested Pipefish [66259]		Species or species habitat may occur within area
Nannocampus subosseus Bonyhead Pipefish, Bony-headed Pipefish [66264]		Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Phoxocampus belcheri Black Rock Pipefish [66719]		Species or species habitat may occur within area
Phycodurus eques Leafy Seadragon [66267]		Species or species habitat may occur within area
Phyllopteryx taeniolatus Common Seadragon, Weedy Seadragon [66268]		Species or species habitat may occur within area
Pugnaso curtirostris Pugnose Pipefish, Pug-nosed Pipefish [66269]		Species or species habitat may occur within area
Solegnathus hardwickii Pallid Pipehorse, Hardwick's Pipehorse [66272]		Species or species habitat may occur within area
Solegnathus lettiensis Gunther's Pipehorse, Indonesian Pipefish [66273]		Species or species habitat may occur within area
Solenostomus cyanopterus Robust Ghostpipefish, Blue-finned Ghost Pipefish, [66183]		Species or species habitat may occur within area
Stigmatopora argus Spotted Pipefish, Gulf Pipefish, Peacock Pipefish [66276]		Species or species habitat may occur within area
Stigmatopora nigra Widebody Pipefish, Wide-bodied Pipefish, Black Pipefish [66277]		Species or species habitat may occur within area
Syngnathoides biaculeatus Double-end Pipehorse, Double-ended Pipehorse, Alligator Pipefish [66279]		Species or species habitat may occur within area
Trachyrhamphus bicoarctatus Bentstick Pipefish, Bend Stick Pipefish, Short-tailed Pipefish [66280]		Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
[Trachyrhamphus longirostris](#) Straightstick Pipefish, Long-nosed Pipefish, Straight Stick Pipefish [66281]		Species or species habitat may occur within area
[Urocampus carinirostris](#) Hairy Pipefish [66282]		Species or species habitat may occur within area
[Vanacampus margaritifer](#) Mother-of-pearl Pipefish [66283]		Species or species habitat may occur within area
Mammal		
[Arctocephalus forsteri](#) Long-nosed Fur-seal, New Zealand Fur-seal [20]		Species or species habitat may occur within area
[Dugong dugon](#) Dugong [28]		Breeding known to occur within area
[Neophoca cinerea](#) Australian Sea-lion, Australian Sea Lion [22]	Endangered	Breeding known to occur within area
Reptile		
[Aipysurus apraefrontalis](#) Short-nosed Sea Snake, Short-nosed Seasnake [1115]	Critically Endangered	Species or species habitat known to occur within area
[Aipysurus duboisii](#) Dubois' Sea Snake, Dubois' Seasnake, Reef Shallows Sea Snake [1116]		Species or species habitat may occur within area
[Aipysurus foliosquama](#) Leaf-scaled Sea Snake, Leaf-scaled Seasnake [1118]	Critically Endangered	Species or species habitat known to occur within area
[Aipysurus laevis](#) Olive Sea Snake, Olive-brown Sea Snake [1120]		Species or species habitat may occur within area
[Aipysurus mosaicus as Aipysurus eydouxii](#) Mosaic Sea Snake [87261]		Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Aipysurus pooleorum Shark Bay Sea Snake [66061]		Species or species habitat may occur within area
Aipysurus tenuis Brown-lined Sea Snake, Mjoberg's Sea Snake [1121]		Species or species habitat may occur within area
Caretta caretta Loggerhead Turtle [1763]	Endangered	Breeding known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Breeding known to occur within area
Crocodylus porosus Salt-water Crocodile, Estuarine Crocodile [1774]		Species or species habitat may occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Foraging, feeding or related behaviour known to occur within area
Emydocephalus annulatus Eastern Turtle-headed Sea Snake [1125]		Species or species habitat may occur within area
Ephalophis greyae as Ephalophis greyi Mangrove Sea Snake [93738]		Species or species habitat may occur within area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Breeding known to occur within area
Hydrelaps darwiniensis Port Darwin Sea Snake, Black-ringed Mangrove Sea Snake [1100]		Species or species habitat may occur within area
Hydrophis czeblukovi Fine-spined Sea Snake [59233]		Species or species habitat may occur within area
Hydrophis elegans Elegant Sea Snake, Bar-bellied Sea Snake [1104]		Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Hydrophis kingii as Disteira kingii		
Spectacled Sea Snake [93511]		Species or species habitat may occur within area
Hydrophis macdowelli as Hydrophis mcdowelli		
MacDowell's Sea Snake, Small-headed Sea Snake, [75601]		Species or species habitat may occur within area
Hydrophis major as Disteira major		
Olive-headed Sea Snake [93512]		Species or species habitat may occur within area
Hydrophis ornatus		
Spotted Sea Snake, Ornate Reef Sea Snake [1111]		Species or species habitat may occur within area
Hydrophis peronii as Acalyptophis peronii		
Horned Sea Snake [93509]		Species or species habitat may occur within area
Hydrophis platura as Pelamis platurus		
Yellow-bellied Sea Snake [93746]		Species or species habitat may occur within area
Hydrophis stokesii as Astrotia stokesii		
Stokes' Sea Snake [93510]		Species or species habitat may occur within area
Natator depressus		
Flatback Turtle [59257]	Vulnerable	Breeding known to occur within area

Whales and Other Cetaceans		[Resource Information]
Current Scientific Name	Status	Type of Presence
Mammal		
Balaenoptera acutorostrata		
Minke Whale [33]		Species or species habitat may occur within area
Balaenoptera bonaerensis		
Antarctic Minke Whale, Dark-shoulder Minke Whale [67812]		Species or species habitat likely to occur within area

Current Scientific Name	Status	Type of Presence
[Balaenoptera borealis](#) Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
[Balaenoptera edeni](#) Bryde's Whale [35]		Species or species habitat likely to occur within area
[Balaenoptera musculus](#) Blue Whale [36]	Endangered	Migration route known to occur within area
[Balaenoptera omurai](#) Omura's Whale [87136]		Species or species habitat likely to occur within area
[Balaenoptera physalus](#) Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
[Delphinus delphis](#) Common Dolphin, Short-beaked Common Dolphin [60]		Species or species habitat may occur within area
[Eubalaena australis](#) Southern Right Whale [40]	Endangered	Species or species habitat likely to occur within area
[Feresa attenuata](#) Pygmy Killer Whale [61]		Species or species habitat may occur within area
[Globicephala macrorhynchus](#) Short-finned Pilot Whale [62]		Species or species habitat may occur within area
[Grampus griseus](#) Risso's Dolphin, Grampus [64]		Species or species habitat may occur within area
[Indopacetus pacificus](#) Longman's Beaked Whale [72]		Species or species habitat may occur within area

Current Scientific Name	Status	Type of Presence
Kogia breviceps Pygmy Sperm Whale [57]		Species or species habitat may occur within area
Kogia sima Dwarf Sperm Whale [85043]		Species or species habitat may occur within area
Lagenodelphis hosei Fraser's Dolphin, Sarawak Dolphin [41]		Species or species habitat may occur within area
Megaptera novaeangliae Humpback Whale [38]		Breeding known to occur within area
Mesoplodon densirostris Blainville's Beaked Whale, Dense-beaked Whale [74]		Species or species habitat may occur within area
Mesoplodon ginkgodens Gingko-toothed Beaked Whale, Gingko-toothed Whale, Gingko Beaked Whale [59564]		Species or species habitat may occur within area
Orcaella heinsohni Australian Snubfin Dolphin [81322]	Vulnerable	Species or species habitat known to occur within area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat may occur within area
Peponocephala electra Melon-headed Whale [47]		Species or species habitat may occur within area
Physeter macrocephalus Sperm Whale [59]		Species or species habitat may occur within area
Pseudorca crassidens False Killer Whale [48]		Species or species habitat likely to occur within area

Current Scientific Name	Status	Type of Presence
Sousa sahulensis Australian Humpback Dolphin [87942]	Vulnerable	Species or species habitat known to occur within area
Stenella attenuata Spotted Dolphin, Pantropical Spotted Dolphin [51]		Species or species habitat may occur within area
Stenella coeruleoalba Striped Dolphin, Euphrosyne Dolphin [52]		Species or species habitat may occur within area
Stenella longirostris Long-snouted Spinner Dolphin [29]		Species or species habitat may occur within area
Steno bredanensis Rough-toothed Dolphin [30]		Species or species habitat may occur within area
Tursiops aduncus Indian Ocean Bottlenose Dolphin, Spotted Bottlenose Dolphin [68418]		Species or species habitat likely to occur within area
Tursiops aduncus (Arafura/Timor Sea populations) Spotted Bottlenose Dolphin (Arafura/Timor Sea populations) [78900]		Species or species habitat known to occur within area
Tursiops truncatus s. str. Bottlenose Dolphin [68417]		Species or species habitat may occur within area
Ziphius cavirostris Cuvier's Beaked Whale, Goose-beaked Whale [56]		Species or species habitat may occur within area

Australian Marine Parks	[Resource Information]
Park Name	Zone & IUCN Categories
Abrolhos	Habitat Protection Zone (IUCN IV)
Carnarvon Canyon	Habitat Protection Zone (IUCN IV)
Dampier	Habitat Protection Zone (IUCN IV)

Park Name	Zone & IUCN Categories
Gascoyne	Habitat Protection Zone (IUCN IV)
Gascoyne	Habitat Protection Zone (IUCN IV)
Abrolhos	Multiple Use Zone (IUCN VI)
Gascoyne	Multiple Use Zone (IUCN VI)
Montebello	Multiple Use Zone (IUCN VI)
Shark Bay	Multiple Use Zone (IUCN VI)
Dampier	National Park Zone (IUCN II)
Gascoyne	National Park Zone (IUCN II)
Ningaloo	National Park Zone (IUCN II)
Ningaloo	Recreational Use Zone (IUCN IV)
Ningaloo	Recreational Use Zone (IUCN IV)
Abrolhos	Special Purpose Zone (IUCN VI)

Habitat Critical to the Survival of Marine Turtles		[Resource Information]
Scientific Name	Behaviour	Presence
All year (Jun - Aug)		
Natator depressus		
Flatback Turtle [59257]	Nesting	Known to occur
Nov-Feb		
Caretta caretta		
Loggerhead Turtle [1763]	Nesting	Known to occur
Oct - Feb		
Eretmochelys imbricata		
Hawksbill Turtle [1766]	Nesting	Known to occur
Oct - Mar		
Chelonia mydas		
Green Turtle [1765]	Nesting	Known to occur

Extra Information

State and Territory Reserves		[Resource Information]
Protected Area Name	Reserve Type	State
Airlie Island	Nature Reserve	WA
Barrow Island	Nature Reserve	WA
Barrow Island	Marine Management Area	WA
Barrow Island	Marine Park	WA
Bernier And Dorre Islands	Nature Reserve	WA
Bessieres Island	Nature Reserve	WA
Boodie, Double Middle Islands	Nature Reserve	WA
Bundegi Coastal Park	5(1)(h) Reserve	WA
Burnside And Simpson Island	Nature Reserve	WA
Cape Range	National Park	WA
Cape Range (South)	National Park	WA
Dirk Hartog Island	National Park	WA
Freycinet, Double Islands etc	Nature Reserve	WA
Gnandaroo Island	Nature Reserve	WA
Great Sandy Island	Nature Reserve	WA
Great Sandy Island	Nature Reserve	WA
Houtman Abrolhos Islands	National Park	WA
Jurabi Coastal Park	5(1)(h) Reserve	WA
Koks Island	Nature Reserve	WA
Little Rocky Island	Nature Reserve	WA
Locker Island	Nature Reserve	WA
Lowendal Islands	Nature Reserve	WA
Montebello Islands	Conservation Park	WA
Montebello Islands	Marine Park	WA

Protected Area Name	Reserve Type	State
Montebello Islands	Conservation Park	WA
Muiron Islands	Nature Reserve	WA
Muiron Islands	Marine Management Area	WA
Murujuga	National Park	WA
Nanga Station	NRS Addition - Gazettal in Progress	WA
Ningaloo	Marine Park	WA
North Sandy Island	Nature Reserve	WA
Nyingguulu (Ningaloo) Coastal Reserve	5(1)(h) Reserve	WA
Port Gregory	NRS Addition - Gazettal in Progress	WA
Rocky Island	Nature Reserve	WA
Round Island	Nature Reserve	WA
Serrurier Island	Nature Reserve	WA
Shark Bay	Marine Park	WA
Tamala Pastoral Lease (Part)	NRS Addition - Gazettal in Progress	WA
Tent Island	Nature Reserve	WA
Thevenard Island	Nature Reserve	WA
Thevenard Island	Nature Reserve	WA
Unnamed WA26400	5(1)(h) Reserve	WA
Unnamed WA36907	5(1)(h) Reserve	WA
Unnamed WA36909	5(1)(h) Reserve	WA
Unnamed WA36910	5(1)(h) Reserve	WA
Unnamed WA36913	Nature Reserve	WA
Unnamed WA36915	Nature Reserve	WA
Unnamed WA37338	5(1)(h) Reserve	WA
Unnamed WA37383	5(1)(h) Reserve	WA

Protected Area Name	Reserve Type	State
Unnamed WA37500	5(1)(g) Reserve	WA
Unnamed WA40322	5(1)(h) Reserve	WA
Unnamed WA40877	5(1)(h) Reserve	WA
Unnamed WA44665	5(1)(h) Reserve	WA
Unnamed WA44667	5(1)(h) Reserve	WA
Unnamed WA44688	5(1)(h) Reserve	WA
Victor Island	Nature Reserve	WA
Weld Island	Nature Reserve	WA
Whalebone Island	Nature Reserve	WA
Y Island	Nature Reserve	WA

EPBC Act Referrals			[Resource Information]
Title of referral	Reference	Referral Outcome	Assessment Status
3D Seismic Survey in the Carnarvon Bsin on the North West Shelf	2002/778		Completed
Ashburton Infrastructure Project	2021/9064		Completed
Babylon 3D Marine Seismic Survey, Commonwealth Waters, nr Exmouth WA	2013/7081		Completed
Dampier Seawater Desalination Plant	2022/09395		Completed
DAVROS MC 3D marine seismic survey northwaet of Dampier, WA	2013/7092		Completed
Deep Water Northwest Shelf 2D Seismic Survey	2007/3260		Completed
Gorgon Gas Development	2003/1294		Post-Approval
Marine Route Survey for Subsea Fibre Optic Data Cable System - Australia West	2024/09826		Completed
Ningaloo Lighthouse Development, 17km north west Exmouth, Western Australia	2020/8693		Post-Approval

Title of referral	Reference	Referral Outcome	Assessment Status
North West Shelf Project Extension, Carnarvon Basin, WA	2018/8335		Approval
Offshore Dredge Spoil Disposal - Mardie Project	2024/10054		Referral Decision
Optimised Mardie Project ? Additional Triodia Grassland Habitat Clearing	2024/10094		Referral Decision
Optimised Mardie Solar Salt Project	2022/9169		Post-Approval
Project Highclere Cable Lay and Operation	2022/09203		Completed
Action clearly unacceptable			
Highlands 3D Marine Seismic Survey	2012/6680	Action Clearly Unacceptable	Completed
Controlled action			
'Van Gogh' Petroleum Field Development	2007/3213	Controlled Action	Post-Approval
Balmoral South Iron Ore Mine	2008/4236	Controlled Action	Post-Approval
Binowee Iron Ore Project	2001/366	Controlled Action	Proposed Decision
Boating Facility	2002/830	Controlled Action	Completed
Construct and operate LNG & domestic gas plant including onshore and offshore facilities - Wheatston	2008/4469	Controlled Action	Post-Approval
Construction and operation of a Solar Salt Project, SW Onslow, WA	2016/7793	Controlled Action	Assessment Approach
Development of Browse Basin Gas Fields (Upstream)	2008/4111	Controlled Action	Completed
Development of Coniston/Novara fields within the Exmouth Sub-basin	2011/5995	Controlled Action	Post-Approval
development of land based tourist facilities on Long Island	2006/2792	Controlled Action	Post-Approval
Development of Stybarrow petroleum field incl drilling and facility installation	2004/1469	Controlled Action	Post-Approval
Enfield full field development	2001/257	Controlled Action	Post-Approval

Title of referral	Reference	Referral Outcome	Assessment Status
Controlled action			
Equus Gas Fields Development Project, Carnarvon Basin	2012/6301	Controlled Action	Completed
Eramurra Industrial Salt Project	2021/9027	Controlled Action	Assessment Approach
Eramurra Industrial Salt Project, near Karratha, WA	2019/8448	Controlled Action	Completed
Gorgon Gas Development 4th Train Proposal	2011/5942	Controlled Action	Post-Approval
Gorgon Gas Revised Development	2008/4178	Controlled Action	Post-Approval
Greater Enfield (Vincent) Development	2005/2110	Controlled Action	Post-Approval
Greater Gorgon Development - Optical Fibre Cable, Mainland to Barrow Island	2005/2141	Controlled Action	Completed
Light Crude Oil Production	2001/365	Controlled Action	Post-Approval
Mardie Project, 80 km south west of Karratha, WA	2018/8236	Controlled Action	Post-Approval
Mauds Landing Marina	2000/98	Controlled Action	Completed
Nava-1 Cable System	2001/510	Controlled Action	Completed
Perdaman Urea Project, near Karratha, WA	2018/8383	Controlled Action	Post-Approval
Pluto Gas Project	2005/2258	Controlled Action	Completed
Proposed West Pilbara Iron Ore Project	2009/4706	Controlled Action	Post-Approval
Pyrenees Oil Fields Development	2005/2034	Controlled Action	Post-Approval
Simpson Development	2000/59	Controlled Action	Completed
Simpson Oil Field Development	2001/227	Controlled Action	Post-Approval
Tourism Facility and Associated Infrastructure	2005/2038	Controlled Action	Post-Approval
Vincent Appraisal Well	2000/22	Controlled Action	Post-Approval

Title of referral	Reference	Referral Outcome	Assessment Status
Controlled action			
Yannarie Solar Salt Project	2004/1679	Controlled Action	Completed
Yardie Creek Road Realignment Project	2021/8967	Controlled Action	Assessment Approach
Not controlled action			
'Van Gogh' Oil Appraisal Drilling Program, Exploration Permit Area WA-155-P(1)	2006/3148	Not Controlled Action	Completed
Accommodation Units Sunday Island Bay, Dirk Hartog Island, WA	2015/7540	Not Controlled Action	Completed
Airlie Island soil and groundwater investigations, Exmouth Gulf, offshore Pilbara coast	2014/7250	Not Controlled Action	Completed
APX-West Fibre-optic telecommunications cable system, WA to Singapore	2013/7102	Not Controlled Action	Completed
archaeological surveys & excavation at historic sites, Cape Inscription	2006/3027	Not Controlled Action	Completed
Baniyas-1 Exploration Well, EP-424, near Onslow	2007/3282	Not Controlled Action	Completed
Barrow Island 2D Seismic survey	2006/2667	Not Controlled Action	Completed
Boating Facility	2002/832	Not Controlled Action	Completed
Bultaco-2, Laverda-2, Laverda-3 and Montesa-2 Appraisal Wells	2000/103	Not Controlled Action	Completed
Carnarvon 3D Marine Seismic Survey	2004/1890	Not Controlled Action	Completed
Construct 110km buried natural gas pipeline from Onslow, connecting to Dampier/Bunbury natural gas p	2013/7039	Not Controlled Action	Completed
Construction and operation of an unmanned sea platform and connecting pipeline to Varanus Island for	2004/1703	Not Controlled Action	Completed
Development of Halyard Field off the west coast of WA	2010/5611	Not Controlled Action	Completed
Differential Global Positioning System (DGPS)	2001/445	Not Controlled Action	Completed

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action			
Drilling of an exploration well Gats-1 in Permit Area WA-261-P	2004/1701	Not Controlled Action	Completed
Eagle-1 Exploration Drilling, North West Shelf, WA	2019/8578	Not Controlled Action	Completed
Expansion of the Sino Iron Ore Mine and export facilities, Cape Preston, WA	2017/7862	Not Controlled Action	Completed
Expansion Proposal, Mineralogy Cape Preston Iron Ore Project, Cape Preston, WA	2009/5010	Not Controlled Action	Completed
Exploration drilling well WA-155-P(1)	2003/971	Not Controlled Action	Completed
Exploration Well (Taunton-2)	2002/731	Not Controlled Action	Completed
Exploration Well in Permit Area WA-155-P(1)	2002/759	Not Controlled Action	Completed
Exploratory drilling in permit area WA-225-P	2001/490	Not Controlled Action	Completed
Extension of Simpson Oil Platforms & Wells	2002/685	Not Controlled Action	Completed
Extention to the existing Blind Strait Black Lip Pearl Oyster Farm	2004/1342	Not Controlled Action	Completed
Gulf Fishing Lodge	2010/5499	Not Controlled Action	Completed
Hadda 1,Flying Foam 1,Magnat 1 exploration drill	2004/1697	Not Controlled Action	Completed
HCA05X Macedon Experimental Survey	2004/1926	Not Controlled Action	Completed
Hess Exploration Drilling Programme	2007/3566	Not Controlled Action	Completed
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed
INDIGO West Submarine Telecommunications Cable, WA	2017/8126	Not Controlled Action	Completed
Infill Production Well (Griffin-9)	2001/417	Not Controlled Action	Completed
Klammer 2D Seismic Survey	2002/868	Not Controlled Action	Completed

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action			
Mermaid Marine Australia Desalination Project	2011/5916	Not Controlled Action	Completed
Montesa-1 and Bultaco-1 Exploration Wells	2000/102	Not Controlled Action	Completed
Murujuga archaeological excavation, collection and sampling, Dampier Archipelago, WA	2014/7160	Not Controlled Action	Completed
Onslow Power Infrastructure Upgrade Project, Onslow, WA	2014/7314	Not Controlled Action	Completed
Onslow Water Supply Infrastructure Upgrade Project, Onslow, WA	2014/7329	Not Controlled Action	Completed
Port Expansion and Dredging	2003/1265	Not Controlled Action	Completed
Project Highclere Geophysical Survey	2021/9023	Not Controlled Action	Completed
Spool Base Facility	2001/263	Not Controlled Action	Completed
Subsea Gas Pipeline From Stybarrow Field to Griffin Venture Gas Export Pipeline	2005/2033	Not Controlled Action	Completed
Thevenard Island Retirement Project	2015/7423	Not Controlled Action	Completed
To construct and operate an offshore submarine fibre optic cable, WA	2014/7373	Not Controlled Action	Completed
Useless Loop Road Upgrade	2000/83	Not Controlled Action	Completed
Wanda Offshore Research Project, 80 km north-east of Exmouth, WA	2018/8293	Not Controlled Action	Completed
Yellowfin Tuna Aquaculture Trial	2003/1115	Not Controlled Action	Completed
Not controlled action (particular manner)			
'Kate' 3D marine seismic survey, exploration permits WA-320-P and WA-345-P, 60km	2005/2037	Not Controlled Action (Particular Manner)	Post-Approval
'Tourmaline' 2D marine seismic survey, permit areas WA-323-P, WA-330-P and WA-32	2005/2282	Not Controlled Action (Particular Manner)	Post-Approval

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action (particular manner)			
"Leanne" offshore 3D seismic exploration, WA-356-P	2005/1938	Not Controlled Action (Particular Manner)	Post-Approval
2D and 3D seismic surveys	2005/2151	Not Controlled Action (Particular Manner)	Post-Approval
2D Marine Seismic Survey in Permit Area WA-337-P	2003/1158	Not Controlled Action (Particular Manner)	Post-Approval
2D seismic survey	2008/4493	Not Controlled Action (Particular Manner)	Post-Approval
2D Seismic Survey	2005/2146	Not Controlled Action (Particular Manner)	Post-Approval
3D marine seismic survey	2008/4281	Not Controlled Action (Particular Manner)	Post-Approval
3D Marine Seismic Survey in Permit Areas WA-15-R, WA-18-R, WA-205-P, WA-253-P, WA-267-P and WA-268-P	2003/1271	Not Controlled Action (Particular Manner)	Post-Approval
3D Marine Seismic Surveys - Contos CT-13 & Supertubes CT-13, offshore WA	2013/6901	Not Controlled Action (Particular Manner)	Post-Approval
3D seismic survey	2006/2715	Not Controlled Action (Particular Manner)	Post-Approval
3D Seismic Survey, WA	2008/4428	Not Controlled Action (Particular Manner)	Post-Approval
Acheron Non-Exclusive 2D Seismic Survey	2008/4565	Not Controlled Action (Particular Manner)	Post-Approval
Acheron Non-Exclusive 2D Seismic Survey	2009/4968	Not Controlled Action (Particular	Post-Approval

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action (particular manner)			
		Manner)	
Agrippina 3D Seismic Marine Survey	2009/5212	Not Controlled Action (Particular Manner)	Post-Approval
Algae Farm and Processing Facilities	2012/6596	Not Controlled Action (Particular Manner)	Post-Approval
Apache Northwest Shelf Van Gogh Field Appraisal Drilling Program	2007/3495	Not Controlled Action (Particular Manner)	Post-Approval
Aperio 3D Marine Seismic Survey, WA	2012/6648	Not Controlled Action (Particular Manner)	Post-Approval
Australia to Singapore Fibre Optic Submarine Cable System	2011/6127	Not Controlled Action (Particular Manner)	Post-Approval
Cape Preston East - Iron Ore Export Facilities, Pilbara, WA	2013/6844	Not Controlled Action (Particular Manner)	Post-Approval
Cerberus exploration drilling campaign, Carnarvon Basin, WA	2016/7645	Not Controlled Action (Particular Manner)	Post-Approval
CGGVERITAS 2010 2D Seismic Survey	2010/5714	Not Controlled Action (Particular Manner)	Post-Approval
Charon 3D Marine Seismic Survey	2007/3477	Not Controlled Action (Particular Manner)	Post-Approval
Consturction & operation of the Varanus Island kitchen & mess cyclone refuge building, compression p	2013/6952	Not Controlled Action (Particular Manner)	Post-Approval
Coverack Marine Seismic Survey	2001/399	Not Controlled Action (Particular Manner)	Post-Approval

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action (particular manner)			
CVG 3D Marine Seismic Survey	2012/6654	Not Controlled Action (Particular Manner)	Post-Approval
Deep Water Drilling Program	2010/5532	Not Controlled Action (Particular Manner)	Post-Approval
Diesel Fuel Bunker Operation	2012/6289	Not Controlled Action (Particular Manner)	Post-Approval
Draeck 3D Marine Seismic Survey, WA-205-P	2006/3067	Not Controlled Action (Particular Manner)	Post-Approval
Drilling 35-40 offshore exploration wells in deep water	2008/4461	Not Controlled Action (Particular Manner)	Post-Approval
Earthworks for kitchen/mess, cyclone refuge building & Compression Plant, Varanus Island	2013/6900	Not Controlled Action (Particular Manner)	Post-Approval
Eendracht Multi-Client 3D Marine Seismic Survey	2009/4749	Not Controlled Action (Particular Manner)	Post-Approval
Enfield M3 & Vincent 4D Marine Seismic Surveys	2008/3981	Not Controlled Action (Particular Manner)	Completed
Enfield M3 4D, Vincent 4D & 4D Line Test Marine Seismic Surveys	2008/4122	Not Controlled Action (Particular Manner)	Post-Approval
Enfield M4 4D Marine Seismic Survey	2008/4558	Not Controlled Action (Particular Manner)	Post-Approval
Enfield oilfield 3D Seismic Survey	2006/3132	Not Controlled Action (Particular Manner)	Post-Approval
Exmouth West 2D Marine Seismic Survey	2008/4132	Not Controlled Action (Particular	Post-Approval

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action (particular manner)			
		Manner)	
Gazelle 3D Marine Seismic Survey in WA-399-P and WA-42-L	2010/5570	Not Controlled Action (Particular Manner)	Post-Approval
Glencoe 3D Marine Seismic Survey WA-390-P	2007/3684	Not Controlled Action (Particular Manner)	Post-Approval
Grimalkin 3D Seismic Survey	2008/4523	Not Controlled Action (Particular Manner)	Post-Approval
Guacamole 2D Marine Seismic Survey	2008/4381	Not Controlled Action (Particular Manner)	Post-Approval
Harmony 3D Marine Seismic Survey	2012/6699	Not Controlled Action (Particular Manner)	Post-Approval
Harpy 1 exploration well	2001/183	Not Controlled Action (Particular Manner)	Post-Approval
Honeycombs MC3D Marine Seismic Survey	2012/6368	Not Controlled Action (Particular Manner)	Post-Approval
Huzzas MC3D Marine Seismic Survey (HZ-13) Carnarvon Basin, offshore WA	2013/7003	Not Controlled Action (Particular Manner)	Post-Approval
Huzzas phase 2 marine seismic survey, Exmouth Plateau, Northern Carnarvon Basin, WA	2013/7093	Not Controlled Action (Particular Manner)	Post-Approval
INDIGO Marine Cable Route Survey (INDIGO)	2017/7996	Not Controlled Action (Particular Manner)	Post-Approval
John Ross & Rosella Off Bottom Cable Seismic Exploration Program	2008/3966	Not Controlled Action (Particular Manner)	Post-Approval

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action (particular manner)			
Laverda 3D Marine Seismic Survey and Vincent M1 4D Marine Seismic Survey	2010/5415	Not Controlled Action (Particular Manner)	Post-Approval
Laying a submarine optical fibre telecommunications cable, Perth to Singapore and Jakarta	2014/7332	Not Controlled Action (Particular Manner)	Post-Approval
Leopard 2D marine seismic survey	2005/2290	Not Controlled Action (Particular Manner)	Post-Approval
Lion 2D Marine Seismic Survey	2007/3777	Not Controlled Action (Particular Manner)	Post-Approval
Macedon Gas Field Development	2008/4605	Not Controlled Action (Particular Manner)	Post-Approval
Marine reconnaissance survey	2008/4466	Not Controlled Action (Particular Manner)	Post-Approval
Moosehead 2D seismic survey within permit WA-192-P	2005/2167	Not Controlled Action (Particular Manner)	Post-Approval
Munmorah 2D seismic survey within permits WA-308/9-P	2003/970	Not Controlled Action (Particular Manner)	Post-Approval
North Perth Marine Survey	2011/6067	Not Controlled Action (Particular Manner)	Post-Approval
Ocean Bottom Cable Seismic Program, WA-264-P	2007/3844	Not Controlled Action (Particular Manner)	Post-Approval
Ocean Bottom Cable Seismic Survey	2005/2017	Not Controlled Action (Particular Manner)	Post-Approval
Onslow Seawater Desalination Plant Marine Geophysical Investigation	2020/8794	Not Controlled Action (Particular	Post-Approval

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action (particular manner)			
		Manner)	
Orcus 3D Marine Seismic Survey in WA-450-P	2010/5723	Not Controlled Action (Particular Manner)	Post-Approval
Osprey and Dionysus Marine Seismic Survey	2011/6215	Not Controlled Action (Particular Manner)	Post-Approval
Palta-1 exploration well in Petroleum Permit Area WA-384-P	2011/5871	Not Controlled Action (Particular Manner)	Post-Approval
Pomodoro 3D Marine Seismic Survey in WA-426-P and WA-427-P	2010/5472	Not Controlled Action (Particular Manner)	Post-Approval
Pyrenees 4D Marine Seismic Monitor Survey, HCA12A	2012/6579	Not Controlled Action (Particular Manner)	Post-Approval
Pyrenees-Macedon 3D marine seismic survey	2005/2325	Not Controlled Action (Particular Manner)	Post-Approval
Quiberon 2D Seismic Survey, permit area WA-385P, offshore of Carnarvon	2009/5077	Not Controlled Action (Particular Manner)	Post-Approval
Reindeer gas reservior development, Devil Creek, Carnarvon Basin - WA	2007/3917	Not Controlled Action (Particular Manner)	Post-Approval
Rydal-1 Petroleum Exploration Well, WA	2012/6522	Not Controlled Action (Particular Manner)	Post-Approval
Salsa 3D Marine Seismic Survey	2010/5629	Not Controlled Action (Particular Manner)	Post-Approval
Scarborough Development nearshore component, NWS, WA	2018/8362	Not Controlled Action (Particular Manner)	Post-Approval

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action (particular manner)			
Skorpion Marine Seismic Survey WA	2001/416	Not Controlled Action (Particular Manner)	Post-Approval
Sovereign 3D Marine Seismic Survey	2011/5861	Not Controlled Action (Particular Manner)	Post-Approval
Stag 4D & Reindeer MAZ Marine Seismic Surveys, WA	2013/7080	Not Controlled Action (Particular Manner)	Post-Approval
Stag Off-bottom Cable Seismic Survey	2007/3696	Not Controlled Action (Particular Manner)	Post-Approval
Stybarrow 4D Marine Seismic Survey	2011/5810	Not Controlled Action (Particular Manner)	Post-Approval
Stybarrow Baseline 4D marine seismic survey	2008/4530	Not Controlled Action (Particular Manner)	Post-Approval
Supply of road building material areas Shark Bay Region WA	2012/6280	Not Controlled Action (Particular Manner)	Post-Approval
Tantabiddi Boat Ramp Sand Bypassing	2015/7411	Not Controlled Action (Particular Manner)	Post-Approval
The Dampier Heavy Load Out Facility Berth and Swing Basin Expansion	2012/6271	Not Controlled Action (Particular Manner)	Post-Approval
Tortilla 2D Seismic Survey, WA	2011/6110	Not Controlled Action (Particular Manner)	Post-Approval
Triton 3D Marine Seismic Survey, WA-2-R and WA-3-R	2006/2609	Not Controlled Action (Particular Manner)	Post-Approval
Undertake a 3D marine seismic survey	2010/5695	Not Controlled Action (Particular	Post-Approval

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action (particular manner)			
		Manner)	
Undertake a three dimensional marine seismic survey	2010/5715	Not Controlled Action (Particular Manner)	Post-Approval
Undertake a three dimensional marine seismic survey	2010/5679	Not Controlled Action (Particular Manner)	Post-Approval
Vincent M1 and Enfield M5 4D Marine Seismic Survey	2010/5720	Not Controlled Action (Particular Manner)	Post-Approval
Warramunga Non-Inclusive 3D Seismic Survey	2008/4553	Not Controlled Action (Particular Manner)	Post-Approval
West Anchor 3D Marine Seismic Survey	2008/4507	Not Controlled Action (Particular Manner)	Post-Approval
West Panaeus 3D seismic survey	2006/3141	Not Controlled Action (Particular Manner)	Post-Approval
Westralia SPAN Marine Seismic Survey, WA & NT	2012/6463	Not Controlled Action (Particular Manner)	Post-Approval
Referral decision			
3D Marine Seismic Survey in the offshore northwest Carnarvon Basin	2011/6175	Referral Decision	Completed
Bianchi 3D Marine Seismic Survey, Carnavon Basin, WA	2013/7078	Referral Decision	Completed
CVG 3D Marine Seismic Survey	2012/6270	Referral Decision	Completed
Enfield 4D Marine Seismic Surveys, Production Permit WA-28-L	2005/2370	Referral Decision	Completed
Mardie Salt Project, Pilbara region, WA	2018/8183	Referral Decision	Completed
Stybarrow Baseline 4D Marine Seismic Survey (Permit Areas WA-255-P, WA-32-L, WA-	2008/4165	Referral Decision	Completed

Title of referral	Reference	Referral Outcome	Assessment Status
Referral decision			
Two Dimensional Transition Zone Seismic Survey - TP/7 (R1)	2010/5507	Referral Decision	Completed
Varanus Island Compression Project	2012/6698	Referral Decision	Completed

Key Ecological Features [Resource Information]

Key Ecological Features are the parts of the marine ecosystem that are considered to be important for the biodiversity or ecosystem functioning and integrity of the Commonwealth Marine Area.

Name	Region
Ancient coastline at 125 m depth contour	North-west
Canyons linking the Cuvier Abyssal Plain and the Cape Range Peninsula	North-west
Commonwealth marine environment surrounding the Houtman Abrolhos Islands	South-west
Commonwealth marine environment within and adjacent to the west coast inshore lagoons	South-west
Commonwealth waters adjacent to Ningaloo Reef	North-west
Continental Slope Demersal Fish Communities	North-west
Exmouth Plateau	North-west
Wallaby Saddle	North-west
Western demersal slope and associated fish communities	South-west
Western rock lobster	South-west

Biologically Important Areas [Resource Information]

Scientific Name	Behaviour	Presence
Dugong		
Dugong dugon Dugong [28]	Breeding	Known to occur
Dugong dugon Dugong [28]	Calving	Known to occur
Dugong dugon Dugong [28]	Foraging	Known to occur

Scientific Name	Behaviour	Presence
Dugong dugon Dugong [28]	Foraging (high density seagrass beds)	Known to occur
Dugong dugon Dugong [28]	Nursing	Known to occur
Marine Turtles		
Caretta caretta Loggerhead Turtle [1763]	Internesting	Known to occur
Caretta caretta Loggerhead Turtle [1763]	Internesting buffer	Known to occur
Caretta caretta Loggerhead Turtle [1763]	Nesting	Known to occur
Chelonia mydas Green Turtle [1765]	Aggregation	Known to occur
Chelonia mydas Green Turtle [1765]	Basking	Known to occur
Chelonia mydas Green Turtle [1765]	Foraging	Known to occur
Chelonia mydas Green Turtle [1765]	Internesting	Known to occur
Chelonia mydas Green Turtle [1765]	Internesting buffer	Known to occur
Chelonia mydas Green Turtle [1765]	Mating	Known to occur
Chelonia mydas Green Turtle [1765]	Migration corridor	Known to occur
Chelonia mydas Green Turtle [1765]	Nesting	Known to occur

Scientific Name	Behaviour	Presence
Eretmochelys imbricata Hawksbill Turtle [1766]	Foraging	Known to occur
Eretmochelys imbricata Hawksbill Turtle [1766]	Internesting	Known to occur
Eretmochelys imbricata Hawksbill Turtle [1766]	Internesting buffer	Known to occur
Eretmochelys imbricata Hawksbill Turtle [1766]	Mating	Known to occur
Eretmochelys imbricata Hawksbill Turtle [1766]	Migration corridor	Known to occur
Eretmochelys imbricata Hawksbill Turtle [1766]	Nesting	Known to occur
Natator depressus Flatback Turtle [59257]	Aggregation	Known to occur
Natator depressus Flatback Turtle [59257]	Foraging	Known to occur
Natator depressus Flatback Turtle [59257]	Internesting	Known to occur
Natator depressus Flatback Turtle [59257]	Internesting buffer	Known to occur
Natator depressus Flatback Turtle [59257]	Mating	Known to occur
Natator depressus Flatback Turtle [59257]	Migration corridor	Known to occur
Natator depressus Flatback Turtle [59257]	Nesting	Known to occur
Seabirds		
Anous stolidus Common Noddy [825]	Foraging (provisioning young)	Known to occur

Scientific Name	Behaviour	Presence
Anous tenuirorstris melanops Australian Lesser Noddy [26000]	Foraging (provisioning young)	Known to occur
Ardenna pacifica Wedge-tailed Shearwater [84292]	Breeding	Known to occur
Ardenna pacifica Wedge-tailed Shearwater [84292]	Foraging (in high numbers)	Known to occur
Hydroprogne caspia Caspian Tern [808]	Foraging (provisioning young)	Known to occur
Larus pacificus Pacific Gull [811]	Foraging (in high numbers)	Known to occur
Onychoprion anaethetus Bridled Tern [82845]	Foraging (in high numbers)	Known to occur
Onychoprion fuscata Sooty Tern [82847]	Foraging	Known to occur
Pelagodroma marina White-faced Storm-petrel [1016]	Foraging (in high numbers)	Known to occur
Puffinus assimilis tunneyi Little Shearwater [59363]	Foraging (in high numbers)	Known to occur
Sterna dougallii Roseate Tern [817]	Breeding	Known to occur
Sterna dougallii Roseate Tern [817]	Foraging (provisioning young)	Known to occur
Sternula nereis Fairy Tern [82949]	Breeding	Known to occur

Scientific Name	Behaviour	Presence
[Sternula nereis](#) Fairy Tern [82949]	Foraging (in high numbers)	Known to occur
[Thalasseus bengalensis](#) Lesser Crested Tern [66546]	Breeding	Known to occur
Seals		
[Neophoca cinerea](#) Australian Sea Lion [22]	Foraging (male)	Likely to occur
[Neophoca cinerea](#) Australian Sea Lion [22]	Foraging (male and female)	Known to occur
Sharks		
[Carcharodon carcharias](#) White Shark [64470]	Foraging	Known to occur
[Rhincodon typus](#) Whale Shark [66680]	Foraging	Known to occur
[Rhincodon typus](#) Whale Shark [66680]	Foraging (high density prey)	Known to occur
Whales		
[Balaenoptera musculus brevicauda](#) Pygmy Blue Whale [81317]	Foraging	Known to occur
[Balaenoptera musculus brevicauda](#) Pygmy Blue Whale [81317]	Known Foraging Area	Known to occur
[Balaenoptera musculus brevicauda](#) Pygmy Blue Whale [81317]	Migration	Known to occur
[Eubalaena australis](#) Southern Right Whale [40]	Migration	
[Eubalaena australis](#) Southern Right Whale [40]	Reproduction	
[Megaptera novaeangliae](#) Humpback Whale [38]	Migration (north and south)	Known to occur

Scientific Name	Behaviour	Presence
Megaptera novaeangliae		
Humpback Whale [38]	Resting	Known to occur

Caveat

1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data is available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance on the contents of this report.

3 DATA SOURCES

Threatened ecological communities

For threatened ecological communities where the distribution is well known, maps are generated based on information contained in recovery plans, State vegetation maps and remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species

Threatened, migratory and marine species distributions have been discerned through a variety of methods. Where distributions are well known and if time permits, distributions are inferred from either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc.) together with point locations and described habitat; or modelled (MAXENT or BIOCLIM habitat modelling) using point locations and environmental data layers.

Where little information is available for a species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc.).

In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More detailed distribution mapping methods are used to update these distributions when time permits.

4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

The following groups have been mapped, but may not cover the complete distribution of the species:

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded breeding sites; and
- seals which have only been mapped for breeding sites near the Australian continent

The breeding sites may be important for the protection of the Commonwealth Marine environment.

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact us page.

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EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Please see the caveat for interpretation of information provided here.

Report created: 09-Feb-2026

Summary
Details
- Matters of NES
- Other Matters Protected by the EPBC Act
- Extra Information

Caveat
Acknowledgements

Summary

Matters of National Environment Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	1
National Heritage Places:	2
Wetlands of International Importance (Ramsar	4
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	8
Listed Threatened Ecological Communities:	1
Listed Threatened Species:	83
Listed Migratory Species:	91

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at https://www.dcceew.gov.au/parks-heritage/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Lands:	160
Commonwealth Heritage Places:	7
Listed Marine Species:	156
Whales and Other Cetaceans:	32
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	1
Australian Marine Parks:	12
Habitat Critical to the Survival of Marine Turtles:	4

Extra Information

This part of the report provides information that may also be relevant to the area you have

State and Territory Reserves:	34
Regional Forest Agreements:	None
Nationally Important Wetlands:	None
EPBC Act Referrals:	234
Key Ecological Features (Marine):	6
Biologically Important Areas:	71
Bioregional Assessments:	None
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

World Heritage Properties		[Resource Information]
Name	State	Legal Status
Murujuga Cultural Landscape	WA	Declared property

National Heritage Places		[Resource Information]
Name	State	Legal Status
Indigenous		
Dampier Archipelago (including Burrup Peninsula)	WA	Listed place
Natural		
The West Kimberley	WA	Listed place

Wetlands of International Importance (Ramsar Wetlands)	[Resource Information]
Ramsar Site Name	Proximity
Eighty-mile beach	Within Ramsar site
Hosnies spring	Within Ramsar site
Roebuck bay	Within Ramsar site
The dales	Within Ramsar site

Commonwealth Marine Area	[Resource Information]

Approval is required for a proposed activity that is located within the Commonwealth Marine Area which has, will have, or is likely to have a significant impact on the environment. Approval may be required for a proposed action taken outside a Commonwealth Marine Area but which has, may have or is likely to have a significant impact on the environment in the Commonwealth Marine Area.

Feature Name
Commonwealth Marine Areas (EPBC Act)
Commonwealth Marine Areas (EPBC Act)
Commonwealth Marine Areas (EPBC Act)
Commonwealth Marine Areas (EPBC Act)
Commonwealth Marine Areas (EPBC Act)
Commonwealth Marine Areas (EPBC Act)
Commonwealth Marine Areas (EPBC Act)

Listed Threatened Ecological Communities [Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.
Status of Vulnerable, Disallowed and Ineligible are not MNES under the EPBC Act.

Community Name	Threatened Category	Presence Text
Monsoon vine thickets on the coastal sand dunes of Dampier Peninsula	Endangered	Community likely to occur within area

Listed Threatened Species [Resource Information]

Status of Conservation Dependent and Extinct are not MNES under the EPBC Act.
Number is the current name ID.

Scientific Name	Threatened Category	Presence Text
BIRD		
Accipiter hiogaster natalis		
Christmas Island Goshawk [82408]	Endangered	Species or species habitat known to occur within area
Anous tenuirostris melanops		
Australian Lesser Noddy [26000]	Vulnerable	Species or species habitat may occur within area
Arenaria interpres		
Ruddy Turnstone [872]	Vulnerable	Roosting known to occur within area
Calidris acuminata		
Sharp-tailed Sandpiper [874]	Vulnerable	Roosting known to occur within area
Calidris canutus		
Red Knot, Knot [855]	Vulnerable	Species or species habitat known to occur within area
Calidris ferruginea		
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
Calidris tenuirostris		
Great Knot [862]	Vulnerable	Roosting known to occur within area
Chalcophaps indica natalis		
Christmas Island Emerald Dove, Emerald Dove (Christmas Island) [67030]	Endangered	Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat known to occur within area
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Roosting known to occur within area
Chloebia gouldiae listed as Erythrura gouldiae Gouldian Finch [90091]	Endangered	Species or species habitat likely to occur within area
Erythrotriorchis radiatus Red Goshawk [942]	Endangered	Species or species habitat may occur within area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat known to occur within area
Falcunculus frontatus whitei Crested Shrike-tit (northern), Northern Shrike-tit [26013]	Vulnerable	Species or species habitat likely to occur within area
Fregata andrewsi Christmas Island Frigatebird, Andrew's Frigatebird [1011]	Endangered	Breeding known to occur within area
Geophaps smithii blaauwi Partridge Pigeon (western) [66501]	Vulnerable	Species or species habitat likely to occur within area
Limnodromus semipalmatus Asian Dowitcher [843]	Vulnerable	Species or species habitat known to occur within area
Limosa lapponica menzbieri Northern Siberian Bar-tailed Godwit, Russkoye Bar-tailed Godwit [86432]	Endangered	Species or species habitat known to occur within area
Limosa limosa Black-tailed Godwit [845]	Endangered	Roosting known to occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Ninox natalis Christmas Island Hawk-Owl, Christmas Boobook [66671]	Vulnerable	Species or species habitat known to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
Papasula abbotti Abbott's Booby [59297]	Endangered	Species or species habitat known to occur within area
Pezoporus occidentalis Night Parrot [59350]	Critically Endangered	Species or species habitat may occur within area
Phaethon lepturus fulvus Christmas Island White-tailed Tropicbird, Golden Bosunbird [26021]	Endangered	Breeding known to occur within area
Phaethon rubricauda westralis Red-tailed Tropicbird (Indian Ocean), Indian Ocean Red-tailed Tropicbird [91824]	Endangered	Breeding known to occur within area
Pluvialis squatarola Grey Plover [865]	Vulnerable	Roosting known to occur within area
Polytelis alexandrae Princess Parrot, Alexandra's Parrot [758]	Vulnerable	Species or species habitat may occur within area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat known to occur within area
Sternula albifrons Little Tern [82849]	Vulnerable	Breeding known to occur within area
Sternula nereis nereis Australian Fairy Tern [82950]	Vulnerable	Breeding known to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]	Endangered	Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
[Turdus poliocephalus erythropleurus](#) Christmas Island Thrush [67122]	Endangered	Species or species habitat known to occur within area
[Tyto novaehollandiae kimberli](#) Masked Owl (northern) [26048]	Vulnerable	Species or species habitat may occur within area
[Xenus cinereus](#) Terek Sandpiper [59300]	Vulnerable	Roosting known to occur within area
MAMMAL		
[Balaenoptera borealis](#) Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
[Balaenoptera musculus](#) Blue Whale [36]	Endangered	Migration route known to occur within area
[Balaenoptera physalus](#) Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
[Crocidura trichura](#) Christmas Island Shrew [86568]	Critically Endangered	Species or species habitat likely to occur within area
[Dasyurus hallucatus](#) Northern Quoll, Digul [Gogo-Yimidir], Wijingadda [Dambimangari], Wiminji [Martu] [331]	Endangered	Species or species habitat known to occur within area
[Isoodon auratus auratus](#) Golden Bandicoot (mainland) [66665]	Vulnerable	Species or species habitat likely to occur within area
[Lagorchestes hirsutus Central Australian subspecies](#) Mala, Rufous Hare-Wallaby (Central Australia) [88019]	Endangered	Translocated population known to occur within area
[Macroderma gigas](#) Ghost Bat [174]	Vulnerable	Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
Macrotis lagotis Greater Bilby [282]	Vulnerable	Species or species habitat known to occur within area
Orcaella heinsohni Australian Snubfin Dolphin [81322]	Vulnerable	Breeding known to occur within area
Petrogale concinna monastria Nabarlek (Kimberley) [87607]	Endangered	Species or species habitat known to occur within area
Phascogale tapoatafa kimberleyensis Kimberley brush-tailed phascogale, Brush-tailed Phascogale (Kimberley) [88453]	Vulnerable	Species or species habitat likely to occur within area
Pteropus natalis Christmas Island Flying-fox, Christmas Island Fruit-bat [87611]	Critically Endangered	Species or species habitat known to occur within area
Rhinonicteris aurantia (Pilbara form) Pilbara Leaf-nosed Bat [82790]	Vulnerable	Species or species habitat likely to occur within area
Saccolaimus saccolaimus nudicluniatus Bare-rumped Sheath-tailed Bat, Bare-rumped Sheathtail Bat [66889]	Vulnerable	Species or species habitat likely to occur within area
Sousa sahulensis Australian Humpback Dolphin [87942]	Vulnerable	Breeding known to occur within area
Trichosurus vulpecula arnhemensis Northern Brushtail Possum [83091]	Vulnerable	Species or species habitat known to occur within area
Xeromys myoides Water Mouse, False Water Rat, Yirrkoo [66]	Vulnerable	Species or species habitat may occur within area
PLANT		
Asplenium listeri Christmas Island Spleenwort [65865]	Critically Endangered	Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
[Pneumatopteris truncata](#) fern [68812]	Critically Endangered	Species or species habitat known to occur within area
[Seringia exastia](#) Fringed Fire-bush [88920]	Critically Endangered	Species or species habitat known to occur within area
[Tectaria devexa](#) Cave Fern [14767]	Endangered	Species or species habitat likely to occur within area
REPTILE		
[Aipysurus apraefrontalis](#) Short-nosed Sea Snake, Short-nosed Seasnake [1115]	Critically Endangered	Species or species habitat known to occur within area
[Aipysurus foliosquama](#) Leaf-scaled Sea Snake, Leaf-scaled Seasnake [1118]	Critically Endangered	Species or species habitat known to occur within area
[Aipysurus fuscus](#) Dusky Sea Snake [1119]	Endangered	Species or species habitat known to occur within area
[Caretta caretta](#) Loggerhead Turtle [1763]	Endangered	Foraging, feeding or related behaviour known to occur within area
[Chelonia mydas](#) Green Turtle [1765]	Vulnerable	Breeding known to occur within area
[Cryptoblepharus egeriae](#) Christmas Island Blue-tailed Skink, Blue-tailed Snake-eyed Skink [1526]	Critically Endangered	Species or species habitat likely to occur within area
[Cyrtodactylus sadleiri](#) Christmas Island Giant Gecko [86865]	Endangered	Species or species habitat known to occur within area
[Dermochelys coriacea](#) Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Breeding likely to occur within area

Scientific Name	Threatened Category	Presence Text
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Breeding known to occur within area
Lepidochelys olivacea Olive Ridley Turtle, Pacific Ridley Turtle [1767]	Endangered	Breeding likely to occur within area
Lepidodactylus listeri Christmas Island Gecko, Lister's Gecko [1711]	Critically Endangered	Species or species habitat known to occur within area
Liasis olivaceus barroni Pilbara Olive Python [66699]	Vulnerable	Species or species habitat likely to occur within area
Liopholis kintorei Great Desert Skink, Tjakura, Warrarna, Mulyamiji, Tjalapa, Nampu [83160]	Vulnerable	Species or species habitat may occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Breeding known to occur within area
Ramphotyphlops exocoeti Christmas Island Blind Snake, Christmas Island Pink Blind Snake [1262]	Vulnerable	Species or species habitat likely to occur within area
Tiliqua scincoides intermedia Northern Blue-tongued Skink [89838]	Critically Endangered	Species or species habitat known to occur within area
Varanus mertensi Mertens' Water Monitor [1568]	Endangered	Species or species habitat likely to occur within area
Varanus mitchelli Mitchell's Water Monitor [1569]	Critically Endangered	Species or species habitat likely to occur within area
SHARK		
Carcharias taurus (west coast population) Grey Nurse Shark (west coast population) [68752]	Vulnerable	Species or species habitat likely to occur within area
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
Glyphis garricki Northern River Shark, New Guinea River Shark [82454]	Endangered	Species or species habitat may occur within area
Pristis clavata Dwarf Sawfish, Queensland Sawfish [68447]	Vulnerable	Breeding known to occur within area
Pristis pristis Largetooth Sawfish, Freshwater Sawfish, River Sawfish, Leichhardt's Sawfish, Northern Sawfish [60756]	Endangered	Species or species habitat known to occur within area
Pristis zijsron Green Sawfish, Dindagubba, Narrowsnout Sawfish [68442]	Vulnerable	Breeding known to occur within area
Rhincodon typus Whale Shark [66680]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Sphyrna lewini Scalloped Hammerhead [85267]	Conservation Dependent	Species or species habitat known to occur within area

Listed Migratory Species		[Resource Information]
Scientific Name	Threatened Category	Presence Text
null		
Balaenoptera omurai Omura's Whale [87136]		Species or species habitat likely to occur within area
Migratory Marine Birds		
Anous stolidus Common Noddy [825]		Species or species habitat likely to occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardenna pacifica Wedge-tailed Shearwater [84292]		Breeding known to occur within area
Calonectris leucomelas Streaked Shearwater [1077]		Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
Fregata andrewsi Christmas Island Frigatebird, Andrew's Frigatebird [1011]	Endangered	Breeding known to occur within area
Fregata ariel Lesser Frigatebird, Least Frigatebird [1012]		Breeding known to occur within area
Fregata minor Great Frigatebird, Greater Frigatebird [1013]		Breeding known to occur within area
Hydroprogne caspia Caspian Tern [808]		Breeding known to occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Onychoprion anaethetus Bridled Tern [82845]		Breeding known to occur within area
Phaethon lepturus White-tailed Tropicbird [1014]		Breeding known to occur within area
Phaethon rubricauda Red-tailed Tropicbird [994]		Breeding known to occur within area
Sterna dougallii Roseate Tern [817]		Breeding known to occur within area
Sternula albifrons Little Tern [82849]	Vulnerable	Breeding known to occur within area
Sula dactylatra Masked Booby [1021]		Breeding known to occur within area
Sula leucogaster Brown Booby [1022]		Breeding known to occur within area
Sula sula Red-footed Booby [1023]		Breeding known to occur within area

Migratory Marine Species

Scientific Name	Threatened Category	Presence Text
Anoxypristis cuspidata Narrow Sawfish, Knifetooth Sawfish [68448]		Species or species habitat known to occur within area
Balaenoptera bonaerensis Antarctic Minke Whale, Dark-shoulder Minke Whale [67812]		Species or species habitat likely to occur within area
Balaenoptera borealis Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Balaenoptera edeni Bryde's Whale [35]		Species or species habitat likely to occur within area
Balaenoptera musculus Blue Whale [36]	Endangered	Migration route known to occur within area
Balaenoptera physalus Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Carcharhinus longimanus Oceanic Whitetip Shark [84108]		Species or species habitat likely to occur within area
Carcharias taurus Grey Nurse Shark [64469]		Species or species habitat likely to occur within area
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat likely to occur within area
Caretta caretta Loggerhead Turtle [1763]	Endangered	Foraging, feeding or related behaviour known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Breeding known to occur within area

Scientific Name	Threatened Category	Presence Text
Crocodylus porosus Salt-water Crocodile, Estuarine Crocodile [1774]		Species or species habitat likely to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Breeding likely to occur within area
Dugong dugon Dugong [28]		Foraging, feeding or related behaviour known to occur within area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Breeding known to occur within area
Isurus oxyrinchus Shortfin Mako, Mako Shark [79073]		Species or species habitat likely to occur within area
Isurus paucus Longfin Mako [82947]		Species or species habitat likely to occur within area
Lepidochelys olivacea Olive Ridley Turtle, Pacific Ridley Turtle [1767]	Endangered	Breeding likely to occur within area
Megaptera novaeangliae Humpback Whale [38]		Breeding known to occur within area
Mobula alfredi as Manta alfredi Reef Manta Ray, Coastal Manta Ray [90033]		Species or species habitat known to occur within area
Mobula birostris as Manta birostris Giant Manta Ray [90034]		Species or species habitat known to occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Breeding known to occur within area
Orcaella heinsohni Australian Snubfin Dolphin [81322]	Vulnerable	Breeding known to occur within area

Scientific Name	Threatened Category	Presence Text
Orcinus orca Killer Whale, Orca [46]		Species or species habitat may occur within area
Physeter macrocephalus Sperm Whale [59]		Species or species habitat may occur within area
Pristis clavata Dwarf Sawfish, Queensland Sawfish [68447]	Vulnerable	Breeding known to occur within area
Pristis pristis Largetooth Sawfish, Freshwater Sawfish, River Sawfish, Leichhardt's Sawfish, Northern Sawfish [60756]	Endangered	Species or species habitat known to occur within area
Pristis zijsron Green Sawfish, Dindagubba, Narrowsnout Sawfish [68442]	Vulnerable	Breeding known to occur within area
Rhincodon typus Whale Shark [66680]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Sousa sahulensis as Sousa chinensis Australian Humpback Dolphin [87942]	Vulnerable	Breeding known to occur within area
Tursiops aduncus (Arafura/Timor Sea populations) Spotted Bottlenose Dolphin (Arafura/Timor Sea populations) [78900]		Species or species habitat known to occur within area

Migratory Terrestrial Species		
Cecropis daurica Red-rumped Swallow [80610]		Species or species habitat known to occur within area
Cuculus optatus Oriental Cuckoo, Horsfield's Cuckoo [86651]		Species or species habitat known to occur within area
Hirundo rustica Barn Swallow [662]		Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
Motacilla cinerea Grey Wagtail [642]		Species or species habitat known to occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat known to occur within area
Migratory Wetlands Species		
Acrocephalus orientalis Oriental Reed-Warbler [59570]		Species or species habitat known to occur within area
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area
Arenaria interpres Ruddy Turnstone [872]	Vulnerable	Roosting known to occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Roosting known to occur within area
Calidris alba Sanderling [875]		Roosting known to occur within area
Calidris canutus Red Knot, Knot [855]	Vulnerable	Species or species habitat known to occur within area
Calidris falcinellus as Limicola falcinellus Broad-billed Sandpiper [91731]		Roosting known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat known to occur within area
Calidris pugnax as Philomachus pugnax Ruff [91256]		Roosting known to occur within area

Scientific Name	Threatened Category	Presence Text
Calidris ruficollis Red-necked Stint [860]		Roosting known to occur within area
Calidris subminuta Long-toed Stint [861]		Species or species habitat known to occur within area
Calidris tenuirostris Great Knot [862]	Vulnerable	Roosting known to occur within area
Charadrius bicinctus Double-banded Plover [895]		Roosting known to occur within area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat known to occur within area
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Roosting known to occur within area
Charadrius veredus Oriental Plover, Oriental Dotterel [882]		Roosting known to occur within area
Gallinago megala Swinhoe's Snipe [864]		Roosting likely to occur within area
Gallinago stenura Pin-tailed Snipe [841]		Roosting likely to occur within area
Glareola maldivarum Oriental Pratincole [840]		Roosting known to occur within area
Limnodromus semipalmatus Asian Dowitcher [843]	Vulnerable	Species or species habitat known to occur within area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area
Limosa limosa Black-tailed Godwit [845]	Endangered	Roosting known to occur within area

Scientific Name	Threatened Category	Presence Text
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
Numenius minutus Little Curlew, Little Whimbrel [848]		Roosting known to occur within area
Numenius phaeopus Whimbrel [849]		Roosting known to occur within area
Pandion haliaetus Osprey [952]		Breeding known to occur within area
Phalaropus lobatus Red-necked Phalarope [838]		Species or species habitat known to occur within area
Pluvialis fulva Pacific Golden Plover [25545]		Roosting known to occur within area
Pluvialis squatarola Grey Plover [865]	Vulnerable	Roosting known to occur within area
Thalasseus bergii Greater Crested Tern [83000]		Breeding known to occur within area
Tringa brevipes Grey-tailed Tattler [851]		Roosting known to occur within area
Tringa glareola Wood Sandpiper [829]		Roosting known to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]	Endangered	Species or species habitat known to occur within area
Tringa stagnatilis Marsh Sandpiper, Little Greenshank [833]		Roosting known to occur within area
Tringa totanus Common Redshank, Redshank [835]		Roosting known to occur within area

Scientific Name	Threatened Category	Presence Text
Xenus cinereus		
Terek Sandpiper [59300]	Vulnerable	Roosting known to occur within area

Other Matters Protected by the EPBC Act

Commonwealth Lands [Resource Information]

The Commonwealth area listed below may indicate the presence of Commonwealth land in this vicinity. Due to the unreliability of the data source, all proposals should be checked as to whether it impacts on a Commonwealth area, before making a definitive decision. Contact the State or Territory government land department for further information.

Commonwealth Land Name	State
Australian Broadcasting Corporation	
Lot 32 D100296 [AGPR209]	WA
Australian Maritime Safety Authority	
Lot 375 P208153 [AGPR262]	WA
Lot 5478 P185135 [AGPR5849]	WA
Bureau of Meteorology	
Lot 146 P023266 [AGPR5860]	WA
Lot 2163 P216952 [AGPR5858]	WA
Department of Agriculture, Fisheries and Forestry	
Lot 2275 P217326 [AGPR5881]	WA
Lot 2279 P217326 [AGPR5880]	WA
Lot 5639 P216779 [AGPR5884]	WA
Department of Climate Change, Energy, the Environment and Water	
Christmas Island National Park (Commonwealth) [CAPAD_CWTH_05]	EXT
Christmas Island Natural Areas [CHL_105187]	EXT
Mermaid Reef - Rowley Shoals [CHL_105255]	WA
Phosphate Hill Historic Area [CHL_105297]	EXT
Poon Saan Group [CHL_105185]	EXT
Scott Reef and Surrounds - Commonwealth Area [CHL_105480]	EXT
Settlement Christmas Island [CHL_105315]	EXT

Commonwealth Land Name	State
South Point Settlement Remains [CHL_105186]	EXT
Department of Defence	
ANC TS BROOME - Broome [DD_0130]	WA
Broome Training Depot [DD_1528]	WA
Broome Training Depot [AGPR4285]	WA
Broome Training Depot [AGPR4286]	WA
Christmas Island Helicopter Facility [DD_3022]	WA
Lot 525 P168696 [AGPR4471]	WA
Port Hedland Training Depot [DD_0773]	WA
Department of Home Affairs	
Lot 1172 P214561 [AGPR6128]	WA
Lot 11 P035135 [AGPR6103]	WA
Lot 1316 P214560 [AGPR4734]	WA
Lot 1 D093901 [AGPR6123]	WA
Lot 202 P023724 [AGPR6110]	WA
Lot 22 P013834 [AGPR6124]	WA
Lot 257 P069434 [AGPR6092]	WA
Lot 532 DP 72758 [AGPR6095]	WA
Lot 5702 P216778 [AGPR6127]	WA
Lot 5704 P216778 [AGPR6122]	WA
Lot 5706 P216778 [AGPR6119]	WA
Lot 5719 P216778 [AGPR6129]	WA
Lot 5724 P216778 [AGPR6120]	WA
Lot 5728 P216778 [AGPR6125]	WA
Lot 5746 P216779 [AGPR6126]	WA
Lot637 DP37858 [AGPR6096]	WA
Lot 812 P047361 [AGPR6111]	WA
Lot 823 P044086 [AGPR6108]	WA

Commonwealth Land Name	State
Lot 824 P044086 [AGPR6109]	WA
Department of Infrastructure, Transport, Regional Development, Communications and the Arts	
Lot 1004 D094854 [AGPR5233]	WA
Lot 1044 P038056 [AGPR5289]	WA
Lot 1045 P029362 [AGPR5221]	WA
Lot 144 P218120 [AGPR5305]	WA
Lot 147 P218121 [AGPR5239]	WA
Lot 149 P218121 [AGPR5309]	WA
Lot 185 P218127 [AGPR5212]	WA
Lot 1 S046928 [AGPR5231]	WA
Lot 226 P218150 [AGPR5350]	WA
Lot 252 P218162 [AGPR5352]	WA
Lot 253 P218162 [AGPR5195]	WA
Lot 284 P036509 [AGPR5353]	WA
Lot 292 P218309 [AGPR5190]	WA
Lot 293 P218309 [AGPR5189]	WA
Lot 294 P218309 [AGPR5355]	WA
Lot 2 S046928 [AGPR5232]	WA
Lot 3012 P037939 [AGPR5413]	WA
Lot 3013 P037939 [AGPR5343]	WA
Lot 3014 P037939 [AGPR5200]	WA
Lot 3016 P042350 [AGPR5358]	WA
Lot 3017 P042350 [AGPR5359]	WA
Lot 3018 P043321 [AGPR5187]	WA
Lot 3019 P043321 [AGPR5412]	WA
Lot 3020 P043319 [AGPR5405]	WA
Lot 3021 P043318 [AGPR6667]	WA

Commonwealth Land Name	State
Lot 3027 P043218 [AGPR5317]	WA
Lot 3028 P044665 [AGPR5339]	WA
Lot 3029 P044665 [AGPR5196]	WA
Lot 3034 P046731 [AGPR5361]	WA
Lot 3035 P046731 [AGPR5362]	WA
Lot 3036 P046731 [AGPR5363]	WA
Lot 3037 P046731 [AGPR5191]	WA
Lot 3048 P047279 [AGPR5202]	WA
Lot 3051 P046328 [AGPR5204]	WA
Lot 3052 P046328 [AGPR5208]	WA
Lot 3053 P046328 [AGPR5206]	WA
Lot 3054 P046328 [AGPR5207]	WA
Lot 3055 P046328 [AGPR5321]	WA
Lot 3056 P046329 [AGPR5203]	WA
Lot 3057 P046329 [AGPR5345]	WA
Lot 3058 P046329 [AGPR5346]	WA
Lot 3059 P046329 [AGPR5347]	WA
Lot 305 P218309 [AGPR5192]	WA
Lot 3063 P050961 [AGPR5344]	WA
Lot 306 P218309 [AGPR5193]	WA
Lot 3100 P403030 [AGPR6665]	WA
Lot 328 P191333 [AGPR6136]	WA
Lot 336 P191380 [AGPR6658]	WA
Lot 379 P219061 [AGPR5365]	WA
Lot 381 P219061 [AGPR5366]	WA
Lot 385 P192116 [AGPR5201]	WA
Lot 3 S029542 [AGPR6659]	WA

Commonwealth Land Name	State
Lot 430 P192386 [AGPR5372]	WA
Lot 461 P219061 [AGPR5197]	WA
Lot 462 P219061 [AGPR5199]	WA
Lot 489 P219762 [AGPR5378]	WA
Lot 492 P219762 [AGPR5216]	WA
Lot 493 P219762 [AGPR5211]	WA
Lot 499 P193407 [AGPR5320]	WA
Lot 502 P220143 [AGPR5382]	WA
Lot 507 P220143 [AGPR5383]	WA
Lot 510 P219762 [AGPR5205]	WA
Lot 511 P220518 [AGPR5384]	WA
Lot 512 P220518 [AGPR5325]	WA
Lot 513 P220518 [AGPR5385]	WA
Lot 514 P220518 [AGPR5386]	WA
Lot 515 P220518 [AGPR5387]	WA
Lot 516 P220518 [AGPR5388]	WA
Lot 517 P220518 [AGPR5389]	WA
Lot 518 P220518 [AGPR5390]	WA
Lot 519 P220518 [AGPR5391]	WA
Lot 520 P194505 [AGPR5194]	WA
Lot 523 P220459 [AGPR6661]	WA
Lot 526 P194618 [AGPR5251]	WA
Lot 527 P194782 [AGPR5238]	WA
Lot 528 P194782 [AGPR5271]	WA
Lot 529 P194782 [AGPR5292]	WA
Lot 530 P194782 [AGPR5303]	WA
Lot 531 P194782 [AGPR5223]	WA

Commonwealth Land Name	State
Lot 532 P194782 [AGPR5234]	WA
Lot 533 P194782 [AGPR5392]	WA
Lot 551 P221135 [AGPR6664]	WA
Lot 556 P195417 [AGPR5393]	WA
Lot 557 P061473 [AGPR5394]	WA
Lot 558 P195416 [AGPR5395]	WA
Lot 567 P026095 [AGPR5398]	WA
Lot 578 P219762 [AGPR5319]	WA
Lot 579 P219761 [AGPR5318]	WA
Lot 581 P029362 [AGPR5403]	WA
Lot 590 P037942 [AGPR5217]	WA
Lot 592 P047247 [AGPR5198]	WA
Lot 597 P037939 [AGPR5416]	WA
Lot 598 P037939 [AGPR5215]	WA
Lot 623 P040591 [AGPR5340]	WA
Lot 624 P040591 [AGPR5209]	WA
Lot 625 P040591 [AGPR5210]	WA
Director of National Parks	
Lot 1022 P029362 [AGPR5761]	WA
Lot 111 P243085 [AGPR5763]	WA
Lot 112 P243085 [AGPR5764]	WA
Lot 280 P243086 [AGPR5762]	WA
Lot 281 P243086 [AGPR5765]	WA
National Indigenous Australians Agency	
Lot 200 P062535 [AGPR6192]	WA
Lot 2191 P217084 [AGPR6195]	WA
Lot 2304 P217326 [AGPR6194]	WA
Lot 2540 P217611 [AGPR6198]	WA

Commonwealth Land Name	State
Lot 2542 P217611 [AGPR6197]	WA
Lot 2554 P217611 [AGPR6199]	WA
Lot 2580 P217611 [AGPR6196]	WA
Lot 2873 P218501 [AGPR6193]	WA
Lot 2879 P218503 [AGPR6201]	WA
Lot 325 P024195 [AGPR6210]	WA
Lot 3 S057609 [AGPR6191]	WA
Lot 67 P222187 [AGPR6241]	WA
Lot 7 S061844 [AGPR6200]	WA
Lot 864 P059296 [AGPR6211]	WA
Services Australia	
Lot 256 P024193 [AGPR6043]	WA
Lot 5734 P216778 [AGPR6050]	WA
Lot 69 P015330 [AGPR6041]	WA

Commonwealth Heritage Places [Resource Information]

Name	State	Status
Historic		
Phosphate Hill Historic Area	EXT	Listed place
Poon Saan Group	EXT	Listed place
Settlement Christmas Island	EXT	Listed place
South Point Settlement Remains	EXT	Listed place
Natural		
Christmas Island Natural Areas	EXT	Listed place
Mermaid Reef - Rowley Shoals	WA	Listed place
Scott Reef and Surrounds - Commonwealth Area	EXT	Listed place

Listed Marine Species [Resource Information]

Scientific Name	Threatened Category	Presence Text
Bird		

Scientific Name	Threatened Category	Presence Text
Acrocephalus orientalis Oriental Reed-Warbler [59570]		Species or species habitat known to occur within area overfly marine area
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area
Anous stolidus Common Noddy [825]		Species or species habitat likely to occur within area
Anous tenuirostris melanops Australian Lesser Noddy [26000]	Vulnerable	Species or species habitat may occur within area
Anseranas semipalmata Magpie Goose [978]		Species or species habitat may occur within area overfly marine area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area
Ardenna pacifica as Puffinus pacificus Wedge-tailed Shearwater [84292]		Breeding known to occur within area
Arenaria interpres Ruddy Turnstone [872]	Vulnerable	Roosting known to occur within area
Bubulcus ibis as Ardea ibis Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Roosting known to occur within area
Calidris alba Sanderling [875]		Roosting known to occur within area

Scientific Name	Threatened Category	Presence Text
Calidris canutus Red Knot, Knot [855]	Vulnerable	Species or species habitat known to occur within area overfly marine area
Calidris falcinellus as Limicola falcinellus Broad-billed Sandpiper [91731]		Roosting known to occur within area overfly marine area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area overfly marine area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat known to occur within area overfly marine area
Calidris pugnax as Philomachus pugnax Ruff [91256]		Roosting known to occur within area overfly marine area
Calidris ruficollis Red-necked Stint [860]		Roosting known to occur within area overfly marine area
Calidris subminuta Long-toed Stint [861]		Species or species habitat known to occur within area overfly marine area
Calidris tenuirostris Great Knot [862]	Vulnerable	Roosting known to occur within area overfly marine area
Calonectris leucomelas Streaked Shearwater [1077]		Species or species habitat known to occur within area
Cecropis daurica as Hirundo daurica Red-rumped Swallow [80610]		Species or species habitat known to occur within area overfly marine area

Scientific Name	Threatened Category	Presence Text
Chalcites osculans as Chrysococcyx osculans		
Black-eared Cuckoo [83425]		Species or species habitat known to occur within area overfly marine area
Charadrius bicinctus		
Double-banded Plover [895]		Roosting known to occur within area overfly marine area
Charadrius leschenaultii		
Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat known to occur within area
Charadrius mongolus		
Lesser Sand Plover, Mongolian Plover [879]	Endangered	Roosting known to occur within area
Charadrius ruficapillus		
Red-capped Plover [881]		Roosting known to occur within area overfly marine area
Charadrius veredus		
Oriental Plover, Oriental Dotterel [882]		Roosting known to occur within area overfly marine area
Chroicocephalus novaehollandiae as Larus novaehollandiae		
Silver Gull [82326]		Breeding known to occur within area
Fregata andrewsi		
Christmas Island Frigatebird, Andrew's Frigatebird [1011]	Endangered	Breeding known to occur within area
Fregata ariel		
Lesser Frigatebird, Least Frigatebird [1012]		Breeding known to occur within area
Fregata minor		
Great Frigatebird, Greater Frigatebird [1013]		Breeding known to occur within area
Gallinago megala		
Swinhoe's Snipe [864]		Roosting likely to occur within area overfly marine area
Gallinago stenura		
Pin-tailed Snipe [841]		Roosting likely to occur within area overfly marine area

Scientific Name	Threatened Category	Presence Text
Glareola maldivarum Oriental Pratincole [840]		Roosting known to occur within area overfly marine area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area
Himantopus himantopus Pied Stilt, Black-winged Stilt [870]		Roosting known to occur within area overfly marine area
Hirundo rustica Barn Swallow [662]		Species or species habitat known to occur within area overfly marine area
Hydroprogne caspia as Sterna caspia Caspian Tern [808]		Breeding known to occur within area
Limnodromus semipalmatus Asian Dowitcher [843]	Vulnerable	Species or species habitat known to occur within area overfly marine area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area
Limosa limosa Black-tailed Godwit [845]	Endangered	Roosting known to occur within area overfly marine area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area
Motacilla cinerea Grey Wagtail [642]		Species or species habitat known to occur within area overfly marine area

Scientific Name	Threatened Category	Presence Text
Motacilla flava Yellow Wagtail [644]		Species or species habitat known to occur within area overfly marine area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
Numenius minutus Little Curlew, Little Whimbrel [848]		Roosting known to occur within area overfly marine area
Numenius phaeopus Whimbrel [849]		Roosting known to occur within area
Onychoprion anaethetus as Sterna anaethetus Bridled Tern [82845]		Breeding known to occur within area
Onychoprion fuscatus as Sterna fuscata Sooty Tern [90682]		Breeding known to occur within area
Pandion haliaetus Osprey [952]		Breeding known to occur within area
Papasula abbotti Abbott's Booby [59297]	Endangered	Species or species habitat known to occur within area
Phaethon lepturus White-tailed Tropicbird [1014]		Breeding known to occur within area
Phaethon lepturus fulvus Christmas Island White-tailed Tropicbird, Golden Bosunbird [26021]	Endangered	Breeding known to occur within area
Phaethon rubricauda Red-tailed Tropicbird [994]		Breeding known to occur within area
Phalaropus lobatus Red-necked Phalarope [838]		Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
Pluvialis fulva Pacific Golden Plover [25545]		Roosting known to occur within area
Pluvialis squatarola Grey Plover [865]	Vulnerable	Roosting known to occur within area overfly marine area
Recurvirostra novaehollandiae Red-necked Avocet [871]		Roosting known to occur within area overfly marine area
Rostratula australis as Rostratula benghalensis (sensu lato) Australian Painted Snipe [77037]	Endangered	Species or species habitat known to occur within area overfly marine area
Sterna dougallii Roseate Tern [817]		Breeding known to occur within area
Sternula albifrons as Sterna albifrons Little Tern [82849]	Vulnerable	Breeding known to occur within area
Sternula nereis as Sterna nereis Fairy Tern [82949]		Breeding known to occur within area
Stiltia isabella Australian Pratincole [818]		Roosting known to occur within area overfly marine area
Sula dactylatra Masked Booby [1021]		Breeding known to occur within area
Sula leucogaster Brown Booby [1022]		Breeding known to occur within area
Sula sula Red-footed Booby [1023]		Breeding known to occur within area
Thalasseus bengalensis as Sterna bengalensis Lesser Crested Tern [66546]		Breeding known to occur within area
Thalasseus bergii as Sterna bergii Greater Crested Tern [83000]		Breeding known to occur within area

Scientific Name	Threatened Category	Presence Text
Tringa brevipes as Heteroscelus brevipes Grey-tailed Tattler [851]		Roosting known to occur within area
Tringa glareola Wood Sandpiper [829]		Roosting known to occur within area overfly marine area
Tringa nebularia Common Greenshank, Greenshank [832]	Endangered	Species or species habitat known to occur within area overfly marine area
Tringa stagnatilis Marsh Sandpiper, Little Greenshank [833]		Roosting known to occur within area overfly marine area
Tringa totanus Common Redshank, Redshank [835]		Roosting known to occur within area overfly marine area
Xenus cinereus Terek Sandpiper [59300]	Vulnerable	Roosting known to occur within area overfly marine area
Fish		
Acentronura larsonae Helen's Pygmy Pipehorse [66186]		Species or species habitat may occur within area
Bhanotia fasciolata Corrugated Pipefish, Barbed Pipefish [66188]		Species or species habitat may occur within area
Bulbonaricus brauni Braun's Pughead Pipefish, Pug-headed Pipefish [66189]		Species or species habitat may occur within area
Campichthys tricarinatus Three-keel Pipefish [66192]		Species or species habitat may occur within area
Choeroichthys brachysoma Pacific Short-bodied Pipefish, Short-bodied Pipefish [66194]		Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Choeroichthys latispinosus Muiron Island Pipefish [66196]		Species or species habitat may occur within area
Choeroichthys sculptus Sculptured Pipefish [66197]		Species or species habitat may occur within area
Choeroichthys suillus Pig-snouted Pipefish [66198]		Species or species habitat may occur within area
Corythoichthys amplexus Fijian Banded Pipefish, Brown-banded Pipefish [66199]		Species or species habitat may occur within area
Corythoichthys flavofasciatus Reticulate Pipefish, Yellow-banded Pipefish, Network Pipefish [66200]		Species or species habitat may occur within area
Corythoichthys haematopterus Reef-top Pipefish [66201]		Species or species habitat may occur within area
Corythoichthys intestinalis Australian Messmate Pipefish, Banded Pipefish [66202]		Species or species habitat may occur within area
Corythoichthys schultzi Schultz's Pipefish [66205]		Species or species habitat may occur within area
Cosmocampus banneri Roughridge Pipefish [66206]		Species or species habitat may occur within area
Cosmocampus maxweberi Maxweber's Pipefish [66209]		Species or species habitat may occur within area
Doryrhamphus baldwini Redstripe Pipefish [66718]		Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Doryrhamphus dactyliophorus Banded Pipefish, Ringed Pipefish [66210]		Species or species habitat may occur within area
Doryrhamphus excisus Bluestripe Pipefish, Indian Blue-stripe Pipefish, Pacific Blue-stripe Pipefish [66211]		Species or species habitat may occur within area
Doryrhamphus janssi Cleaner Pipefish, Janss' Pipefish [66212]		Species or species habitat may occur within area
Doryrhamphus multiannulatus Many-banded Pipefish [66717]		Species or species habitat may occur within area
Doryrhamphus negrosensis Flagtail Pipefish, Masthead Island Pipefish [66213]		Species or species habitat may occur within area
Festucalex scalaris Ladder Pipefish [66216]		Species or species habitat may occur within area
Filicampus tigris Tiger Pipefish [66217]		Species or species habitat may occur within area
Halicampus brocki Brock's Pipefish [66219]		Species or species habitat may occur within area
Halicampus dunckeri Red-hair Pipefish, Duncker's Pipefish [66220]		Species or species habitat may occur within area
Halicampus grayi Mud Pipefish, Gray's Pipefish [66221]		Species or species habitat may occur within area
Halicampus macrorhynchus Whiskered Pipefish, Ornate Pipefish [66222]		Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Halicampus mataafae Samoan Pipefish [66223]		Species or species habitat may occur within area
Halicampus nitidus Glittering Pipefish [66224]		Species or species habitat may occur within area
Halicampus spinirostris Spiny-snout Pipefish [66225]		Species or species habitat may occur within area
Haliichthys taeniophorus Ribboned Pipehorse, Ribboned Seadragon [66226]		Species or species habitat may occur within area
Hippichthys cyanospilos Blue-speckled Pipefish, Blue-spotted Pipefish [66228]		Species or species habitat may occur within area
Hippichthys heptagonus Madura Pipefish, Reticulated Freshwater Pipefish [66229]		Species or species habitat may occur within area
Hippichthys penicillus Beady Pipefish, Steep-nosed Pipefish [66231]		Species or species habitat may occur within area
Hippichthys spicifer Belly-barred Pipefish, Banded Freshwater Pipefish [66232]		Species or species habitat may occur within area
Hippocampus angustus Western Spiny Seahorse, Narrow-bellied Seahorse [66234]		Species or species habitat may occur within area
Hippocampus histrix Spiny Seahorse, Thorny Seahorse [66236]		Species or species habitat may occur within area
Hippocampus kuda Spotted Seahorse, Yellow Seahorse [66237]		Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Hippocampus planifrons Flat-face Seahorse [66238]		Species or species habitat may occur within area
Hippocampus spinosissimus Hedgehog Seahorse [66239]		Species or species habitat may occur within area
Hippocampus trimaculatus Three-spot Seahorse, Low-crowned Seahorse, Flat-faced Seahorse [66720]		Species or species habitat may occur within area
Micrognathus brevirostris thorntail Pipefish, Thorn-tailed Pipefish [66254]		Species or species habitat may occur within area
Micrognathus micronotopterus Tidepool Pipefish [66255]		Species or species habitat may occur within area
Phoxocampus belcheri Black Rock Pipefish [66719]		Species or species habitat may occur within area
Solegnathus hardwickii Pallid Pipehorse, Hardwick's Pipehorse [66272]		Species or species habitat may occur within area
Solegnathus lettiensis Gunther's Pipehorse, Indonesian Pipefish [66273]		Species or species habitat may occur within area
Solenostomus cyanopterus Robust Ghostpipefish, Blue-finned Ghost Pipefish, [66183]		Species or species habitat may occur within area
Syngnathoides biaculeatus Double-end Pipehorse, Double-ended Pipehorse, Alligator Pipefish [66279]		Species or species habitat may occur within area
Trachyrhamphus bicoarctatus Bentstick Pipefish, Bend Stick Pipefish, Short-tailed Pipefish [66280]		Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Trachyrhamphus longirostris Straightstick Pipefish, Long-nosed Pipefish, Straight Stick Pipefish [66281]		Species or species habitat may occur within area
Mammal		
Dugong dugon Dugong [28]		Foraging, feeding or related behaviour known to occur within area
Reptile		
Aipysurus apraefrontalis Short-nosed Sea Snake, Short-nosed Seasnake [1115]	Critically Endangered	Species or species habitat known to occur within area
Aipysurus duboisii Dubois' Sea Snake, Dubois' Seasnake, Reef Shallows Sea Snake [1116]		Species or species habitat may occur within area
Aipysurus foliosquama Leaf-scaled Sea Snake, Leaf-scaled Seasnake [1118]	Critically Endangered	Species or species habitat known to occur within area
Aipysurus fuscus Dusky Sea Snake [1119]	Endangered	Species or species habitat known to occur within area
Aipysurus laevis Olive Sea Snake, Olive-brown Sea Snake [1120]		Species or species habitat may occur within area
Aipysurus mosaicus as Aipysurus eydouxii Mosaic Sea Snake [87261]		Species or species habitat may occur within area
Aipysurus tenuis Brown-lined Sea Snake, Mjoberg's Sea Snake [1121]		Species or species habitat may occur within area
Caretta caretta Loggerhead Turtle [1763]	Endangered	Foraging, feeding or related behaviour known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Breeding known to occur within area

Scientific Name	Threatened Category	Presence Text
Crocodylus johnstoni Freshwater Crocodile, Johnston's Crocodile, Johnstone's Crocodile [1773]		Species or species habitat may occur within area
Crocodylus porosus Salt-water Crocodile, Estuarine Crocodile [1774]		Species or species habitat likely to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Breeding likely to occur within area
Emydocephalus annulatus Eastern Turtle-headed Sea Snake [1125]		Species or species habitat may occur within area
Ephalophis greyae as Ephalophis greyi Mangrove Sea Snake [93738]		Species or species habitat may occur within area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Breeding known to occur within area
Hydrelaps darwiniensis Port Darwin Sea Snake, Black-ringed Mangrove Sea Snake [1100]		Species or species habitat may occur within area
Hydrophis coggeri Cogger's Sea Snake, Black-headed Sea Snake [25925]		Species or species habitat may occur within area
Hydrophis czeblukovi Fine-spined Sea Snake [59233]		Species or species habitat may occur within area
Hydrophis elegans Elegant Sea Snake, Bar-bellied Sea Snake [1104]		Species or species habitat may occur within area
Hydrophis hardwickii as Lapemis hardwickii Spine-bellied Sea Snake [93516]		Species or species habitat may occur within area
Hydrophis kingii as Disteira kingii Spectacled Sea Snake [93511]		Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Hydrophis macdowelli as Hydrophis mcdowelli		
MacDowell's Sea Snake, Small-headed Sea Snake, [75601]		Species or species habitat may occur within area
Hydrophis major as Disteira major		
Olive-headed Sea Snake [93512]		Species or species habitat may occur within area
Hydrophis ornatus		
Spotted Sea Snake, Ornate Reef Sea Snake [1111]		Species or species habitat may occur within area
Hydrophis peronii as Acalyptophis peronii		
Horned Sea Snake [93509]		Species or species habitat may occur within area
Hydrophis platura as Pelamis platurus		
Yellow-bellied Sea Snake [93746]		Species or species habitat may occur within area
Hydrophis stokesii as Astrotia stokesii		
Stokes' Sea Snake [93510]		Species or species habitat may occur within area
Hydrophis zweifeli as Enhydrina schistosa		
Australian Beaked Sea Snake [93514]		Species or species habitat may occur within area
Lepidochelys olivacea		
Olive Ridley Turtle, Pacific Ridley Turtle [1767]	Endangered	Breeding likely to occur within area
Natator depressus		
Flatback Turtle [59257]	Vulnerable	Breeding known to occur within area

Whales and Other Cetaceans		[Resource Information]
Current Scientific Name	Status	Type of Presence
Mammal		
Balaenoptera acutorostrata		
Minke Whale [33]		Species or species habitat may occur within area
Balaenoptera bonaerensis		
Antarctic Minke Whale, Dark-shoulder Minke Whale [67812]		Species or species habitat likely to occur within area

Current Scientific Name	Status	Type of Presence
Balaenoptera borealis Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Balaenoptera edeni Bryde's Whale [35]		Species or species habitat likely to occur within area
Balaenoptera musculus Blue Whale [36]	Endangered	Migration route known to occur within area
Balaenoptera omurai Omura's Whale [87136]		Species or species habitat likely to occur within area
Balaenoptera physalus Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Delphinus delphis Common Dolphin, Short-beaked Common Dolphin [60]		Species or species habitat may occur within area
Feresa attenuata Pygmy Killer Whale [61]		Species or species habitat may occur within area
Globicephala macrorhynchus Short-finned Pilot Whale [62]		Species or species habitat may occur within area
Grampus griseus Risso's Dolphin, Grampus [64]		Species or species habitat may occur within area
Indopacetus pacificus Longman's Beaked Whale [72]		Species or species habitat may occur within area
Kogia breviceps Pygmy Sperm Whale [57]		Species or species habitat may occur within area

Current Scientific Name	Status	Type of Presence
Kogia sima Dwarf Sperm Whale [85043]		Species or species habitat may occur within area
Lagenodelphis hosei Fraser's Dolphin, Sarawak Dolphin [41]		Species or species habitat may occur within area
Megaptera novaeangliae Humpback Whale [38]		Breeding known to occur within area
Mesoplodon densirostris Blainville's Beaked Whale, Dense-beaked Whale [74]		Species or species habitat may occur within area
Mesoplodon ginkgodens Gingko-toothed Beaked Whale, Gingko-toothed Whale, Gingko Beaked Whale [59564]		Species or species habitat may occur within area
Orcaella heinsohni Australian Snubfin Dolphin [81322]	Vulnerable	Breeding known to occur within area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat may occur within area
Peponocephala electra Melon-headed Whale [47]		Species or species habitat may occur within area
Physeter macrocephalus Sperm Whale [59]		Species or species habitat may occur within area
Pseudorca crassidens False Killer Whale [48]		Species or species habitat likely to occur within area
Sousa sahulensis Australian Humpback Dolphin [87942]	Vulnerable	Breeding known to occur within area
Stenella attenuata Spotted Dolphin, Pantropical Spotted Dolphin [51]		Species or species habitat may occur within area

Current Scientific Name	Status	Type of Presence
Stenella coeruleoalba Striped Dolphin, Euphrosyne Dolphin [52]		Species or species habitat may occur within area
Stenella longirostris Long-snouted Spinner Dolphin [29]		Species or species habitat may occur within area
Steno bredanensis Rough-toothed Dolphin [30]		Species or species habitat may occur within area
Tursiops aduncus Indian Ocean Bottlenose Dolphin, Spotted Bottlenose Dolphin [68418]		Species or species habitat likely to occur within area
Tursiops aduncus (Arafura/Timor Sea populations) Spotted Bottlenose Dolphin (Arafura/Timor Sea populations) [78900]		Species or species habitat known to occur within area
Tursiops truncatus s. str. Bottlenose Dolphin [68417]		Species or species habitat may occur within area
Ziphius cavirostris Cuvier's Beaked Whale, Goose-beaked Whale [56]		Species or species habitat may occur within area

Commonwealth Reserves Terrestrial

[Resource Information]

Name	State	Type
Christmas Island	EXT	National Park (Commonwealth)

Australian Marine Parks

[Resource Information]

Park Name	Zone & IUCN Categories
Christmas Island	Habitat Protection Zone (IUCN IV)
Dampier	Habitat Protection Zone (IUCN IV)
Argo-Rowley Terrace	Multiple Use Zone (IUCN VI)
Argo-Rowley Terrace	Multiple Use Zone (IUCN VI)
Eighty Mile Beach	Multiple Use Zone (IUCN VI)

Park Name	Zone & IUCN Categories
Kimberley	Multiple Use Zone (IUCN VI)
Montebello	Multiple Use Zone (IUCN VI)
Roebuck	Multiple Use Zone (IUCN VI)
Argo-Rowley Terrace	National Park Zone (IUCN II)
Dampier	National Park Zone (IUCN II)
Mermaid Reef	National Park Zone (IUCN II)
Argo-Rowley Terrace	Special Purpose Zone (Trawl) (IUCN VI)

Habitat Critical to the Survival of Marine Turtles [Resource Information]

Scientific Name	Behaviour	Presence
All year (Jun - Aug)		
Natator depressus		
Flatback Turtle [59257]	Nesting	Known to occur
May - Jul		
Lepidochelys olivacea		
Olive Ridley Turtle [1767]	Nesting	Known to occur
Oct - Feb		
Eretmochelys imbricata		
Hawksbill Turtle [1766]	Nesting	Known to occur
Oct - Mar		
Chelonia mydas		
Green Turtle [1765]	Nesting	Known to occur

Extra Information

State and Territory Reserves [Resource Information]

Protected Area Name	Reserve Type	State
Bardi Jawi Gaarra	Marine Park	WA
Bedout Island	Nature Reserve	WA
Broome Bird Observatory	5(1)(h) Reserve	WA
Broome Wildlife Centre	5(1)(h) Reserve	WA
Browse Island	Nature Reserve	WA

Protected Area Name	Reserve Type	State
Coulomb Point	Nature Reserve	WA
Eighty Mile Beach	Marine Park	WA
Jarrkunpungu	Nature Reserve	WA
Jinmarnkur	Conservation Park	WA
Jinmarnkur Kulja	Nature Reserve	WA
Kujungurru Warrarn	Conservation Park	WA
Kujungurru Warrarn	Nature Reserve	WA
Lalang-gaddam	Marine Park	WA
Mayala	Marine Park	WA
Montebello Islands	Conservation Park	WA
Montebello Islands	Conservation Park	WA
Montebello Islands	Marine Park	WA
North Kimberley	Marine Park	WA
North Turtle Island	Nature Reserve	WA
Rowley Shoals	Marine Park	WA
Scott Reef	Nature Reserve	WA
Unnamed WA36915	Nature Reserve	WA
Unnamed WA41775	5(1)(h) Reserve	WA
Unnamed WA44672	5(1)(h) Reserve	WA
Unnamed WA51105	5(1)(h) Reserve	WA
Unnamed WA51162	5(1)(h) Reserve	WA
Unnamed WA51497	5(1)(h) Reserve	WA
Unnamed WA51583	5(1)(h) Reserve	WA
Unnamed WA51617	5(1)(h) Reserve	WA
Unnamed WA51932	5(1)(h) Reserve	WA
Unnamed WA52354	5(1)(h) Reserve	WA
Unnamed WA52366	Nature Reserve	WA

Protected Area Name	Reserve Type	State
Unnamed WA53015	Nature Reserve	WA
Yawuru Nagulagun / Roebuck Bay	Marine Park	WA

EPBC Act Referrals

[Resource Information]

Title of referral	Reference	Referral Outcome	Assessment Status
2 geotechnical surveys - preliminary and final	2006/2886		Completed
Aerial Baiting of Yellow Crazy Ants	2012/6438		Completed
Boskalis Cambridge Gulf Marine Sand Sourcing Project	2025/10106		Referral Decision
Broome Wharf Extension Project	2024/09823		Completed
Browse Carbon Capture and Storage Project	2024/10028		Referral Decision
Browse to North West Shelf Development, Indian Ocean, WA	2018/8319		Approval
DAVROS MC 3D marine seismic survey northwaet of Dampier, WA	2013/7092		Completed
Deep Water Northwest Shelf 2D Seismic Survey	2007/3260		Completed
Derby Tidal Power Project	2010/5544		Assessment
Development of Mutineer and Exeter petroleum fields for oil production, Permit	2003/1033		Completed
Gorgon Gas Development	2003/1294		Post-Approval
Marine Route Survey for Subsea Fibre Optic Data Cable System - Australia West	2024/09826		Completed
North West Shelf Project Extension, Carnarvon Basin, WA	2018/8335		Approval
Ocean Barramundi Expansion Project	2022/09272		Assessment
Port Hedland Green Steel Project - Stage 1	2023/09764		Assessment
Project Highclere Cable Lay and Operation	2022/09203		Completed

Title of referral	Reference	Referral Outcome	Assessment Status
Ridley Magnetite Project	2023/09477		Referral Decision
Winu Copper and Gold Mine (Winu Project)	2024/09804		Completed
Action clearly unacceptable			
Asian Renewable Energy Hub Revised Proposal, WA	2021/8891	Action Clearly Unacceptable	Completed
Controlled action			
2-D seismic survey Scott Reef	2000/125	Controlled Action	Post-Approval
Additional Rail Infrastructure between Herb Elliott Port Facility and Cloudbreak Mine Site	2010/5513	Controlled Action	Post-Approval
Asian Renewable Energy Hub, 220 km east of Port Hedland, Western Australia	2017/8112	Controlled Action	Post-Approval
Broome Boating Facility	2021/9098	Controlled Action	Referral Decision
Browse FLNG Development, Commonwealth Waters	2013/7079	Controlled Action	Post-Approval
Christmas Island Airport Expansion	2001/434	Controlled Action	Post-Approval
Christmas Island Port Facility	2001/435	Controlled Action	Post-Approval
Conduct an exploration drilling campaign	2010/5718	Controlled Action	Completed
Construct and operate LNG & domestic gas plant including onshore and offshore facilities - Wheatston	2008/4469	Controlled Action	Post-Approval
Construction of mobile phone tower	2002/694	Controlled Action	Completed
Develop Ichthys gas-condensate field permit area W	2006/2767	Controlled Action	Completed
Develop Jansz-Io deepwater gas field in Permit Areas WA-18-R, WA-25-R and WA-26-	2005/2184	Controlled Action	Post-Approval
Development of Angel gas and condensate field, North West Shelf	2004/1805	Controlled Action	Post-Approval
Development of Browse Basin Gas Fields (Upstream)	2008/4111	Controlled Action	Completed

Title of referral	Reference	Referral Outcome	Assessment Status
Controlled action			
East Christmas Island Phosphate Mines (9 sites)	2001/487	Controlled Action	Completed
Echo-Yodel Production Wells	2000/11	Controlled Action	Post-Approval
Equus Gas Fields Development Project, Carnarvon Basin	2012/6301	Controlled Action	Completed
Exploration for Mineable Phosphate, Christmas Island	2000/43	Controlled Action	Completed
Gorgon Gas Development 4th Train Proposal	2011/5942	Controlled Action	Post-Approval
Great Northern Pipeline - 630 km buried gas pipeline	2009/5257	Controlled Action	Completed
Lily Beach Recreational Facilities	2001/395	Controlled Action	Post-Approval
Lily Beach Rock Pool Development	2001/400	Controlled Action	Completed
Nava-1 Cable System	2001/510	Controlled Action	Completed
Phosphate Mining in South Point Christmas Island	2012/6653	Controlled Action	Post-Approval
Pluto Gas Project	2005/2258	Controlled Action	Completed
Pluto Gas Project Including Site B	2006/2968	Controlled Action	Post-Approval
Port Hedland Outer Harbour Development and associated marine and terrestrial in	2008/4159	Controlled Action	Post-Approval
Port Hedland Spoilbank Marina, WA	2019/8520	Controlled Action	Post-Approval
Proposed exploration drilling programme for Christmas Island	2016/7779	Controlled Action	Completed
Road Upgrade/Construction between Lily Beach Road and Port Faci	2001/436	Controlled Action	Post-Approval
Salvage, transport and processing of phosphate resource with extended airport si	2003/1217	Controlled Action	Post-Approval
Shamrock Station Irrigation Project, west Kimberley region, WA	2017/8004	Controlled Action	Post-Approval

Title of referral	Reference	Referral Outcome	Assessment Status
Controlled action			
The Scarborough Project - FLNG & assoc subsea infrastructure, Carnarvon Basin	2013/6811	Controlled Action	Post-Approval
Torosa South Initial Appraisal Drilling	2007/3500	Controlled Action	Completed
Yellow Crazy Ant Biological Control	2013/6836	Controlled Action	Post-Approval
Not controlled action			
'Goodwyn A' Low Pressure Train Project	2003/914	Not Controlled Action	Completed
3D marine seismic survey in WA 314P and WA 315P	2004/1927	Not Controlled Action	Completed
96-108 Gaze Road - Residential upgrade	2006/2632	Not Controlled Action	Completed
Aerial Baiting, Yellow Crazy Ant Supercolonies, Christmas Island, WA	2019/8492	Not Controlled Action	Completed
APX-West Fibre-optic telecommunications cable system, WA to Singapore	2013/7102	Not Controlled Action	Completed
Boat Ramp Construction	2001/237	Not Controlled Action	Completed
Bollinger 2D Seismic Survey 200km North of North West Cape WA	2004/1868	Not Controlled Action	Completed
Building of a carport adjacent to residential house	2004/1538	Not Controlled Action	Completed
Cazadores 2D seismic survey	2004/1720	Not Controlled Action	Completed
Christmas Island/Construction of a double storey shed/carport at MQ387 Gaze Road	2004/1561	Not Controlled Action	Completed
Community Recreation Centre	2003/1279	Not Controlled Action	Completed
Construction and operation of an unmanned sea platform and connecting pipeline to Varanus Island for	2004/1703	Not Controlled Action	Completed
Construction of a Commodities Berth, Wharf and Associated Infrastructure	2008/4129	Not Controlled Action	Completed

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action			
Controlled Source Electromagnetic Survey	2007/3262	Not Controlled Action	Completed
courtyard shower & handbasin facilities	2006/2803	Not Controlled Action	Completed
Development of Halyard Field off the west coast of WA	2010/5611	Not Controlled Action	Completed
Development of iron ore resources in eastern Pilbara region, including port at P	2004/1562	Not Controlled Action	Completed
Drilling of an exploration well Gats-1 in Permit Area WA-261-P	2004/1701	Not Controlled Action	Completed
Drilling of exploration wells, Permit areas WA-301-P to WA-305-P	2002/769	Not Controlled Action	Completed
Dwelling demolition, maintenance and carpark/carport/storage shed works	2004/1837	Not Controlled Action	Completed
Echo A Development WA-23-L, WA-24-L	2005/2042	Not Controlled Action	Completed
Establish a 4m wide trace line along the road allignment for James Price Point	2010/5682	Not Controlled Action	Completed
Exploration of appraisal wells	2006/3065	Not Controlled Action	Completed
Extension of a Masonary Brick Wall adjacent to the Poon Saan Club by 500 mm	2004/1564	Not Controlled Action	Completed
Garage and Office Facilities	2004/1919	Not Controlled Action	Completed
Hess Exploration Drilling Programme	2007/3566	Not Controlled Action	Completed
Housing and Garden Maintenance Works	2004/1487	Not Controlled Action	Completed
Huascaran-1 exploration well (WA-292-P)	2001/539	Not Controlled Action	Completed
Identification of unmarked grave, exhumation/identification of remains which may belong to a sailor	2006/2992	Not Controlled Action	Completed
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action			
INDIGO West Submarine Telecommunications Cable, WA	2017/8126	Not Controlled Action	Completed
Internal and external modifications Lot 1014 Gaze Road	2004/1807	Not Controlled Action	Completed
Jansz-2 and 3 Appraisal Wells	2002/754	Not Controlled Action	Completed
Kimberley Marine Offloading Facility	2020/8736	Not Controlled Action	Completed
Light Industrial Subdivision Development	2004/1799	Not Controlled Action	Completed
Lot 1056 Extensions and Alterations	2004/1801	Not Controlled Action	Completed
Maia-Gaea Exploration wells	2000/17	Not Controlled Action	Completed
Manaslu - 1 and Huascaran - 1 Offshore Exploration Wells	2001/235	Not Controlled Action	Completed
North Rankin B gas compression facility	2005/2500	Not Controlled Action	Completed
Pilbara Bulk Ore Transport System Project, WA	2016/7637	Not Controlled Action	Completed
Pipeline System Modifications Project	2000/3	Not Controlled Action	Completed
Placement of bitumen/ concrete on rail sections of heritage listed incline, Christmas Island	2013/7009	Not Controlled Action	Completed
Port Hedland Channel Risk and Optimisation Project, WA	2017/7915	Not Controlled Action	Completed
Port of Broome Channel Optimisation Project, West Roebuck Bay, WA	2018/8162	Not Controlled Action	Completed
Power Station Upgrade	2001/357	Not Controlled Action	Completed
Power Station Upgrade (South Port Site)	2001/414	Not Controlled Action	Completed
Project Highclere Geophysical Survey	2021/9023	Not Controlled Action	Completed
Proposed sale or lease of Crown land, 11 lots, Christmas Island	2018/8220	Not Controlled Action	Completed

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action			
Rail and Port Facilities	2001/474	Not Controlled Action	Completed
Realignment of Gaze Road Service Road and Gaze Road Junction	2004/1735	Not Controlled Action	Completed
Refurbishment and Extension of Seaview Lodge	2012/6353	Not Controlled Action	Completed
renovate free-standing servant's quarters	2006/2811	Not Controlled Action	Completed
Residential upgrade, 2 Coconut Grove	2007/3295	Not Controlled Action	Completed
Searipple gas and condensate field development	2000/89	Not Controlled Action	Completed
sub-sea tieback of Perseus field wells	2004/1326	Not Controlled Action	Completed
Supermarket Extensions	2006/2515	Not Controlled Action	Completed
Telfer Gold Mine Project - Mine and Borefield Extensions and Upgrade of Storage	2002/787	Not Controlled Action	Completed
Telstra North Rankin Spur Fibre Optic Cable	2016/7836	Not Controlled Action	Completed
To construct and operate an offshore submarine fibre optic cable, WA	2014/7373	Not Controlled Action	Completed
Upgrade of Residence, Coconut Grove	2006/2728	Not Controlled Action	Completed
Verandah Extension to Existing Breezeway Unit, Gaze Road	2005/1970	Not Controlled Action	Completed
WA-295-P Kerr-McGee Exploration Wells	2001/152	Not Controlled Action	Completed
Walkway Lighting Upgrade	2009/4965	Not Controlled Action	Completed
Wastewater Treatment Plant	2008/4545	Not Controlled Action	Completed
Western Flank Gas Development	2005/2464	Not Controlled Action	Completed
Wheatstone 3D seismic survey, 70km north of Barrow Island	2004/1761	Not Controlled Action	Completed
Not controlled action (particular manner)			

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action (particular manner)			
'Tourmaline' 2D marine seismic survey, permit areas WA-323-P, WA-330-P and WA-32	2005/2282	Not Controlled Action (Particular Manner)	Post-Approval
"Leanne" offshore 3D seismic exploration, WA-356-P	2005/1938	Not Controlled Action (Particular Manner)	Post-Approval
2D marine seismic survey	2012/6296	Not Controlled Action (Particular Manner)	Post-Approval
2D Seismic Survey	2005/2146	Not Controlled Action (Particular Manner)	Post-Approval
2D seismic survey in permit areas WA-274P and WA-281P	2004/1521	Not Controlled Action (Particular Manner)	Post-Approval
2D Seismic Survey Permit Area WA-352-P	2008/4628	Not Controlled Action (Particular Manner)	Post-Approval
2D seismic survey within permit WA-291	2007/3265	Not Controlled Action (Particular Manner)	Post-Approval
3D Marine Seismic Survey (WA-482-P, WA-363-P), WA	2013/6761	Not Controlled Action (Particular Manner)	Post-Approval
3D Marine Seismic Survey in Permit Areas WA-15-R, WA-18-R, WA-205-P, WA-253-P, WA-267-P and WA-268-P	2003/1271	Not Controlled Action (Particular Manner)	Post-Approval
3D Marine Seismic Survey in WA 457-P & WA 458-P, North West Shelf, offshore WA	2013/6862	Not Controlled Action (Particular Manner)	Post-Approval
3D marine seismic Survey - Maxima 3D MSS	2006/2945	Not Controlled Action (Particular Manner)	Post-Approval
3D marine seismic survey over petroleum title WA-268-P	2007/3458	Not Controlled Action (Particular	Post-Approval

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action (particular manner)			
		Manner)	
3D Marine Seismic Surveys - Contos CT-13 & Supertubes CT-13, offshore WA	2013/6901	Not Controlled Action (Particular Manner)	Post-Approval
3D seismic survey	2006/2715	Not Controlled Action (Particular Manner)	Post-Approval
3D Seismic Survey, Browse Basin, WA	2009/5048	Not Controlled Action (Particular Manner)	Post-Approval
3D Seismic Survey, near Scott Reef, Browse Basin	2005/2126	Not Controlled Action (Particular Manner)	Post-Approval
3D sesmic survey	2006/2781	Not Controlled Action (Particular Manner)	Post-Approval
Additional Rail Infrastructure	2012/6314	Not Controlled Action (Particular Manner)	Post-Approval
Agrippina 3D Seismic Marine Survey	2009/5212	Not Controlled Action (Particular Manner)	Post-Approval
Aperio 3D Marine Seismic Survey, WA	2012/6648	Not Controlled Action (Particular Manner)	Post-Approval
Artemis-1 Drilling Program (WA-360-P)	2010/5432	Not Controlled Action (Particular Manner)	Post-Approval
Asbestos Removal from Commonwealth Owned Assests including Commonwealth Heritage	2009/4873	Not Controlled Action (Particular Manner)	Post-Approval
Australia to Singapore Fibre Optic Submarine Cable System	2011/6127	Not Controlled Action (Particular Manner)	Post-Approval

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action (particular manner)			
Baiting Efficacy Trial of Feral Cat Bait and PAPP Toxicant	2008/4383	Not Controlled Action (Particular Manner)	Post-Approval
Balnaves Condensate Field Development	2011/6188	Not Controlled Action (Particular Manner)	Post-Approval
Bonaventure 3D seismic survey	2006/2514	Not Controlled Action (Particular Manner)	Post-Approval
Braveheart 2D Infill Marine Seismic Survey 100km offshore	2008/4442	Not Controlled Action (Particular Manner)	Post-Approval
Braveheart 2D Marine Seismic Survey	2005/2322	Not Controlled Action (Particular Manner)	Post-Approval
Cable Seismic Exploration Permit areas WA-323-P and WA-330-P	2008/4227	Not Controlled Action (Particular Manner)	Post-Approval
CGGVERITAS 2010 2D Seismic Survey	2010/5714	Not Controlled Action (Particular Manner)	Post-Approval
Conduct an exploration drilling campaign	2011/5964	Not Controlled Action (Particular Manner)	Post-Approval
Construction of a 43km long sealed access road to the Browse LNG precinct	2011/5852	Not Controlled Action (Particular Manner)	Post-Approval
Crazy Ant Aerial Baiting Control Program	2002/722	Not Controlled Action (Particular Manner)	Post-Approval
Cue Seismic Survey within WA-359-P, WA-361-P and WA-360-P	2007/3647	Not Controlled Action (Particular Manner)	Post-Approval
Decommissioning of the Legendre facilities	2010/5681	Not Controlled Action (Particular	Post-Approval

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action (particular manner)			
		Manner)	
Deep Water Drilling Program	2010/5532	Not Controlled Action (Particular Manner)	Post-Approval
Demeter 3D Seismic Survey, off Dampier, WA	2002/900	Not Controlled Action (Particular Manner)	Post-Approval
Draeck 3D Marine Seismic Survey, WA-205-P	2006/3067	Not Controlled Action (Particular Manner)	Post-Approval
Dredging of marine sediment to enable construction of eight berths and a turnin	2010/5678	Not Controlled Action (Particular Manner)	Post-Approval
Drilling 35-40 offshore exploration wells in deep water	2008/4461	Not Controlled Action (Particular Manner)	Post-Approval
Endurance 3D Marine Seismic Data Acquisition Survey	2007/3667	Not Controlled Action (Particular Manner)	Post-Approval
Establishment of AQIS washdown facility, logistics support base and ancillary businesses	2012/6364	Not Controlled Action (Particular Manner)	Post-Approval
Exmouth West 2D Marine Seismic Survey	2008/4132	Not Controlled Action (Particular Manner)	Post-Approval
Exploration drilling of Zeus-1 well	2008/4351	Not Controlled Action (Particular Manner)	Post-Approval
Exploration Drilling Program - Permit areas - WA-314-P, WA-315-P, WA-398-P.	2008/4064	Not Controlled Action (Particular Manner)	Post-Approval
Fletcher-Finucane Development, WA26-L and WA191-P	2011/6123	Not Controlled Action (Particular Manner)	Post-Approval

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action (particular manner)			
Foxhound 3D Non-Exclusive Marine Seismic Survey	2009/4703	Not Controlled Action (Particular Manner)	Post-Approval
Geco Eagle 3D Marine Seismic Survey	2008/3958	Not Controlled Action (Particular Manner)	Post-Approval
Gigas 2D Pilot Ocean Bottom Cable Marine Seismic Survey	2007/3839	Not Controlled Action (Particular Manner)	Post-Approval
Glencoe 3D Marine Seismic Survey WA-390-P	2007/3684	Not Controlled Action (Particular Manner)	Post-Approval
Greater Western Flank Phase 1 gas Development	2011/5980	Not Controlled Action (Particular Manner)	Post-Approval
Grimalkin 3D Seismic Survey	2008/4523	Not Controlled Action (Particular Manner)	Post-Approval
Harmony 3D Marine Seismic Survey	2012/6699	Not Controlled Action (Particular Manner)	Post-Approval
Helicopter baiting of exotic yellow crazy ant supercolonies, Christmas Island, Indian Ocean	2009/5016	Not Controlled Action (Particular Manner)	Post-Approval
Honeycombs MC3D Marine Seismic Survey	2012/6368	Not Controlled Action (Particular Manner)	Post-Approval
INDIGO Marine Cable Route Survey (INDIGO)	2017/7996	Not Controlled Action (Particular Manner)	Post-Approval
John Ross & Rosella Off Bottom Cable Seismic Exploration Program	2008/3966	Not Controlled Action (Particular Manner)	Post-Approval
Judo Marine 3D Seismic Survey within and adjacent to WA-412-P	2009/4801	Not Controlled Action (Particular	Post-Approval

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action (particular manner)			
		Manner)	
Judo Marine 3D Seismic Survey within and adjacent to WA-412-P	2008/4630	Not Controlled Action (Particular Manner)	Post-Approval
Julimar Brunello Gas Development Project	2011/5936	Not Controlled Action (Particular Manner)	Post-Approval
Kingtree & Ironstone-1 Exploration Wells	2011/5935	Not Controlled Action (Particular Manner)	Post-Approval
Klimt 2D Marine Seismic Survey	2007/3856	Not Controlled Action (Particular Manner)	Post-Approval
Kraken, Lusca & Asperus 3D Marine Seismic Survey	2013/6730	Not Controlled Action (Particular Manner)	Post-Approval
Laying a submarine optical fibre telecommunications cable, Perth to Singapore and Jakarta	2014/7332	Not Controlled Action (Particular Manner)	Post-Approval
Leopard 2D marine seismic survey	2005/2290	Not Controlled Action (Particular Manner)	Post-Approval
Lion 2D Marine Seismic Survey	2007/3777	Not Controlled Action (Particular Manner)	Post-Approval
Marine Geotechnical Drilling Program	2008/4012	Not Controlled Action (Particular Manner)	Post-Approval
Mariner Non-Exclusive 2D Seismic Survey	2011/6172	Not Controlled Action (Particular Manner)	Post-Approval
Moosehead 2D seismic survey within permit WA-192-P	2005/2167	Not Controlled Action (Particular Manner)	Post-Approval

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action (particular manner)			
Offshore Canning Multi Client 2D Marine Seismic Survey	2010/5393	Not Controlled Action (Particular Manner)	Post-Approval
Offshore Drilling Campaign	2011/5830	Not Controlled Action (Particular Manner)	Post-Approval
Offshore Fibre Optic Cable Network Construction & Operation, Port Hedland WA to Darwin NT	2014/7223	Not Controlled Action (Particular Manner)	Post-Approval
Osprey and Dionysus Marine Seismic Survey	2011/6215	Not Controlled Action (Particular Manner)	Post-Approval
Outer Canning exploration drilling program off NW coast of WA	2012/6618	Not Controlled Action (Particular Manner)	Post-Approval
Phoenix 3D Seismic Survey, Bedout Sub-Basin	2010/5360	Not Controlled Action (Particular Manner)	Post-Approval
Pilot Appraisal Well - Torosa South 1	2008/3991	Not Controlled Action (Particular Manner)	Post-Approval
Pomodoro 3D Marine Seismic Survey in WA-426-P and WA-427-P	2010/5472	Not Controlled Action (Particular Manner)	Post-Approval
Port Headland Outer Harbour Pre-construction Pilling program	2012/6341	Not Controlled Action (Particular Manner)	Post-Approval
Port of Port Hedland channel marker replacement project, WA	2017/8010	Not Controlled Action (Particular Manner)	Post-Approval
Reindeer gas reservior development, Devil Creek, Carnarvon Basin - WA	2007/3917	Not Controlled Action (Particular Manner)	Post-Approval
Repsol 3d & 2D Marine Seismic Survey	2012/6658	Not Controlled Action (Particular	Post-Approval

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action (particular manner)			
		Manner)	
Rose 3D Seismic Program	2008/4239	Not Controlled Action (Particular Manner)	Post-Approval
Rosebud 3D Marine Seismic Survey in WA-30-R and TR/5	2012/6493	Not Controlled Action (Particular Manner)	Post-Approval
Santos Winchester three dimensional seismic survey - WA-323-P & WA-330-P	2011/6107	Not Controlled Action (Particular Manner)	Post-Approval
Scarborough Development nearshore component, NWS, WA	2018/8362	Not Controlled Action (Particular Manner)	Post-Approval
Schild Phase 11 MC3D Marine Seismic Survey, Browse Basin	2013/6894	Not Controlled Action (Particular Manner)	Post-Approval
Scott Reef Seismic Research	2006/2647	Not Controlled Action (Particular Manner)	Post-Approval
Sovereign 3D Marine Seismic Survey	2011/5861	Not Controlled Action (Particular Manner)	Post-Approval
Stag 4D & Reindeer MAZ Marine Seismic Surveys, WA	2013/7080	Not Controlled Action (Particular Manner)	Post-Approval
Stag Off-bottom Cable Seismic Survey	2007/3696	Not Controlled Action (Particular Manner)	Post-Approval
Swimming Pool modification	2007/3312	Not Controlled Action (Particular Manner)	Post-Approval
Tidepole Maz 3D Seismic Survey Campaign	2007/3706	Not Controlled Action (Particular Manner)	Post-Approval

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action (particular manner)			
Torosa-5 Apraisal Well, WA-30-R	2008/4430	Not Controlled Action (Particular Manner)	Post-Approval
Trials of a bait delivery system for the control of Yellow Crazy Ants	2009/4763	Not Controlled Action (Particular Manner)	Post-Approval
Tridacna 3D Ocean Bottom Cable Marine Seismic Survey	2011/5959	Not Controlled Action (Particular Manner)	Post-Approval
Triton 3D Marine Seismic Survey, WA-2-R and WA-3-R	2006/2609	Not Controlled Action (Particular Manner)	Post-Approval
Undertake a 3D marine seismic survey	2010/5695	Not Controlled Action (Particular Manner)	Post-Approval
upgrade of 3 community recreation sites	2005/2349	Not Controlled Action (Particular Manner)	Post-Approval
Vampire 2D Non Exclusive Seismic Survey, WA	2010/5543	Not Controlled Action (Particular Manner)	Post-Approval
Water supply upgrade	2005/2269	Not Controlled Action (Particular Manner)	Post-Approval
West Anchor 3D Marine Seismic Survey	2008/4507	Not Controlled Action (Particular Manner)	Post-Approval
West Panaeus 3D seismic survey	2006/3141	Not Controlled Action (Particular Manner)	Post-Approval
Westralia SPAN Marine Seismic Survey, WA & NT	2012/6463	Not Controlled Action (Particular Manner)	Post-Approval
Wheatstone 3D MAZ Marine Seismic Survey	2011/6058	Not Controlled Action (Particular	Post-Approval

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action (particular manner)			
		Manner)	
Wheatstone Iago Appraisal Well Drilling	2008/4134	Not Controlled Action (Particular Manner)	Post-Approval
Wheatstone Iago Appraisal Well Drilling	2007/3941	Not Controlled Action (Particular Manner)	Post-Approval
Referral decision			
3D Seismic Survey	2008/4219	Referral Decision	Completed
Alterations and Improvements to existing residence at Lot 3015 Gaze Rd, Christmas Island	2009/5039	Referral Decision	Completed
Experimental Study of Behavioural and Physiological Impact on Fish of Seismic Ex	2006/2625	Referral Decision	Completed
Outer Harbour Development and associated marine and terrestial infrastructure	2008/4148	Referral Decision	Completed
Pilot Appraisal Well - Torosa South-1	2008/3985	Referral Decision	Completed
Rocky Point Dwelling Redevelopment	2005/2203	Referral Decision	Referral Decision
Rose 3D Seismic acquisition survey	2008/4220	Referral Decision	Completed
Seismic Data Acquisition, Browse Basin	2010/5475	Referral Decision	Completed

Key Ecological Features [Resource Information]

Key Ecological Features are the parts of the marine ecosystem that are considered to be important for the biodiversity or ecosystem functioning and integrity of the Commonwealth Marine Area.

Name	Region
Ancient coastline at 125 m depth contour	North-west
Continental Slope Demersal Fish Communities	North-west
Exmouth Plateau	North-west
Glomar Shoals	North-west

Name	Region
Mermaid Reef and Commonwealth waters surrounding Rowley Shoals	North-west
Seringapatam Reef and Commonwealth waters in the Scott Reef Complex	North-west

Biologically Important Areas

[Resource Information]

Scientific Name	Behaviour	Presence
Dolphins		
Orcaella heinsohni Australian Snubfin Dolphin [81322]	Breeding	Known to occur
Orcaella heinsohni Australian Snubfin Dolphin [81322]	Calving	Known to occur
Orcaella heinsohni Australian Snubfin Dolphin [81322]	Foraging	Known to occur
Orcaella heinsohni Australian Snubfin Dolphin [81322]	Foraging (high density prey)	Known to occur
Orcaella heinsohni Australian Snubfin Dolphin [81322]	Resting	Known to occur
Sousa chinensis Indo-Pacific Humpback Dolphin [50]	Breeding	Known to occur
Sousa chinensis Indo-Pacific Humpback Dolphin [50]	Breeding	Likely to occur
Sousa chinensis Indo-Pacific Humpback Dolphin [50]	Calving	Likely to occur
Sousa chinensis Indo-Pacific Humpback Dolphin [50]	Calving	Known to occur
Sousa chinensis Indo-Pacific Humpback Dolphin [50]	Foraging	Likely to occur
Sousa chinensis Indo-Pacific Humpback Dolphin [50]	Foraging	Known to occur
Sousa chinensis Indo-Pacific Humpback Dolphin [50]	Foraging (high density prey)	Known to occur

Scientific Name	Behaviour	Presence
Tursiops aduncus Indo-Pacific/Spotted Bottlenose Dolphin [68418]	Breeding	Known to occur
Tursiops aduncus Indo-Pacific/Spotted Bottlenose Dolphin [68418]	Calving	Known to occur
Tursiops aduncus Indo-Pacific/Spotted Bottlenose Dolphin [68418]	Foraging	Known to occur
Dugong		
Dugong dugon Dugong [28]	Foraging	Likely to occur
Dugong dugon Dugong [28]	Foraging	Known to occur
Dugong dugon Dugong [28]	Migration likely	Known to occur
Marine Turtles		
Caretta caretta Loggerhead Turtle [1763]	Foraging	Known to occur
Caretta caretta Loggerhead Turtle [1763]	Internesting buffer	Known to occur
Caretta caretta Loggerhead Turtle [1763]	Nesting	Known to occur
Chelonia mydas Green Turtle [1765]	Foraging	Likely to occur
Chelonia mydas Green Turtle [1765]	Foraging	Known to occur
Chelonia mydas Green Turtle [1765]	Internesting	Likely to occur
Chelonia mydas Green Turtle [1765]	Internesting	Known to occur
Chelonia mydas Green Turtle [1765]	Internesting buffer	Known to occur

Scientific Name	Behaviour	Presence
Chelonia mydas Green Turtle [1765]	Mating	Known to occur
Chelonia mydas Green Turtle [1765]	Migration corridor	Known to occur
Chelonia mydas Green Turtle [1765]	Nesting	Known to occur
Eretmochelys imbricata Hawksbill Turtle [1766]	Foraging	Known to occur
Eretmochelys imbricata Hawksbill Turtle [1766]	Internesting	Known to occur
Eretmochelys imbricata Hawksbill Turtle [1766]	Internesting buffer	Known to occur
Eretmochelys imbricata Hawksbill Turtle [1766]	Mating	Known to occur
Eretmochelys imbricata Hawksbill Turtle [1766]	Migration corridor	Known to occur
Eretmochelys imbricata Hawksbill Turtle [1766]	Nesting	Known to occur
Natator depressus Flatback Turtle [59257]	Foraging	Known to occur
Natator depressus Flatback Turtle [59257]	Internesting	Known to occur
Natator depressus Flatback Turtle [59257]	Internesting buffer	Known to occur
Natator depressus Flatback Turtle [59257]	Mating	Known to occur
Natator depressus Flatback Turtle [59257]	Migration corridor	Known to occur

Scientific Name	Behaviour	Presence
Natator depressus Flatback Turtle [59257]	Nesting	Known to occur
River shark		
Pristis clavata Dwarf Sawfish [68447]	Foraging	Known to occur
Pristis clavata Dwarf Sawfish [68447]	Nursing	Known to occur
Pristis clavata Dwarf Sawfish [68447]	Pupping	Known to occur
Pristis pristis Largetooth Sawfish [60756]	Foraging	Known to occur
Pristis pristis Largetooth Sawfish [60756]	Juvenile	Known to occur
Pristis pristis Largetooth Sawfish [60756]	Pupping	Known to occur
Pristis pristis Largetooth Sawfish [60756]	Pupping	Likely to occur
Pristis zijsron Green Sawfish [68442]	Foraging	Known to occur
Pristis zijsron Green Sawfish [68442]	Nursing	Known to occur
Pristis zijsron Green Sawfish [68442]	Pupping	Known to occur
Seabirds		
Ardenna pacifica Wedge-tailed Shearwater [84292]	Breeding	Known to occur
Fregata ariel Lesser Frigatebird [1012]	Breeding	Known to occur
Fregata minor Greater Frigatebird [1013]	Breeding	Known to occur

Scientific Name	Behaviour	Presence
Phaethon lepturus White-tailed Tropicbird [1014]	Breeding	Known to occur
Sterna dougallii Roseate Tern [817]	Breeding	Known to occur
Sterna dougallii Roseate Tern [817]	Resting	Known to occur
Sternula albifrons sinensis Little Tern [82850]	Breeding	Known to occur
Sternula albifrons sinensis Little Tern [82850]	Resting	Known to occur
Sternula nereis Fairy Tern [82949]	Breeding	Known to occur
Sula leucogaster Brown Booby [1022]	Breeding	Known to occur
Sula sula Red-footed Booby [1023]	Breeding	Known to occur
Thalasseus bengalensis Lesser Crested Tern [66546]	Breeding	Known to occur
Sharks		
Rhincodon typus Whale Shark [66680]	Foraging	Known to occur
Whales		
Balaenoptera musculus brevicauda Pygmy Blue Whale [81317]	Foraging	Known to occur
Balaenoptera musculus brevicauda Pygmy Blue Whale [81317]	Migration	Known to occur
Megaptera novaeangliae Humpback Whale [38]	Calving	Known to occur
Megaptera novaeangliae Humpback Whale [38]	Migration	Known to occur

Scientific Name	Behaviour	Presence
Megaptera novaeangliae Humpback Whale [38]	Migration (north and south)	Known to occur
Megaptera novaeangliae Humpback Whale [38]	Nursing	Known to occur
Megaptera novaeangliae Humpback Whale [38]	Resting	Known to occur

Caveat

1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data is available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance on the contents of this report.

3 DATA SOURCES

Threatened ecological communities

For threatened ecological communities where the distribution is well known, maps are generated based on information contained in recovery plans, State vegetation maps and remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species

Threatened, migratory and marine species distributions have been discerned through a variety of methods. Where distributions are well known and if time permits, distributions are inferred from either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc.) together with point locations and described habitat; or modelled (MAXENT or BIOCLIM habitat modelling) using point locations and environmental data layers.

Where little information is available for a species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc.).

In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More detailed distribution mapping methods are used to update these distributions when time permits.

4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

The following groups have been mapped, but may not cover the complete distribution of the species:

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded breeding sites; and
- seals which have only been mapped for breeding sites near the Australian continent

The breeding sites may be important for the protection of the Commonwealth Marine environment.

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact us page.

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Appendix E Aboriginal Cultural Heritage Inquiry System Report for Hydrocarbon Spill EMBA

Aboriginal Cultural Heritage Inquiry System

List of Aboriginal Cultural Heritage (ACH) Register

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Search Criteria

No Aboriginal Cultural Heritage (ACH) Register in Shapefile - NV_VG_DC1

Disclaimer

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Department of **Planning, Lands and Heritage**

GOVERNMENT OF WESTERN AUSTRALIA

Aboriginal Cultural Heritage Inquiry System

Map of Aboriginal Cultural Heritage (ACH) Register

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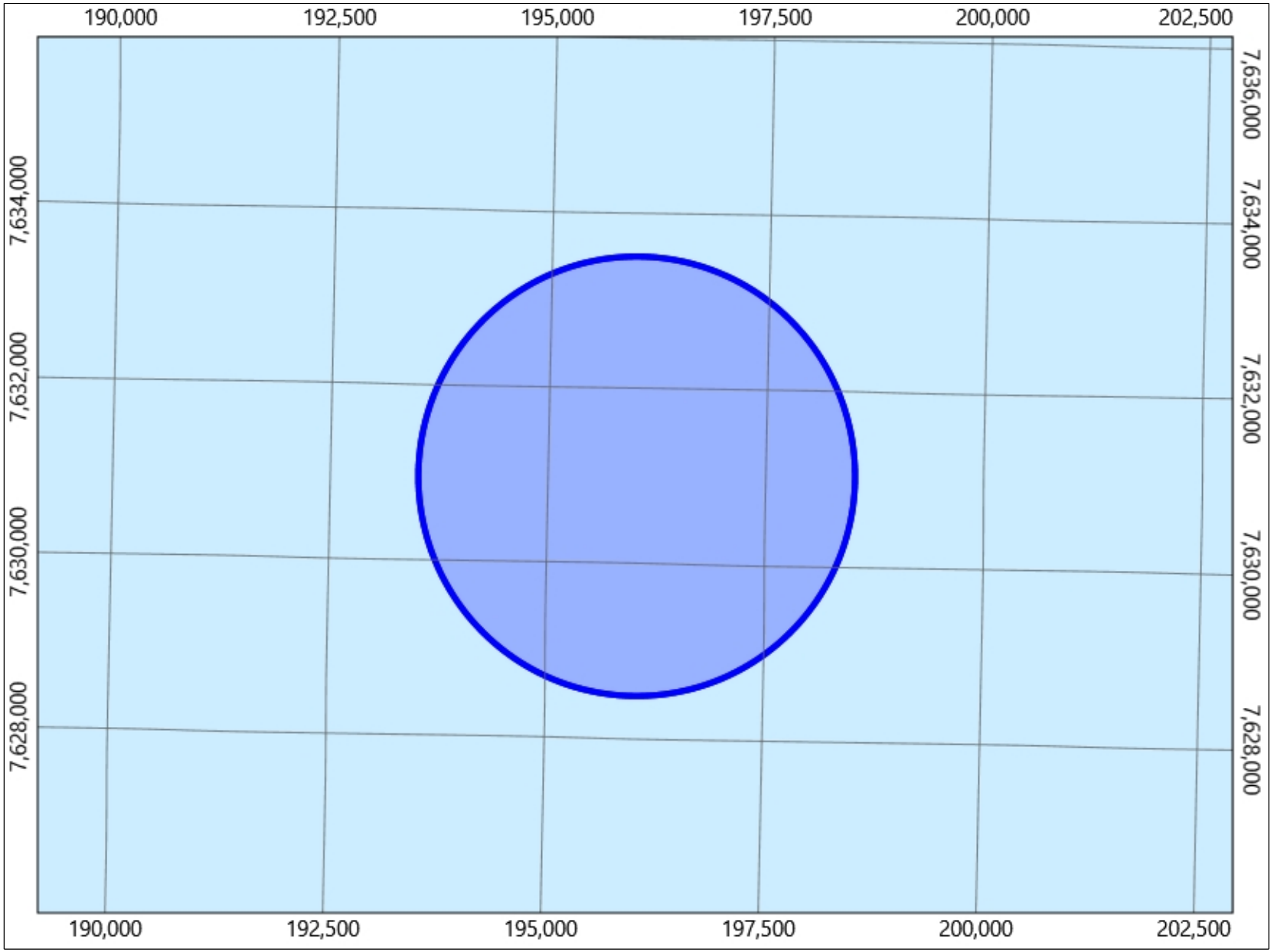

Legend

- Aboriginal Cultural Heritage (ACH) Register
- Search Area
- Aboriginal Community
  - *Permanent*
  - *Seasonal*
  - *Town Based*
- Town
- Road
- River
- Local Government Authority

2.35 kilometres

Map Scale 1 : 71,200

MGA Zone 50 (GDA2020)

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Aboriginal Cultural Heritage Inquiry System

List of Aboriginal Cultural Heritage (ACH) Lodged

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Search Criteria

No Aboriginal Cultural Heritage (ACH) Lodged in Shapefile - NV_VG_DC1

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Department of **Planning, Lands and Heritage**

GOVERNMENT OF WESTERN AUSTRALIA

Aboriginal Cultural Heritage Inquiry System

Map of Aboriginal Cultural Heritage (ACH) Lodged

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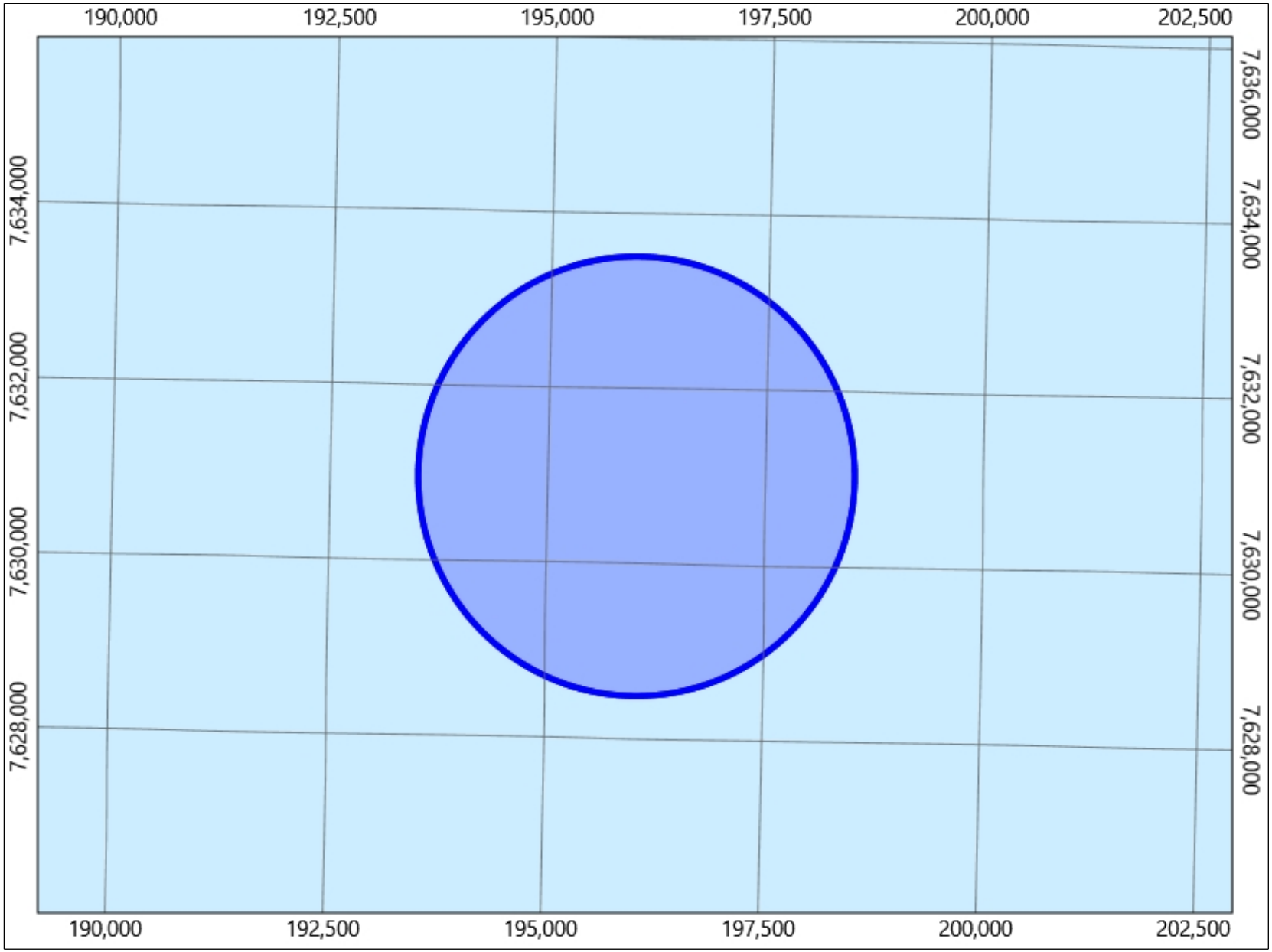

Legend

- Aboriginal Cultural Heritage (ACH) Lodged
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  - *Permanent*
  - *Seasonal*
  - *Town Based*
- Town
- Road
- River
- Local Government Authority

2.35 kilometres

Map Scale 1 : 71,200

MGA Zone 50 (GDA2020)

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Search Criteria

208 Aboriginal Cultural Heritage (ACH) Register in Shapefile - Socio-cultural EMBA_PMST_A

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Terminology

ID: ACH on the Register is assigned a unique ID by the Department of Planning, Lands and Heritage using the format: ACH-00000001. For ACH on the former Register the ID numbers remain unchanged and use the new format. For example the ACH ID of the place Swan River was previously '3536' and is now 'ACH-00003536'.

Access and Restrictions:

- Boundary Reliable (Yes/No): Indicates whether to the best knowledge of the Department, the location and extent of the ACH boundary is considered reliable.
- Boundary Restricted = No: Represents the actual location of the ACH as understood by the Department..
- Boundary Restricted = Yes: To preserve confidentiality the exact location and extent of the place is not displayed on the map. However, the shaded region (generally with an area of at least 4km²) provides a general indication of where the ACH is located. If you are a landowner and wish to find out more about the exact location of the place, please contact the Department of Planning, Lands and Heritage.
- Culturally Sensitive = No: Availability of information that the Department of Planning, Lands and Heritage holds in relation to the ACH is not restricted in any way.
- Culturally Sensitive = Yes: Some of the information that the Department of Planning, Lands and Heritage holds in relation to the ACH is restricted if it is considered culturally sensitive information. This information will only be made available if the Department of Planning, Lands and Heritage receives written approval from the people who provided the information. To request access please contact via https://achknowledge.dplh.wa.gov.au/ach-enquiry-form.
- Culturally Sensitive Nature:
  - No Gender / Initiation Restrictions: Anyone can view the information.
  - Men only: Only males can view restricted information.
  - Women only: Only females can view restricted information.

Status:

- Register: Aboriginal cultural heritage places that are assessed as meeting Section 5 of the Aboriginal Heritage Act 1972.
- Lodged: Information which has been received in relation to an Aboriginal cultural heritage place, but is yet to be assessed under Section 5 of the Aboriginal Heritage Act 1972.
- Historic: Aboriginal heritage places assessed as not meeting the criteria of Section 5 of the Aboriginal Heritage Act 1972. Includes places that no longer exist as a result of land use activities with existing approvals.

Place Type: The type of Aboriginal cultural heritage place. For example an artefact scatter place or engravings place.

Legacy ID: This is the former unique number that the former Department of Aboriginal Sites assigned to the place.

Coordinates

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Aboriginal Cultural Heritage Inquiry System

List of Aboriginal Cultural Heritage (ACH) Register

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ID	Name	Boundary Restricted	Boundary Reliable	Culturally Sensitive	Culturally Sensitive Nature	Status	Place Type	Knowledge Holders	Legacy ID
508	POINT MURAT 03	No	Yes	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Midden	*Registered Knowledge Holder names available from DPLH	P07503
509	POINT MURAT 04	No	Yes	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter	*Registered Knowledge Holder names available from DPLH	P07504
563	POINT MURAT 01	No	Yes	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Midden	*Registered Knowledge Holder names available from DPLH	P07501
564	POINT MURAT 02	No	Yes	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Midden	*Registered Knowledge Holder names available from DPLH	P07502
600	UPPER BULBARLI WELL 2	No	Yes	No	No Gender / Initiation Restrictions	Register	Burial; Artefacts / Scatter; Midden	*Registered Knowledge Holder names available from DPLH	P07442
628	CAMP THIRTEEN BURIAL	No	Yes	No	No Gender / Initiation Restrictions	Register	Burial	*Registered Knowledge Holder names available from DPLH	P07434
811	URALA 94 B	No	No	No	No Gender / Initiation Restrictions	Register	Midden	*Registered Knowledge Holder names available from DPLH	P07322
873	MONTEBELLO IS: NOALA CAVE.	No	Yes	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Midden; Rock Shelter	*Registered Knowledge Holder names available from DPLH	P07287
909	FORTESCUE COAST - DUNES	No	Yes	No	No Gender / Initiation Restrictions	Register	Midden	*Registered Knowledge Holder names available from DPLH	P07269
910	FORTESCUE MOUTH	No	Yes	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Midden	*Registered Knowledge Holder names available from DPLH	P07270
911	40 MILE - EASTERN POINT	No	Yes	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Midden	*Registered Knowledge Holder names available from DPLH	P07271
919	ENDERBY IS.27: GOODWYN VIEW	No	No	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Midden	*Registered Knowledge Holder names available from DPLH	P07279
926	MONTEBELLO IS: HAYNES CAVE.	No	Yes	No	No Gender / Initiation Restrictions	Register	Sub surface cultural material; Artefacts / Scatter; Midden; Rock Shelter	*Registered Knowledge Holder names available from DPLH	P07286
927	ENDERBY IS.16: WHITE BASIN	No	No	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Midden	*Registered Knowledge Holder names available from DPLH	P07233
929	ENDERBY IS.18: MANGROVE CK	No	No	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Quarry	*Registered Knowledge Holder names available from DPLH	P07235
930	ENDERBY IS.19: MANGROVE CK	No	No	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter	*Registered Knowledge Holder names available from DPLH	P07236
931	ENDERBY IS.20: MANGROVE CK	No	No	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Midden	*Registered Knowledge Holder names available from DPLH	P07237

Aboriginal Cultural Heritage Inquiry System

List of Aboriginal Cultural Heritage (ACH) Register

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ID	Name	Boundary Restricted	Boundary Reliable	Culturally Sensitive	Culturally Sensitive Nature	Status	Place Type	Knowledge Holders	Legacy ID
932	ENDERBY IS.21: BACK QUARRY	No	No	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Quarry	*Registered Knowledge Holder names available from DPLH	P07238
933	ENDERBY IS.22: TEREBRALIA	No	No	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Midden	*Registered Knowledge Holder names available from DPLH	P07239
934	ENDERBY IS.23: GRINDING	No	No	No	No Gender / Initiation Restrictions	Register	Engraving; Grinding areas / Grooves	*Registered Knowledge Holder names available from DPLH	P07240
936	ENDERBY IS.25: DINGHY MIDDEN	No	No	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Midden	*Registered Knowledge Holder names available from DPLH	P07242
937	ENDERBY IS.26: NORTH POINT	No	No	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Midden; Quarry	*Registered Knowledge Holder names available from DPLH	P07243
966	ROSEMARY IS.11: CHOOKIE BAY	No	No	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Midden	*Registered Knowledge Holder names available from DPLH	P07219
967	ROSEMARY IS.12: CHOOKIE BAY	No	No	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Quarry	*Registered Knowledge Holder names available from DPLH	P07220
968	ROSEMARY IS.13	No	No	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Grinding areas / Grooves; Midden	*Registered Knowledge Holder names available from DPLH	P07221
969	ROSEMARY IS.14	No	No	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Grinding areas / Grooves; Midden	*Registered Knowledge Holder names available from DPLH	P07222
970	ROSEMARY IS.15: AIRSTRIP	No	No	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Grinding areas / Grooves; Midden	*Registered Knowledge Holder names available from DPLH	P07223
971	ROSEMARY IS.16: AIRSTRIP	No	No	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Midden; Quarry	*Registered Knowledge Holder names available from DPLH	P07224
972	ROSEMARY IS.17: AIRSTRIP	No	No	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Quarry	*Registered Knowledge Holder names available from DPLH	P07225
973	ROSEMARY IS.18: DEEP WATER	No	No	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Midden	*Registered Knowledge Holder names available from DPLH	P07226
974	ROSEMARY IS.19: CHITON	No	No	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Midden	*Registered Knowledge Holder names available from DPLH	P07227
975	ROSEMARY IS.20: HALFWAY CK	No	No	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Midden	*Registered Knowledge Holder names available from DPLH	P07228
977	ROSEMARY IS.22	No	No	No	No Gender / Initiation Restrictions	Register	Engraving; Traditional Structure	*Registered Knowledge Holder names available from DPLH	P07230
978	ROSEMARY IS.23: WADJURU R/H	No	No	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Engraving; Grinding areas / Grooves; Traditional Structure; Midden; Water Source	*Registered Knowledge Holder names available from DPLH	P07231

ID	Name	Boundary Restricted	Boundary Reliable	Culturally Sensitive	Culturally Sensitive Nature	Status	Place Type	Knowledge Holders	Legacy ID
979	ROSEMARY IS.24: HUNGERFORD	No	No	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Midden	*Registered Knowledge Holder names available from DPLH	P07232
1112	LEGENDRE 09.	No	No	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Shell	*Registered Knowledge Holder names available from DPLH	P07202
1113	LEGENDRE 10.	No	No	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Rock Shelter; Shell	*Registered Knowledge Holder names available from DPLH	P07203
5946	WEST INTERCOURSE ISLAND 11	No	No	No	No Gender / Initiation Restrictions	Register	Engraving	*Registered Knowledge Holder names available from DPLH	P07153
5999	WEST INTERCOURSE ISLAND 09.	No	No	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Water Source	*Registered Knowledge Holder names available from DPLH	P07151
6000	WEST INTERCOURSE ISLAND 10	No	No	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Midden	*Registered Knowledge Holder names available from DPLH	P07152
6060	CAPE CUVIER	No	Yes	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Midden	*Registered Knowledge Holder names available from DPLH	P07053
6078	ROSEMARY ISLAND 10	No	Yes	No	No Gender / Initiation Restrictions	Register	Engraving	*Registered Knowledge Holder names available from DPLH	P07019
6079	ENDERBY ISLAND 12	No	Yes	No	No Gender / Initiation Restrictions	Register	Traditional Structure	*Registered Knowledge Holder names available from DPLH	P07020
6080	ENDERBY ISLAND 13	No	Yes	No	No Gender / Initiation Restrictions	Register	Engraving	*Registered Knowledge Holder names available from DPLH	P07021
6081	ENDERBY ISLAND 14	No	Yes	No	No Gender / Initiation Restrictions	Register	Engraving	*Registered Knowledge Holder names available from DPLH	P07022
6082	ENDERBY ISLAND 15	No	Yes	No	No Gender / Initiation Restrictions	Register	Engraving	*Registered Knowledge Holder names available from DPLH	P07023
6182	EAST LEWIS ISLAND: SW.	No	Yes	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Camp; Engraving; Midden	*Registered Knowledge Holder names available from DPLH	P06915
6184	ENDERBY ISLAND 09: SE	No	Yes	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Fish Trap; Midden	*Registered Knowledge Holder names available from DPLH	P06917
6185	ENDERBY ISLAND 10: N.	No	Yes	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Camp; Engraving; Midden; Quarry	*Registered Knowledge Holder names available from DPLH	P06918
6186	ENDERBY ISLAND 11: NE.	No	Yes	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Camp; Ritual / Ceremonial; Engraving; Grinding areas / Grooves; Traditional Structure	*Registered Knowledge Holder names available from DPLH	P06919
6228	WEST LEWIS ISLAND: SW.	No	Yes	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Camp; Grinding areas / Grooves; Midden; Other; Quarry; Water Source	*Registered Knowledge Holder names available from DPLH	P06909

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6229	WEST LEWIS ISLAND: NW ARM 1	No	Yes	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Ritual / Ceremonial; Engraving; Grinding areas / Grooves; Traditional Structure	*Registered Knowledge Holder names available from DPLH	P06910
6230	WEST LEWIS ISLAND: NW ARM 2	Yes	Yes	Yes	Men only	Register	Artefacts / Scatter; Ritual / Ceremonial; Engraving; Grinding areas / Grooves; Traditional Structure	*Registered Knowledge Holder names available from DPLH	P06911
6233	EAST LEWIS ISLAND: S.	No	Yes	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Camp; Engraving; Midden	*Registered Knowledge Holder names available from DPLH	P06914
6311	POINT MURAT.	No	Yes	No	No Gender / Initiation Restrictions	Register	Burial; Artefacts / Scatter; Camp; Midden; Other	*Registered Knowledge Holder names available from DPLH	P06628
6498	DIRK HARTOG ISLAND	No	No	No	No Gender / Initiation Restrictions	Register	Traditional Structure	*Registered Knowledge Holder names available from DPLH	P06448
6535	URALA STATION SOUTH	No	Yes	No	No Gender / Initiation Restrictions	Register	Midden	*Registered Knowledge Holder names available from DPLH	P06432
6541	URALA STATION WEST	Yes	No	Yes	No Gender / Initiation Restrictions	Register	Ritual / Ceremonial	*Registered Knowledge Holder names available from DPLH	P06438
6575	JINTA 1 MIDDEN	Yes	No	Yes	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Midden	*Registered Knowledge Holder names available from DPLH	P06370
6596	POINT ANDERSON.	Yes	Yes	Yes	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Camp; Hunting Place; Midden; Shell; Water Source	*Registered Knowledge Holder names available from DPLH	P06341
6606	CRAYFISH BAY 1	No	No	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Midden; Water Source	*Registered Knowledge Holder names available from DPLH	P06351
6607	CRAYFISH BAY 2	No	No	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Midden; Quarry	*Registered Knowledge Holder names available from DPLH	P06352
6608	ZUYTDORP POINT	No	No	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Midden	*Registered Knowledge Holder names available from DPLH	P06353
6616	CORAL BAY ACCESS 2	No	No	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Midden	*Registered Knowledge Holder names available from DPLH	P06361
6617	BURUBARLADJI	Yes	Yes	Yes	No Gender / Initiation Restrictions	Register	Creation / Dreaming Narrative	*Registered Knowledge Holder names available from DPLH	P06362
6618	DEW TALU.	Yes	Yes	Yes	No Gender / Initiation Restrictions	Register	Ritual / Ceremonial; Water Source	*Registered Knowledge Holder names available from DPLH	P06363
6619	JINTA 1.	Yes	Yes	Yes	No Gender / Initiation Restrictions	Register	Water Source	*Registered Knowledge Holder names available from DPLH	P06364
6620	JINTA 2.	Yes	Yes	Yes	No Gender / Initiation Restrictions	Register	Water Source	*Registered Knowledge Holder names available from DPLH	P06365

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6723	MULANDA 2	No	No	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Midden	*Registered Knowledge Holder names available from DPLH	P06257
6724	MULANDA 3	No	No	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Midden	*Registered Knowledge Holder names available from DPLH	P06258
6725	MULANDA 4	No	No	No	No Gender / Initiation Restrictions	Register	Midden	*Registered Knowledge Holder names available from DPLH	P06259
6754	OSPREY BAY 6	No	Yes	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Midden	*Registered Knowledge Holder names available from DPLH	P06165
6755	OSPREY BAY INTERDUNAL 1	No	No	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Midden	*Registered Knowledge Holder names available from DPLH	P06166
6756	OSPREY BAY INTERDUNAL 2	No	Yes	No	No Gender / Initiation Restrictions	Register	Midden	*Registered Knowledge Holder names available from DPLH	P06167
6757	BLOODWOOD CREEK MIDDEN 1	No	Yes	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Midden	*Registered Knowledge Holder names available from DPLH	P06168
6758	BLOODWOOD CREEK MIDDEN 2	No	Yes	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Midden	*Registered Knowledge Holder names available from DPLH	P06169
6759	BLOODWOOD CREEK MIDDEN 3	No	Yes	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Midden	*Registered Knowledge Holder names available from DPLH	P06170
6760	BLOODWOOD CREEK SHORELINE	No	Yes	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Midden	*Registered Knowledge Holder names available from DPLH	P06171
6761	LOW POINT MIDDEN	No	Yes	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Midden	*Registered Knowledge Holder names available from DPLH	P06172
6762	MILYERING MIDDEN	No	Yes	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Midden	*Registered Knowledge Holder names available from DPLH	P06173
6763	YARDIE ROCKSHELTERS NORTH.	No	No	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Midden; Rock Shelter	*Registered Knowledge Holder names available from DPLH	P06174
6764	CAMP 17 SOUTH MIDDENS	No	No	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Midden	*Registered Knowledge Holder names available from DPLH	P06175
6765	CAMP 17 NORTH MIDDENS	No	No	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Midden	*Registered Knowledge Holder names available from DPLH	P06176
6769	MULANDA 1	No	Yes	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Midden	*Registered Knowledge Holder names available from DPLH	P06180
6782	28 MILE CREEK NORTH 1	No	No	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Midden	*Registered Knowledge Holder names available from DPLH	P06140

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6784	MANDU MANDU CREEK SOUTH	No	No	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Midden	*Registered Knowledge Holder names available from DPLH	P06142
6785	MANDU MANDU CREEK NORTH	No	No	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Midden	*Registered Knowledge Holder names available from DPLH	P06143
6790	YARDIE CREEK SOUTH 1	No	Yes	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Midden	*Registered Knowledge Holder names available from DPLH	P06148
6791	YARDIE CREEK SOUTH 2	No	Yes	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Midden	*Registered Knowledge Holder names available from DPLH	P06149
6793	ROAD ALIGNMENT 1	No	No	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Midden	*Registered Knowledge Holder names available from DPLH	P06151
6794	ROAD ALIGNMENT 2	No	No	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Midden	*Registered Knowledge Holder names available from DPLH	P06152
6795	ROAD ALIGNMENT 3	No	Yes	No	No Gender / Initiation Restrictions	Register	Midden	*Registered Knowledge Holder names available from DPLH	P06153
6797	YARDIE WELL ROCKSHELTER.	No	Yes	No	No Gender / Initiation Restrictions	Register	Sub surface cultural material; Artefacts / Scatter; Midden; Other; Rock Shelter	*Registered Knowledge Holder names available from DPLH	P06155
6798	YARDIE INTERDUNAL SWALE	No	Yes	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Midden	*Registered Knowledge Holder names available from DPLH	P06156
6799	YARDIE BEACH MIDDEN	No	Yes	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Midden	*Registered Knowledge Holder names available from DPLH	P06157
6800	OYSTER STACKS MIDDEN	No	Yes	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Midden	*Registered Knowledge Holder names available from DPLH	P06158
6801	NORTH T-BONE BAY	No	Yes	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Midden	*Registered Knowledge Holder names available from DPLH	P06159
6802	OSPREY BAY 1	No	Yes	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Midden	*Registered Knowledge Holder names available from DPLH	P06160
6803	OSPREY BAY 2	No	Yes	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Midden	*Registered Knowledge Holder names available from DPLH	P06161
6804	OSPREY BAY 3	No	Yes	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Midden	*Registered Knowledge Holder names available from DPLH	P06162
6805	OSPREY BAY 4	No	Yes	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Midden	*Registered Knowledge Holder names available from DPLH	P06163
6806	OSPREY BAY 5	No	Yes	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Midden	*Registered Knowledge Holder names available from DPLH	P06164

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6827	CORAL BAY SKELETON	No	No	No	No Gender / Initiation Restrictions	Register	Burial	*Registered Knowledge Holder names available from DPLH	P06132
6966	ENDERBY ISLAND 08	No	No	No	No Gender / Initiation Restrictions	Register	Engraving	*Registered Knowledge Holder names available from DPLH	P05955
7059	FOUR MILE CREEK MIDDEN	No	No	No	No Gender / Initiation Restrictions	Register	Midden	*Registered Knowledge Holder names available from DPLH	P05890
7123	BERNIER ISLAND	No	No	No	No Gender / Initiation Restrictions	Register	Burial	*Registered Knowledge Holder names available from DPLH	P05789
7124	DORRE ISLAND	No	No	No	No Gender / Initiation Restrictions	Register	Burial	*Registered Knowledge Holder names available from DPLH	P05790
7126	MESA CAMP	No	No	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Midden	*Registered Knowledge Holder names available from DPLH	P05792
7138	QUOBBA DUNES.	Yes	No	Yes	No Gender / Initiation Restrictions	Register	Burial; Artefacts / Scatter; Camp; Midden	*Registered Knowledge Holder names available from DPLH	P05804
7203	BAUBOODJOO POINT (Bruboodjoo Midden Site)	No	Yes	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Camp; Hunting Place; Midden	*Registered Knowledge Holder names available from DPLH	P05707
7205	TWIN HILL FISHING PLACE.	No	No	No	No Gender / Initiation Restrictions	Register	Hunting Place	*Registered Knowledge Holder names available from DPLH	P05709
7206	WEALJUGOO MIDDEN.	No	Yes	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Camp; Hunting Place; Midden	*Registered Knowledge Holder names available from DPLH	P05710
7209	BULBARLI POINT COMPLEX.	No	Yes	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Camp; Midden; Water Source	*Registered Knowledge Holder names available from DPLH	P05713
7211	MAUD LANDING.	No	No	No	No Gender / Initiation Restrictions	Register	Burial; Camp; Meeting Place; Water Source	*Registered Knowledge Holder names available from DPLH	P05715
7254	SANDY BAY NORTH	No	Yes	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Midden	*Registered Knowledge Holder names available from DPLH	P05652
7265	LAKE SIDE VIEW	No	Yes	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Midden	*Registered Knowledge Holder names available from DPLH	P05664
7286	KAPOK WELL BURIAL	Yes	Yes	Yes	No Gender / Initiation Restrictions	Register	Burial	*Registered Knowledge Holder names available from DPLH	P05632
7298	YARDIE CREEK ROCKSHELTERS	No	Yes	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter	*Registered Knowledge Holder names available from DPLH	P05644
7299	YARDIE CREEK	No	No	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Midden	*Registered Knowledge Holder names available from DPLH	P05645

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7300	MANDU MANDU CK ROCKSHELTERS	Yes	Yes	Yes	No Gender / Initiation Restrictions	Register	Artefacts / Scatter	*Registered Knowledge Holder names available from DPLH	P05646
7303	TULKI WELL MIDDEN	No	Yes	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Midden	*Registered Knowledge Holder names available from DPLH	P05649
7304	PILGRAMUNNA BAY MIDDEN	No	Yes	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Midden	*Registered Knowledge Holder names available from DPLH	P05650
7305	MANGROVE BAY.	No	Yes	No	No Gender / Initiation Restrictions	Register	Burial; Artefacts / Scatter; Hunting Place; Midden	*Registered Knowledge Holder names available from DPLH	P05651
7332	URALA STATION 12	No	Yes	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Midden	*Registered Knowledge Holder names available from DPLH	P05574
7334	URALA STATION 14	No	Yes	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Midden	*Registered Knowledge Holder names available from DPLH	P05576
7381	URALA STATION 09	No	Yes	No	No Gender / Initiation Restrictions	Register	Burial; Artefacts / Scatter; Camp; Midden	*Registered Knowledge Holder names available from DPLH	P05569
7382	ROCKY POINT MIDDEN COMPLEX	No	Yes	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Midden	*Registered Knowledge Holder names available from DPLH	P05570
7383	ROCKY POINT EAST	No	Yes	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Midden	*Registered Knowledge Holder names available from DPLH	P05571
7385	URALA STATION 11	No	Yes	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Midden	*Registered Knowledge Holder names available from DPLH	P05573
8299	BEADON CREEK	No	Yes	No	No Gender / Initiation Restrictions	Register	Burial; Artefacts / Scatter	*Registered Knowledge Holder names available from DPLH	P04351
8300	CORAL BAY	No	No	No	No Gender / Initiation Restrictions	Register	Burial	*Registered Knowledge Holder names available from DPLH	P04352
8301	NINGALOO STATION	No	No	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter	*Registered Knowledge Holder names available from DPLH	P04353
8302	WARROORA	No	No	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Midden	*Registered Knowledge Holder names available from DPLH	P04354
8920	ONSLOW 1	No	Yes	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Midden	*Registered Knowledge Holder names available from DPLH	P03563
8927	TEN MILE WELL BURIAL	No	Yes	No	No Gender / Initiation Restrictions	Register	Burial	*Registered Knowledge Holder names available from DPLH	P03570
9737	ENDERBY ISLAND 06: BOILER B	No	Yes	No	No Gender / Initiation Restrictions	Register	Engraving; Quarry	*Registered Knowledge Holder names available from DPLH	P02449

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10381	VLAMING HEAD	Yes	No	Yes	No Gender / Initiation Restrictions	Register	Ritual / Ceremonial; Creation / Dreaming Narrative	*Registered Knowledge Holder names available from DPLH	P01799
10999	CRAYFISH BAY.	No	No	No	No Gender / Initiation Restrictions	Register	Historical; Traditional Structure; Other	*Registered Knowledge Holder names available from DPLH	P01151
11328	GAP WELL	No	No	No	No Gender / Initiation Restrictions	Register	Engraving	*Registered Knowledge Holder names available from DPLH	P00836
11401	5 Mile Well (Cape Range)	No	No	No	No Gender / Initiation Restrictions	Register	Sub surface cultural material; Artefacts / Scatter; Engraving; Painting; Quarry	*Registered Knowledge Holder names available from DPLH	P00751
11402	URALA DUNE BURIAL	Yes	Yes	Yes	No Gender / Initiation Restrictions	Register	Burial; Artefacts / Scatter; Midden	*Registered Knowledge Holder names available from DPLH	P00752
11458	NINGALOO (near)	No	No	No	No Gender / Initiation Restrictions	Register	Painting	*Registered Knowledge Holder names available from DPLH	P00701
11460	WARROORA STATION	No	No	No	No Gender / Initiation Restrictions	Register	Burial	*Registered Knowledge Holder names available from DPLH	P00703
11461	BULBARLI WELL.	No	No	No	No Gender / Initiation Restrictions	Register	Burial; Artefacts / Scatter; Camp; Hunting Place; Midden	*Registered Knowledge Holder names available from DPLH	P00704
11729	NGARLUMA POINT, GIDLEY IS.	No	Yes	No	No Gender / Initiation Restrictions	Register	Engraving; Traditional Structure	*Registered Knowledge Holder names available from DPLH	P00434
11744	EAST LEWIS 5	No	No	No	No Gender / Initiation Restrictions	Register	Engraving	*Registered Knowledge Holder names available from DPLH	P00395
11745	EAST LEWIS 6	No	Yes	No	No Gender / Initiation Restrictions	Register	Engraving	*Registered Knowledge Holder names available from DPLH	P00396
11746	EAST LEWIS 7	No	No	No	No Gender / Initiation Restrictions	Register	Engraving	*Registered Knowledge Holder names available from DPLH	P00397
11747	EAST LEWIS 8	No	No	No	No Gender / Initiation Restrictions	Register	Engraving	*Registered Knowledge Holder names available from DPLH	P00398
11748	EAST LEWIS 9	No	Yes	No	No Gender / Initiation Restrictions	Register	Engraving	*Registered Knowledge Holder names available from DPLH	P00399
11767	FISH POINT, GIDLEY ISLAND	No	No	No	No Gender / Initiation Restrictions	Register	Engraving	*Registered Knowledge Holder names available from DPLH	P00418
11771	ENDERBY ISLAND 05	No	No	No	No Gender / Initiation Restrictions	Register	Engraving	*Registered Knowledge Holder names available from DPLH	P00368
11772	ROSEMARY ISLAND 09	No	No	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Midden	*Registered Knowledge Holder names available from DPLH	P00369

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ID	Name	Boundary Restricted	Boundary Reliable	Culturally Sensitive	Culturally Sensitive Nature	Status	Place Type	Knowledge Holders	Legacy ID
11773	ROSEMARY ISLAND 08	No	No	No	No Gender / Initiation Restrictions	Register	Engraving; Grinding areas / Grooves; Traditional Structure	*Registered Knowledge Holder names available from DPLH	P00370
11774	ROSEMARY ISLAND 07	No	No	No	No Gender / Initiation Restrictions	Register	Engraving	*Registered Knowledge Holder names available from DPLH	P00371
11775	ROSEMARY ISLAND 06	No	No	No	No Gender / Initiation Restrictions	Register	Engraving	*Registered Knowledge Holder names available from DPLH	P00372
11776	ROSEMARY ISLAND 04.	No	No	No	No Gender / Initiation Restrictions	Register	Camp; Engraving	*Registered Knowledge Holder names available from DPLH	P00373
11777	ROSEMARY ISLAND 03	No	No	No	No Gender / Initiation Restrictions	Register	Engraving	*Registered Knowledge Holder names available from DPLH	P00374
11789	ROSEMARY ISLAND 01	No	No	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Engraving; Midden; Quarry	*Registered Knowledge Holder names available from DPLH	P00386
11818	ROSEMARY ISLAND 02	No	No	No	No Gender / Initiation Restrictions	Register	Engraving	*Registered Knowledge Holder names available from DPLH	P00362
11819	ROSEMARY ISLAND 05	No	No	No	No Gender / Initiation Restrictions	Register	Engraving	*Registered Knowledge Holder names available from DPLH	P00363
11820	ENDERBY ISLAND 01	No	No	No	No Gender / Initiation Restrictions	Register	Engraving	*Registered Knowledge Holder names available from DPLH	P00364
11821	ENDERBY ISLAND 02	No	Yes	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Midden	*Registered Knowledge Holder names available from DPLH	P00365
11822	ENDERBY ISLAND 03	No	No	No	No Gender / Initiation Restrictions	Register	Engraving	*Registered Knowledge Holder names available from DPLH	P00366
11823	ENDERBY ISLAND 04	No	Yes	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Engraving; Midden	*Registered Knowledge Holder names available from DPLH	P00367
11885	PADJARI MANU CAVE (Formerly Bunbury Cave)	Yes	Yes	Yes	No Gender / Initiation Restrictions	Register	Sub surface cultural material; Artefacts / Scatter; Ritual / Ceremonial; Engraving; Painting; Water Source	*Registered Knowledge Holder names available from DPLH	P00267
15322	POINT MURAT/WHITE OPAL	No	Yes	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Midden	*Registered Knowledge Holder names available from DPLH	P07916
15926	TUBRIDGI 01	No	Yes	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Midden; Shell	*Registered Knowledge Holder names available from DPLH	
15927	TUBRIDGI 02	No	Yes	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Midden; Shell	*Registered Knowledge Holder names available from DPLH	
15928	TUBRIDGI 04	No	Yes	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Shell	*Registered Knowledge Holder names available from DPLH	

Aboriginal Cultural Heritage Inquiry System

List of Aboriginal Cultural Heritage (ACH) Register

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ID	Name	Boundary Restricted	Boundary Reliable	Culturally Sensitive	Culturally Sensitive Nature	Status	Place Type	Knowledge Holders	Legacy ID
15929	TUBRIDGI 05	No	Yes	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Shell	*Registered Knowledge Holder names available from DPLH	
15930	TUBRIDGI 06	No	Yes	No	No Gender / Initiation Restrictions	Register	Midden; Shell	*Registered Knowledge Holder names available from DPLH	
16594	Cardabia Station	No	Yes	No	No Gender / Initiation Restrictions	Register	Midden; Shell	*Registered Knowledge Holder names available from DPLH	
16597	Baler Bluff	No	Yes	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Midden; Shell	*Registered Knowledge Holder names available from DPLH	
16792	Site A	No	No	No	No Gender / Initiation Restrictions	Register	Midden; Shell	*Registered Knowledge Holder names available from DPLH	
16793	Site B	No	No	No	No Gender / Initiation Restrictions	Register	Midden; Shell	*Registered Knowledge Holder names available from DPLH	
17193	Ningaloo Station	No	No	No	No Gender / Initiation Restrictions	Register	Burial	*Registered Knowledge Holder names available from DPLH	
17447	PAP HILL OCHRE	No	Yes	No	No Gender / Initiation Restrictions	Register	Ritual / Ceremonial; Grinding areas / Grooves; Ochre; Rock Shelter	*Registered Knowledge Holder names available from DPLH	
18822	Cape Preston 19	No	Yes	No	No Gender / Initiation Restrictions	Register	Quarry	*Registered Knowledge Holder names available from DPLH	
18823	Cape Preston 20	No	Yes	No	No Gender / Initiation Restrictions	Register	Quarry	*Registered Knowledge Holder names available from DPLH	
18824	Cape Preston 21	No	No	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Midden	*Registered Knowledge Holder names available from DPLH	
18825	Cape Preston 22	No	Yes	No	No Gender / Initiation Restrictions	Register	Quarry	*Registered Knowledge Holder names available from DPLH	
18826	Cape Preston 23	No	Yes	No	No Gender / Initiation Restrictions	Register	Quarry	*Registered Knowledge Holder names available from DPLH	
18827	Cape Preston 24	No	Yes	No	No Gender / Initiation Restrictions	Register	Quarry	*Registered Knowledge Holder names available from DPLH	
18838	Cape Preston 35	No	Yes	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Midden	*Registered Knowledge Holder names available from DPLH	
18839	Cape Preston 36	No	Yes	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Midden	*Registered Knowledge Holder names available from DPLH	
18840	Cape Preston 37	No	Yes	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Midden	*Registered Knowledge Holder names available from DPLH	

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List of Aboriginal Cultural Heritage (ACH) Register

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18859	Cape Preston 56	No	Yes	No	No Gender / Initiation Restrictions	Register	Grinding areas / Grooves; Midden	*Registered Knowledge Holder names available from DPLH	
21526	Robe River (Gadjiwura)	No	Yes	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Camp; Ritual / Ceremonial; Creation / Dreaming Narrative; Modified Tree; Other	*Registered Knowledge Holder names available from DPLH	
21607	Roller/Skate Site 2	No	Yes	No	No Gender / Initiation Restrictions	Register	Midden; Shell	*Registered Knowledge Holder names available from DPLH	
21609	Roller/Skate Site 4	No	No	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Midden; Shell	*Registered Knowledge Holder names available from DPLH	
26006	Site No. 25	Yes	Yes	Yes	No Gender / Initiation Restrictions	Register	Engraving	*Registered Knowledge Holder names available from DPLH	
26017	P08 - 02	No	Yes	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Engraving; Grinding areas / Grooves; Midden; Quarry; Shell	*Registered Knowledge Holder names available from DPLH	
26019	P08 - 08	No	Yes	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Quarry	*Registered Knowledge Holder names available from DPLH	
26020	P08 - 09	No	Yes	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Quarry	*Registered Knowledge Holder names available from DPLH	
26441	P09 - 01	No	Yes	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Shell	*Registered Knowledge Holder names available from DPLH	
26444	P09 - 04	No	Yes	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Quarry	*Registered Knowledge Holder names available from DPLH	
26446	P09 - 06	No	Yes	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Quarry	*Registered Knowledge Holder names available from DPLH	
26736	ACHM - 09-05	No	Yes	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter	*Registered Knowledge Holder names available from DPLH	
28615	MP08-53	Yes	Yes	Yes	No Gender / Initiation Restrictions	Register	Ritual / Ceremonial; Creation / Dreaming Narrative; Water Source	*Registered Knowledge Holder names available from DPLH	
28700	MP08 - 50	No	Yes	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Camp	*Registered Knowledge Holder names available from DPLH	
28701	MP08 - 52	No	Yes	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Camp; Midden; Shell	*Registered Knowledge Holder names available from DPLH	
32668	Maitland River Scatter 09	No	Yes	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter	*Registered Knowledge Holder names available from DPLH	

Aboriginal Cultural Heritage Inquiry System

List of Aboriginal Cultural Heritage (ACH) Register

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ID	Name	Boundary Restricted	Boundary Reliable	Culturally Sensitive	Culturally Sensitive Nature	Status	Place Type	Knowledge Holders	Legacy ID
32879	Lower Fortescue River (Mardathuni)	No	No	No	No Gender / Initiation Restrictions	Register	Camp; Creation / Dreaming Narrative; Hunting Place; Landscape / Seascape Feature; Plant Resource; Water Source	*Registered Knowledge Holder names available from DPLH	
37522	Mindurru (Ashburton River)	Yes	Yes	Yes		Register	Creation / Dreaming Narrative	*Registered Knowledge Holder names available from DPLH	
38533	Cape Bruguieres Channel	No	Yes	No		Register	Artefacts / Scatter	*Registered Knowledge Holder names available from DPLH	
40427	Warroora Station burial	Yes	Yes	Yes	No Gender / Initiation Restrictions	Register	Burial; Artefacts / Scatter; Ritual / Ceremonial	*Registered Knowledge Holder names available from DPLH	
40522	Freshwater Soak	No	Yes	No		Register		*Registered Knowledge Holder names available from DPLH	

Department of **Planning, Lands and Heritage**

GOVERNMENT OF WESTERN AUSTRALIA

Aboriginal Cultural Heritage Inquiry System

Map of Aboriginal Cultural Heritage (ACH) Register

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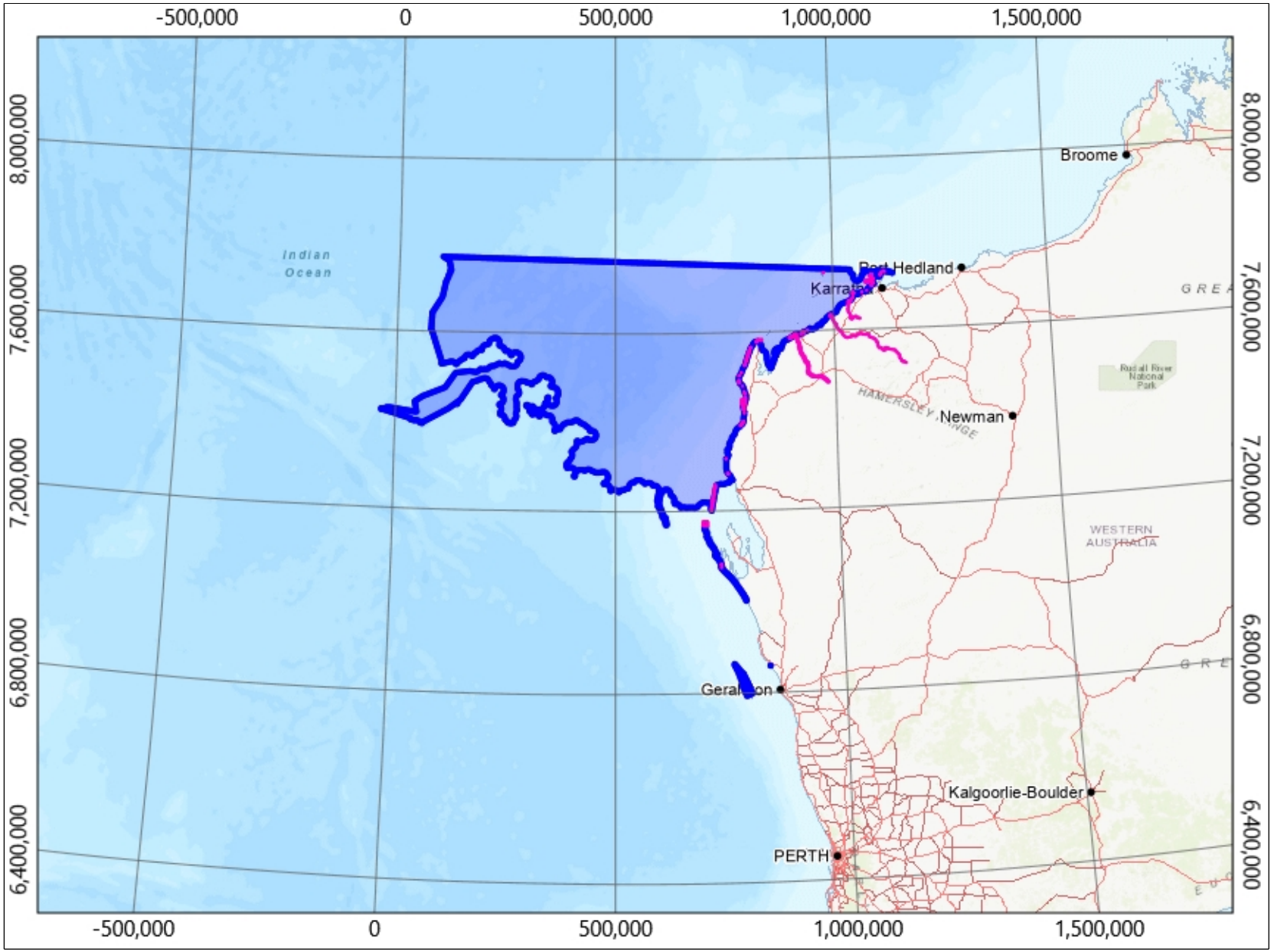

Legend

- Aboriginal Cultural Heritage (ACH) Register
- Search Area
- Aboriginal Community
  - *Permanent*
  - *Seasonal*
  - *Town Based*
- Town
- Road
- River
- Local Government Authority

470.19 kilometres

Map Scale 1 : 14,250,000

MGA Zone 49 (GDA2020)

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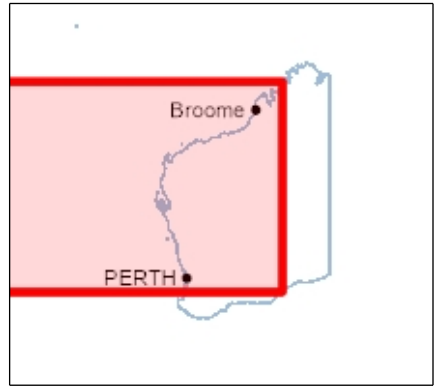

Aboriginal Cultural Heritage Inquiry System

List of Aboriginal Cultural Heritage (ACH) Lodged

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Search Criteria

104 Aboriginal Cultural Heritage (ACH) Lodged in Shapefile - Socio-cultural EMBA_PMST_A

Disclaimer

Aboriginal heritage holds significant value to Aboriginal people for their social, spiritual, historical, scientific, or aesthetic importance within Aboriginal traditions, and provides an essential link for Aboriginal people to their past, present and future. In Western Australia Aboriginal heritage is protected under the Aboriginal Heritage Act 1972.

All Aboriginal cultural heritage in Western Australia is protected, whether or not the ACH has been reported or exists on the Register.

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Terminology

ID: ACH on the Register is assigned a unique ID by the Department of Planning, Lands and Heritage using the format: ACH-00000001. For ACH on the former Register the ID numbers remain unchanged and use the new format. For example the ACH ID of the place Swan River was previously '3536' and is now 'ACH-00003536'.

Access and Restrictions:

- Boundary Reliable (Yes/No): Indicates whether to the best knowledge of the Department, the location and extent of the ACH boundary is considered reliable.
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- Culturally Sensitive = No: Availability of information that the Department of Planning, Lands and Heritage holds in relation to the ACH is not restricted in any way.
- Culturally Sensitive = Yes: Some of the information that the Department of Planning, Lands and Heritage holds in relation to the ACH is restricted if it is considered culturally sensitive information. This information will only be made available if the Department of Planning, Lands and Heritage receives written approval from the people who provided the information. To request access please contact via https://achknowledge.dplh.wa.gov.au/ach-enquiry-form.
- Culturally Sensitive Nature:
  - No Gender / Initiation Restrictions: Anyone can view the information.
  - Men only: Only males can view restricted information.
  - Women only: Only females can view restricted information.

Status:

- Register: Aboriginal cultural heritage places that are assessed as meeting Section 5 of the Aboriginal Heritage Act 1972.
- Lodged: Information which has been received in relation to an Aboriginal cultural heritage place, but is yet to be assessed under Section 5 of the Aboriginal Heritage Act 1972.
- Historic: Aboriginal heritage places assessed as not meeting the criteria of Section 5 of the Aboriginal Heritage Act 1972. Includes places that no longer exist as a result of land use activities with existing approvals.

Place Type: The type of Aboriginal cultural heritage place. For example an artefact scatter place or engravings place.

Legacy ID: This is the former unique number that the former Department of Aboriginal Sites assigned to the place.

Coordinates

Map coordinates are based on the GDA 2020 Datum.

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Aboriginal Cultural Heritage Inquiry System

List of Aboriginal Cultural Heritage (ACH) Lodged

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ID	Name	Boundary Restricted	Boundary Reliable	Culturally Sensitive	Culturally Sensitive Nature	Status	Place Type	Knowledge Holders	Legacy ID
810	URALA 94 A	No	Yes	No	No Gender / Initiation Restrictions	Lodged	Midden	*Registered Knowledge Holder names available from DPLH	
883	BARROW ISLAND 01	No	Yes	No	No Gender / Initiation Restrictions	Lodged	Artefacts / Scatter	*Registered Knowledge Holder names available from DPLH	
884	I-24-S0001/S0002	No	Yes	No	No Gender / Initiation Restrictions	Lodged	Historical; Other	*Registered Knowledge Holder names available from DPLH	
885	BARROW ISLAND 03	No	Yes	No	No Gender / Initiation Restrictions	Lodged	Artefacts / Scatter	*Registered Knowledge Holder names available from DPLH	
886	C-21-S0001	No	Yes	No	No Gender / Initiation Restrictions	Lodged	Historical; Other	*Registered Knowledge Holder names available from DPLH	
887	O-02-S0001	No	Yes	No	No Gender / Initiation Restrictions	Lodged	Historical; Other	*Registered Knowledge Holder names available from DPLH	
888	P-05-S0001	No	No	No	No Gender / Initiation Restrictions	Lodged	Historical; Other	*Registered Knowledge Holder names available from DPLH	
889	O-06-S0001	No	Yes	No	No Gender / Initiation Restrictions	Lodged	Historical; Other	*Registered Knowledge Holder names available from DPLH	
890	D-20-S0001	No	Yes	No	No Gender / Initiation Restrictions	Lodged	Historical; Other	*Registered Knowledge Holder names available from DPLH	
891	Bandicoot Bay Settlement	No	Yes	No	No Gender / Initiation Restrictions	Lodged	Historical; Other	*Registered Knowledge Holder names available from DPLH	
892	BARROW ISLAND 10	No	Yes	No	No Gender / Initiation Restrictions	Lodged	Artefacts / Scatter	*Registered Knowledge Holder names available from DPLH	
893	D-20-S0002	No	Yes	No	No Gender / Initiation Restrictions	Lodged	Historical; Other	*Registered Knowledge Holder names available from DPLH	
894	D-16-S0001	No	Yes	No	No Gender / Initiation Restrictions	Lodged	Historical; Other	*Registered Knowledge Holder names available from DPLH	
935	ENDERBY IS.24: LIMESTONE	No	No	No	No Gender / Initiation Restrictions	Lodged	Artefacts / Scatter; Traditional Structure	*Registered Knowledge Holder names available from DPLH	
976	ROSEMARY IS.21: HALFWAY CK	No	No	No	No Gender / Initiation Restrictions	Lodged	Traditional Structure	*Registered Knowledge Holder names available from DPLH	
6119	PAP HILL 1.	No	Yes	No	No Gender / Initiation Restrictions	Lodged	Rock Shelter	*Registered Knowledge Holder names available from DPLH	
6120	PAP HILL 2.	No	Yes	No	No Gender / Initiation Restrictions	Lodged	Grinding areas / Grooves; Rock Shelter	*Registered Knowledge Holder names available from DPLH	

Aboriginal Cultural Heritage Inquiry System

List of Aboriginal Cultural Heritage (ACH) Lodged

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ID	Name	Boundary Restricted	Boundary Reliable	Culturally Sensitive	Culturally Sensitive Nature	Status	Place Type	Knowledge Holders	Legacy ID
6346	MT SALT	No	Yes	No	No Gender / Initiation Restrictions	Lodged	Burial	*Registered Knowledge Holder names available from DPLH	
6783	28 MILE CREEK NORTH 2	No	Yes	No	No Gender / Initiation Restrictions	Lodged	Artefacts / Scatter; Midden	*Registered Knowledge Holder names available from DPLH	
6786	LAKESIDE COASTAL PLAIN	No	No	No	No Gender / Initiation Restrictions	Lodged	Artefacts / Scatter; Midden	*Registered Knowledge Holder names available from DPLH	
6789	TURQUOISE BAY NORTH	No	No	No	No Gender / Initiation Restrictions	Lodged	Artefacts / Scatter; Midden	*Registered Knowledge Holder names available from DPLH	
6831	GNARALOO STATION	No	Yes	No	No Gender / Initiation Restrictions	Lodged	Burial	*Registered Knowledge Holder names available from DPLH	
6965	ENDERBY ISLAND 07	No	No	No	No Gender / Initiation Restrictions	Lodged	Midden	*Registered Knowledge Holder names available from DPLH	
7204	CHABJUWARDOO BAY.	No	Yes	No	No Gender / Initiation Restrictions	Lodged	Hunting Place	*Registered Knowledge Holder names available from DPLH	
7207	NORWEGIAN BAY MIDDEN	No	Yes	No	No Gender / Initiation Restrictions	Lodged	Midden	*Registered Knowledge Holder names available from DPLH	
7208	MILYERING ROCKS.	No	Yes	No	No Gender / Initiation Restrictions	Lodged	Hunting Place	*Registered Knowledge Holder names available from DPLH	
7210	UPPER BULBARLI WELL.	No	Yes	No	No Gender / Initiation Restrictions	Lodged	Hunting Place	*Registered Knowledge Holder names available from DPLH	
7212	GREYLING CLIFFS.	No	No	No	No Gender / Initiation Restrictions	Lodged	Hunting Place	*Registered Knowledge Holder names available from DPLH	
7333	URALA STATION 13	No	Yes	No	No Gender / Initiation Restrictions	Lodged	Artefacts / Scatter; Midden	*Registered Knowledge Holder names available from DPLH	
7380	URALA STATION 08	No	Yes	No	No Gender / Initiation Restrictions	Lodged	Midden	*Registered Knowledge Holder names available from DPLH	
8897	YALABIDIE WELL	No	No	No	No Gender / Initiation Restrictions	Lodged	Burial	*Registered Knowledge Holder names available from DPLH	
10074	TAMALA STONE MOUND	No	No	No	No Gender / Initiation Restrictions	Lodged	Traditional Structure	*Registered Knowledge Holder names available from DPLH	
10099	POINT MAUD, CORAL BAY	No	No	No	No Gender / Initiation Restrictions	Lodged	Burial	*Registered Knowledge Holder names available from DPLH	
10100	GNARALOO BAY	No	Yes	No	No Gender / Initiation Restrictions	Lodged	Burial	*Registered Knowledge Holder names available from DPLH	

Aboriginal Cultural Heritage Inquiry System

List of Aboriginal Cultural Heritage (ACH) Lodged

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ID	Name	Boundary Restricted	Boundary Reliable	Culturally Sensitive	Culturally Sensitive Nature	Status	Place Type	Knowledge Holders	Legacy ID
10595	CORAL BAY BURIAL	No	No	No	No Gender / Initiation Restrictions	Lodged	Burial	*Registered Knowledge Holder names available from DPLH	
11000	CARRANG-TAMALA BOUNDARY	No	No	No	No Gender / Initiation Restrictions	Lodged	Midden	*Registered Knowledge Holder names available from DPLH	
11801	COASTAL MIDDEN, 5 MILE	No	No	No	No Gender / Initiation Restrictions	Lodged	Artefacts / Scatter; Midden	*Registered Knowledge Holder names available from DPLH	
19171	Ceremonial Ground	Yes	Yes	No	Men only	Lodged	Ritual / Ceremonial; Creation / Dreaming Narrative; Engraving	*Registered Knowledge Holder names available from DPLH	
21439	Cardabia Station Waterhole	No	No	No	No Gender / Initiation Restrictions	Lodged	Water Source	*Registered Knowledge Holder names available from DPLH	
22943	Flacourt Bay 01	No	Yes	No	No Gender / Initiation Restrictions	Lodged	Rock Shelter	*Registered Knowledge Holder names available from DPLH	
24398	Quobba Skeletal Remains	No	Yes	No	No Gender / Initiation Restrictions	Lodged	Burial	*Registered Knowledge Holder names available from DPLH	
24401	OS06-01	No	Yes	No	No Gender / Initiation Restrictions	Lodged	Sub surface cultural material; Artefacts / Scatter; Midden; Shell	*Registered Knowledge Holder names available from DPLH	
24768	OWS07-01	No	Yes	No	No Gender / Initiation Restrictions	Lodged	Midden; Shell	*Registered Knowledge Holder names available from DPLH	
24769	OWS07-02	No	Yes	No	No Gender / Initiation Restrictions	Lodged	Midden; Shell	*Registered Knowledge Holder names available from DPLH	
24770	OWS07-03	No	Yes	No	No Gender / Initiation Restrictions	Lodged	Midden; Shell	*Registered Knowledge Holder names available from DPLH	
24771	OWS07-04	No	Yes	No	No Gender / Initiation Restrictions	Lodged	Midden; Shell	*Registered Knowledge Holder names available from DPLH	
24772	OWS07-05	No	Yes	No	No Gender / Initiation Restrictions	Lodged	Midden; Shell	*Registered Knowledge Holder names available from DPLH	
24773	OWS07-06	No	Yes	No	No Gender / Initiation Restrictions	Lodged	Midden; Shell	*Registered Knowledge Holder names available from DPLH	
24774	OWS07-07	No	Yes	No	No Gender / Initiation Restrictions	Lodged	Midden; Shell	*Registered Knowledge Holder names available from DPLH	
24775	OWS07-08	No	Yes	No	No Gender / Initiation Restrictions	Lodged	Midden; Shell	*Registered Knowledge Holder names available from DPLH	
24776	OWS07-09	No	Yes	No	No Gender / Initiation Restrictions	Lodged	Midden; Shell	*Registered Knowledge Holder names available from DPLH	

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List of Aboriginal Cultural Heritage (ACH) Lodged

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24777	OWS07-10	No	Yes	No	No Gender / Initiation Restrictions	Lodged	Midden; Shell	*Registered Knowledge Holder names available from DPLH	
24778	OWS07-11	No	Yes	No	No Gender / Initiation Restrictions	Lodged	Midden; Shell	*Registered Knowledge Holder names available from DPLH	
24779	OWS07-12	No	Yes	No	No Gender / Initiation Restrictions	Lodged	Midden; Shell	*Registered Knowledge Holder names available from DPLH	
24780	OWS07-13	No	Yes	No	No Gender / Initiation Restrictions	Lodged	Midden; Shell	*Registered Knowledge Holder names available from DPLH	
24781	OWS07-14	No	Yes	No	No Gender / Initiation Restrictions	Lodged	Midden; Shell	*Registered Knowledge Holder names available from DPLH	
25076	Norwegian Bay Burial 01/2008	No	Yes	No	No Gender / Initiation Restrictions	Lodged	Burial	*Registered Knowledge Holder names available from DPLH	
26119	Dirk Hartog Island: Preseverant Camp-Fireplace	No	Yes	No	No Gender / Initiation Restrictions	Lodged	Artefacts / Scatter; Shell	*Registered Knowledge Holder names available from DPLH	
29549	Boodie Soak	No	Yes	No	No Gender / Initiation Restrictions	Lodged	Artefacts / Scatter	*Registered Knowledge Holder names available from DPLH	
31762	Site 1	No	Yes	No	No Gender / Initiation Restrictions	Lodged	Artefacts / Scatter	*Registered Knowledge Holder names available from DPLH	
31763	Site 2	No	Yes	No	No Gender / Initiation Restrictions	Lodged	Artefacts / Scatter	*Registered Knowledge Holder names available from DPLH	
36199	Boodie Cave		Yes	No		Lodged	Historical; Other	*Registered Knowledge Holder names available from DPLH	
36200	John Wayne Country Rockshelter	No	Yes	No	No Gender / Initiation Restrictions	Lodged	Historical; Other	*Registered Knowledge Holder names available from DPLH	
36234	South End structures, Barrow Island.	No	No	No		Lodged	Historical; Other	*Registered Knowledge Holder names available from DPLH	
36261	G-13-S0001	No	Yes	No		Lodged	Historical; Other	*Registered Knowledge Holder names available from DPLH	
36262	H-24-S0001	No	Yes	No		Lodged	Historical; Other	*Registered Knowledge Holder names available from DPLH	
36263	H-24-S0002	No	Yes	No		Lodged	Historical; Other	*Registered Knowledge Holder names available from DPLH	
36264	I-23-S0001	No	Yes	No		Lodged	Historical; Other	*Registered Knowledge Holder names available from DPLH	

Aboriginal Cultural Heritage Inquiry System

List of Aboriginal Cultural Heritage (ACH) Lodged

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ID	Name	Boundary Restricted	Boundary Reliable	Culturally Sensitive	Culturally Sensitive Nature	Status	Place Type	Knowledge Holders	Legacy ID
36265	I-23-S0002	No	Yes	No		Lodged	Historical; Other	*Registered Knowledge Holder names available from DPLH	
36266	I-24-S0003	No	Yes	No		Lodged	Historical; Other	*Registered Knowledge Holder names available from DPLH	
36267	J-23-S0001	No	Yes	No		Lodged	Historical; Other	*Registered Knowledge Holder names available from DPLH	
36268	J-23-S0002	No	Yes	No		Lodged	Historical; Other	*Registered Knowledge Holder names available from DPLH	
36269	J-23-S0003	No	Yes	No		Lodged	Historical; Other	*Registered Knowledge Holder names available from DPLH	
36270	M-03-S0001	No	Yes	No		Lodged	Historical; Other	*Registered Knowledge Holder names available from DPLH	
36271	N-02-S0001	No	Yes	No		Lodged	Historical; Other	*Registered Knowledge Holder names available from DPLH	
36272	O-02-S0002	No	Yes	No		Lodged	Historical; Other	*Registered Knowledge Holder names available from DPLH	
36273	O-05-S0003	No	Yes	No		Lodged	Historical; Other	*Registered Knowledge Holder names available from DPLH	
36344	N-05-S0002	No	Yes	No	No Gender / Initiation Restrictions	Lodged	Historical; Other	*Registered Knowledge Holder names available from DPLH	
36345	N-05-S0001	No	Yes	No	No Gender / Initiation Restrictions	Lodged	Historical; Other	*Registered Knowledge Holder names available from DPLH	
36346	O-05-S0001	No	Yes	No	No Gender / Initiation Restrictions	Lodged	Historical; Other	*Registered Knowledge Holder names available from DPLH	
36347	O-05-S0002	No	Yes	No	No Gender / Initiation Restrictions	Lodged	Historical; Other	*Registered Knowledge Holder names available from DPLH	
36348	P-04-S0001	No	Yes	No		Lodged	Historical; Other	*Registered Knowledge Holder names available from DPLH	
36718	Skeleton Bay is the name of the landform in which the remains were found.	Yes	Yes	Yes	No Gender / Initiation Restrictions	Lodged	Burial	*Registered Knowledge Holder names available from DPLH	
38299	Farquhar	No	Yes	No		Lodged	Burial	*Registered Knowledge Holder names available from DPLH	
38662	Farquhar on Gnarloo Station	No	Yes	No		Lodged	Burial; Artefacts / Scatter	*Registered Knowledge Holder names available from DPLH	

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ID	Name	Boundary Restricted	Boundary Reliable	Culturally Sensitive	Culturally Sensitive Nature	Status	Place Type	Knowledge Holders	Legacy ID
38844	Warroora burial site.	No	Yes	No		Lodged	Burial; Artefacts / Scatter; Ochre	*Registered Knowledge Holder names available from DPLH	
39730	Tantabiddi Midden 1	No	Yes	No	No Gender / Initiation Restrictions	Lodged		*Registered Knowledge Holder names available from DPLH	
40768	Jurabi Point	Yes		Yes	No Gender / Initiation Restrictions	Lodged	Burial	*Registered Knowledge Holder names available from DPLH	
41443	Ngundabugga (Ngoorndabooja) Ngarrari (Ngardarri)	No	Yes	No	No Gender / Initiation Restrictions	Lodged	Burial; Artefacts / Scatter; Camp; Grinding areas / Grooves; Shell	*Registered Knowledge Holder names available from DPLH	
41452	6 Mile Scatter 1	No	Yes	No		Lodged	Artefacts / Scatter; Shell; Water Source	*Registered Knowledge Holder names available from DPLH	
41454	Gutharra (Gnaraloo Road Scatter 2)	No	Yes	No		Lodged	Artefacts / Scatter; Shell	*Registered Knowledge Holder names available from DPLH	
41455	Gnaraloo Road Scatter 3	No	Yes	No		Lodged	Artefacts / Scatter; Midden; Shell; Water Source	*Registered Knowledge Holder names available from DPLH	
41456	Gnaraloo Road Scatter 4	No	Yes	No		Lodged	Artefacts / Scatter	*Registered Knowledge Holder names available from DPLH	
41457	Gnaraloo Road Scatter 5	No	Yes	No		Lodged	Artefacts / Scatter; Shell	*Registered Knowledge Holder names available from DPLH	
41458	Gnaraloo Road Scatter 6	No	Yes	No		Lodged	Artefacts / Scatter; Shell; Water Source	*Registered Knowledge Holder names available from DPLH	
41459	Gnaraloo Road Scatter 7	No	Yes	No		Lodged	Artefacts / Scatter; Shell; Water Source	*Registered Knowledge Holder names available from DPLH	
41460	Gnaraloo Road Scatter 8	No	Yes	No		Lodged	Artefacts / Scatter; Midden; Shell	*Registered Knowledge Holder names available from DPLH	
41461	Gnaraloo Road Scatter 9	No	Yes	No		Lodged	Artefacts / Scatter; Shell	*Registered Knowledge Holder names available from DPLH	
41462	Gnaraloo Road Scatter 10	No	Yes	No		Lodged	Sub surface cultural material; Midden; Shell	*Registered Knowledge Holder names available from DPLH	
41463	Gnaraloo Road Scatter 11	No	Yes	No		Lodged	Artefacts / Scatter; Midden; Shell	*Registered Knowledge Holder names available from DPLH	
41464	Gnaraloo Road Scatter 12	No	Yes	No		Lodged	Artefacts / Scatter; Shell; Water Source	*Registered Knowledge Holder names available from DPLH	
41467	Yalabaya Scatter 6	No	Yes	No		Lodged	Artefacts / Scatter; Midden; Shell	*Registered Knowledge Holder names available from DPLH	

Aboriginal Cultural Heritage Inquiry System

List of Aboriginal Cultural Heritage (ACH) Lodged

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ID	Name	Boundary Restricted	Boundary Reliable	Culturally Sensitive	Culturally Sensitive Nature	Status	Place Type	Knowledge Holders	Legacy ID
41468	Yalabaya Scatter 2	No	Yes	No		Lodged	Burial; Artefacts / Scatter; Midden	*Registered Knowledge Holder names available from DPLH	
41640	Tantabiddi Burial Complex	No		Yes	No Gender / Initiation Restrictions	Lodged	Burial	*Registered Knowledge Holder names available from DPLH	

Department of **Planning, Lands and Heritage**

GOVERNMENT OF WESTERN AUSTRALIA

Aboriginal Cultural Heritage Inquiry System

Map of Aboriginal Cultural Heritage (ACH) Lodged

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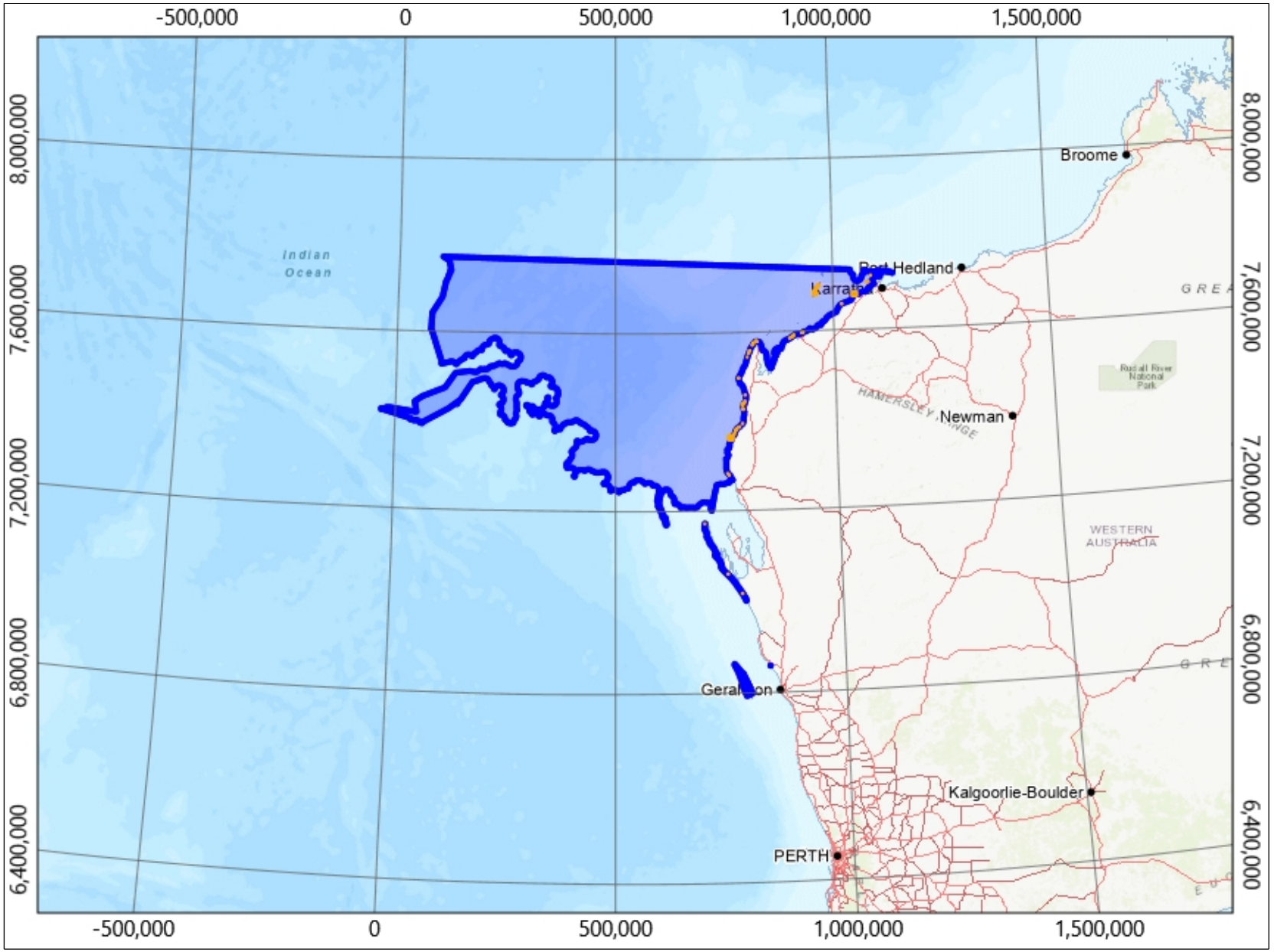

Legend

- Aboriginal Cultural Heritage (ACH) Lodged
- Search Area
- Aboriginal Community
  - *Permanent*
  - *Seasonal*
  - *Town Based*
- Town
- Road
- River
- Local Government Authority

470.19 kilometres

Map Scale 1 : 14,250,000

MGA Zone 49 (GDA2020)

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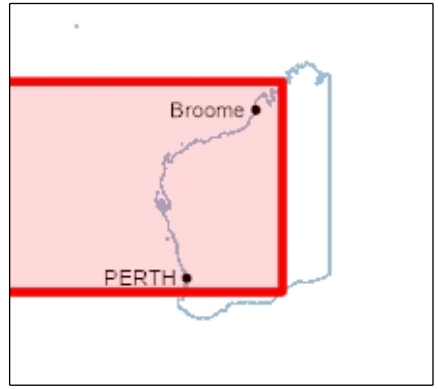

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Search Criteria

104 Aboriginal Cultural Heritage (ACH) Register in Shapefile - Socio-cultural EMBA_PMST_B

Disclaimer

Aboriginal heritage holds significant value to Aboriginal people for their social, spiritual, historical, scientific, or aesthetic importance within Aboriginal traditions, and provides an essential link for Aboriginal people to their past, present and future. In Western Australia Aboriginal heritage is protected under the Aboriginal Heritage Act 1972.

All Aboriginal cultural heritage in Western Australia is protected, whether or not the ACH has been reported or exists on the Register.

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Terminology

ID: ACH on the Register is assigned a unique ID by the Department of Planning, Lands and Heritage using the format: ACH-00000001. For ACH on the former Register the ID numbers remain unchanged and use the new format. For example the ACH ID of the place Swan River was previously '3536' and is now 'ACH-00003536'.

Access and Restrictions:

- Boundary Reliable (Yes/No): Indicates whether to the best knowledge of the Department, the location and extent of the ACH boundary is considered reliable.
- Boundary Restricted = No: Represents the actual location of the ACH as understood by the Department..
- Boundary Restricted = Yes: To preserve confidentiality the exact location and extent of the place is not displayed on the map. However, the shaded region (generally with an area of at least 4km²) provides a general indication of where the ACH is located. If you are a landowner and wish to find out more about the exact location of the place, please contact the Department of Planning, Lands and Heritage.
- Culturally Sensitive = No: Availability of information that the Department of Planning, Lands and Heritage holds in relation to the ACH is not restricted in any way.
- Culturally Sensitive = Yes: Some of the information that the Department of Planning, Lands and Heritage holds in relation to the ACH is restricted if it is considered culturally sensitive information. This information will only be made available if the Department of Planning, Lands and Heritage receives written approval from the people who provided the information. To request access please contact via https://achknowledge.dplh.wa.gov.au/ach-enquiry-form.
- Culturally Sensitive Nature:
  - No Gender / Initiation Restrictions: Anyone can view the information.
  - Men only: Only males can view restricted information.
  - Women only: Only females can view restricted information.

Status:

- Register: Aboriginal cultural heritage places that are assessed as meeting Section 5 of the Aboriginal Heritage Act 1972.
- Lodged: Information which has been received in relation to an Aboriginal cultural heritage place, but is yet to be assessed under Section 5 of the Aboriginal Heritage Act 1972.
- Historic: Aboriginal heritage places assessed as not meeting the criteria of Section 5 of the Aboriginal Heritage Act 1972. Includes places that no longer exist as a result of land use activities with existing approvals.

Place Type: The type of Aboriginal cultural heritage place. For example an artefact scatter place or engravings place.

Legacy ID: This is the former unique number that the former Department of Aboriginal Sites assigned to the place.

Coordinates

Map coordinates are based on the GDA 2020 Datum.

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Aboriginal Cultural Heritage Inquiry System

List of Aboriginal Cultural Heritage (ACH) Register

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ID	Name	Boundary Restricted	Boundary Reliable	Culturally Sensitive	Culturally Sensitive Nature	Status	Place Type	Knowledge Holders	Legacy ID
6325	COWERIE WELL	Yes	No	Yes	No Gender / Initiation Restrictions	Register	Burial	*Registered Knowledge Holder names available from DPLH	P06642
6334	MUNDA STATION BURIAL 1	No	No	No	No Gender / Initiation Restrictions	Register	Burial	*Registered Knowledge Holder names available from DPLH	P06651
6335	MUNDA STATION BURIAL 2	No	No	No	No Gender / Initiation Restrictions	Register	Burial	*Registered Knowledge Holder names available from DPLH	P06652
6567	TABBA TABBA MOUTH 2	No	No	No	No Gender / Initiation Restrictions	Register	Midden	*Registered Knowledge Holder names available from DPLH	P06412
7786	BAALYINNYE.	Yes	Yes	Yes	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Midden; Water Source	*Registered Knowledge Holder names available from DPLH	P05055
11448	23 MILE CREEK	No	No	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Engraving	*Registered Knowledge Holder names available from DPLH	P00744
12071	SOUTH WEST CREEK 4.	Yes	Yes	Yes	No Gender / Initiation Restrictions	Register	Sub surface cultural material; Artefacts / Scatter; Camp; Ritual / Ceremonial; Engraving; Traditional Structure; Midden; Other	*Registered Knowledge Holder names available from DPLH	P00090
12195	WAILALKUNYA, SLATE ISLANDS	No	Yes	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Quarry	*Registered Knowledge Holder names available from DPLH	K00023
12410	LINTAPITJIN/LOT 2065PORT DR	Yes	Yes	Yes	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Ritual / Ceremonial; Creation / Dreaming Narrative; Midden	*Registered Knowledge Holder names available from DPLH	K02819
12468	GALYUNGA	Yes	Yes	Yes	No Gender / Initiation Restrictions	Register	Ritual / Ceremonial; Creation / Dreaming Narrative; Fish Trap	*Registered Knowledge Holder names available from DPLH	K02772
12469	GUNJI CEREMONIAL GROUND	Yes	Yes	Yes	No Gender / Initiation Restrictions	Register	Ritual / Ceremonial	*Registered Knowledge Holder names available from DPLH	K02773
12470	GULGUDUNG	Yes	No	Yes	No Gender / Initiation Restrictions	Register	Creation / Dreaming Narrative	*Registered Knowledge Holder names available from DPLH	K02774
12471	MARUNGUDA	Yes	Yes	Yes	No Gender / Initiation Restrictions	Register	Creation / Dreaming Narrative	*Registered Knowledge Holder names available from DPLH	K02775
12550	CONDINI LANDING WEST	No	No	No	No Gender / Initiation Restrictions	Register	Burial	*Registered Knowledge Holder names available from DPLH	K02698
12552	CLEMENTSON ST. SITE COMPLEX	Yes	Yes	Yes	No Gender / Initiation Restrictions	Register	Ritual / Ceremonial; Creation / Dreaming Narrative	*Registered Knowledge Holder names available from DPLH	K02700
12720	DULI CAVE.	No	No	No	No Gender / Initiation Restrictions	Register	Camp; Ritual / Ceremonial; Creation / Dreaming Narrative; Rock Shelter	*Registered Knowledge Holder names available from DPLH	K02503

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ID	Name	Boundary Restricted	Boundary Reliable	Culturally Sensitive	Culturally Sensitive Nature	Status	Place Type	Knowledge Holders	Legacy ID
12722	DIDJI POINT.	No	No	No	No Gender / Initiation Restrictions	Register	Creation / Dreaming Narrative; Traditional Structure	*Registered Knowledge Holder names available from DPLH	K02505
12725	DIDJI WELLS.	No	No	No	No Gender / Initiation Restrictions	Register	Creation / Dreaming Narrative; Water Source	*Registered Knowledge Holder names available from DPLH	K02508
12726	CASSINI STONE LINE	No	Yes	No	No Gender / Initiation Restrictions	Register	Creation / Dreaming Narrative; Traditional Structure	*Registered Knowledge Holder names available from DPLH	K02509
12727	CASSINI STONE CIRCLES	No	No	No	No Gender / Initiation Restrictions	Register	Creation / Dreaming Narrative; Traditional Structure	*Registered Knowledge Holder names available from DPLH	K02510
12835	LAMBINJINMAN.	No	No	No	No Gender / Initiation Restrictions	Register	Midden	*Registered Knowledge Holder names available from DPLH	K02405
12838	JILBANUNG.	No	Yes	No	No Gender / Initiation Restrictions	Register	Camp; Midden	*Registered Knowledge Holder names available from DPLH	K02408
12839	BILLINGURRU.	Yes	Yes	Yes	Men only	Register	Camp; Ritual / Ceremonial; Creation / Dreaming Narrative	*Registered Knowledge Holder names available from DPLH	K02409
12842	INBALMARRA.	Yes	Yes	Yes	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Camp; Ritual / Ceremonial; Creation / Dreaming Narrative; Midden; Quarry	*Registered Knowledge Holder names available from DPLH	K02412
12872	GANTHEAUME POINT 2.	No	Yes	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Camp; Midden	*Registered Knowledge Holder names available from DPLH	K02331
12873	ENTRANCE POINT	No	Yes	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Midden	*Registered Knowledge Holder names available from DPLH	K02332
12888	BALJARKURUKUN.	No	Yes	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Midden; Quarry	*Registered Knowledge Holder names available from DPLH	K02347
12902	KUNDANDU.	Yes	Yes	Yes	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Camp; Creation / Dreaming Narrative; Midden; Other; Water Source	*Registered Knowledge Holder names available from DPLH	K02308
12903	MURRJAL.	Yes	Yes	Yes	Women only	Register	Artefacts / Scatter; Camp; Creation / Dreaming Narrative; Midden; Other; Water Source	*Registered Knowledge Holder names available from DPLH	K02309
12904	RURRJAMAN.	Yes	Yes	Yes	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Camp; Creation / Dreaming Narrative; Midden; Other; Plant Resource; Water Source	*Registered Knowledge Holder names available from DPLH	K02310
12905	NORTH BARRED CREEK.	No	No	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Midden; Water Source	*Registered Knowledge Holder names available from DPLH	K02311

Aboriginal Cultural Heritage Inquiry System

List of Aboriginal Cultural Heritage (ACH) Register

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ID	Name	Boundary Restricted	Boundary Reliable	Culturally Sensitive	Culturally Sensitive Nature	Status	Place Type	Knowledge Holders	Legacy ID
12906	WILLIES CREEK COMPLEX.	Yes	Yes	Yes	No Gender / Initiation Restrictions	Register	Burial; Artefacts / Scatter; Camp; Ritual / Ceremonial; Creation / Dreaming Narrative; Hunting Place; Midden; Water Source	*Registered Knowledge Holder names available from DPLH	K02312
12907	COCONUT WELL 2	No	Yes	No	No Gender / Initiation Restrictions	Register	Midden	*Registered Knowledge Holder names available from DPLH	K02313
12908	COCONUT WELL 1.	Yes	Yes	Yes	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Creation / Dreaming Narrative; Midden; Water Source	*Registered Knowledge Holder names available from DPLH	K02314
12909	COCONUT WELL ISLAND	Yes	No	Yes	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Midden	*Registered Knowledge Holder names available from DPLH	K02315
12910	NORTH CABLE BEACH 6	No	Yes	No	No Gender / Initiation Restrictions	Register	Midden	*Registered Knowledge Holder names available from DPLH	K02316
12911	NORTH CABLE BEACH 5	No	Yes	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Midden	*Registered Knowledge Holder names available from DPLH	K02317
12912	JURLIRR.	Yes	No	Yes	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Ritual / Ceremonial; Creation / Dreaming Narrative; Midden; Other; Water Source	*Registered Knowledge Holder names available from DPLH	K02318
12913	NORTH CABLE BEACH 4	No	Yes	No	No Gender / Initiation Restrictions	Register	Midden	*Registered Knowledge Holder names available from DPLH	K02319
12914	NORTH CABLE BEACH 3	No	Yes	No	No Gender / Initiation Restrictions	Register	Midden	*Registered Knowledge Holder names available from DPLH	K02320
12915	NORTH CABLE BEACH 2	No	Yes	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Midden	*Registered Knowledge Holder names available from DPLH	K02321
12916	NORTH CABLE BEACH 1	No	Yes	No	No Gender / Initiation Restrictions	Register	Midden	*Registered Knowledge Holder names available from DPLH	K02322
12917	CABLE BEACH 6.	Yes	No	Yes	No Gender / Initiation Restrictions	Register	Camp; Meeting Place; Midden; Water Source	*Registered Knowledge Holder names available from DPLH	K02323
12918	CABLE BEACH 4.	No	No	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Camp; Midden; Other; Water Source	*Registered Knowledge Holder names available from DPLH	K02324
12919	CABLE BEACH 2	No	Yes	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Midden; Other	*Registered Knowledge Holder names available from DPLH	K02325
12920	CABLE BEACH 1	No	Yes	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Midden; Other	*Registered Knowledge Holder names available from DPLH	K02326

ID	Name	Boundary Restricted	Boundary Reliable	Culturally Sensitive	Culturally Sensitive Nature	Status	Place Type	Knowledge Holders	Legacy ID
12921	MINYIRR.	Yes	Yes	Yes	No Gender / Initiation Restrictions	Register	Creation / Dreaming Narrative; Other; Water Source	*Registered Knowledge Holder names available from DPLH	K02327
12922	JUNGKURR	Yes	Yes	Yes	No Gender / Initiation Restrictions	Register	Creation / Dreaming Narrative; Other	*Registered Knowledge Holder names available from DPLH	K02328
12923	NGAKALYALYA	Yes	Yes	Yes	No Gender / Initiation Restrictions	Register	Creation / Dreaming Narrative; Other	*Registered Knowledge Holder names available from DPLH	K02329
12924	GANTHEAUME POINT 1	Yes	No	Yes	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Creation / Dreaming Narrative; Midden; Other	*Registered Knowledge Holder names available from DPLH	K02330
12944	KURAKARAMUNJUNO 1.	No	Yes	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Camp; Midden	*Registered Knowledge Holder names available from DPLH	K02298
12945	KURAKARAMUNJUNO 2.	No	Yes	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Camp; Midden	*Registered Knowledge Holder names available from DPLH	K02299
12947	KURAKARAMUNJUNO 4.	No	No	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Camp; Midden; Water Source	*Registered Knowledge Holder names available from DPLH	K02301
12948	FLAT ROCK 1.	No	Yes	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Midden	*Registered Knowledge Holder names available from DPLH	K02302
12949	FLAT ROCK 2.	No	Yes	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Midden	*Registered Knowledge Holder names available from DPLH	K02303
12950	KULMUKARAKUN JUNO 1	No	Yes	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Midden	*Registered Knowledge Holder names available from DPLH	K02304
12964	CAPE KERAUDREN 2	No	Yes	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter	*Registered Knowledge Holder names available from DPLH	K02265
12965	CAPE KERAUDREN 3.	Yes	No	Yes	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Camp; Midden; Water Source	*Registered Knowledge Holder names available from DPLH	K02266
12967	CAPE KERAUDREN 5	Yes	No	Yes	No Gender / Initiation Restrictions	Register	Burial; Midden	*Registered Knowledge Holder names available from DPLH	K02268
12968	CAPE KERAUDREN 6	No	Yes	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Grinding areas / Grooves; Midden	*Registered Knowledge Holder names available from DPLH	K02269
12969	WARRA MURRANGA TALU	Yes	No	Yes	No Gender / Initiation Restrictions	Register	Ritual / Ceremonial; Creation / Dreaming Narrative	*Registered Knowledge Holder names available from DPLH	K02270
13075	MANGALAGUN+IWALAN GANJDANJ.	Yes	Yes	Yes	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Creation / Dreaming Narrative; Midden; Water Source	*Registered Knowledge Holder names available from DPLH	K02163
13076	WALMADAN (James Price Point)	No	Yes	No	No Gender / Initiation Restrictions	Register	Burial; Artefacts / Scatter; Camp; Fish Trap; Hunting Place; Midden; Other; Water Source	*Registered Knowledge Holder names available from DPLH	K02164

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ID	Name	Boundary Restricted	Boundary Reliable	Culturally Sensitive	Culturally Sensitive Nature	Status	Place Type	Knowledge Holders	Legacy ID
13350	FRAZIER DOWNS BEACH	No	Yes	No	No Gender / Initiation Restrictions	Register	Burial	*Registered Knowledge Holder names available from DPLH	K01902
13465	WIRGANJU GROUND	Yes	Yes	Yes	No Gender / Initiation Restrictions	Register		*Registered Knowledge Holder names available from DPLH	K01694
13503	WIRRAR.	Yes	Yes	Yes	No Gender / Initiation Restrictions	Register	Burial; Artefacts / Scatter; Camp; Midden; Water Source	*Registered Knowledge Holder names available from DPLH	K01677
13504	KARDILAKAN - JAJAL.	Yes	Yes	Yes	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Camp; Ritual / Ceremonial; Creation / Dreaming Narrative; Fish Trap; Midden; Other; Water Source	*Registered Knowledge Holder names available from DPLH	K01678
14241	FISHERMENS BEND 3	Yes	Yes	Yes	Men only	Register	Ritual / Ceremonial; Creation / Dreaming Narrative; Other; Repository / Storage Place	*Registered Knowledge Holder names available from DPLH	K00851
14242	FISHERMENS BEND 4	Yes	No	Yes	Men only	Register	Creation / Dreaming Narrative; Other	*Registered Knowledge Holder names available from DPLH	K00852
14243	FISHERMENS BEND 5	Yes	No	Yes	Men only	Register	Creation / Dreaming Narrative; Other	*Registered Knowledge Holder names available from DPLH	K00853
14291	FISHERMENS BEND 1.	Yes	No	Yes	Men only	Register	Artefacts / Scatter; Camp; Creation / Dreaming Narrative; Midden; Other; Water Source	*Registered Knowledge Holder names available from DPLH	K00849
14312	CAPE VILLARET	Yes	Yes	Yes	No Gender / Initiation Restrictions	Register	Creation / Dreaming Narrative	*Registered Knowledge Holder names available from DPLH	K00817
14341	SHELLBOROUGH 1-3.	Yes	No	Yes	No Gender / Initiation Restrictions	Register	Burial; Artefacts / Scatter; Camp; Grinding areas / Grooves; Traditional Structure; Midden; Other	*Registered Knowledge Holder names available from DPLH	K00773
14432	CAPE JAUBERT	No	Yes	No	No Gender / Initiation Restrictions	Register	Fish Trap	*Registered Knowledge Holder names available from DPLH	K00650
14433	PORT SMITH.	Yes	Yes	Yes	No Gender / Initiation Restrictions	Register	Camp; Ritual / Ceremonial	*Registered Knowledge Holder names available from DPLH	K00651
14434	ADMIRAL BAY	No	Yes	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Fish Trap; Midden	*Registered Knowledge Holder names available from DPLH	K00652
14438	BLACKROCK POINT 2.	No	Yes	No	No Gender / Initiation Restrictions	Register	Camp; Fish Trap; Midden	*Registered Knowledge Holder names available from DPLH	K00656
14439	BIDIR-NGA:BA	Yes	No	Yes	No Gender / Initiation Restrictions	Register	Creation / Dreaming Narrative; Fish Trap	*Registered Knowledge Holder names available from DPLH	K00657

Aboriginal Cultural Heritage Inquiry System

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14440	BLACKROCK POINT 1.	No	No	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Camp; Midden	*Registered Knowledge Holder names available from DPLH	K00658
14442	LAGRANGE.	No	No	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Camp; Midden; Water Source	*Registered Knowledge Holder names available from DPLH	K00660
14444	BEACON HILL	No	Yes	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Midden	*Registered Knowledge Holder names available from DPLH	K00662
14445	CAPE VILLARET BURIAL	No	No	No	No Gender / Initiation Restrictions	Register	Burial	*Registered Knowledge Holder names available from DPLH	K00663
14489	BIDIYANABA FOOTPRINT	No	Yes	No	No Gender / Initiation Restrictions	Register	Creation / Dreaming Narrative	*Registered Knowledge Holder names available from DPLH	K00589
14556	NGAMILI, CONDILLAC ISLAND	Yes	No	Yes	No Gender / Initiation Restrictions	Register	Creation / Dreaming Narrative	*Registered Knowledge Holder names available from DPLH	K00549
14557	CABLE BEACH 5.	No	Yes	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Camp; Ritual / Ceremonial; Creation / Dreaming Narrative; Hunting Place; Midden; Other	*Registered Knowledge Holder names available from DPLH	K00497
14561	SACRED STORES/ BROOME	Yes	Yes	Yes	No Gender / Initiation Restrictions	Register	Ritual / Ceremonial; Repository / Storage Place	*Registered Knowledge Holder names available from DPLH	K00501
14609	CABLE BEACH 3.	Yes	Yes	Yes	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Camp; Creation / Dreaming Narrative; Midden; Other	*Registered Knowledge Holder names available from DPLH	K00496
14929	ALBERT ISLAND	No	No	No	No Gender / Initiation Restrictions	Register	Engraving	*Registered Knowledge Holder names available from DPLH	K00131
14930	SOUTH MARET ISLAND	No	Yes	No	No Gender / Initiation Restrictions	Register	Traditional Structure	*Registered Knowledge Holder names available from DPLH	K00132
14977	CHAMPAGNY ISLANDS	No	No	No	No Gender / Initiation Restrictions	Register	Traditional Structure; Painting	*Registered Knowledge Holder names available from DPLH	K00179
17568	CAPE VILLARET AREA 03 / HOMESTEAD SITE	No	Yes	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Midden; Other	*Registered Knowledge Holder names available from DPLH	
17569	CAPE VILLARET AREA 04	No	Yes	No	No Gender / Initiation Restrictions	Register	Camp; Midden; Other	*Registered Knowledge Holder names available from DPLH	
17570	CAPE VILLARET AREA 05	No	Yes	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Midden; Other; Rock Shelter	*Registered Knowledge Holder names available from DPLH	
17571	CAPE VILLARET AREA 06	No	Yes	No	No Gender / Initiation Restrictions	Register	Midden; Other; Rock Shelter	*Registered Knowledge Holder names available from DPLH	

Aboriginal Cultural Heritage Inquiry System

List of Aboriginal Cultural Heritage (ACH) Register

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ID	Name	Boundary Restricted	Boundary Reliable	Culturally Sensitive	Culturally Sensitive Nature	Status	Place Type	Knowledge Holders	Legacy ID
17572	CAPE VILLARET AREA 07 / BARNES BEACH MIDDEN	No	Yes	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Midden; Other	*Registered Knowledge Holder names available from DPLH	
17573	CAPE VILLARET AREA 08	No	Yes	No	No Gender / Initiation Restrictions	Register	Sub surface cultural material; Artefacts / Scatter; Midden; Ochre	*Registered Knowledge Holder names available from DPLH	
17574	CAPE VILLARET AREA 09	No	Yes	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Midden	*Registered Knowledge Holder names available from DPLH	
17575	CAPE VILLARET AREA 10	No	Yes	No	No Gender / Initiation Restrictions	Register	Midden	*Registered Knowledge Holder names available from DPLH	
17580	CAPE VILLARET AREA 15	No	Yes	No	No Gender / Initiation Restrictions	Register	Camp; Midden; Other	*Registered Knowledge Holder names available from DPLH	
17918	Yardoogarra Reburial	No	Yes	No	No Gender / Initiation Restrictions	Register	Burial	*Registered Knowledge Holder names available from DPLH	
19799	Mungullagun Blackberry Tree Midden	No	Yes	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Midden	*Registered Knowledge Holder names available from DPLH	
21512	Railway 4	No	Yes	No	No Gender / Initiation Restrictions	Register	Midden	*Registered Knowledge Holder names available from DPLH	
32041	PIL3381	No	Yes	No	No Gender / Initiation Restrictions	Register	Midden; Shell	*Registered Knowledge Holder names available from DPLH	
32447	Gardalargun South	No	Yes	No	No Gender / Initiation Restrictions	Register		*Registered Knowledge Holder names available from DPLH	

Department of **Planning, Lands and Heritage**

GOVERNMENT OF WESTERN AUSTRALIA

Aboriginal Cultural Heritage Inquiry System

Map of Aboriginal Cultural Heritage (ACH) Register

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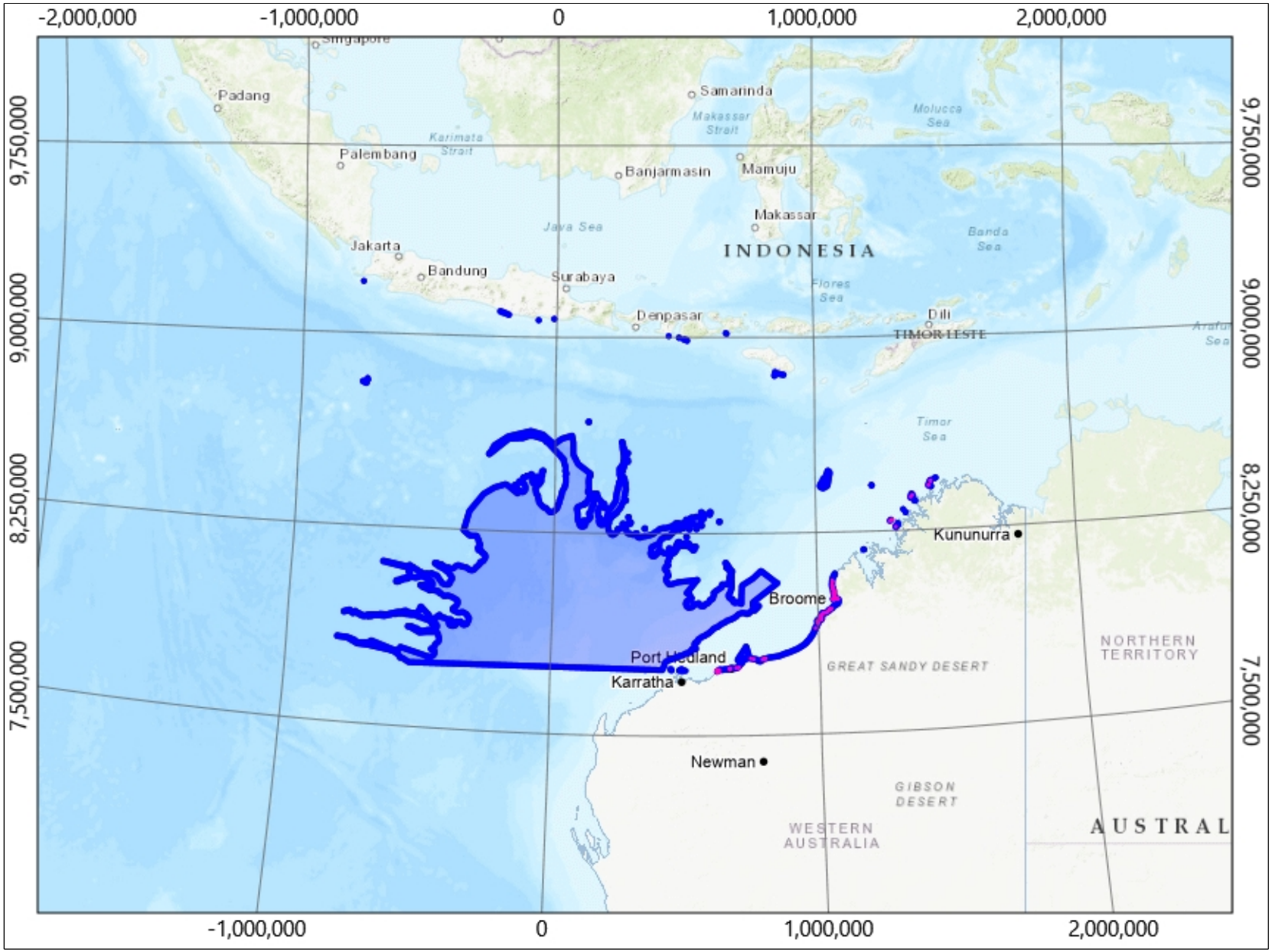

Legend

- Aboriginal Cultural Heritage (ACH) Register
- Search Area
- Aboriginal Community
  - *Permanent*
  - *Seasonal*
  - *Town Based*
- Town
- Road
- River
- Local Government Authority

753.26 kilometres

Map Scale 1 : 22,830,000

MGA Zone 50 (GDA2020)

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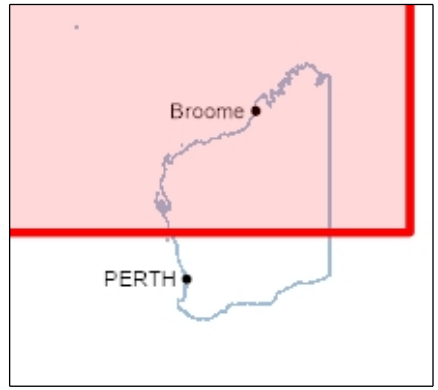

Aboriginal Cultural Heritage Inquiry System

List of Aboriginal Cultural Heritage (ACH) Lodged

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Search Criteria

43 Aboriginal Cultural Heritage (ACH) Lodged in Shapefile - Socio-cultural EMBA_PMST_B

Disclaimer

Aboriginal heritage holds significant value to Aboriginal people for their social, spiritual, historical, scientific, or aesthetic importance within Aboriginal traditions, and provides an essential link for Aboriginal people to their past, present and future. In Western Australia Aboriginal heritage is protected under the Aboriginal Heritage Act 1972.

All Aboriginal cultural heritage in Western Australia is protected, whether or not the ACH has been reported or exists on the Register.

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Terminology

ID: ACH on the Register is assigned a unique ID by the Department of Planning, Lands and Heritage using the format: ACH-00000001. For ACH on the former Register the ID numbers remain unchanged and use the new format. For example the ACH ID of the place Swan River was previously '3536' and is now 'ACH-00003536'.

Access and Restrictions:

- Boundary Reliable (Yes/No): Indicates whether to the best knowledge of the Department, the location and extent of the ACH boundary is considered reliable.
- Boundary Restricted = No: Represents the actual location of the ACH as understood by the Department..
- Boundary Restricted = Yes: To preserve confidentiality the exact location and extent of the place is not displayed on the map. However, the shaded region (generally with an area of at least 4km²) provides a general indication of where the ACH is located. If you are a landowner and wish to find out more about the exact location of the place, please contact the Department of Planning, Lands and Heritage.
- Culturally Sensitive = No: Availability of information that the Department of Planning, Lands and Heritage holds in relation to the ACH is not restricted in any way.
- Culturally Sensitive = Yes: Some of the information that the Department of Planning, Lands and Heritage holds in relation to the ACH is restricted if it is considered culturally sensitive information. This information will only be made available if the Department of Planning, Lands and Heritage receives written approval from the people who provided the information. To request access please contact via https://achknowledge.dplh.wa.gov.au/ach-enquiry-form.
- Culturally Sensitive Nature:
  - No Gender / Initiation Restrictions: Anyone can view the information.
  - Men only: Only males can view restricted information.
  - Women only: Only females can view restricted information.

Status:

- Register: Aboriginal cultural heritage places that are assessed as meeting Section 5 of the Aboriginal Heritage Act 1972.
- Lodged: Information which has been received in relation to an Aboriginal cultural heritage place, but is yet to be assessed under Section 5 of the Aboriginal Heritage Act 1972.
- Historic: Aboriginal heritage places assessed as not meeting the criteria of Section 5 of the Aboriginal Heritage Act 1972. Includes places that no longer exist as a result of land use activities with existing approvals.

Place Type: The type of Aboriginal cultural heritage place. For example an artefact scatter place or engravings place.

Legacy ID: This is the former unique number that the former Department of Aboriginal Sites assigned to the place.

Coordinates

Map coordinates are based on the GDA 2020 Datum.

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Aboriginal Cultural Heritage Inquiry System

List of Aboriginal Cultural Heritage (ACH) Lodged

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ID	Name	Boundary Restricted	Boundary Reliable	Culturally Sensitive	Culturally Sensitive Nature	Status	Place Type	Knowledge Holders	Legacy ID
432	RED POINT	No	Yes	No	No Gender / Initiation Restrictions	Lodged	Creation / Dreaming Narrative	*Registered Knowledge Holder names available from DPLH	
433	GANTHEAUME PT. 3	No	Yes	No	No Gender / Initiation Restrictions	Lodged	Creation / Dreaming Narrative	*Registered Knowledge Holder names available from DPLH	
10635	WHIM CREEK 27, PACKSADDLE.	Yes	Yes	Yes	No Gender / Initiation Restrictions	Lodged	Burial; Modified Tree; Rock Shelter	*Registered Knowledge Holder names available from DPLH	
11442	COWERIE WELL	No	No	No	No Gender / Initiation Restrictions	Lodged	Burial	*Registered Knowledge Holder names available from DPLH	
12416	GANTHEAUME PT: DOG DREAMING	Yes	Yes	Yes	No Gender / Initiation Restrictions	Lodged	Creation / Dreaming Narrative	*Registered Knowledge Holder names available from DPLH	
12427	PIDIRAKUNDJUNU CREEK.	No	No	No	No Gender / Initiation Restrictions	Lodged	Camp	*Registered Knowledge Holder names available from DPLH	
12436	BIDJADANGA SKELETAL FIND	Yes	No	Yes	No Gender / Initiation Restrictions	Lodged	Burial; Fish Trap	*Registered Knowledge Holder names available from DPLH	
12465	BUNDABUNDA.	No	No	No	No Gender / Initiation Restrictions	Lodged	Water Source	*Registered Knowledge Holder names available from DPLH	
12466	JUDIMULANBA.	No	Yes	No	No Gender / Initiation Restrictions	Lodged	Camp; Water Source	*Registered Knowledge Holder names available from DPLH	
12467	FALSE CAPE BOSSUT MIDDEN.	No	No	No	No Gender / Initiation Restrictions	Lodged	Camp; Midden; Water Source	*Registered Knowledge Holder names available from DPLH	
12684	INBALLAL KARNBOR.	No	Yes	No	No Gender / Initiation Restrictions	Lodged	Camp; Ritual / Ceremonial; Creation / Dreaming Narrative; Hunting Place; Other; Water Source	*Registered Knowledge Holder names available from DPLH	
12698	KUMBILLEBILLEKAN.	Yes	No	Yes	No Gender / Initiation Restrictions	Lodged	Burial; Camp	*Registered Knowledge Holder names available from DPLH	
12719	DULI COVE CAVES.	No	No	No	No Gender / Initiation Restrictions	Lodged	Sub surface cultural material; Artefacts / Scatter; Other	*Registered Knowledge Holder names available from DPLH	
12832	MILIBUNYARI.	No	Yes	No	No Gender / Initiation Restrictions	Lodged	Camp	*Registered Knowledge Holder names available from DPLH	
12836	WANGKUNAN.	No	No	No	No Gender / Initiation Restrictions	Lodged	Camp; Ritual / Ceremonial	*Registered Knowledge Holder names available from DPLH	
12837	MANANGKABU.	No	Yes	No	No Gender / Initiation Restrictions	Lodged	Camp	*Registered Knowledge Holder names available from DPLH	
12840	YARRARRA.	Yes	No	Yes	No Gender / Initiation Restrictions	Lodged	Camp; Creation / Dreaming Narrative	*Registered Knowledge Holder names available from DPLH	

Aboriginal Cultural Heritage Inquiry System

List of Aboriginal Cultural Heritage (ACH) Lodged

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ID	Name	Boundary Restricted	Boundary Reliable	Culturally Sensitive	Culturally Sensitive Nature	Status	Place Type	Knowledge Holders	Legacy ID
12841	MARNALAKUN.	Yes	No	Yes	No Gender / Initiation Restrictions	Lodged	Burial; Camp	*Registered Knowledge Holder names available from DPLH	
12889	NUNUKURAKUN	Yes	Yes	No	No Gender / Initiation Restrictions	Lodged	Ritual / Ceremonial; Creation / Dreaming Narrative	*Registered Knowledge Holder names available from DPLH	
12890	JIBIDANGKUN.	No	Yes	No	No Gender / Initiation Restrictions	Lodged	Camp	*Registered Knowledge Holder names available from DPLH	
12899	KULMUKARAKUN JUNO 2	No	Yes	No	No Gender / Initiation Restrictions	Lodged	Artefacts / Scatter; Midden	*Registered Knowledge Holder names available from DPLH	
12900	NGARRIMARRAN JUNO QUARRY	No	Yes	No	No Gender / Initiation Restrictions	Lodged	Artefacts / Scatter; Quarry	*Registered Knowledge Holder names available from DPLH	
12901	MURRDUDUN	No	No	No	No Gender / Initiation Restrictions	Lodged	Artefacts / Scatter; Creation / Dreaming Narrative; Midden; Other	*Registered Knowledge Holder names available from DPLH	
12941	BINDINGANKUNY 1.	No	Yes	No	No Gender / Initiation Restrictions	Lodged	Artefacts / Scatter; Camp; Midden	*Registered Knowledge Holder names available from DPLH	
12942	BINDINGANKUNY 2.	No	Yes	No	No Gender / Initiation Restrictions	Lodged	Artefacts / Scatter; Camp; Midden	*Registered Knowledge Holder names available from DPLH	
12943	BINDINGANKUNY 3.	No	Yes	No	No Gender / Initiation Restrictions	Lodged	Artefacts / Scatter; Camp; Midden	*Registered Knowledge Holder names available from DPLH	
12963	CAPE KERAUDREN 1	No	Yes	No	No Gender / Initiation Restrictions	Lodged	Midden	*Registered Knowledge Holder names available from DPLH	
13341	SLATE ISLAND	No	Yes	No	No Gender / Initiation Restrictions	Lodged	Burial	*Registered Knowledge Holder names available from DPLH	
13731	PIDIRNGAPA.	No	No	No	No Gender / Initiation Restrictions	Lodged	Creation / Dreaming Narrative; Water Source	*Registered Knowledge Holder names available from DPLH	
13732	JIDAMUNGA.	Yes	No	No	No Gender / Initiation Restrictions	Lodged	Creation / Dreaming Narrative; Landscape / Seascape Feature	*Registered Knowledge Holder names available from DPLH	
13733	JINJAGURIN / NUNDUNARR.	Yes	No	No	No Gender / Initiation Restrictions	Lodged	Creation / Dreaming Narrative; Water Source	*Registered Knowledge Holder names available from DPLH	
14271	MINARRINGY.	Yes	Yes	Yes	No Gender / Initiation Restrictions	Lodged	Burial; Artefacts / Scatter; Camp; Creation / Dreaming Narrative; Midden; Other; Water Source	*Registered Knowledge Holder names available from DPLH	
14311	CAPE GOURDON	Yes	Yes	Yes	No Gender / Initiation Restrictions	Lodged	Creation / Dreaming Narrative	*Registered Knowledge Holder names available from DPLH	
14504	CONDILLAC MIDDEN.	No	No	No	No Gender / Initiation Restrictions	Lodged	Camp; Midden	*Registered Knowledge Holder names available from DPLH	

Aboriginal Cultural Heritage Inquiry System

List of Aboriginal Cultural Heritage (ACH) Lodged

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ID	Name	Boundary Restricted	Boundary Reliable	Culturally Sensitive	Culturally Sensitive Nature	Status	Place Type	Knowledge Holders	Legacy ID
14952	CASSINI ISLAND	No	Yes	No	No Gender / Initiation Restrictions	Lodged	Traditional Structure	*Registered Knowledge Holder names available from DPLH	
17566	CAPE VILLARET AREA 01	No	Yes	No	No Gender / Initiation Restrictions	Lodged	Midden	*Registered Knowledge Holder names available from DPLH	
17755	CAPE FREZIER (CHINAMAN'S BEACH)	No	Yes	No	No Gender / Initiation Restrictions	Lodged	Fish Trap	*Registered Knowledge Holder names available from DPLH	
17756	YARDOOGARA 1 + 2 (CAPE VILLARET)	No	Yes	No	No Gender / Initiation Restrictions	Lodged	Fish Trap	*Registered Knowledge Holder names available from DPLH	
17757	YARDOOGARA 3	No	Yes	No	No Gender / Initiation Restrictions	Lodged	Fish Trap	*Registered Knowledge Holder names available from DPLH	
17850	BAMBOO LANDING	No	Yes	No	No Gender / Initiation Restrictions	Lodged	Other	*Registered Knowledge Holder names available from DPLH	
20621	Bedout Island	No	Yes	No	No Gender / Initiation Restrictions	Lodged	Creation / Dreaming Narrative; Landscape / Seascape Feature; Other	*Registered Knowledge Holder names available from DPLH	
24152	Saltwater Country - reef sites and fish traps (Maret Island)	Yes	Yes	Yes	No Gender / Initiation Restrictions	Lodged	Sub surface cultural material; Camp; Ritual / Ceremonial; Creation / Dreaming Narrative; Fish Trap; Historical; Hunting Place; Meeting Place; Landscape / Seascape Feature; Ochre; Plant Resource; Rock Shelter; Shell; Water Source	*Registered Knowledge Holder names available from DPLH	
24153	Jaradanyingga - Jaajaal	Yes	Yes	Yes	No Gender / Initiation Restrictions	Lodged	Sub surface cultural material; Camp; Ritual / Ceremonial; Historical; Hunting Place; Meeting Place; Landscape / Seascape Feature; Ochre; Plant Resource; Quarry; Rock Shelter; Shell; Water Source	*Registered Knowledge Holder names available from DPLH	

Department of **Planning, Lands and Heritage**

GOVERNMENT OF WESTERN AUSTRALIA

Aboriginal Cultural Heritage Inquiry System

Map of Aboriginal Cultural Heritage (ACH) Lodged

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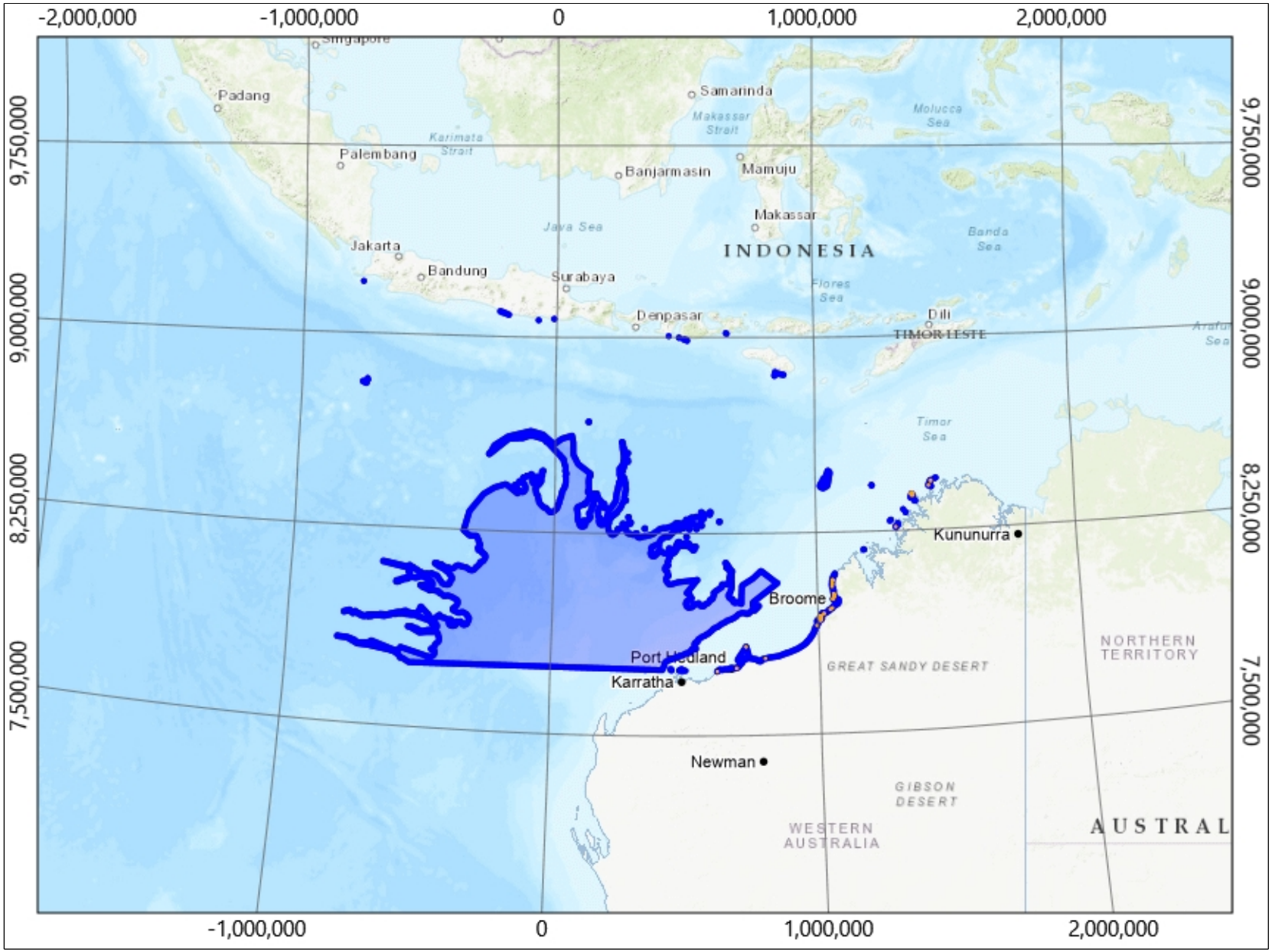

Legend

- Aboriginal Cultural Heritage (ACH) Lodged
- Search Area
- Aboriginal Community
  - *Permanent*
  - *Seasonal*
  - *Town Based*
- Town
- Road
- River
- Local Government Authority

753.26 kilometres

Map Scale 1 : 22,830,000

MGA Zone 50 (GDA2020)

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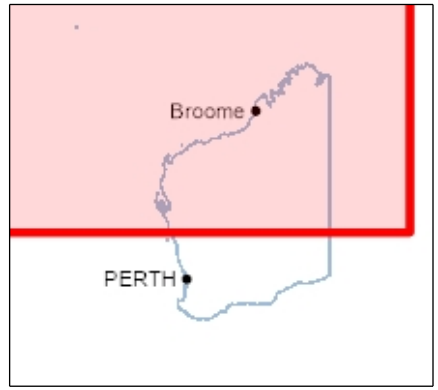

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ACHIS search results for the EMBA

Appendix F Consultation

[HOLD, for Santos to supply]

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APPENDIX F

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Introduction

This appendix summarises Santos' consultation effort for this EP, which has been conducted in accordance with NOPSEMA guidance to consult:

- Each Department or agency of the Commonwealth to which the activities to be carried out under the environment plan, or the revision of the environment plan, may be relevant;
- Each Department or agency of a State to which the activities to be carried out under the environment plan, or the revision of the environment plan, may be relevant;
- The Department of the responsible State Minister;
- A person or organisation whose functions, interests or activities may be affected by the activities to be carried out under the environment plan, or the revision of the environment plan;
- Any other person or organisation that the titleholder considers relevant.

Consultation information

As described in Section 4 of this EP, a key aspect of Santos' consultation approach recognised, based on publicly available information and where Santos had first-hand knowledge through previous consultation activities, that the interests or activities of authorities, persons or organisations identified for consultation may be affected by:

- Impacts from planned activities and risks from unplanned events given their proximity to proposed activities (email type 1).
- Risks from unplanned events only given their significant distance from proposed activities (email type 2).

Emails were also provided to authorities, representative organisations and organisations with commercial fishing interests, noting that we had not identified any commercial fishers who have active fishing data at this location, an email was sent where fishers may be affected by activity risks only (email type 2a).

Further, based on publicly available information, the physical location of the interests or activities of some organisations may not be clear (email type 3).

As a result, Santos developed four consultation email types reflecting the above assessments, ensuring that email recipients were clear about why Santos was contacting them.

A list of all authorities, persons or organisations and their relevant email type is provided in this Appendix.

Other consultation materials presented in this Appendix are listed below:

- General fact sheet
- Print advertising
- Social media posts
- Consultation presentation to support face-to-face and online meetings

Consultation report

A summary of consultation with authorities, persons and organisations is included in this Appendix, comprising:

- A summary of objections, claims or other feedback provided by the authority, person or organisation;

- An assessment of merits where objections or claims were raised about adverse impacts and risks of the proposed activities;
- Santos' response statement; and
- Details of measures adopted, including the relevant EP reference.

Campaign Emails

Initial campaign email consultations

Email Type 1

Email Type 1 where authorities, persons and organisations may be affected by impacts from planned activities and risks from unplanned events given their proximity to proposed activities.

ID No.	Date	Sent/ Received	Record Type	Consultation Materials	Email Subject
772	13/10/2025	Sent	Campaign Email	General Factsheet; Map	**Email 1:** CONSULTATION | Carnarvon Basin | Van Gogh Coniston Novara VGA-4H GI ST1 Well Intervention/Plug & Abandonment Environment Plan
ID -772 - Organisations Australian Border Force; Australian Hydrographic Office; Australian Maritime Safety Authority - maritime safety; Department of Biodiversity, Conservation and Attractions; Department of Climate Change, Energy, the Environment and Water - Director of National Parks; Department of Climate Change, Energy, the Environment and Water - Underwater cultural heritage; Department of Defence; Department of Industry, Science and Resources; ; Exmouth Community Liaison Group; Exmouth Game Fishing Club; James (for Nganhurra Thanardi Garrbu Aboriginal Corporation); Pilbara Ports Authority; Recfishwest; Shire of Exmouth; Western Australian Game Fishing Association					
ID -785 – Organisation Department of Mines, Petroleum and Exploration					

Example

From: Santos Consultation Team <offshore.consultation@santos.com>
Sent: Monday, 13 October 2025 12:02
To: [redacted]>
Subject: ![EXT]: CONSULTATION | Carnarvon Basin | Van Gogh Coniston Novara VGA-4H GI ST1 Well Intervention/Plug & Abandonment Environment Plan

Dear [redacted]

Santos is contacting you as we are proposing to suspend or plug and abandon (P&A) the VGA-4H GI ST1 well within the Van Gogh Coniston Novara (VGCN) field.

The proposed activities are planned to commence as early as Q4 2026, subject to obtaining all regulatory and business approvals. The expected activity duration is between approximately 10 and 40 days, with the duration subject to change based on potential for operational or weather-related challenges.

An Environment Plan (EP) is being prepared for the proposed activities and will have validity of five years, once accepted. The Operational Area is located within Commonwealth waters approximately 44 km north-northwest of the Cape Range Peninsula and 59.5 km north-northwest of Exmouth, Western Australia.

Why are we contacting you?

Under Commonwealth Government Regulations, Santos is required to consult with relevant persons about proposed activities in the course of preparing an EP.

A relevant person includes government agencies and authorities to which the proposed activity may be relevant, and persons or organisations whose functions, interests or activities may be affected by the proposed activity.

Information provided by relevant persons in consultation helps us to better understand the values and sensitivities of the environment and inform the evaluation of the potential impacts and risks associated with the activity and how to manage them appropriately.

We are contacting you because Santos considers that you may have functions, interests or activities which may be affected by impacts from planned activities.

Information about planned activities, including a summary of Activity key impacts, risks and management measures is included in a Consultation Fact Sheet that can be accessed via this link to our Consultation Hub web site.

Information and maps are also included showing how we use sophisticated computer-based modelling to present the areas that could be affected in the unlikely event of a spill, noting that not all areas within the modelled Environment that May Be Affected (EMBA) would be affected at the same time.

Providing feedback

As part of the consultation for proposed activities we are seeking any input you may have about:

- Features of the environment that may be affected by proposed activities, including social, economic and cultural values and sensitivities.
- Potential environmental impacts and risks of proposed activities, including the potential consequences of the activities on your functions, interests or activities.
- What, if any, measures could reduce environmental impacts or risks, considering those measures already proposed by Santos and outlined in the Consultation Fact Sheet.

Feedback received during consultation will be considered in the development of the EP, which will be submitted to the Commonwealth Regulator, the National Offshore Petroleum Safety

and Environmental Management Authority (NOPSEMA), for assessment.

Please note that the information provided during consultation will be included in documentation submitted to NOPSEMA. Please let us know if you would like any information you provide to us not to be published. If requested, Santos will ensure your information is included in a separate report which is not published on NOPSEMA's website. Santos will handle your information in accordance with our *Offshore Western Australia and Northern Territory Consultation Privacy Policy*.

You are also invited to pass on consultation information to any persons you consider appropriate and let us know if you know of any other authorities, organisations or individuals who may have functions, interests or activities which may be affected by the proposed activities and should participate in the consultation process.

Please let us know if you would like to receive an activity notification in advance and upon completion of planned activities.

Santos welcomes your feedback specific to the proposed activities described under the proposed EP by the close of business on **10 November 2025.**

If you wish to discuss the consultation process or provide feedback for the EP, you can do so via return email or call us toll free on **1800 267 600**.

Where can you get more information?

More details about the Commonwealth Government environmental approval process can be found on the NOPSEMA website at NOPSEMA.gov.au.

Click the image to read in full.

We look forward to hearing from you soon.

Regards,

Santos Consultation Team

Santos

t: +61 1800 267 600 | e: offshore.consulation@santos.com

Santos.com

Santos acknowledges the Traditional Owners and Custodians of the lands on which we operate. We pay our respects to their Elders past, present and emerging.

Email Type 2

Email Type 2 where authorities, persons and organisations may be affected by risks from unplanned events only given their significant distance from proposed activities.

ID No.	Date	Sent/ Received	Record Type	Consultation Materials	Email Subject
774	13/10/2025	Sent	Campaign Email	General Factsheet; Map	**Email 2:** CONSULTATION | Carnarvon Basin | Van Gogh Coniston Novara VGA-4H GI ST1 Well Intervention/Plug & Abandonment Environment Plan

ID-774 -Organisations

Ashburton Anglers Incorporated; Australian Communications and Media Authority; Australian Maritime Safety Authority - marine pollution; Beagle No. 1 P/L; BP Developments Australia; Broome Chamber of Commerce and Industry; Broome Fishing Club Inc; Bundi Yamatji Aboriginal Corporation (Yamatji Nation); Buurabalayji Thalanyji Aboriginal Corporation; Carnarvon Chamber of Commerce and Industry; Carnarvon Fishing Club Incorporated; Chevron Australia; City of Greater Geraldton; City of Karratha; Dambimangari Aboriginal Corporation; Department of Agriculture, Fisheries and Forestry – Biosecurity; Department of Foreign Affairs and Trade; Department of Infrastructure, Transport, Regional Development, Communications and the Arts; Department of Planning, Lands and Heritage; Department of Transport – Marine pollution; Department of Jobs, Tourism, Science and Innovation; Exmouth Chamber of Commerce and Industry; ExxonMobil Australia Resources Company Pty Limited; Finder Energy Holdings Ltd; Gascoyne Development Commission; Geraldton & Districts Fishing Club Inc; InCapture P/L; Jadestone Energy (Australia) Pty Ltd; Karajarri Traditional Lands Association; Kariyarra Aboriginal Corporation; Karratha and Districts Chamber of Commerce and Industry; KATO Energy; Kimberley Development Commission; Kimberley Land Council; King Bay Game Fishing Club Inc; KUFPEC Australia Pty Ltd; Malgana Aboriginal Corporation; Maritime Union of Australia; Mayala Inninalang Aboriginal Corporation; Melbana Energy Ltd; Mid West Chamber of Commerce and Industry; Murujuga Aboriginal Corporation; Nanda Aboriginal Corporation; Ngarluma Aboriginal Corporation; Nhuwala Claim Group; Nickol Bay Sportfishing Club Inc; Ningaloo Coast World Heritage Advisory Committee; Nyangumarta Karajarri Aboriginal Corporation; Nyangumarta Warrarn Aboriginal Corporation ; Onslow Chamber of Commerce and Industry; Pathfinder Energy Pty Ltd; Pilbara Development Commission; Port Hedland Chamber of Commerce and Industry; Port Hedland Game Fishing Club Inc; Port Hedland Industries Council; Regional Development Australia - Mid West Gascoyne; Regional Development Australia – Pilbara; Shark Bay World Heritage Advisory Committee; Shire of Ashburton (Onslow); Shire of Broome; Shire of Carnarvon; Shire of Christmas Island; Shire of Derby-West Kimberly; Shire of East Pilbara; Shire of Northampton; Shire of Shark Bay; Shire of Wyndham-East Kimberley; Thalanyji Nhuwala People; Town of Port Hedland; WA Local Government Association; Wanjina Wunggurr Aboriginal Corporation; Wanparta Aboriginal Corporation; Western Australian Museum; Wirrawandi Aboriginal Corporation; Woodside Energy Group Ltd; Yamatji Marlpa Aboriginal Corporation; Yamatji Southern Regional Corporation (Yamatji Nation); Yawuru Native Title Holders Aboriginal Corporation; Yinggarda Aboriginal Corporation

ID- 786-Organisations

Christmas Island of Commerce and Industry

ID -787 -Organisations

Western Gas Pty Ltd

ID -788-Organisations sent on 14/10/2025

Regional Development Australia - Kimberley

ID -1671-Organisations sent on 12/12/2025

Nyul Nyul PBC Aboriginal Corporation

ID -1674-Organisations sent on 12/12/2025

Gogolanygor Aboriginal Corporation

Example

From: Santos Consultation Team <offshore.consultation@santos.com>
Sent: Monday, 13 October 2025 12:08
To: [redacted]
Subject: ![EXT]: CONSULTATION | Carnarvon Basin | Van Gogh Coniston Novara VGA-4H GI ST1 Well Intervention/Plug & Abandonment Environment Plan

Dear [redacted]

Santos is contacting you as we are proposing to suspend or plug and abandon (P&A) the VGA-4H GI ST1 well within the Van Gogh Coniston Novara (VGCN) field.

The proposed activities are planned to commence as early as Q4 2026, subject to obtaining all regulatory and business approvals. The expected activity duration is between approximately 10 and 40 days, with the duration subject to change based on potential for operational or weather-related challenges.

An Environment Plan (EP) is being prepared for the proposed activities and will have validity of five years, once accepted. The Operational Area is located within Commonwealth waters approximately 44 km north-northwest of the Cape Range Peninsula and 59.5 km north-northwest of Exmouth, Western Australia.

Why are we contacting you?

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A relevant person includes government agencies and authorities to which the proposed activity may be relevant, and persons or organisations whose functions, interests or activities may be affected by the proposed activity.

Information provided by relevant persons in consultation helps us to better understand the values and sensitivities of the environment and inform the evaluation of the potential impacts and risks associated with the activity and how to manage them appropriately.

We are contacting you because Santos considers that you may have functions, interests or activities which may be affected by the

proposed activities, although we expect this would only be in the unlikely event of a worst-case hydrocarbon spill.

Information about planned activities, including a summary of Activity key impacts, risks and management measures is included in a Consultation Fact Sheet that can be accessed via this link to our Consultation Hub web site.

Information and maps are also included showing how we use sophisticated computer-based modelling to present the areas that could be affected in the unlikely event of a spill, noting that not all areas within the modelled Environment that May Be Affected (EMBA) would be affected at the same time.

Providing feedback

As part of the consultation for proposed activities we are seeking any input you may have about:

- Features of the environment that may be affected by proposed activities, including social, economic and cultural values and sensitivities.
- Potential environmental impacts and risks of proposed activities, including the potential consequences of the activities on your functions, interests or activities.
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Click the image to read in full.

We look forward to hearing from you soon.

Regards,

Santos Consultation Team

Santos

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Santos acknowledges the Traditional Owners and Custodians of the lands on which we operate. We pay our respects to their Elders past, present and emerging.

ID 788

From: Consultation, Santos <Offshore.consultation@santos.com>
Sent: Tuesday, 14 October 2025 11:17
To: [redacted]
Cc: Consultation, Santos <Offshore.consultation@santos.com>
Subject: CONSULTATION | Carnarvon Basin | Van Gogh Coniston Novara VGA-4H GI ST1 Well Intervention/Plug & Abandonment Environment Plan

Dear [redacted],

Santos is contacting you as we are proposing to suspend or plug and abandon (P&A) the VGA-4H GI ST1 well within the Van Gogh Coniston Novara (VGCN) field.

The proposed activities are planned to commence as early as Q4 2026, subject to obtaining all regulatory and business approvals. The expected activity duration is between approximately 10 and 40 days, with the duration subject to change based on potential for operational or weather-related challenges.

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Information for relevant persons

Santos

Van Gogh Coniston Novara VGA-4H GI ST1
Well Intervention/Plug & Abandonment Environment Plan

Activity Overview

Consultation and Feedback

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Providing feedback

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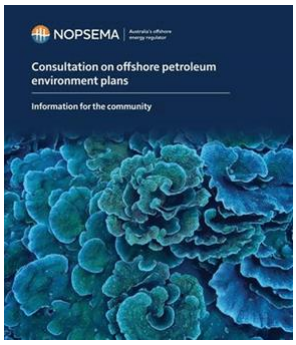

We look forward to hearing from you soon.

Regards,

Santos Consultation Team

Santos

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Santos

ID 1671

From: Consultation, Santos <Offshore.consultation@santos.com>
Sent: Friday, 12 December 2025 11:52
To: [redacted]
Cc: Consultation, Santos <Offshore.consultation@santos.com>
Subject: CONSULTATION | Carnarvon Basin | Van Gogh Coniston Novara VGA-4H GI ST1 Well Intervention/Plug & Abandonment Environment Plan

Dear [redacted],

Santos is contacting you as we are proposing to suspend or plug and abandon (P&A) the VGA-4H GI ST1 well within the Van Gogh Coniston Novara (VGCN) field.

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Information for relevant persons

Santos

Van Gogh Coniston Novara VGA-4H GI ST1
Well Intervention/Plug & Abandonment Environment Plan

Activity Overview

Consultation and Feedback

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Providing feedback

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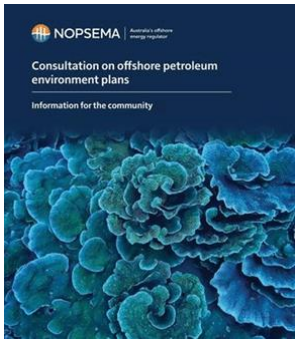
Click the image to read in full.â€¯



We look forward to hearing from you soon.

Regards,

Santos Consultation Team

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Santos.com
Santos acknowledges the Traditional Owners and Custodians of the lands on which we operate. We pay our respects to their Elders past, present and emerging.

ID 1674

From: Consultation, Santos <Offshore.consultation@santos.com>
Sent: Friday, 12 December 2025 11:15
To: [redacted]
Cc: Consultation, Santos <Offshore.consultation@santos.com>
Subject: CONSULTATION | Carnarvon Basin | Van Gogh Coniston Novara VGA-4H GI ST1 Well Intervention/Plug & Abandonment Environment Plan

Dear [redacted],

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Information for relevant persons

Santos

Van Gogh Coniston Novara VGA-4H GI ST1
Well Intervention/Plug & Abandonment Environment Plan

Activity Overview

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santos.com

Providing feedback

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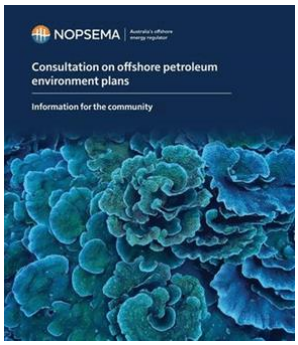

We look forward to hearing from you soon.

Regards,

Santos Consultation Team

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Santos.com
Santos acknowledges the Traditional Owners and Custodians of the lands on which we operate. We pay our respects to their Elders past, present and emerging.

Email Type 3

Email Type 3 where it is not clear from publicly available information where authorities, persons and organisations may be affected by impacts from planned activities and risks from unplanned events.

ID No.	Date	Sent/ Received	Record Type	Consultation Materials	Email Subject
777	13/10/2025	Sent	Campaign Email	General Factsheet; Map	**Email 3:** CONSULTATION | Carnarvon Basin | Van Gogh Coniston Novara VGA-4H GI ST1 Well Intervention/Plug & Abandonment Environment Plan

ID -777 - Organisations

Abrolhos Island Charters; Absolute Ocean Charters (Broome); All the Gear No Idea Sportfishing; Apache Charters; Aqualand Charters; Archipelago Adventures; Australian Conservation Foundation; Australian Energy Producers; Australian Institute of Marine Science; Australian Marine Sciences Association – WA; Australian Marine Conservation Society; Baiyungu Dreaming; Batavia Sea Safaris; Blue Horizon Charters; Blue Juice Charters; Blue Lightning Charters; BlueSun2 Boat Charters; Brian Lee Hunters Creek Tagalong Tours; Broome Hovercraft; Broome Tours Pty Ltd; Broome Whale Watching & Eco Tours; Bunda Bunda NJ Tours; Bundy's Cultural Tours; Cannon Charters The Kimberley;
Cape Conservation Group; Care for Hedland Environmental Association; Commonwealth Scientific and Industrial Research Organisation; Conservation Council of WA; Coral Bay Ecotours; Coral Bay Progress Association; Coral Coast Tours; Curtin University (Centre for Marine Science and Technology); Dampier Archipelago and Murujuga Sea Kayak Expedition; Dampier Archipelago Environmental Advisory Group; Dive Ningaloo; Diversity Charters; Eco Abrolhos; Edith Cowan University; Eighty Mile Beach Caravan Park, WA; Environs Kimberley; Evolution Fishing Charters Exmouth; Exmouth Adventure Co; Exmouth Dive & Whalesharks Ningaloo; Exmouth Fishing Adventures; Exmouth Gulf Taskforce; Fishabout Tours; Fisheries Research and Development Corporation; Greenpeace Australia Pacific ; Gt Diving A; Image Dive and Charters; Innkeeper Sport Fishing Charter; International Fund for Animal Welfare; James Cook University; Karma IV Charters; Karratha Adventure Sports; Kimberley Day Cruise; Kimberley Marine Research Station; Kimberley Outback Tours; Kings Ningaloo Reef Tours; Lethal Adventures; Live Ningaloo; Lombadina; Mac Attack Fishing Charters; Maccy Dave's Kayak Fishing Adventures; Mackerel Islands Pty Ltd; Mahi Mahi Fishing Charters; Marine Tourism Western Australia; Maritime Industry Australia Ltd; Montebello Island Safaris; Murdoch University; Murujuga Rock Art & Cultural Tours Pilbara WA; Ningaloo Car & Boat Hire; Ningaloo Coral Bay Boats; Ningaloo Marine Interactions; Ningaloo Reef Dive; Ningaloo Safari Tours; Ningaloo Sportfishing Charters; Ningaloo Whale Shark N Dive; Ocean Dream Charters; Odyssey Expeditions; Offshore Charters WA; On Point Spearfishing; On Strike Charters; Onslow Beach Resort; Peak Sportfishing Charters; Pelican Charters; Perfect Nature Cruises; Pilbara Dive and Tours; Pilbara Tours; Protect Ningaloo; Reef Seeker Charters; Reel Teaser Fishing Adventures; Roebuck Bay Working Group; Sail Ningaloo; Sal Salis; Save the Kimberley; Sea Shepherd Australia; Seaforce Fishing Charters; Seastar Boat Charters; Shark Bay Charters; Shark Bay Coastal Tours; Shark Bay Dolphin Project; Shark Bay Eco Tours; Silverado Charters; Southern Cross Cultural Tours at Lullumb; Telstra; The Great Escape Charter Company; The Pew Charitable Trusts; Top Gun Charters; Tourism Council of Western Australia; True North Fishing Charters; University of Western Australia (Oceans Institute); Unreel Adventure Safaris; View Ningaloo ; Vocus Group Ltd; West Kimberley Fishing Tours; Western Australian Indigenous Tourism Operators Council; Western Australian Marine Science Institution; Whale and Dolphin Conservation; Wilderness Society; Willie Pearl Lugger Cruises; World Wide Fund For Nature; Wula Gura Nyinda Eco Cultural Adventures

ID - 790- Organisations

Bundy's Cultural Tours

ID - 791- Organisations

Ningaloo Research Centre (Murdoch University)

ID - 792- Organisations 14/10/25

Bunda Bunda NJ Tours

ID - 793 Organisations 14/10/25

Kimberley Pearl Charters

ID - 1649- Organisations 02/12/25

Western Australian Coastal and Marine Network;

Example

From: Santos Consultation Team <offshore.consultation@santos.com>
Sent: Monday, 13 October 2025 12:13
To: [redacted]
Subject: ![EXT]: CONSULTATION | Carnarvon Basin | Van Gogh Coniston Novara VGA-4H GI ST1 Well Intervention/Plug & Abandonment Environment Plan

Dear [redacted]

Santos is contacting you as we are proposing to suspend or plug and abandon (P&A) the VGA-4H GI ST1 well within the Van Gogh Coniston Novara (VGCN) field.

The proposed activities are planned to commence as early as Q4 2026, subject to obtaining all regulatory and business approvals. The expected activity duration is between approximately 10 and 40 days, with the duration subject to change based on potential for operational or weather-related challenges.

An Environment Plan (EP) is being prepared for the proposed activities and will have validity of five years, once accepted. The Operational Area is located within Commonwealth waters approximately 44 km north-northwest of the Cape Range Peninsula and 59.5 km north-northwest of Exmouth, Western Australia.

Why are we contacting you?

Under Commonwealth Government Regulations, Santos is required to consult with relevant persons about proposed activities in the course of preparing an EP.

A relevant person includes government agencies and authorities to which the proposed activity may be relevant, and persons or organisations whose functions, interests or activities may be affected by the proposed activity.

Information provided by relevant persons in consultation helps us to better understand the values and sensitivities of the environment and inform the evaluation of the potential impacts and risks associated with the activity and how to manage them appropriately.

We are contacting you because it is not clear to Santos, based on publicly available information, whether your functions, interests or activities may be affected by the proposed activities. Please consider

the information we have provided with this email and let us know if you would like to be consulted for these proposed activities.

Information about planned activities, including a summary of Activity key impacts, risks and management measures is included in a Consultation Fact Sheet that can be accessed via this link to our Consultation Hub web site.

Information and maps are also included showing how we use sophisticated computer-based modelling to present the areas that could be affected in the unlikely event of a spill, noting that not all areas within the modelled Environment that May Be Affected (EMBA) would be affected at the same time.

Providing feedback

As part of the consultation for proposed activities we are seeking any input you may have about:

- Features of the environment that may be affected by proposed activities, including social, economic and cultural values and sensitivities.
- Potential environmental impacts and risks of proposed activities, including the potential consequences of the activities on your functions, interests or activities.
- What, if any, measures could reduce environmental impacts or risks, considering those measures already proposed by Santos and outlined in the Consultation Fact Sheet.

Feedback received during consultation will be considered in the development of the EP, which will be submitted to the

Commonwealth Regulator, the National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA), for assessment.

Please note that the information provided during consultation will be included in documentation submitted to NOPSEMA. Please let us know if you would like any information you provide to us not to be published. If requested, Santos will ensure your information is included in a separate report which is not published on NOPSEMA's website. Santos will handle your information in accordance with our *Offshore Western Australia and Northern Territory Consultation Privacy Policy*.

You are also invited to pass on consultation information to any persons you consider appropriate and let us know if you know of any other authorities, organisations or individuals who may have functions, interests or activities which may be affected by the proposed activities and should participate in the consultation process.

Please let us know if you would like to receive an activity notification in advance and upon completion of planned activities.

Santos welcomes your feedback specific to the proposed activities described under the proposed EP by the close of business on **10 November 2025.**

If you wish to discuss the consultation process or provide feedback for the EP, you can do so via return email or call us toll free on **1800 267 600**.

Where can you get more information?

More details about the Commonwealth Government environmental approval process can be found on the NOPSEMA website at NOPSEMA.gov.au.

Click the image to read in full.

We look forward to hearing from you soon.

Regards,

Santos Consultation Team

Santos

t: +61 1800 267 600 | e: offshore.consulation@santos.com

Santos.com

Santos acknowledges the Traditional Owners and Custodians of the lands on which we operate. We pay our respects to their Elders past, present and emerging.

If you'd like to unsubscribe and stop receiving these emails click here.

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ID 792 and ID 793

From: Consultation, Santos <Offshore.consultation@santos.com>
Sent: Tuesday, 14 October 2025 09:45
To: [redacted]
Cc: Consultation, Santos <Offshore.consultation@santos.com>
Subject: CONSULTATION | Carnarvon Basin | Van Gogh Coniston Novara VGA-4H GI ST1 Well Intervention/Plug & Abandonment Environment Plan

Dear [redacted],

Santos is contacting you as we are proposing to suspend or plug and abandon (P&A) the VGA-4H GI ST1 well within the Van Gogh Coniston Novara (VGCN) field.

The proposed activities are planned to commence as early as Q4 2026, subject to obtaining all regulatory and business approvals. The expected activity duration is between approximately 10 and 40 days, with the duration subject to change based on potential for operational or weather-related challenges.

An Environment Plan (EP) is being prepared for the proposed activities and will have validity of five years, once accepted. The Operational Area is located within Commonwealth waters approximately 44 km north-northwest of the Cape Range Peninsula and 59.5 km north-northwest of Exmouth, Western Australia.

Why are we contacting you?

Under Commonwealth Government Regulations, Santos is required to consult with relevant persons about proposed activities in the course of preparing an EP.

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Information provided by relevant persons in consultation helps us to better understand the values and sensitivities of the environment and inform the evaluation of the potential impacts and risks associated with the activity and how to manage them appropriately.

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Information about planned activities, including a summary of Activity key impacts, risks and management measures is included in a Consultation Fact Sheet that can be accessed via this link to our Consultation Hub web site.

Information and maps are also included showing how we use sophisticated computer-based modelling to present the areas that could be affected in the unlikely event of a spill, noting that not all areas within the modelled Environment that May Be Affected (EMBA) would be affected at the same time.

Information for relevant persons

Santos

Van Gogh Coniston Novara VGA-4H GI ST1
Well Intervention/Plug & Abandonment Environment Plan

Activity Overview

Consultation and Feedback

santos.com

Providing feedback

As part of the consultation for proposed activities we are seeking any input you may have about:

- Features of the environment that may be affected by proposed activities, including social, economic and cultural values and sensitivities.
- Potential environmental impacts and risks of proposed activities, including the potential consequences of the activities on your functions, interests or activities.
- What, if any, measures could reduce environmental impacts or risks, considering those measures already proposed by Santos and outlined in the Consultation Fact Sheet.

Feedback received during consultation will be considered in the development of the EP, which will be submitted to the Commonwealth Regulator, the National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA), for assessment.

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may be affected by the proposed activities and should participate in the consultation process.

Please let us know if you would like to receive an activity notification in advance and upon completion of planned activities.

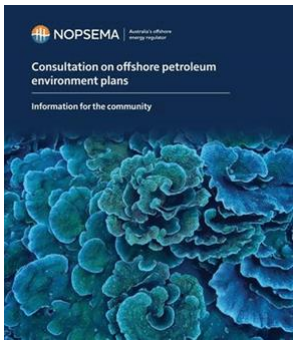
Santos welcomes your feedback specific to the proposed activities described under the proposed EP by the close of business on **10 November 2025.**

If you wish to discuss the consultation process or provide feedback for the EP, you can do so via return email or call us toll free on **1800 267 600**.

Where can you get more information?

More details about the Commonwealth Government environmental approval process can be found on the NOPSEMA website at NOPSEMA.gov.au.

Click the image to read in full.



We look forward to hearing from you soon.

Regards,

Santos Consultation Team

Santos

t: +61 1800 267 600 | e: offshore.consulation@santos.com

Santos.com

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If you'd like to unsubscribe and stop receiving these emails click here.

ID 1649

From: Consultation, Santos <Offshore.consultation@santos.com>
Sent: Tuesday, 2 December 2025 16:57
To [redacted]
Cc: Consultation, Santos <Offshore.consultation@santos.com>
Subject: CONSULTATION | Carnarvon Basin | Van Gogh Coniston Novara VGA-4H GI ST1 Well Intervention/Plug & Abandonment Environment Plan

Dear [redacted],

Santos is contacting you as we are proposing to suspend or plug and abandon (P&A) the VGA-4H GI ST1 well within the Van Gogh Coniston Novara (VGCN) field.

The proposed activities are planned to commence as early as Q4 2026, subject to obtaining all regulatory and business approvals. The expected activity duration is between approximately 10 and 40 days, with the duration subject to change based on potential for operational or weather-related challenges.

An Environment Plan (EP) is being prepared for the proposed activities and will have validity of five years, once accepted. The Operational Area is located within Commonwealth waters approximately 44 km north-northwest of the Cape Range Peninsula and 59.5 km north-northwest of Exmouth, Western Australia.

Why are we contacting you?

Under Commonwealth Government Regulations, Santos is required to consult with relevant persons about proposed activities in the course of preparing an EP.

A relevant person includes government agencies and authorities to which the proposed activity may be relevant, and persons or organisations whose functions, interests or activities may be affected by the proposed activity.

Information provided by relevant persons in consultation helps us to better understand the values and sensitivities of the environment and inform the evaluation of the potential impacts and risks associated with the activity and how to manage them appropriately.

We are contacting you because it is not clear to Santos, based on publicly available information, whether your functions, interests or activities may be affected by the proposed activities. Please consider the information we have provided with this email and let us know if you would like to be consulted for these proposed activities.

Information about planned activities, including a summary of Activity key impacts, risks and management measures is included in a Consultation Fact Sheet that can be accessed via this link to our Consultation Hub web site.

Information and maps are also included showing how we use sophisticated computer-based modelling to present the areas that could be affected in the unlikely event of a spill, noting that not all areas within the modelled Environment that May Be Affected (EMBA) would be affected at the same time.

Information for relevant persons

Santos

Van Gogh Coniston Novara VGA-4H GI ST1
Well Intervention/Plug & Abandonment Environment Plan

Activity Overview

Consultation and Feedback

santos.com

Providing feedback

As part of the consultation for proposed activities we are seeking any input you may have about:

- Features of the environment that may be affected by proposed activities, including social, economic and cultural values and sensitivities.
- Potential environmental impacts and risks of proposed activities, including the potential consequences of the activities on your functions, interests or activities.
- What, if any, measures could reduce environmental impacts or risks, considering those measures already proposed by Santos and outlined in the Consultation Fact Sheet.

Feedback received during consultation will be considered in the development of the EP, which will be submitted to the Commonwealth Regulator, the National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA), for assessment.

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You are also invited to pass on consultation information to any persons you consider appropriate and let us know if you know of any other authorities, organisations or individuals who may have functions, interests or activities which may be affected by the proposed activities and should participate in the consultation process.

Please let us know if you would like to receive an activity notification in advance and upon completion of planned activities.

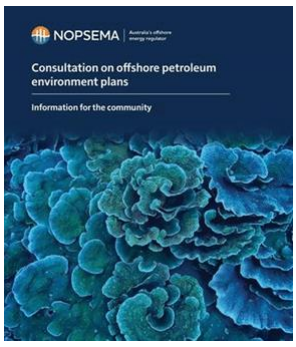
Santos welcomes your feedback specific to the proposed activities described under the proposed EP by the close of business on **9 January 2026.**

If you wish to discuss the consultation process or provide feedback for the EP, you can do so via return email or call us toll free on **1800 267 600**.

Where can you get more information?

More details about the Commonwealth Government environmental approval process can be found on the NOPSEMA website at NOPSEMA.gov.au.

Click the image to read in full.



We look forward to hearing from you soon.

Regards,

Santos Consultation Team

t: +61 1800 267 600 | e: offshore.consulation@santos.com

Santos.com

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Email Type 2a

Email Type 2a where authorities, persons and organisations with commercial fishing interests may be affected by risks from unplanned events only given their significant distance from proposed activities.

ID No.	Date	Sent/ Received	Record Type	Consultation Materials	Email Subject
775	13/10/2025	Sent	Campaign Email	General Factsheet;	**Email 2a:** CONSULTATION | Carnarvon Basin | Van Gogh Coniston Novara VGA-4H GI ST1 Well Intervention/Plug & Abandonment Environment Plan
ID -775 - Organisations Aquaculture Council of Western Australia; Australian Fisheries Management Authority; Australian Southern Bluefin Tuna Industry Association; Commonwealth Fisheries Association; Department of Agriculture, Fisheries and Forestry – Fisheries; Department of Primary Industries and Regional Development – Fisheries; Tuna Australia-Western Tuna and Billfish Fishery; Western Australian Fishing Industry Council; Western Rock Lobster Council;					

Example

From: Santos Consultation Team <offshore.consultation@santos.com>
Sent: Monday, 13 October 2025 12:10
To: [redacted]
Subject: ![EXT]: CONSULTATION | Carnarvon Basin | Van Gogh Coniston Novara VGA-4H GI ST1 Well Intervention/Plug & Abandonment Environment Plan

Dear [redacted]

Santos is contacting you as we are proposing to suspend or plug and abandon the VGA-4H GI ST1 well within the Van Gogh Coniston Novara (VGCN) fields as a component of the well decommissioning process.

The VGA-4H GI ST1 well is located in Western Australia's north west coast, offshore in Commonwealth Waters. The nearest community to the Operational Area (OA) is the Shire of Exmouth, which is located approximately 32 km away.

The proposed activities may commence as early as Q3 2026, subject to obtaining all regulatory and business approvals. An Environment Plan (EP) is being prepared for the proposed activities and will have validity of five years, once accepted.

Why are we contacting you?

Under Commonwealth Government Regulations, Santos is required to consult with relevant persons about proposed activities in the course of preparing an EP.

A relevant person includes government agencies and authorities to which the proposed activity may be relevant, and persons or organisations whose functions, interests or activities may be affected by the proposed activity.

Information provided by relevant persons in consultation helps us to better understand the values and sensitivities of the environment and inform the evaluation of the potential impacts and risks associated with the activity and how to manage them appropriately.

For activities proposed to be managed under this EP, Santos has assessed that Commonwealth and WA fisheries are unlikely be active in the Operational Area for proposed activities based on a review of

government fisheries data. As such, fisheries are only expected to be affected in the event of a worst-case hydrocarbon spill. Fisheries that have a spatial overlap with the Operational Area and the Environment that May Be Affected (EMBA) are identified in the table below.

	Fishery spatial overlap with Operational Areas	Fishery spatial overlap with EMBA
Commonwealth Fishery		
North West Slope Trawl Fishery	Yes	Yes
Southern Bluefin Tuna Fishery	Yes	Yes
Southern Tuna and Billfish Fishery	No	Yes
Western Deepwater Trawl Fishery	No	Yes
Western Skipjack Tuna Fishery	Yes	Yes
Western Tuna and Billfish Fishery	Yes	Yes
Western Australian Fishery		
Abalone Managed Fishery	No	Yes
Abrolhos Island and Midwest Trawl	No	Yes*
Broome Prawn Fishery	No	Yes*
Exmouth Gulf Prawn Managed Fishery	No	Yes
Gascoyne Demersal Scalefish Managed Fishery	No	Yes
Kimberly Crab Fishery	No	Yes*
Kimberly Gillnet and Barramundi	No	Yes*
Kimberly Prawn Managed Fishery	No	Yes*
Mackerel Managed Fishery	Yes	Yes

Marine Aquarium Fish Managed Fishery	Yes	Yes
Nickol Bay Prawn Managed Fishery	No	Yes
Northern Demersal Scalefish Managed Fishery	No	Yes
Octopus Interim Managed Fishery	No	Yes*
Onslow Prawn Managed Fishery	No	Yes
Pearl Oyster Managed Fishery	No	Yes
Pilbara Demersal Scalefish Fisheries (includes trawl, trap and line fisheries)		
• Pilbara Fish Trawl Interim Managed Fishery	No	Yes
• Pilbara Line Fishery	No	Yes
• Pilbara Trap Managed Fishery	No	Yes
Pilbara Developmental Crab Managed Fishery	Yes	Yes
Shark Bay Crab Managed Fishery	No	Yes
Shark Bay Prawn Managed Fishery	No	Yes
Shark Bay Scallop Managed Fishery	No	Yes
South-West Coast Salmon Fishery	Yes	Yes
Specimen Shell Managed Fishery	Yes	Yes
West Coast Deep Sea Crustacean Managed Fishery	Yes	Yes
West Coast Demersal Scalefish	No	Yes
West Coast Gillnet/Demersal Longline	No	Yes*
West Coast Rock Lobster Managed Fishery	No	Yes

* Depicts fishery that spatially intersects shoreline accumulation only.

Information about planned activities, including a summary of Activity key impacts, risks and management measures is included in a Consultation Fact Sheet that can be accessed via this link to our Consultation Hub web site.

Information and maps are also included showing how we use sophisticated computer-based modelling to present the areas that could be affected in the unlikely event of a spill, noting that not all areas within the modelled Environment that May Be Affected (EMBA) would be affected at the same time.

Providing feedback

As part of the consultation for proposed activities we are seeking any input you may have about:

- Features of the environment that may be affected by proposed activities, including social, economic and cultural values and sensitivities.
- Potential environmental impacts and risks of proposed activities, including the potential consequences of the activities on your functions, interests or activities.
- What, if any, measures could reduce environmental impacts or risks, considering those measures already proposed by Santos and outlined in the Consultation Fact Sheet.

Feedback received during consultation will be considered in the development of the EP, which will be submitted to the Commonwealth

Regulator, the National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA), for assessment.

Please note that the information provided during consultation will be included in documentation submitted to NOPSEMA. Please let us know if you would like any information you provide to us not to be published. If requested, Santos will ensure your information is included in a separate report which is not published on NOPSEMA's website. Santos will handle your information in accordance with our *Offshore Western Australia and Northern Territory Consultation Privacy Policy*.

You are also invited to pass on consultation information to any persons you consider appropriate and let us know if you know of any other authorities, organisations or individuals who may have functions, interests or activities which may be affected by the proposed activities and should participate in the consultation process.

Please let us know if you would like to receive an activity notification in advance and upon completion of planned activities.

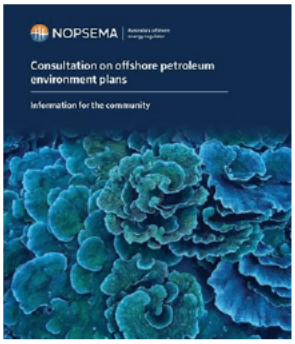
Santos welcomes your feedback specific to the proposed activities described under the proposed EP by the close of business on **10 November 2025.**

If you wish to discuss the consultation process or provide feedback for the EP, you can do so via return email or call us toll free on **1800 267 600**.

Where can you get more information?

More details about the Commonwealth Government environmental approval process can be found on the NOPSEMA website at NOPSEMA.gov.au.

Click the image to read in full.



We look forward to hearing from you soon.

Regards,

Santos Consultation Team

Santos

t: +61 1800 267 600 | e: offshore.consulation@santos.com

Santos.com

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If you'd like to unsubscribe and stop receiving these emails click here.

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Reminder email consultations

Reminder Email Type 1

Reminder Email Type 1 where authorities, persons and organisations may be affected by impacts from planned activities and risks from unplanned events given their proximity to proposed activities.

Date	Sent/ Received	Record Type	Consultation Materials	Email Subject
03/11/2025	Sent	Reminder Email	General Factsheet	**Email 1** Reminder - CONSULTATION | Carnarvon Basin | Van Gogh Coniston Novara VGA-4H GI ST1 Well Intervention/Plug & Abandonment Environment Plan

ID No.			
ID - 998 Australian Border Force:	ID - 999 Australian Hydrographic: Office	ID - 1000 Australian Maritime Safety Authority - Maritime Safety	ID - 1001 Department of Biodiversity, Conservation and Attractions
ID - 1002 Department of Climate Change, Energy, the Environment and Water - Director of National Parks:	ID - 1003 Department of Climate Change, Energy, the Environment and Water - Underwater cultural heritage:	ID - 1004 Department of Defence:	ID - 1005 Department of Industry, Science and Resources:
ID - 1006 Department of Mines, Petroleum and Exploration:	ID - 1007 Exmouth Community Liaison Group:	ID - 1008 Exmouth Game Fishing Club Inc:	ID - 1009 Nganhurra Thanardi Garrbu Aboriginal Corporation:
ID - 1010 Pilbara Ports Authority:	ID - 1011 Recfishwest:	ID - 1012 Shire of Exmouth:	ID - 1013 Western Australian Game Fishing Association:

Example

From: Santos Consultation Team <offshore.consultation@santos.com>
Sent: Monday, 3 November 2025 09:52
To: [redacted]
Subject: ![EXT]: REMINDER: CONSULTATION | Carnarvon Basin | Van Gogh Coniston Novara VGA-4H GI ST1 Well Intervention/Plug & Abandonment Environment Plan

Dear [redacted]

Further to our previous advice on 13 October (below), please be informed the consultation closing date of Van Gogh Coniston Novara VGA-4H GI ST1 Well Intervention/Plug & Abandonment Environment Plan is **Wednesday**, **12 November 2025**.

Please note the consultation date has been extended to allow for a 30-day consultation period.

Feedback can be provided via email to offshore.consultation@santos.com or by calling toll free on 1800 267 600.

Regards,

Santos Consultation Team

Dear [redacted]

Santos is contacting you as we are proposing to suspend or plug and abandon (P&A) the VGA-4H GI ST1 well within the Van Gogh Coniston Novara (VGCN) field.

The proposed activities are planned to commence as early as Q4 2026, subject to obtaining all regulatory and business approvals. The expected activity duration is between approximately 10 and 40 days, with the duration subject to change based on potential for operational or weather-related challenges.

An Environment Plan (EP) is being prepared for the proposed activities and will have validity of five years, once accepted. The Operational Area is located within Commonwealth waters approximately 44 km north-northwest of the Cape Range Peninsula and 59.5 km north-northwest of Exmouth, Western Australia.

Why are we contacting you?

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Information provided by relevant persons in consultation helps us to better understand the values and sensitivities of the environment and inform the evaluation of the potential impacts and risks associated with the activity and how to manage them appropriately.

We are contacting you because Santos considers that you may have functions, interests or activities which may be affected by impacts from planned activities.

Information about planned activities, including a summary of Activity key impacts, risks and management measures is included in a Consultation Fact Sheet that can be accessed via this link to our Consultation Hub web site.

Information and maps are also included showing how we use sophisticated computer-based modelling to present the areas that could be affected in the unlikely event of a spill, noting that not all areas within the modelled Environment that May Be Affected (EMBA) would be affected at the same time.

Santos

Van Gogh Conidon Novara VGA-4H GI ST1
Well Intervention/Plug & Abandonment Environment Plan

Activity Overview

Consultation and Feedback

Providing feedback

As part of the consultation for proposed activities we are seeking any input you may have about:

- Features of the environment that may be affected by proposed activities, including social, economic and cultural values and sensitivities.
- Potential environmental impacts and risks of proposed activities, including the potential consequences of the activities on your functions, interests or activities.
- What, if any, measures could reduce environmental impacts or risks, considering those measures already proposed by Santos and outlined in the Consultation Fact Sheet.

Feedback received during consultation will be considered in the development of the EP, which will be submitted to the Commonwealth Regulator, the National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA), for assessment.

Please note that the information provided during consultation will be included in documentation submitted to NOPSEMA. Please let us know if you would like any information you provide to us not to be published. If requested, Santos will ensure your information is included in a separate report which is not published on NOPSEMA's website. Santos will handle your information in accordance with our *Offshore Western Australia and Northern Territory Consultation Privacy Policy*.

You are also invited to pass on consultation information to any persons you consider appropriate and let us know if you know of any

other authorities, organisations or individuals who may have functions, interests or activities which may be affected by the proposed activities and should participate in the consultation process.

Please let us know if you would like to receive an activity notification in advance and upon completion of planned activities.

Santos welcomes your feedback specific to the proposed activities described under the proposed EP by the close of business on **10 November 2025.**

If you wish to discuss the consultation process or provide feedback for the EP, you can do so via return email or call us toll free on **1800 267 600**.

Where can you get more information?

More details about the Commonwealth Government environmental approval process can be found on the NOPSEMA website at NOPSEMA.gov.au.

Click the image to read in full.

We look forward to hearing from you soon.

Regards,

Santos Consultation Team

Santos

t: +61 1800 267 600 | e: offshore.consulation@santos.com

Santos.com

Santos acknowledges the Traditional Owners and Custodians of the lands on which we operate. We pay our respects to their Elders past, present and emerging.

If you'd like to unsubscribe and stop receiving these emails click here.

Reminder Email Type 2

Reminder Email Type 2 where authorities, persons and organisations may be affected by risks from unplanned events only given their significant distance from proposed activities.

Date	Sent/ Received	Record Type	Consultation Materials	Email Subject
03/11/2025	Sent	Reminder Email	General Factsheet;	**Email 2** Reminder - CONSULTATION | Carnarvon Basin | Van Gogh Coniston Novara VGA-4H GI ST1 Well Intervention/Plug & Abandonment Environment Plan

ID No.			
ID -1015 Ashburton Anglers Incorporated	ID -1016 Australian Communications and Media Authority	ID -1017 Australian Maritime Safety Authority - Marine Pollution	ID 1018 Beagle No.1 Pty Ltd
ID -1019 BP Developments Australia	ID -1020 Broome Chamber of Commerce and Industry	ID -1021 Broome Fishing Club Inc	ID-1024 Bundi Yamatji Aboriginal Corporation
ID -1048 Buurabalayji Thalanyji Aboriginal Corporation	ID -1022 Carnarvon Chamber of Commerce and Industry	ID -1023 Carnarvon Fishing Club Incorporated	ID -1027 Chevron Australia
ID -1028 Christmas Island of Commerce and Industry	ID -1029 City of Greater Geraldton	ID -1062 Dambimangari Aboriginal Corporation	ID -1031 Department of Agriculture, Fisheries and Forestry - Biosecurity marine pests
ID -1032 Department of Creative Industries, Tourism and Sport	ID -1049 Department of Foreign Affairs and Trade	ID -1033 Department of Infrastructure, Transport, Regional Development, Communications and the Arts	ID -1034 Department of Transport - Marine pollution
ID -1035 Exmouth Chamber of Commerce and Industry	ID -1036 ExxonMobil	ID -1037 Finder Energy Holdings Ltd	ID -1030 Gascoyne Development Commission
ID -1038 Geraldton & Districts Fishing Club Inc	ID -1039 Jadestone Energy (Australia) Pty Ltd	ID -1042 Karajarri Traditional Lands Association	ID -1040 Kariyarra Aboriginal Corporation
ID -1041 Karratha & Districts Chamber of Commerce and Industry	ID -1043 KATO Energy	ID -1045 Kimberley Development Commission	ID -1088 Kimberley Land Council
ID -1046 King Bay Game Fishing Club Inc	ID -1047 KUFPEC Australia Pty Ltd	ID -1050 Malgana Aboriginal Corporation	ID -1051 Maritime Union of Australia
ID -1072 Mayala Inninalang Aboriginal Corporation	ID -1052 Melbana Energy Ltd	ID -1056 Mid West Chamber of Commerce and Industry	ID -1044 Murujuga Aboriginal Corporation

ID -1057 Nanda Aboriginal Corporation	ID -1014 Ngarluma Aboriginal Corporation	ID -1063 Nhuwala Claim Group	ID -1058 Nickol Bay Sportfishing Club Inc
ID -1059 Ningaloo Coast World Heritage Advisory Committee	ID -1026 Nyangumarta Karajarri Aboriginal Corporation	ID -1060 Nyangumarta Warrarn Aboriginal Corporation	ID -1061 Onslow Chamber of Commerce and Industry
ID -1053 Pathfinder Energy Pty Ltd	ID -1064 Pilbara Development Commission	ID -1065 Port Hedland Chamber of Commerce & Industry	ID -1066 Port Hedland Game Fishing Club Inc
ID -1067 Port Hedland Industries Council	ID -1069 Regional Development Australia - Kimberley	ID -1070 Regional Development Australia - Mid West Gascoyne	ID -1071 Regional Development Australia - Pilbara
ID -1073 Shark Bay World Heritage Advisory Committee	ID -1074 Shire of Ashburton	ID -1075 Shire of Broome	ID -1076 Shire of Carnarvon
ID -1077 Shire of Christmas Island	ID -1078 Shire of Derby/West Kimberley	ID -1079 Shire of East Pilbara	ID -1080 Shire of Northampton
ID -1081 Shire of Shark Bay	ID -1082 Shire of Wyndham-East Kimberley	ID -1084 Thalanyji Nhuwala People	ID -1087 Town of Port Hedland
ID -1089 WA Local Government Association	ID -1068 Wanjina Wunggurr Aboriginal Corporations	ID -1086 Wanparta Aboriginal Corporation	ID -1090 Western Australian Museum
ID -1091 Western Gas Pty Ltd	ID -1085 Wirrawandi Aboriginal Corporation	ID -1092 Woodside Energy Group Ltd	ID -1083 Yamatji Marlpa Aboriginal Corporation
ID -1025 Yamatji Southern Regional Corporation	ID -1054 Yawuru Native Title Holders Aboriginal Corporation	ID -1055 Yinggarda Aboriginal Corporation	ID -1806 sent 12/01/2026 Fisheries Research and Development Corporation
ID -1807 sent 12/01/2026 Nyul Nyul PBC Aboriginal Corporation	ID -1808 sent 12/01/2026 Gogolanygor Aboriginal Corporation		

Example

From: Santos Consultation Team <offshore.consultation@santos.com>
Sent: Monday, 3 November 2025 1:34 PM
To: [redacted]
Subject: Reminder: CONSULTATION | Carnarvon Basin | Van Gogh Coniston Novara VGA-4H GI ST1 Well Intervention/Plug & Abandonment Environment Plan

Dear [redacted]

Further to our previous advice on 13 October (below), please be informed the consultation closing date of Van Gogh Coniston Novara VGA-4H GI ST1 Well Intervention/Plug & Abandonment Environment Plan is **Wednesday, 12 November 2025**.

Please note the consultation date has been extended to allow for a 30-day consultation period.

Feedback can be provided via email to offshore.consultation@santos.com or by calling toll free on 1800 267 600.

Regards,

Santos Consultation Team

Dear [redacted]

Santos is contacting you as we are proposing to suspend or plug and abandon (P&A) the VGA-4H GI ST1 well within the Van Gogh Coniston Novara (VGCN) field.

The proposed activities are planned to commence as early as Q4 2026, subject to obtaining all regulatory and business approvals. The expected activity duration is between approximately 10 and 40 days, with the duration subject to change based on potential for operational or weather-related challenges.

An Environment Plan (EP) is being prepared for the proposed activities and will have validity of five years, once accepted. The Operational Area is located within Commonwealth waters approximately 44 km north-northwest of the Cape Range Peninsula and 59.5 km north-northwest of Exmouth, Western Australia.

Why are we contacting you?

Under Commonwealth Government Regulations, Santos is required to consult with relevant persons about proposed activities in the course of preparing an EP.

A relevant person includes government agencies and authorities to which the proposed activity may be relevant, and persons or organisations whose functions, interests or activities may be affected by the proposed activity.

Information provided by relevant persons in consultation helps us to better understand the values and sensitivities of the environment and inform the evaluation of the potential impacts and risks associated with the activity and how to manage them appropriately.

We are contacting you because Santos considers that you may have functions, interests or activities which may be affected by the proposed activities, although we expect this would only be in the unlikely event of a worst-case hydrocarbon spill.

Information about planned activities, including a summary of Activity key impacts, risks and management measures is included in a Consultation Fact Sheet that can be accessed via this link to our Consultation Hub web site.

Information and maps are also included showing how we use sophisticated computer-based modelling to present the areas that could be affected in the unlikely event of a spill, noting that not all areas within the modelled Environment that May Be Affected (EMBA) would be affected at the same time.

Santos

Van Gogh Coniston Novara VGA-4H GI ST1
Well Intervention/Plug & Abandonment Environment Plan

Activity Overview

Consultation and Feedback

Providing feedback

As part of the consultation for proposed activities we are seeking any input you may have about:

- Features of the environment that may be affected by proposed activities, including social, economic and cultural values and sensitivities.
- Potential environmental impacts and risks of proposed activities, including the potential consequences of the activities on your functions, interests or activities.
- What, if any, measures could reduce environmental impacts or risks, considering those measures already proposed by Santos and outlined in the Consultation Fact Sheet.

Feedback received during consultation will be considered in the development of the EP, which will be submitted to the Commonwealth Regulator, the National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA), for assessment.

Please note that the information provided during consultation will be included in documentation submitted to NOPSEMA. Please let us know if you would like any information you provide to us not to be published. If requested, Santos will ensure your information is included in a separate report which is not published on NOPSEMA's website. Santos will handle your information in accordance with our

Offshore Western Australia and Northern Territory Consultation Privacy Policy.

You are also invited to pass on consultation information to any persons you consider appropriate and let us know if you know of any other authorities, organisations or individuals who may have functions, interests or activities which may be affected by the proposed activities and should participate in the consultation process.

Please let us know if you would like to receive an activity notification in advance and upon completion of planned activities.

Santos welcomes your feedback specific to the proposed activities described under the proposed EP by the close of business on **10 November 2025.**

If you wish to discuss the consultation process or provide feedback for the EP, you can do so via return email or call us toll free on **1800 267 600**.

Where can you get more information?

More details about the Commonwealth Government environmental approval process can be found on the NOPSEMA website at NOPSEMA.gov.au.

Click the image to read in full.

We look forward to hearing from you soon.

Regards,

Santos Consultation Team

Santos

t: +61 1800 267 600 | e: offshore.consulation@santos.com

Santos.com

Santos acknowledges the Traditional Owners and Custodians of the lands on which we operate. We pay our respects to their Elders past, present and emerging.

If you'd like to unsubscribe and stop receiving these emails click here.

ID 1806

From: Consultation, Santos <Offshore.consultation@santos.com>
Sent: Monday, 12 January 2026 12:34
To: FRDC [redacted]>
Cc: Consultation, Santos <Offshore.consultation@santos.com>
Subject: Reminder - CONSULTATION | Carnarvon Basin | Van Gogh Coniston Novara VGA-4H GI ST1 Well Intervention/Plug & Abandonment Environment Plan

Dear [redacted],

Further to our advice of 13 October, we wish to inform you that, due to a system error, you did not receive a reminder email for this consultation. As a result, we have extended the closing date for feedback on the Van Gogh Coniston Novara VGA-4H GI ST1 Well Intervention/Plug & Abandonment Environment Plan to **Monday, 19 January 2026.**

Feedback can be provided via email offshore.consultation@santos.com or by calling on toll-free on 1800 267 600.

Regards
Santos Consultation Team

From: Santos Consultation Team <offshore.consultation@santos.com>
Sent: Monday, 13 October 2025 12:10
To: [redacted]>
Subject: ![EXT]: CONSULTATION | Carnarvon Basin | Van Gogh Coniston Novara VGA-4H GI ST1 Well Intervention/Plug & Abandonment Environment Plan

Dear [redacted],

Santos is contacting you as we are proposing to suspend or plug and abandon the VGA-4H GI ST1 well within the Van Gogh Coniston Novara (VGCN) fields as a component of the well decommissioning process.

The VGA-4H GI ST1 well is located in Western Australia's north west coast, offshore in Commonwealth Waters. The nearest community to the Operational Area (OA) is the Shire of Exmouth, which is located approximately 32 km away.

The proposed activities may commence as early as Q3 2026, subject to obtaining all regulatory and business approvals. An Environment Plan (EP) is being prepared for the proposed activities and will have validity of five years, once accepted.

Why are we contacting you?
Under Commonwealth Government Regulations, Santos is required to consult with relevant persons about proposed activities in the course of preparing an EP.

A relevant person includes government agencies and authorities to which the proposed activity may be relevant, and persons or organisations whose functions, interests or activities may be affected by the proposed activity.

Information provided by relevant persons in consultation helps us to better understand the values and sensitivities of the environment and inform the evaluation of the potential impacts and risks associated with the activity and how to manage them appropriately.

For activities proposed to be managed under this EP, Santos has assessed that Commonwealth and WA fisheries are unlikely be active in the Operational Area for proposed activities based on a review of government fisheries data. As such, fisheries are only expected to be affected in the event of a worst-case hydrocarbon spill. Fisheries that have a spatial overlap with the Operational Area and the Environment that May Be Affected (EMBA) are identified in the table below.

	Fishery spatial overlap with Operational Areas	Fishery spatial overlap with EMBA
Commonwealth Fishery		
North West Slope Trawl Fishery	Yes	Yes
Southern Bluefin Tuna Fishery	Yes	Yes
Southern Tuna and Billfish Fishery	No	Yes
Western Deepwater Trawl Fishery	No	Yes
Western Skipjack Tuna Fishery	Yes	Yes
Western Tuna and Billfish Fishery	Yes	Yes
Western Australian Fishery		
Abalone Managed Fishery	No	Yes
Abrolhos Island and Midwest Trawl	No	Yes*
Broome Prawn Fishery	No	Yes*
Exmouth Gulf Prawn Managed Fishery	No	Yes
Gascoyne Demersal Scalefish Managed Fishery	No	Yes
Kimberly Crab Fishery	No	Yes*
Kimberly Gillnet and Barramundi	No	Yes*
Kimberly Prawn Managed Fishery	No	Yes*
Mackerel Managed Fishery	Yes	Yes
Marine Aquarium Fish Managed Fishery	Yes	Yes
Nickol Bay Prawn Managed Fishery	No	Yes
Northern Demersal Scalefish Managed Fishery	No	Yes
Octopus Interim Managed Fishery	No	Yes*
Onslow Prawn Managed Fishery	No	Yes
Pearl Oyster Managed Fishery	No	Yes
Pilbara Demersal Scalefish Fisheries (includes trawl, trap and line fisheries)		
• Pilbara Fish Trawl Interim Managed Fishery	No	Yes

• Pilbara Line Fishery	No	Yes
• Pilbara Trap Managed Fishery	No	Yes
Pilbara Developmental Crab Managed Fishery	Yes	Yes
Shark Bay Crab Managed Fishery	No	Yes
Shark Bay Prawn Managed Fishery	No	Yes
Shark Bay Scallop Managed Fishery	No	Yes
South-West Coast Salmon Fishery	Yes	Yes
Specimen Shell Managed Fishery	Yes	Yes
West Coast Deep Sea Crustacean Managed Fishery	Yes	Yes
West Coast Demersal Scalefish	No	Yes
West Coast Gillnet/Demersal Longline	No	Yes*
West Coast Rock Lobster Managed Fishery	No	Yes

* Depicts fishery that spatially intersects shoreline accumulation only.

Information about planned activities, including a summary of Activity key impacts, risks and management measures is included in a Consultation Fact Sheet that can be accessed via this link to our Consultation Hub web site.

Information and maps are also included showing how we use sophisticated computer-based modelling to present the areas that could be affected in the unlikely event of a spill, noting that not all areas within the modelled Environment that May Be Affected (EMBA) would be affected at the same time.

Santos

Van Gogh Conlston Novara VGA-4H GI ST1
Well Intervention/Plug & Abandonment Environment Plan

Providing feedback

As part of the consultation for proposed activities we are seeking any input you may have about:

- Features of the environment that may be affected by proposed activities, including social, economic and cultural values and sensitivities.

- Potential environmental impacts and risks of proposed activities, including the potential consequences of the activities on your functions, interests or activities.
- What, if any, measures could reduce environmental impacts or risks, considering those measures already proposed by Santos and outlined in the Consultation Fact Sheet.

Feedback received during consultation will be considered in the development of the EP, which will be submitted to the Commonwealth Regulator, the National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA), for assessment.

Please note that the information provided during consultation will be included in documentation submitted to NOPSEMA. Please let us know if you would like any information you provide to us not to be published. If requested, Santos will ensure your information is included in a separate report which is not published on NOPSEMA's website. Santos will handle your information in accordance with our *Offshore Western Australia and Northern Territory Consultation Privacy Policy*.

You are also invited to pass on consultation information to any persons you consider appropriate and let us know if you know of any other authorities, organisations or individuals who may have functions, interests or activities which may be affected by the proposed activities and should participate in the consultation process.

Please let us know if you would like to receive an activity notification in advance and upon completion of planned activities.

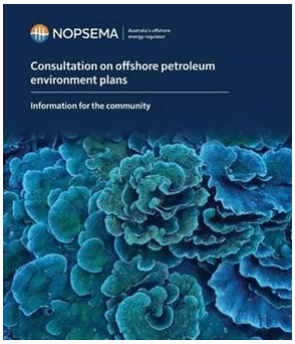
Santos welcomes your feedback specific to the proposed activities described under the proposed EP by the close of business on **10 November 2025.**

If you wish to discuss the consultation process or provide feedback for the EP, you can do so via return email or call us toll free on **1800 267 600**.

Where can you get more information?

More details about the Commonwealth Government environmental approval process can be found on the NOPSEMA website at NOPSEMA.gov.au.

Click the image to read in full.



We look forward to hearing from you soon.

Regards,

Santos Consultation Team

t: +61 1800 267 600 | e: offshore.consulation@santos.com

Santos.com

Santos acknowledges the Traditional Owners and Custodians of the lands on which we operate. We pay our respects to their Elders past, present and emerging.

ID 1807

From: Consultation, Santos <Offshore.consultation@santos.com>
Sent: Monday, 12 January 2026 12:34
To: [redacted]
Cc: Consultation, Santos <Offshore.consultation@santos.com>
Subject: Reminder - CONSULTATION | Carnarvon Basin | Van Gogh Coniston Novara VGA-4H GI ST1 Well Intervention/Plug & Abandonment Environment Plan

Dear [redacted]

Further to our advice of 12 December (below), please be informed the consultation closing date of Van Gogh Coniston Novara VGA-4H GI ST1 Well Intervention/Plug & Abandonment Environment Plan is **Monday, 19 January 2026**.

Feedback can be provided via email to offshore.consultation@santos.com or by calling toll free on 1800 267 600.

Kind regards,
Santos Offshore Consultation

From: Consultation, Santos <Offshore.consultation@santos.com>
Sent: Friday, 12 December 2025 11:52
To: [redacted]
Cc: Consultation, Santos <Offshore.consultation@santos.com>
Subject: CONSULTATION | Carnarvon Basin | Van Gogh Coniston Novara VGA-4H GI ST1 Well Intervention/Plug & Abandonment Environment Plan

Dear [redacted],

Santos is contacting you as we are proposing to suspend or plug and abandon (P&A) the VGA-4H GI ST1 well within the Van Gogh Coniston Novara (VGCN) field.
The proposed activities are planned to commence as early as Q4 2026, subject to obtaining all regulatory and business approvals. The expected activity duration is between approximately 10 and 40 days, with the duration subject to change based on potential for operational or weather-related challenges.
An Environment Plan (EP) is being prepared for the proposed activities and will have validity of five years, once accepted. The Operational Area is located within Commonwealth waters approximately 44 km north-northwest of the Cape Range Peninsula and 59.5 km north-northwest of Exmouth, Western Australia.

Why are we contacting you?

Under Commonwealth Government Regulations, Santos is required to consult with relevant persons about proposed activities in the course of preparing an EP.

A relevant person includes government agencies and authorities to which the proposed activity may be relevant, and persons or organisations whose functions, interests or activities may be affected by the proposed activity.

Information provided by relevant persons in consultation helps us to better understand the values and sensitivities of the environment and inform the evaluation of the potential impacts and risks associated with the activity and how to manage them appropriately.

We are contacting you because Santos considers that you may have functions, interests or activities which may be affected by the proposed activities, although we expect this would only be in the unlikely event of a worst-case hydrocarbon spill.

Information about planned activities, including a summary of Activity key impacts, risks and management measures is included in a Consultation Fact Sheet that can be accessed via this link to our Consultation Hub web site.

Information and maps are also included showing how we use sophisticated computer-based modelling to present the areas that could be affected in the unlikely event of a spill, noting that not all areas within the modelled Environment that May Be Affected (EMBA) would be affected at the same time.

Information for relevant persons

Santos

Van Gogh Corsiton Novara VGA-4H GI ST1
Well Intervention/Plug & Abandonment Environment Plan

Activity Overview

Consultation and Feedback

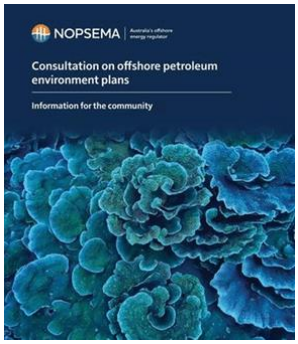
Providing feedback

As part of the consultation for proposed activities we are seeking any input you may have about:

- Features of the environment that may be affected by proposed activities, including social, economic and cultural values and sensitivities.
- Potential environmental impacts and risks of proposed activities, including the potential consequences of the activities on your functions, interests or activities.
- What, if any, measures could reduce environmental impacts or risks, considering those measures already proposed by Santos and outlined in the Consultation Fact Sheet.

Feedback received during consultation will be considered in the development of the EP, which will be submitted to the Commonwealth Regulator, the National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA), for assessment.
Please note that the information provided during consultation will be included in documentation submitted to NOPSEMA. Please let us know if you would like any information you provide to us not to be published. If requested, Santos will ensure your information is included in a separate report which is not published on NOPSEMAâ€™s website. Santos will handle your information in accordance with our *Offshore Western Australia and Northern Territory Consultation Privacy Policy*.
You are also invited to pass on consultation information to any persons you consider appropriate and let us know if you know of any other authorities, organisations or individuals who may have functions, interests or activities which may be affected by the proposed activities and should participate in the consultation process.
Please let us know if you would like to receive an activity notification in advance and upon completion of planned activities.
Santos welcomes your feedback specific to the proposed activities described under the proposed EP by the close of business on **19 January 2026.**
If you wish to discuss the consultation process or provide feedback for the EP, you can do so via return email or call us toll free on **1800 267 600**.

Where can you get more information?
More details about the Commonwealth Government environmental approval process can be found on the NOPSEMA website at NOPSEMA.gov.au.
Click the image to read in full.â€¯



We look forward to hearing from you soon.

Regards,

Santos Consultation Team

t: +61 1800 267 600 | e: offshore.consulation@santos.com
Santos.com
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ID 1808

From: Consultation, Santos <Offshore.consultation@santos.com>
Sent: Monday, 12 January 2026 12:34
To: [redacted]
Cc: Consultation, Santos <Offshore.consultation@santos.com>
Subject: Reminder - CONSULTATION | Carnarvon Basin | Van Gogh Coniston Novara VGA-4H GI ST1 Well Intervention/Plug & Abandonment Environment Plan

Dear [redacted],

Further to our advice of 12 December (below), please be informed the consultation closing date of Van Gogh Coniston Novara VGA-4H GI ST1 Well Intervention/Plug & Abandonment Environment Plan is **Monday, 19 January 2026**.

Feedback can be provided via email to offshore.consultation@santos.com or by calling toll free on 1800 267 600.

Kind regards,
Santos Offshore Consultation

From: Consultation, Santos <Offshore.consultation@santos.com>
Sent: Friday, 12 December 2025 11:15
To: [redacted]u
Cc: Consultation, Santos <Offshore.consultation@santos.com>
Subject: CONSULTATION | Carnarvon Basin | Van Gogh Coniston Novara VGA-4H GI ST1 Well Intervention/Plug & Abandonment Environment Plan

Dear [redacted],

Santos is contacting you as we are proposing to suspend or plug and abandon (P&A) the VGA-4H GI ST1 well within the Van Gogh Coniston Novara (VGCN) field.
The proposed activities are planned to commence as early as Q4 2026, subject to obtaining all regulatory and business approvals. The expected activity duration is between approximately 10 and 40 days, with the duration subject to change based on potential for operational or weather-related challenges.
An Environment Plan (EP) is being prepared for the proposed activities and will have validity of five years, once accepted. The Operational Area is located within Commonwealth waters approximately 44 km north-northwest of the Cape Range Peninsula and 59.5 km north-northwest of Exmouth, Western Australia.
Why are we contacting you?
Under Commonwealth Government Regulations, Santos is required to consult with relevant persons about proposed activities in the course of preparing an EP.

A relevant person includes government agencies and authorities to which the proposed activity may be relevant, and persons or organisations whose functions, interests or activities may be affected by the proposed activity.
Information provided by relevant persons in consultation helps us to better understand the values and sensitivities of the environment and inform the evaluation of the potential impacts and risks associated with the activity and how to manage them appropriately.
We are contacting you because Santos considers that you may have functions, interests or activities which may be affected by the proposed activities, although we expect this would only be in the unlikely event of a worst-case hydrocarbon spill.
Information about planned activities, including a summary of Activity key impacts, risks and management measures is included in a Consultation Fact Sheet that can be accessed via this link to our Consultation Hub web site.
Information and maps are also included showing how we use sophisticated computer-based modelling to present the areas that could be affected in the unlikely event of a spill, noting that not all areas within the modelled Environment that May Be Affected (EMBA) would be affected at the same time.

Information for relevant persons

Santos

Van Gogh Corniston Novara VGA-4H GI ST1
Well Intervention/Plug & Abandonment Environment Plan

Activity Overview

Consultation and Feedback

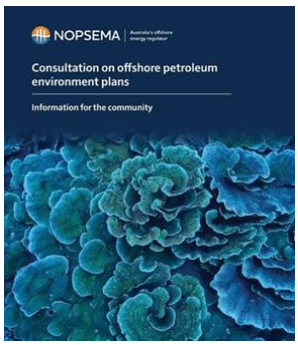
Providing feedback
As part of the consultation for proposed activities we are seeking any input you may have about:

- Features of the environment that may be affected by proposed activities, including social, economic and cultural values and sensitivities.
- Potential environmental impacts and risks of proposed activities, including the potential consequences of the activities on your functions, interests or activities.
- What, if any, measures could reduce environmental impacts or risks, considering those measures already proposed by Santos and outlined in the Consultation Fact Sheet.

Feedback received during consultation will be considered in the development of the EP, which will be submitted to the Commonwealth Regulator, the National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA), for assessment.
Please note that the information provided during consultation will be included in documentation submitted to NOPSEMA. Please let us know if you would like any information you provide to us not to be published. If requested, Santos will ensure your

information is included in a separate report which is not published on NOPSEMAâ€™s website. Santos will handle your information in accordance with our *Offshore Western Australia and Northern Territory Consultation Privacy Policy*.
You are also invited to pass on consultation information to any persons you consider appropriate and let us know if you know of any other authorities, organisations or individuals who may have functions, interests or activities which may be affected by the proposed activities and should participate in the consultation process.
Please let us know if you would like to receive an activity notification in advance and upon completion of planned activities.
Santos welcomes your feedback specific to the proposed activities described under the proposed EP by the close of business on **19 January 2026.**
If you wish to discuss the consultation process or provide feedback for the EP, you can do so via return email or call us toll free on **1800 267 600**.

Where can you get more information?
More details about the Commonwealth Government environmental approval process can be found on the
Click the image to read in full.â€¯



We look forward to hearing from you soon.

Regards,

Santos Consultation Team

Reminder Email Type 3

Reminder Email Type 3 where it is not clear from publicly available information where authorities, persons and organisations may be affected by impacts from planned activities and risks from unplanned events.

Date	Sent/ Received	Record Type	Consultation Materials	Email Subject
03/11/2025	Sent	Reminder Email	General Factsheet;	**Email 3** Reminder - CONSULTATION | Carnarvon Basin | Van Gogh Coniston Novara VGA-4H GI ST1 Well Intervention/Plug & Abandonment Environment Plan

ID No.			
ID-1101 Abrolhos Island Charters	ID -1102 Absolute Ocean Charters	ID -1104 All the Gear No Idea Sportfishing	ID -1105 Apache Charters
ID -1106 Aqualand Charters	ID -1107 Archipelago Adventures	ID -1103 Australian Conservation Foundation	ID -1108 Australian Energy Producers
ID -1109 Australian Institute of Marine Science	ID -1110 Australian Marine Conservation Society	ID -1111 Baiyungu Dreaming	ID -1112 Batavia Sea Safaris
ID -1113 Blue Horizon Charters	ID -1114 Blue Juice Charters	ID -1115 Blue Lightning Charters	ID -1116 BlueSun2 Boat Charters
ID -1117 Brian Lee Hunters Creek Tagalong Tours	ID -1119 Broome Hovercraft	ID -1120 Broome Tours Pty Ltd	ID -1121 Broome Whale Watching & Eco Tours
ID -1122 Bunda Bunda NJ Tours	ID -1123 Cannon Charters The Kimberley	ID -1150 Cape Conservation Group	ID -1124 Care for Hedland Environmental Association
ID -1125 Commonwealth Scientific and Industrial Research Organisation- ACT Corporate Headquarters	ID -1126 Conservation Council of WA	ID -1127 Coral Bay Ecotours	ID -1128 Coral Bay Progress Association
ID -1129 Coral Coast Tours	ID -1130 Curtin University Centre for Marine Science and Technology	ID -1131 Dampier Archipelago and Murujuga Sea Kayak Expedition	ID -1132 Dampier Archipelago Environmental Advisory Group
ID -1133 Dive Ningaloo	ID -1134 Diversity Charters	ID -1135 Eco Abrolhos	ID -1136 Edith Cowan University
ID -1137 Eighty Mile Beach Caravan Park WA	ID -1138 Environs Kimberley	ID -1139 Evolution Fishing Charters Exmouth	ID -1140 Exmouth Adventure Co
ID -1141 Exmouth Dive & Whalesharks Ningaloo	ID -1142 Exmouth Fishing Adventures	ID -1143 Exmouth Gulf Taskforce	ID -1144 Fishabout Tours

ID -1145 Greenpeace Australia Pacific	ID -1146 GT Diving A	ID -1147 Image Dive and Charters	ID -1148 InnKeeper Sport Fishing Charter
ID -1149 International Fund for Animal Welfare	ID -1151 James Cook University	ID -1153 Karma IV Charters	ID -1154 Karratha Adventure Sports
ID -1155 Kimberley Day Cruise	ID -1156 Kimberley Marine Research Station	ID -1157 Kimberley Pearl Charters	ID -1158 Kings Ningaloo Reef tours
Con-1159 Lethal Adventures	ID -1160 Live Ningaloo	ID -1161 Lombadina	ID -1162 Mac Attack Fishing Charters
ID -1163 Maccy Dave's Kayak Fishing Adventures	ID -1164 Mackerel Islands Pty Ltd	ID -1165 Mahi Mahi Fishing Charters	ID -1166 Maritime Industry Australia Ltd
ID -1167 Montebello Island Safaris	ID -1169 Ningaloo Car & Boat Hire	ID -1170 Ningaloo Coral Bay Boats	ID -1171 Ningaloo Marine Interaction
ID -1172 Ningaloo Reef Dive	ID -1173 Ningaloo Research Centre (Murdoch University)	ID -1174 Ningaloo Safari Tours	ID -1175 Ningaloo Sportfishing Charters
ID -1176 Ningaloo Whale Shark N Dive	ID -1177 Ocean Dream Charters	ID -1179 Odyssey Expeditions	ID -1180 Offshore Charters WA
ID -1181 On Point Spearfishing	ID -1182 On Strike Charters	ID -1183 Onslow Beach Resort	ID -1184 Peak Sportfishing Charters
ID -1185 Pelican Charters	ID -1186 Perfect Nature Cruises	ID -1188 Pilbara Dive and Tours	ID -1189 Pilbara Tours
ID -1190 Protect Ningaloo	ID -1191 Reef Seeker Charters	ID -1192 Reel Teaser Fishing Adventures	ID -1193 Roebuck Bay Working Group
ID -1194 Sail Ningaloo	ID -1195 Sal Salis	ID -1187 Save the Kimberley	ID -1196 Sea Shepherd Australia
ID -1197 Seaforce Fishing Charters	ID -1198 Seastar Boat Charters	ID -1199 Shark Bay Charters	ID -1200 Shark Bay Coastal Tours
ID -1201 Shark Bay Dolphin Project	ID -1202 Shark Bay Eco Tours	ID -1203 Silverado Charters	ID -1204 Southern Cross Cultural Tours at Lullumb
ID -1205 Telstra	ID -1206 The Great Escape	ID -1207 The Pew Charitable Trusts	ID -1208 Top Gun Charters

ID -1209 Tourism Council of Western Australia	ID -1210 True North Fishing Charters	ID -1211 University of Western Australia Oceans Institute	ID -1212 Unreel Adventure Safaris
ID -1213 View Ningaloo	ID -1152 Vocus Group Ltd	ID -1216 West Kimberley Fishing Tours	ID -1217 Western Australian Indigenous Tourism Operators Council
ID -1218 Western Australian Marine Science Institution	ID -1219 Whale and Dolphin Conservation	ID -1220 Wilderness Society	ID -1221 Willie Pearl Lugger Cruises
ID -1223 World Wide Fund for Nature	ID -1224 Wula Gura Nyinda Eco Cultural Adventures		

Date	Sent/ Received	Record Type	Consultation Materials	Email Subject
02/12/2025	Sent	Reminder Email	General Factsheet;	**Email 3** Reminder - CONSULTATION | Carnarvon Basin | Van Gogh Coniston Novara VGA-4H GI ST1 Well Intervention/Plug & Abandonment Environment Plan
ID No.				
ID -1645 Kimberley Outback Tours		ID -1647 Marine Tourism Western Australia	ID -1646 Murdoch University	ID -1648 Murujuga Rock Art & Cultural Tours Pilbara WA

Date	Sent/ Received	Record Type	Consultation Materials	Email Subject
19/12/2025	Sent	Reminder Email	General Factsheet;	**Email 3** Reminder - CONSULTATION | Carnarvon Basin | Van Gogh Coniston Novara VGA-4H GI ST1 Well Intervention/Plug & Abandonment Environment Plan
ID No.				
ID -1805 Western Australian Coastal and Marine Network				

Example

From: Consultation, Santos <Offshore.consultation@santos.com>
Sent: Monday, 3 November 2025 12:28
To: [redacted]
Cc: Consultation, Santos <Offshore.consultation@santos.com>
Subject: REMINDER: CONSULTATION | Carnarvon Basin | Van Gogh Coniston Novara VGA-4H GI ST1 Well Intervention/Plug & Abandonment Environment Plan

Dear [redacted]

Further to our previous advice on 13 October (below), please be informed the consultation closing date of Van Gogh Coniston Novara VGA-4H GI ST1 Well Intervention/Plug & Abandonment Environment Plan is Wednesday, 12 November 2025.

Please note the consultation date has been extended to allow for a 30-day consultation period.

Feedback can be provided via email to offshore.consultation@santos.com or by calling toll free on 1800 267 600.

Regards,

Santos Consultation Team

From: Consultation, Santos <Offshore.consultation@santos.com>
Sent: Monday, 13 October 2025 15:42
To: [redacted]
Cc: Consultation, Santos <Offshore.consultation@santos.com>
Subject: CONSULTATION | Carnarvon Basin | Van Gogh Coniston Novara VGA-4H GI ST1 Well Intervention/Plug & Abandonment Environment Plan

Dear [redacted]

Santos is contacting you as we are proposing to suspend or plug and abandon (P&A) the VGA-4H GI ST1 well within the Van Gogh Coniston Novara (VGCN) field.

The proposed activities are planned to commence as early as Q4 2026, subject to obtaining all regulatory and business approvals. The expected activity duration is between approximately 10 and 40 days, with the duration subject to change based on potential for operational or weather-related challenges.

An Environment Plan (EP) is being prepared for the proposed activities and will have validity of five years, once accepted. The Operational Area is located within Commonwealth waters approximately 44 km north-northwest of the Cape Range Peninsula and 59.5 km north-northwest of Exmouth, Western Australia.

Why are we contacting you?

Under Commonwealth Government Regulations, Santos is required to consult with relevant persons about proposed activities in the course of preparing an EP.

A relevant person includes government agencies and authorities to which the proposed activity may be relevant, and persons or organisations whose functions, interests or activities may be affected by the proposed activity.

Information provided by relevant persons in consultation helps us to better understand the values and sensitivities of the environment and inform the evaluation of the potential impacts and risks associated with the activity and how to manage them appropriately.

We are contacting you because it is not clear to Santos, based on publicly available information, whether your functions, interests or activities may be affected by the proposed activities. Please consider the information we have provided with this email and let us know if you would like to be consulted for these proposed activities.

Information about planned activities, including a summary of Activity key impacts, risks and management measures is included in a Consultation Fact Sheet that can be accessed via this link to our Consultation Hub web site.

Information and maps are also included showing how we use sophisticated computer-based modelling to present the areas that

could be affected in the unlikely event of a spill, noting that not all areas within the modelled Environment that May Be Affected (EMBA) would be affected at the same time.

Providing feedback

As part of the consultation for proposed activities we are seeking any input you may have about:

- Features of the environment that may be affected by proposed activities, including social, economic and cultural values and sensitivities.
- Potential environmental impacts and risks of proposed activities, including the potential consequences of the activities on your functions, interests or activities.
- What, if any, measures could reduce environmental impacts or risks, considering those measures already proposed by Santos and outlined in the Consultation Fact Sheet.

Feedback received during consultation will be considered in the development of the EP, which will be submitted to the Commonwealth Regulator, the National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA), for assessment.

Please note that the information provided during consultation will be included in documentation submitted to NOPSEMA. Please let us know if you would like any information you provide to us not to be published. If requested, Santos will ensure your information is included in a separate report which is not published on NOPSEMA's website. Santos will handle your information in accordance with our

Offshore Western Australia and Northern Territory Consultation Privacy Policy.

You are also invited to pass on consultation information to any persons you consider appropriate and let us know if you know of any other authorities, organisations or individuals who may have functions, interests or activities which may be affected by the proposed activities and should participate in the consultation process.

Please let us know if you would like to receive an activity notification in advance and upon completion of planned activities.

Santos welcomes your feedback specific to the proposed activities described under the proposed EP by the close of business on **10 November 2025.**

If you wish to discuss the consultation process or provide feedback for the EP, you can do so via return email or call us toll free on **1800 267 600**.

Where can you get more information?

More details about the Commonwealth Government environmental approval process can be found on the NOPSEMA website at NOPSEMA.gov.au.

Click the image to read in full.

We look forward to hearing from you soon.

Regards,

Santos Consultation Team

Santos

t: +61 1800 267 600 | e: offshore.consulation@santos.com

Santos.com

Santos acknowledges the Traditional Owners and Custodians of the lands on which we operate. We pay our respects to their Elders past, present and emerging.

If you'd like to unsubscribe and stop receiving these emails click here.

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ID 1645, ID 1646, ID 1647, ID 1648

From: Consultation, Santos <Offshore.consultation@santos.com>
Sent: Tuesday, 2 December 2025 13:43
To: [redacted]
Cc: Consultation, Santos <Offshore.consultation@santos.com>
Subject: Reminder: CONSULTATION | Carnarvon Basin | Van Gogh Coniston Novara VGA-4H GI ST1 Well Intervention/Plug & Abandonment Environment Plan

Dear [redacted]

Further to our advice of 13 October, we wish to inform you that, due to a system error, you did not receive a reminder email for this consultation. As a result, we have extended the closing date for feedback on the Van Gogh Coniston Novara VGA-4H GI ST1 Well Intervention/Plug & Abandonment Environment Plan to **Monday, 8 December 2025.**

Feedback can be provided via email offshore.consultation@santos.com or by calling on toll-free on 1800 267 600.

Regards
Santos Consultation Team

From: Santos Consultation Team <offshore.consultation@santos.com>
Sent: Monday, 13 October 2025 12:13
To: [redacted]
Subject: ![EXT]: CONSULTATION | Carnarvon Basin | Van Gogh Coniston Novara VGA-4H GI ST1 Well Intervention/Plug & Abandonment Environment Plan

Dear [redacted],

Santos is contacting you as we are proposing to suspend or plug and abandon (P&A) the VGA-4H GI ST1 well within the Van Gogh Coniston Novara (VGCN) field.

The proposed activities are planned to commence as early as Q4 2026, subject to obtaining all regulatory and business approvals. The expected activity duration is between approximately 10 and 40 days, with the duration subject to change based on potential for operational or weather-related challenges.

An Environment Plan (EP) is being prepared for the proposed activities and will have validity of five years, once accepted. The Operational Area is located within Commonwealth waters approximately 44 km north-northwest of the Cape Range Peninsula and 59.5 km north-northwest of Exmouth, Western Australia.

Why are we contacting you?

Under Commonwealth Government Regulations, Santos is required to consult with relevant persons about proposed activities in the course of preparing an EP.

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Information and maps are also included showing how we use sophisticated computer-based modelling to present the areas that could be affected in the unlikely event of a spill, noting that not all areas within the modelled Environment that May Be Affected (EMBA) would be affected at the same time.

Information for relevant persons

Santos

Van Gogh Coniston Novara VGA-4H GI ST1
Well Intervention/Plug & Abandonment Environment Plan

Activity Overview

Consultation and Feedback

santos.com

Providing feedback

As part of the consultation for proposed activities we are seeking any input you may have about:

- Features of the environment that may be affected by proposed activities, including social, economic and cultural values and sensitivities.
- Potential environmental impacts and risks of proposed activities, including the potential consequences of the activities on your functions, interests or activities.
- What, if any, measures could reduce environmental impacts or risks, considering those measures already proposed by Santos and outlined in the Consultation Fact Sheet.

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You are also invited to pass on consultation information to any persons you consider appropriate and let us know if you know of any other authorities, organisations or individuals who may have functions, interests or activities which may be affected by the proposed activities and should participate in the consultation process.

Please let us know if you would like to receive an activity notification in advance and upon completion of planned activities.

Santos welcomes your feedback specific to the proposed activities described under the proposed EP by the close of business on **10 November 2025.**

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Where can you get more information?

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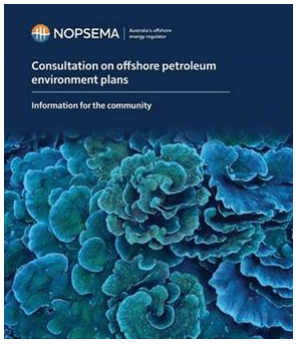
Click the image to read in full.



We look forward to hearing from you soon.

Regards,

Santos Consultation Team

t: +61 1800 267 600 | e: offshore.consulation@santos.com

Santos.com

Santos acknowledges the Traditional Owners and Custodians of the lands on which we operate. We pay our respects to their Elders past, present and emerging.

ID 1805

From: Consultation, Santos <Offshore.consultation@santos.com>
Sent: Friday, 19 December 2025 10:07
To [redacted]>
Cc: Consultation, Santos <Offshore.consultation@santos.com>
Subject: Reminder: CONSULTATION | Carnarvon Basin | Van Gogh Coniston Novara VGA-4H GI ST1 Well Intervention/Plug & Abandonment Environment Plan

Dear [redacted],

Further to our advice of 2 December (below), please be informed the consultation closing date of Van Gogh Coniston Novara VGA-4H GI ST1 Well Intervention/Plug & Abandonment Environment Plan is **Friday**, **9 January 2025**.

Feedback can be provided via email to offshore.consultation@santos.com or by calling toll free on 1800 267 600.

Kind regards,
Santos Offshore Consultation

From: Consultation, Santos
Sent: Tuesday, 2 December 2025 16:57
To: '[redacted]>
Cc: Consultation, Santos <Offshore.consultation@santos.com>
Subject: CONSULTATION | Carnarvon Basin | Van Gogh Coniston Novara VGA-4H GI ST1 Well Intervention/Plug & Abandonment Environment Plan

Dear [redacted],

Santos is contacting you as we are proposing to suspend or plug and abandon (P&A) the VGA-4H GI ST1 well within the Van Gogh Coniston Novara (VGCN) field.

The proposed activities are planned to commence as early as Q4 2026, subject to obtaining all regulatory and business approvals. The expected activity duration is between approximately 10 and 40 days, with the duration subject to change based on potential for operational or weather-related challenges.

An Environment Plan (EP) is being prepared for the proposed activities and will have validity of five years, once accepted. The Operational Area is located within Commonwealth waters approximately 44 km north-northwest of the Cape Range Peninsula and 59.5 km north-northwest of Exmouth, Western Australia.

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Information and maps are also included showing how we use sophisticated computer-based modelling to present the areas that could be affected in the unlikely event of a spill, noting that not all areas within the modelled Environment that May Be Affected (EMBA) would be affected at the same time.

Information for relevant persons

Santos

Van Gogh Coniston Novara VGA-4H GI ST1
Well Intervention/Plug & Abandonment Environment Plan

Activity Overview

Consultation and Feedback

santos.com

Providing feedback

As part of the consultation for proposed activities we are seeking any input you may have about:

- Features of the environment that may be affected by proposed activities, including social, economic and cultural values and sensitivities.

- Potential environmental impacts and risks of proposed activities, including the potential consequences of the activities on your functions, interests or activities.
- What, if any, measures could reduce environmental impacts or risks, considering those measures already proposed by Santos and outlined in the Consultation Fact Sheet.

Feedback received during consultation will be considered in the development of the EP, which will be submitted to the Commonwealth Regulator, the National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA), for assessment.

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You are also invited to pass on consultation information to any persons you consider appropriate and let us know if you know of any other authorities, organisations or individuals who may have functions, interests or activities which may be affected by the proposed activities and should participate in the consultation process.

Please let us know if you would like to receive an activity notification in advance and upon completion of planned activities.

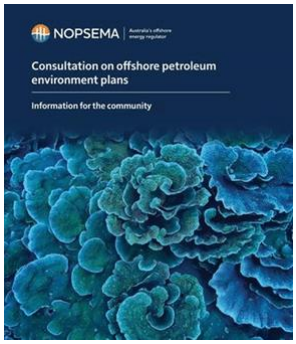
Santos welcomes your feedback specific to the proposed activities described under the proposed EP by the close of business on **9 January 2026.**

If you wish to discuss the consultation process or provide feedback for the EP, you can do so via return email or call us toll free on **1800 267 600**.

Where can you get more information?

More details about the Commonwealth Government environmental approval process can be found on the NOPSEMA website at NOPSEMA.gov.au.

Click the image to read in full.



We look forward to hearing from you soon.

Regards,

Santos Consultation Team

Santos

t: +61 1800 267 600 | e: offshore.consulation@santos.com

Santos.com

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Reminder Email Type 2a

Reminder Email Type 2a where authorities, persons and organisations with commercial fishing interests may be affected by risks from unplanned events only given their significant distance from proposed activities.

Date	Sent/ Received	Record Type	Consultation Materials	Email Subject
03/11/2025	Sent	Reminder Email	General Factsheet	**Email 2a** Reminder - CONSULTATION | Carnarvon Basin | Van Gogh Coniston Novara VGA-4H GI ST1 Well Intervention/Plug & Abandonment Environment Plan

ID No.			
ID -1093 Aquaculture Council of Western Australia	ID -1094 Australian Southern Bluefin Tuna Industry Association	ID -1095 Commonwealth Fisheries Association	ID -1096 Department of Agriculture, Fisheries and Forestry - Fisheries Division
ID -1097 Department of Primary Industries and Regional Development	ID -1098 Tuna Australia	ID -1099 Western Australian Fishing Industry Council	ID -1100 Western Rock Lobster Council

Example

From: offshore.consultation@santos.com <offshore.consultation@santos.com>
Sent: Monday, 3 November 2025 10:42
To: [redacted]
Subject: REMINDER: CONSULTATION | Carnarvon Basin | Van Gogh Coniston Novara VGA-4H GI ST1 Well Intervention/Plug & Abandonment Environment Plan

Dear [redacted]

Further to our previous advice on 13 October (below), please be informed the consultation closing date of Van Gogh Coniston Novara VGA-4H GI ST1 Well Intervention/Plug & Abandonment Environment Plan is **Wednesday, 12 November 2025**.

Please note the consultation date has been extended to allow for a 30-day consultation period.

Feedback can be provided via email to offshore.consultation@santos.com or by calling toll free on 1800 267 600.

Regards,

Santos Consultation Team

Dear [redacted]

Santos is contacting you as we are proposing to suspend or plug and abandon the VGA-4H GI ST1 well within the Van Gogh Coniston Novara (VGCN) fields as a component of the well decommissioning process.

The VGA-4H GI ST1 well is located in Western Australia's north west coast, offshore in Commonwealth Waters. The nearest community to the

Operational Area (OA) is the Shire of Exmouth, which is located approximately 32 km away.

The proposed activities may commence as early as Q3 2026, subject to obtaining all regulatory and business approvals. An Environment Plan (EP) is being prepared for the proposed activities and will have validity of five years, once accepted.

Why are we contacting you?

Under Commonwealth Government Regulations, Santos is required to consult with relevant persons about proposed activities in the course of preparing an EP.

A relevant person includes government agencies and authorities to which the proposed activity may be relevant, and persons or organisations whose functions, interests or activities may be affected by the proposed activity.

Information provided by relevant persons in consultation helps us to better understand the values and sensitivities of the environment and inform the evaluation of the potential impacts and risks associated with the activity and how to manage them appropriately.

For activities proposed to be managed under this EP, Santos has assessed that Commonwealth and WA fisheries are unlikely be active in the Operational Area for proposed activities based on a review of government fisheries data. As such, fisheries are only expected to be affected in the event of a worst-case hydrocarbon spill. Fisheries that have a spatial overlap with the Operational Area and the Environment that May Be Affected (EMBA) are identified in the table below.

	Fishery spatial overlap with Operational Areas	Fishery spatial overlap with EMBA
Commonwealth Fishery		
North West Slope Trawl Fishery	Yes	Yes

Southern Bluefin Tuna Fishery	Yes	Yes
Western Deepwater Trawl Fishery	No	Yes
Western Skipjack Tuna Fishery	Yes	Yes
Western Tuna and Billfish Fishery	Yes	Yes
Western Australian Fishery		
Abalone Managed Fishery	No	Yes
Abrolhos Island and Midwest Trawl	No	Yes*
Broome Prawn Fishery	No	Yes*
Exmouth Gulf Prawn Managed Fishery	No	Yes
Gascoyne Demersal Scalefish Managed Fishery	No	Yes
Kimberly Crab Fishery	No	Yes*
Kimberly Gillnet and Barramundi	No	Yes*
Kimberly Prawn Managed Fishery	No	Yes*
Mackerel Managed Fishery	Yes	Yes
Marine Aquarium Fish Managed Fishery	Yes	Yes
Nickol Bay Prawn Managed Fishery	No	Yes
Northern Demersal Scalefish Managed Fishery	No	Yes
Octopus Interim Managed Fishery	No	Yes*
Onslow Prawn Managed Fishery	No	Yes
Pearl Oyster Managed Fishery	No	Yes
Pilbara Demersal Scalefish Fisheries (includes trawl, trap and line fisheries)		
• Pilbara Fish Trawl Interim Managed Fishery	No	Yes

• Pilbara Line Fishery	No	Yes
• Pilbara Trap Managed Fishery	No	Yes
Pilbara Developmental Crab Managed Fishery	Yes	Yes
Shark Bay Crab Managed Fishery	No	Yes
Shark Bay Prawn Managed Fishery	No	Yes
Shark Bay Scallop Managed Fishery	No	Yes
South-West Coast Salmon Fishery	Yes	Yes
Specimen Shell Managed Fishery	Yes	Yes
West Coast Deep Sea Crustacean Managed Fishery	Yes	Yes
West Coast Demersal Scalefish	No	Yes
West Coast Gillnet/Demersal Longline	No	Yes*
West Coast Rock Lobster Managed Fishery	No	Yes

* Depicts fishery that spatially intersects shoreline accumulation only.

Information about planned activities, including a summary of Activity key impacts, risks and management measures is included in a Consultation Fact Sheet that can be accessed via this link to our Consultation Hub web site.

Information and maps are also included showing how we use sophisticated computer-based modelling to present the areas that could be affected in the unlikely event of a spill, noting that not all areas within the modelled Environment that May Be Affected (EMBA) would be affected at the same time.

Providing feedback

As part of the consultation for proposed activities we are seeking any input you may have about:

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Please let us know if you would like to receive an activity notification in advance and upon completion of planned activities.

Santos welcomes your feedback specific to the proposed activities described under the proposed EP by the close of business on **10 November 2025.**

If you wish to discuss the consultation process or provide feedback for the EP, you can do so via return email or call us toll free on **1800 267 600**.

Where can you get more information?

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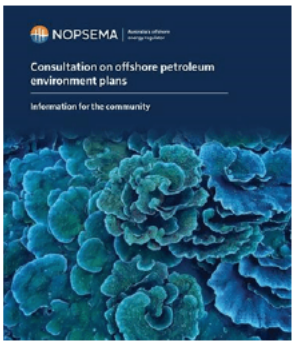

We look forward to hearing from you soon.

Regards,

Santos Consultation Team

Santos

t: +61 1800 267 600 | e: offshore.consulation@santos.com

Santos.com

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Fact sheets

Information for relevant persons

Santos

Van Gogh Coniston Novara VGA-4H GI ST1 Well Intervention/Plug & Abandonment Environment Plan

Activity Overview

Santos is proposing to suspend or plug and abandon (P&A) the VGA-4H GI ST1 well within the Van Gogh Coniston Novara (VGCN) fields. The Operational Area (OA) is located within Commonwealth waters approximately 44 km north-northwest of the North West Cape and 60 km north of Exmouth, Western Australia. (**Figure 1**)

The proposed activities are planned to commence as early as Q3 2026, subject to obtaining all regulatory and business approvals. The expected activity duration is between approximately 10 and 40 days, with the duration subject to change based on potential for operational or weather-related challenges. The Environment Plan (EP) being prepared for the proposed activities will have a validity of five years.

Consultation and Feedback

All petroleum activities in Commonwealth waters must have an EP accepted by the National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA) before any activities can take place.

Under the *Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2023 (Cth) (OPGGS Environment Regulations)*, Santos is required to consult with relevant persons about proposed activities in the course of preparing an EP. A relevant person includes Commonwealth and State agencies and authorities to which the proposed activity may be relevant, and persons or organisations whose functions, interests or activities may be affected by the proposed activity. Santos meets this requirement by undertaking consultation. More details on consultation and providing feedback can be found on the back page of this factsheet.

If you consider you may be a relevant person, please contact us as soon as possible to initiate consultation with you, and so you can tell us how you would like to be consulted throughout the consultation process or if you need additional information. The consultation period for this EP closes **10 November 2025**.

More details about the Commonwealth Government environmental approval process can be found on the NOPSEMA website at **nopsema.gov.au**.

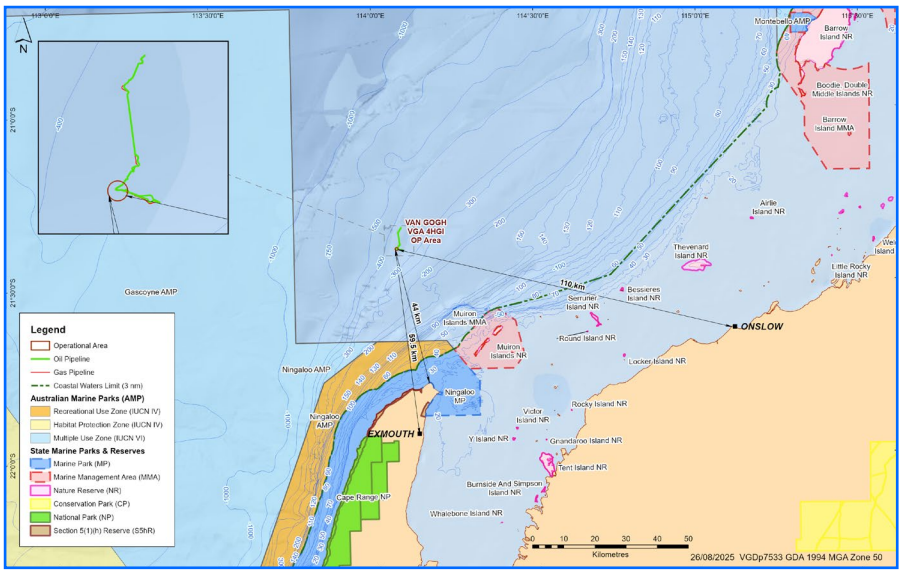

Figure 1. *Van Gogh VGA-4H GI ST1 activity location.*

Table 1. Activity Details

An overview of proposed activities is outlined in Table 1.

Activity details	
Indicative timing	Well suspension/P&A activities may commence any time between Q3 2026 and Q4 2027 with planned commencement date subject to obtaining all regulatory and business approvals.
Duration	Expected duration is between approximately 20 and 40 days for P&A or 10 to 30 days for well suspension, with duration subject to change based on potential for operational or weather-related challenges.
Planned activities	The key activities for a well suspension using a Light Well Intervention Vessel (LWIV) are summarised below. • Mobilisation and positioning of the LWIV on well • Preparation of the Xmas Tree (XT) for well re-entry, including the removal of the debris cap • Deployment of the subsea intervention lubricator (SIL) and workover control system • Recovery of the upper and lower crown plugs • Installation and testing of a mechanical bridge plug in the well • Reinstallation of the lower crown plug • Reinstallation of the upper crown plug, if required • Recovery of the SIL and workover control system • Reinstallation of the corrosion cap • General visual inspection of the well and surrounding seabed • Demobilisation of the LWIV. The key activities for a well P&A using a Mobile Offshore Drilling Unit (MODU) are summarised below. • Mobilisation and positioning of the MODU on well, including the running of anchors, if applicable • Installation of the XT wet park mud mat and Metocean monitoring equipment, if applicable • Preparation of the XT for well re-entry, including the removal of the debris cap • Installation of the Blow Out Preventer (BOP) and riser, including a BOP tethering system, if required • Installation and testing of the well bleed-off package • Recovery of the internal tree cap and upper crown plug • Recovery of the lower crown plug • Displacement of hydrocarbons from well • Installation and testing of the reservoir permanent barriers • Installation and testing of the non-hydrocarbon bearing zones permanent barrier, if required • Recovery of the riser and BOP, including the BOP tethering system, if required • Cut and recovery of the wellhead • Recovery of the Metocean monitoring equipment, if applicable • Recovery of any material/equipment used for activities under this EP • General visual inspection of the well and surrounding seabed • Demobilisation of the MODU, including the recovery of all anchors, if applicable.

Vessels / aircraft and other equipment	• MODU (well P&A activities) or LWIV (well suspension activities), including the use of a Remotely Operated Vehicle (ROV) • Support vessels (up to 3), which may be Anchor Handling Tug Supply (AHTS) vessels, Platform Supply Vessels (PSV), or a combination of the 2 • Helicopters to support crew changes, critical equipment supply and emergency response.
Operational Area	The activities covered by this EP will occur within a 2,500 m radius of VGA-4H GI ST1 subsea well. Other marine users are permitted to use the OA but should exercise caution for safety reasons and stay clear of the safety exclusion zone.
Exclusion zones	A 500 m radius Petroleum Safety Zone (PSZ) exclusion zone will be in place around the MODU/LWIV for the duration of the activity as a safety requirement to protect the MODU/LWIV and other marine users who might be in the area.

Table 2. Permit and Operational Area locations and water depths

Activities are proposed in the OA, details of which are outlined in Table 2.

	Latitude (GDA 94)	Longitude (GDA 94)	Water Depth
Well location	21° 23’ 52.23” S	114° 04’ 4.11” E	320 – 350m across the OA
Permit WA-35 L	21° 19′ 55.34″ S	114° 00′ 4.81″ E	260 – 460 m across the permit
	21° 19′ 55.33″ S	114° 10′ 4.8″ E	
	21° 24′ 55.34″ S	114° 10′ 4.8″ E	
	21° 24′ 55.34″ S	114° 00′ 4.81″ E	

Activity Purpose

Santos is proposing to suspend or plug and abandon (P&A) the VGA-4H GI ST1 well within the Van Gogh Coniston Novara (VGCN) fields as a component of the well decommissioning process.

Well suspension involves the installation of an interim mechanical barrier plug using a LWIV to temporarily abandon the well. If suspended, the well would be fully decommissioned in future years.

P&A is full decommissioning of the well using a MODU and involves removal of well infrastructure to allow placement of permanent plugs in the well as well as restoration of the seabed in line with the EP. Both methods are well recognised and accepted industry practices.

Both the LWIV and MODU will require support vessels and helicopters. Also, the LWIV and MODU will require an ROV throughout the suspension/P&A activities.

The proposed activities may commence as early as Q3 2026, subject to obtaining all regulatory and business approvals. The expected activity duration is between approximately 10 and 40 days and is subject to change if operational or weather-related challenges are encountered. The Environment Plan (EP) being prepared for the proposed activities will have a validity of five years.

Indicative examples of semi-submersible MODU (image above) and of a LWIV (image below).

Defining the environment that may be affected

Santos has undertaken an assessment to define environmental and socio-economic values and sensitivities that may be affected by proposed activities. To do this, Santos has considered the areas where activity impacts and risks may occur.

The OA where activities associated with the EP occur comprises a 2,500 m radius around the VGA-4H GI ST1 well (**Figure 1**).

The environment that may be affected (EMBA) is defined as the widest geographic extent of potential ecological and socio-economic impacts resulting from a credible worst-case hydrocarbon spill event.

For this EP, a loss of well control is the worst-case credible hydrocarbon spill event.

To determine the extent of the EMBA, Santos considered exposure values for the four phases of a hydrocarbon spill: shoreline accumulation, floating hydrocarbons, dissolved and entrained hydrocarbons in the water column.

These exposure values, combined with advanced and sophisticated computer spill modelling, enable Santos to present the areas that could be affected in the unlikely event of a spill.

The computer modelling overlays a great number (hundreds) of individual spill simulations, accounting for the range of potential metocean conditions, and combines all these hypothetical spill events into a single map (**Figure 2**).

This modelling helps Santos to determine the EMBA and develop tailored response strategies for the range of credible spill scenarios. These strategies are described in the Oil Pollution Emergency Plan for this EP, which will be reviewed and assessed by the Regulator.

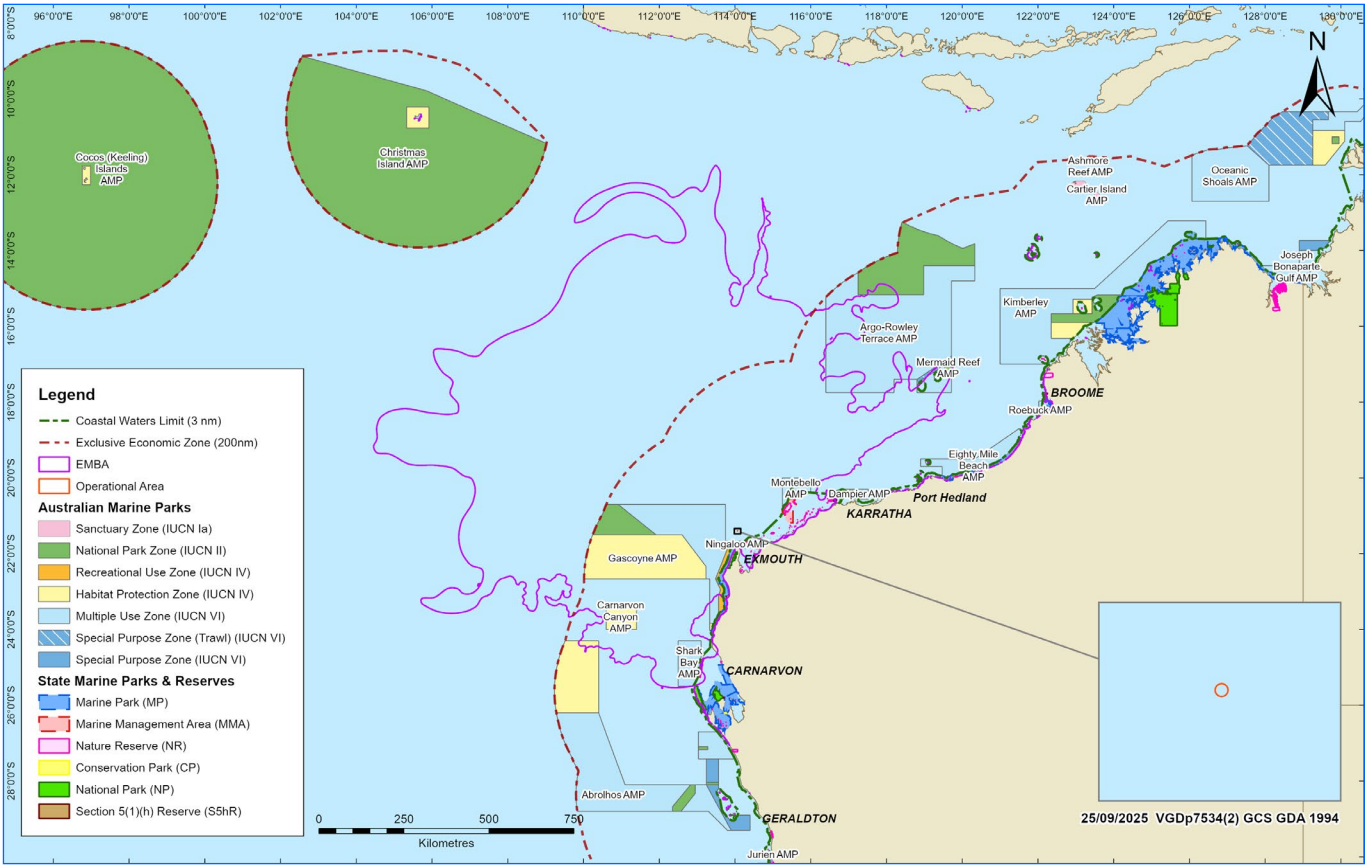

Figure 2. *Van Gogh VGA-4H GI ST1 Well P&A Activity EMBA*

Santos has undertaken a review of publicly available information to identify environmental, social, economic and cultural values and sensitivities that may be affected by activity impacts and risks. The outcomes of this review are summarised in **Table 3**

Table 3. Environmental values and sensitivities

Value / Sensitivity	Description	Spatial overlap with OA	Spatial overlap with EMBA	Public Information Review
Biologically Important Areas	Biologically important areas (BIAs) are spatially defined areas where aggregations of individuals of a species are known to display biologically important behaviour such as reproduction, foraging, resting or migration.	Yes	Yes	The OA overlaps the following BIAs: • Wedge-tailed Shearwater (breeding) • Pygmy Blue Whale (migration) • Humpback Whale (migration – north & south) • Whale Shark (foraging) • Flatback Turtle (reproduction) • Loggerhead Turtle (reproduction) • Green Turtle (reproduction) • Hawksbill Turtle (reproduction) The EMBA also includes BIAs for dugong, marine turtles, seabirds, seals, sharks, whales, and dolphins.

Table 3. Environmental values and sensitivities ... continued

Value / Sensitivity	Description	Spatial overlap with OA	Spatial overlap with EMBA	Public Information Review
Key Ecological Features	Key Ecological Features (KEFs) are elements of the Commonwealth marine environment that are considered to be of regional importance for either a region's biodiversity or its ecosystem function and integrity.	Yes	Yes	One KEF (Continental Slope Demersal Fish Communities KEF) intercepts the OA. There are 13 KEFs present within the EMBA: • Commonwealth marine environment surrounding the Houtman Abrolhos Islands • Western demersal slope and associated fish communities • Commonwealth waters adjacent to Ningaloo Reef •Western rock lobster • Ancient coastline at 125 m depth contour • Exmouth Plateau • Canyons linking the Cuvier Abyssal Plain and the Cape Range Peninsula • Wallaby Saddle • Commonwealth marine environment within and adjacent to the west coast inshore lagoons • Continental Slope Demersal Fish Communities • Mermaid Reef and Commonwealth waters surrounding Rowley Shoals • Seringapatam Reef and Commonwealth waters in the Scott Reef Complex • Glomar Shoals

Table 3. Environmental values and sensitivities ... continued

Value / Sensitivity	Description	Spatial overlap with OA	Spatial overlap with EMBA	Public Information Review
Listed and Protected Marine Fauna	The Australian Government uses the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) to protect and manage threatened, migratory and marine species.	Yes	Yes	The OA and EMBA are traversed by a range of listed and protected marine species that include seabirds, whales, turtles and sharks. The protected matters search tool report for the operational area identified 26 listed species and the search for the EMBA identified 107 listed species.
Protected Areas	World Heritage Areas (WHA) Commonwealth Heritage Listed (CHL) National Heritage Listed (NHL)	No	Yes	No WHAs, CHL or NHL areas intercept the OA. The closest WHA to the OA is the Ningaloo Coast WHA located approximately 27 km. The EMBA contains: Three WHAs: • Shark Bay • The Ningaloo Coast • The Murujuga Cultural Landscape Two CHLs: • Ningaloo Marine Area • Learmonth Air Weapons Range Facility Three NHLs: • Shark Bay • The Ningaloo Coast • Dampier Archipelago (including Burrup Peninsula)

Table 3. Environmental values and sensitivities ... continued

Value / Sensitivity	Description	Spatial overlap with OA	Spatial overlap with EMBA	Public Information Review
Protected Areas	Australian Marine Parks	No	Yes	No Australian Marine Parks (AMP) intercept the OA. The nearest Australian Marine Parks to the OA are the Gascoyne and Ningaloo AMPs (28 km). The EMBA intersects with 13 Australian Marine Parks.
Protected Areas	Western Australian Marine Parks and Marine Management Areas	No	Yes	There are no Western Australian Marine Parks or Marine Management Areas located within the OA. The Muiron Islands Marine Park (33 km) is the closest WA State Protected area, to the OA. The EMBA intersects 13 state Marine Parks/Marine Management Areas.

Table 3. Environmental values and sensitivities ... continued

Value / Sensitivity	Description	Spatial overlap with OA	Spatial overlap with EMBA	Public Information Review
Protected Areas	Wetlands of International or National Importance	No	Yes	There are no Wetlands of International or National importance located within the OA. The closest Ramsar Wetland is the Eighty Mile Beach, over 530 km from the OA. The EMBA intersects four Ramsar wetland and fourteen wetlands of national importance. RAMSAR: • Roebuck bay • Eighty-mile beach • Hosnies spring • The dales Wetlands of National Importance: • Learmonth Air Weapons Range - Saline Coastal Flats • Bundera Sinkhole • Shark Bay East • Exmouth Gulf East • Cape Range Subterranean Waterways • Lake MacLeod • Eighty Mile Beach System • Willie Creek Wetlands • "The Dales", Christmas Island • Bunda-Bunda Mound Springs • Roebuck Bay • Leslie (Port Hedland) Saltfields System • Hosine's Spring, Christmas Island • Mermaid Reef

Table 3. Environmental values and sensitivities ... continued

Value / Sensitivity	Description	Spatial overlap with OA	Spatial overlap with EMBA	Public Information Review
Communities	Local Government Area	No	Yes	No Local Government Areas intercept the OA. The closest Local Government Area to the OA is the Shire of Exmouth, which is located approximately 32 km from the OA. There are a number of local Government Areas within the EMBA.
Indigenous, subsistence or customary fishing	Indigenous, subsistence or customary fishing areas	No	Yes	Traditional Indigenous fishing in WA waters predominately occurs within inshore tidal waters and is not expected in the OA. Traditional Indigenous fishing in WA waters may occur in the EMBA.
Recreational fishing	Recreational fishing areas	No	Yes	Recreational fishing is unlikely to occur within the OA. Recreational fishing is known to occur within the EMBA.

Table 4. Economic values and sensitivities

Feature	Description	Spatial overlap with OA	Spatial overlap with EMBA	Public Information Review
Commercial fishing	Commercial fishing (Cth)	Yes	Yes	Four Commonwealth managed fisheries overlap the OA. FishCube data confirms no recent active fishing efforts within the OA. Five Commonwealth managed fisheries overlap with the EMBA.
	Commercial fishing (WA)	Yes	Yes	Six Western Australian managed fisheries overlap the OA. FishCube data confirms no recent active fishing efforts within the OA. The EMBA overlaps 21 WA State managed fisheries.
Defence	Designated defence activity areas	Yes	Yes	The OA intersects Defence Practice area and training area (RAAF Base Learmonth),
Energy Industry	Offshore carbon capture and storage activities	No	Yes	The OA does not intersect any Greenhouse Gas (GHG) assessment permits for offshore carbon capture and storage activities. The nearest carbon capture and storage is located approximately 6.9 km from the OA in G-18-AP. There are multiple offshore carbon capture and storage activities within the EMBA.
	Oil and gas activities	No	Yes	The OA does not intersect any other oil and gas activity and associated infrastructure. There are oil and gas activities within the EMBA.
	Offshore renewables activities	No	No	The OA does not intersect any Offshore Energy Infrastructure (OEI) licences for proposed offshore renewables activities. The nearest OEI licence is located off the coast of Bunbury, more than 1264 km south of the OA.

Table 4. Economic values and sensitivities ... continued

Value / Sensitivity	Description	Spatial overlap with OA	Spatial overlap with EMBA	Public Information Review
Shipping	AMSA shipping fairways and recorded vessel movements and shipping routes	No	Yes	No shipping fairways are within the OA. There are shipping fairways and vessel movements and shipping routes within the EMBA.
	Port areas	No	Yes	The OA does not intersect any Port Authority boundaries. The closest port to the OA is the Port of Exmouth, which is approximately 45 km south.
Telecommunications infrastructure	Subsea telecommunications cables	No	Yes	The OA does not intersect any subsea telecommunications cables. There are subsea telecommunications cables within the EMBA.
Tourism	Marine and coastal tourism	No	Yes	No known tourism activities occur in the OA. Tourism activities are known to occur in the EMBA.

Table 5. Cultural values and sensitivities

Feature	Description	Spatial overlap with OA	Spatial overlap with EMBA	Public Information Review
Aboriginal Heritage	Registered Aboriginal Heritage sites protected under the: *Aboriginal and Torres Strait Islander Heritage Protection Act 1984 (Cth)*	No	Yes	There are no registered Aboriginal Heritage sites within the OA. Aboriginal Heritage sites are present along the eastern boundaries of the EMBA.
	Registered Aboriginal Heritage sites protected under the: *Aboriginal Heritage Act 1972 (WA)*	No	Yes	There are no registered sites within the OA. Aboriginal Heritage sites are present along the eastern boundaries of the EMBA.
Cultural Heritage	Registered cultural sites under the: *Underwater Cultural Heritage Act 2018 (Cth)* *Maritime Archaeology Act 1973 (WA)*	No	Yes	No known sites of shipwrecks, sunken aircraft or other types of underwater cultural heritage were identified within the OA using the "Australian National Shipwrecks" dataset. There are shipwrecks within the EMBA.

Environmental impact and risk assessment considers planned activities and unplanned events:

- **Planned activities** come with unavoidable and known impacts that occur as part of the Activity, such as noise and atmospheric emissions.
- **Unplanned events** are not expected to occur, such as accidental discharges or spills. These events are assessed to ensure that, in the unlikely of an occurrence, the risks are managed adequately (through contingency measures).

Table 6 and 7 summarises the potential environmental impacts, risks and associated management measures to reduce environmental consequences to minor and As Low as Reasonably Practicable (ALARP).for the proposed Activity.

Table 6. Proposed activity potential impacts

Proposed activity potential impacts	
Noise emissions	

Description of impacts
Noise will be generated by:
• MODU operations
• LWIV Dynamic positioning (DP) systems
• Flaring during well bleed off activities
• Activity support and survey vessels
• Helicopters
Elevated underwater noise has the potential to change marine fauna behaviour such as attraction, avoidance and disorientation. The sensitivity of fauna to elevated noise levels varies depending on individual response.
Noise from proposed activities are not expected to impact socio-economic receptors as the impacts to fish from underwater noise are limited to localised behavioural changes that will not have any flow on impact to commercial fishing operations.
	Compliance with the following key management measures
	• Implement Santos' *Protected Marine Fauna Interaction and Sighting Procedure* for vessel and aircraft movements. This procedure limits marine fauna approach distances and speed, allowing marine fauna to be avoided or to move away which complies with Part 8 of *Environment Protection and Biodiversity Conservation Regulations (EPBC Regulations) for interacting with cetaceans* including:
	  • Support vessels will not travel faster than 6 knots within 300 m of a cetacean or turtle (caution zone) and minimise noise;
	  • Support vessels will not approach closer than 50 m to a dolphin or turtle and/or 100 m for a whale; and
	  • Vessels' movements and helicopter flights comply with Part 8 of EPBC Regulations for interacting with cetaceans.
	• Marine assurance standards and planned vessel maintenance will minimise noise generated from vessels and MODU by ensuring they are operated, maintained and crewed in accordance with industry standards and regulatory requirements.
	• Vessel planned maintenance system to maintain vessel dynamic positioning engines and machinery
	  • Vessel bridge crew receive induction in marine fauna observations and marine fauna interaction requirements

Table 6. Proposed activity potential impacts ... continued

Light emissions	

Description of impacts
Light will be generated by:
• Flaring activities
• Artificial lighting for:
  • operational and navigational safety during the Activity;
  • spot lighting when needed, such as deploying or retrieving equipment; and
  • when ROVs are working underwater.
Light may impact threatened, migratory or local fauna (e.g. marine mammals, marine turtles, sharks, rays, other fish and seabirds) and socio-economic receptors (cultural features). For example, fish may be attracted to artificial light, leading to a short-term localised increase in fauna activity.
The vessels, including the MODU are expected to produce similar light levels to other marine vessels in the region.
	Compliance with the following key management measures
	• Lighting is to be limited to that required for safe operations and navigation and will comply with the following maritime regulations:
	  • International Regulations for Preventing Collisions at Sea (COLREGS) / Marine Orders 30: Prevention of Collisions, and
	  • Marine Orders 21: Safety of Navigation and Emergency Procedures.
	• The Commonwealth *National Light Pollution Guidelines for Wildlife* (2023) will be followed as reasonably practicable.

Table 6. Proposed activity potential impacts ... continued

Physical presence and interaction with other marine users	

Description of impacts
Interaction with other marine users may occur as a result of but not limited to:
• MODU/LWIV and ROV presence in OA
• Support vessels and helicopters presence in OA
• Presence of well infrastructure and other equipment on seabed
The presence of the activity could potentially temporarily inhibit or impact other marine user groups including commercial and recreational fishing, tourism, commercial shipping and other oil and gas activities.
	Compliance with the following key management measures
	• All project vessels operating within the OA will adhere to the navigation safety requirements:
	  • International Regulations for Preventing Collisions at Sea 1972,
	  • Chapter 5 of International Convention for the Safety of Life at Sea 1974,
	  • International Convention on Standards of Training, Certification and Watchkeeping for Seafarers 1978, and
	  • the *Navigation Act 2012* and any subsequent Marine Orders that specify standards for crew training and competency, navigation, communication, and safety measures.
	• The Australian Hydrographic Office will be advised of project activities and installed infrastructure to facilitate issuing Notices to Mariners and maintaining nautical charts.
	• The MODU and activity vessels will maintain navigation aids to facilitate identification by other users.
	• A 500 m exclusion zone will be established and maintained around MODU/LWIV
	• Lighting will be used as required for safe work conditions and navigational purposes

Table 6. Proposed activity potential impacts ... continued

Seabed and benthic (above seabed level) habitat disturbance	
Description of impacts Seabed disturbance will occur by: • MODU positioning and anchoring • Cutting of wellhead • Placement of objects on the seabed such as ROV baskets • Marine growth removal Seabed disturbance could result in localised removal of epifauna or decreases in the abundance and diversity of local infauna. The total area of seabed disturbance that has been calculated for the proposed activities: • Rov baskets up to 24 m^2 per placement activity • Pre-lay of MODU anchors in OA where the semi-submersible will be used: conservatively 2,520 m^2 for the well	**Compliance with the following key management measures** • The semi-submersible MODU anchor mooring design and station keeping system will be designed to limit the extent of seabed disturbance by minimising the length of mooring line deployed. • No planned mooring of support vessels. • All deployed equipment is to be recovered at the end of activity to enable seabed and habitat recovery. • Santos continues to consider risks and impacts to cultural values and additional control measures may be adopted following site surveys.
Operational discharges - vessels	
Description of impacts The types of vessel discharges are typical of most offshore commercial vessels and include: • Bilge water • Cooling water • Deck drainage • Desalination brine • Food waste • Sewage and greywater • Ballast water • Firefighting foam Discharges from the MODU and support vessels may create a localised and temporary reduction in marine water quality.	**Compliance with the following key management measures** • Santos' chemical selection process will be implemented so that environmentally acceptable chemicals are used. • Additives will be selected and optimised for biodegradability as well as low aquatic toxicity and bioaccumulation potential. • All wastewater discharges will comply with relevant MARPOL 73/78, *Navigation Act 2012, Protection of the Sea (Prevention of Pollution from Ships) Act 1983* and subsequent Marine Order requirements (as appropriate for vessel classification). • Marine Order 91 (Marine Pollution Prevention – Oil), which implements Annex I of MARPOL 73/78. • Marine Order 95 (Marine Pollution Prevention – Garbage), which implements Annex V of MARPOL 73/78. • Marine Order 96 (Marine Pollution Prevention – Sewage), which implements Annex IV of MARPOL 73/78. • Santos Waste (Garbage) Management Procedures

Table 6. Proposed activity potential impacts ... continued

Operational discharges - drilling	
Description of impacts The types of routine drilling discharges include: • Brine • Drilling muds, which will be water-based for this activity • Drilling fluids and cuttings • Subsea control fluids • Cement and completion fluids (such as well clean up and suspension fluids) • Formation water • Chemicals such as tracer dyes Drilling discharges will be intermittent during the activity with volumes discharged dependent on a range of variables. Drilling discharges to the marine environment will result in a localised (around the discharge location) and temporary (minutes to hours) reduction in water quality. The OA is in a well mixed deep open water environment. The discharges are expected to be dispersed and diluted rapidly with concentrations significantly dropping the further away from the discharge location. Water quality change outside the OA is therefore unlikely to occur.	**Compliance with the following key management measures** • Chemical selection procedures so that only environmentally acceptable products are used in the activity. • Cuttings management system to ensure all drilling fluid will be recovered prior to the cuttings discharge to the sea. • Well test procedures to reduce oil in water content of drilling fluids • Inventory control procedure- restricts type and volume of drilling discharges

Table 6. Proposed activity potential impacts ... continued

Atmospheric emissions	
Description of impacts	**Compliance with the following key management measures**
Atmospheric emissions will occur from: • Fuel combustion to operate the MODU, vessels and helicopters • Operation of vessel incinerators • Flaring from MODU during well bleed off activities Atmospheric emission from the above activities may result in a temporary, localised reduction of air quality in the environment immediately surrounding the discharge point during the activity. Non-GHG emissions (NOx and SOx), can lead to a reduction in local air quality. Other atmospheric emissions may include greenhouse gases (GHG) such as CO_2, N_2O and CH_4. GHG emissions are linked to global warming and climate change.	• The MODU and support vessels will comply with MARPOL Annex VI (Prevention of Air Pollution from Ships), the *Navigation Act 2012*, the *Protection of the Sea (Prevention of Pollution from Ships) Act 1983* and subsequent Marine Orders, which require vessels to have a valid International Air Pollution Prevention Certificate (for vessels more than 400 tonnage), and to use low-sulphur fuel. • Ozone-depleting substances onboard vessels and the facilities will comply with relevant MARPOL 73/78 (Annex VI - air pollution), *Navigation Act 2012*, *Protection of the Sea (Prevention of Pollution from Ships) Act 1983* and subsequent Marine Order requirements (as appropriate for vessel classification). • Vessel preventative maintenance systems. • Measure, monitor or estimate fuel and flare emissions (in accordance with the National Pollutant Inventory). • Emissions, energy consumption and energy production data will be reported annually to the Clean Energy Regulator by the vessel contractors in accordance with *National Greenhouse and Energy Reporting Act 2007* requirements. • Well test procedure to reduce risk of hydrocarbons being released to air and sea • MODU planned maintenance system – reduces emissions by ensuring contracted MODU is operated, maintained and manned in accordance with industry standards and regulatory requirements. The control measures to be adopted are designed to be consistent with maritime regulations and petroleum industry standards.

Table 7. Potential activity risks

Potential activity risks	
Unplanned introduction of invasive marine species (IMS)	

Description of risks
Introduction of invasive marine species (IMS) may occur due to:
• Biofouling on vessels and external/internal niches (such as sea chests, seawater systems)
• Biofouling on equipment that is routinely submerged in water (such as ROVs)
• Discharge of high-risk ballast water
If successfully established, IMS can:
• Outcompete native species for food or space
• Prey on native species
• Change the nature of the environment
• Impact fisheries or aquaculture
• Impact human health through released toxins
• Reduce coastal aesthetics
• Cause damage to marine and industrial equipment and infrastructure
	Compliance with the following key management measures
	• Ballast water exchange operations will comply with the International Convention for the Control and Management of Ships' Ballast Water and Sediments 2004 (as appropriate to vessel class), Australian Ballast Water Management Requirements (DAWE 2020), *Protection of the Sea (Harmful Anti-fouling Systems) Act 2006*, and *Biosecurity Act 2015*, including:
	  • all ballast water exchanges conducted more than 12 nm from land
	  • vessel Ballast Water Management Plan stipulating that ballast water exchange records will be maintained Compliance with Santos IMS Management Plan
	• Biofouling management for vessels will be in accordance with the IMO Guidelines.
	• Compliance with the International Convention on the Control of Harmful Anti-fouling Systems on Ships 2001.
	• Valid International Anti-Fouling Systems Certificate.

Table 7. Potential activity risks ... continued

Unplanned interaction with marine fauna	

Description of risks
Potential interaction with marine fauna may occur as a result of:
• MODU operations
• Vessel operations
• Helicopter operations
Marine fauna in surface waters that are most at risk from vessel collision include marine mammals, marine turtles and whale sharks.
The MODU is not self-propelled and will be stationary once on location and MODU related marine fauna interactions are not anticipated.
Potential strike or collision may result in severe injury or mortality.
	Compliance with the following key management measures
	• Monitoring of surrounding marine environment by support vessel(s).
	• Santos' Procedure for interacting with marine fauna, which is designed to align with the EPBC Regulations 2000. This procedure limits marine fauna approach distances and speed, allowing marine fauna to be avoided or to move away.
	• Vessels within the OA will adhere to the requirements of the EPBC Regulations Part 8.1 – Interacting with cetaceans, (except in emergency conditions or when manoeuvring is not possible), which include:
	  • Implement a caution zone of 150 m for dolphins and 300 m for whales;
	  • Vessels will not knowingly approach closer than 50 m to a dolphin and 100 m to a whale (i.e. no approach zone);
	  • Make sure a vessel does not drift or approach within 50 m of a dolphin or 100 m of a whale; and
	  • Vessels will not knowingly travel more than 6 knots within the caution zone of a dolphin or whale.
	• Helicopters within the designated OA will adhere to the requirements of the EPBC Regulations Part 8.1 – Interacting with cetaceans (except in emergency conditions or when manoeuvring is not possible), which includes:
	  • not operating the helicopter at a height lower than 1650 feet or within a horizontal radius of 500 m of a cetacean, and
	  • not allowing the aircraft to approach a cetacean from head on.
	• Vessel standard operating procedure.

Table 7. Potential activity risks ... continued

Unplanned release of solid objects	

Description of risks
• Objects that could be accidentally released to the marine environment from vessels or during installation activities include:
• Non-hazardous solid wastes (paper, plastics and packaging)
• Hazardous solid wastes, (such as batteries, fluorescent tubes and aerosol cans)
• Equipment and materials (supplies, hard hats, tools or infrastructure parts)
Dropped objects from the MODU or support vessels may occur due to:
• Overfull or uncovered bins
• Incorrectly disposed items
• Incidents during transfers of waste or supplies
• Accidentally dropped objects/lost equipment
• Solid objects, equipment and other items lost at sea could lead to disturbance of benthic habitats in the area where the object has been dropped
	Compliance with the following key management measures
	• All wastewater discharges will comply with relevant MARPOL 73/78, *Navigation Act 2012*, *Protection of the Sea (Prevention of Pollution from Ships) Act 1983* and subsequent Marine Order requirements (as appropriate for vessel classification)
	• Objects dropped overboard will be recovered where practicable to mitigate the environmental consequences from objects remaining in the marine environment, unless the environmental consequences are minor, or safety risks are disproportionate to the environmental consequences
	• Waste management procedures will include:
	  • Classification of wastes including segregation of wastes into recyclable and non-recyclable materials
	  • Appropriate storage of wastes
	  • Transportation and disposal of wastes by a licenced waste contractor at licenced waste management facilities in accordance with waste classifications
	• Crane and lifting operations will comply with the following:
	  • Lifting equipment will be inspected and certified
	  • Preventative maintenance will be carried out, and lifting operators will be competent and qualified

Table 7. Potential activity risks ... continued

Unplanned hazardous liquid release (non-hydrocarbon)	
Description of risks Unplanned hazardous liquid release (non-hydrocarbon) may occur during: • Transferring, storing or using bulk products (e.g., mixed cement) • Mechanical failure of equipment, such as a tank or pipework failure • Handling and storage spill and leaks due to insufficient fastening • Hose or hose connection failure or leak • Lifting – dropped objects damaging liquid vessels (containers) inadequate bunding Non-hydrocarbon liquids include miscellaneous chemicals and waste streams (brine, mixed cement, cleaning and cooling agents, stored or spent chemicals and leftover paint materials) used or stored on board activity vessels, including the MODU. • Impacts to water quality are expected to be short-term and localised due to the selection of environmentally acceptable chemicals, the relatively small size of an unplanned spill and the rapid dispersal. • A decrease in water quality is likely to be restricted to the immediate area surrounding the spill location and contained within the OA. • Due to the small volumes and expected rapid dilution to concentrations below impact thresholds, impacts to water quality are not expected to cause flow-on effects to sediment quality, benthic habitats or socio-economic receptors such as commercial fisheries and/or cultural features.	**Compliance with the following key management measures** Santos has a suite of procedures to manage the selection, storage, handling and clean-up of chemicals and other non-hydrocarbon liquids. All project vessels operating within the OA will adhere to the navigation safety requirements including: • International Regulations for Preventing Collisions at Sea 1972 • Chapter 5 of International Convention for the Safety of Life at Sea 1974 • International Convention on Standards of Training, Certification and Watchkeeping for Seafarers 1978 • the *Navigation Act 2012* and any subsequent Marine Orders that specify standards for training and competency, navigation, communication, and safety measures • All vessels involved in the project will have a valid SOPEP or Shipboard Marine Pollution Emergency Plan (as appropriate for vessel classification). Vessels will have spill response plans. • Santos chemical selection process will be implemented so that environmentally acceptable chemicals are used • All project vessels subject to Santos' marine assurance procedures ensuring contracted vessels are operated, maintained and crewed in accordance with industry standards and regulatory requirements • A 500 m exclusion zone will be established and maintained around the MODU/LWIV • Spill kits will be available on-board vessels and personnel will receive an induction/training to inform them of deck spill response requirements. • Chemical storage areas will typically be set up in cabinets or bunded storage areas • Vessel lifting standards and cargo transfer procedures

Table 7. Potential activity risks ... continued

Unplanned minor hydrocarbon release	
Description of risks	**Compliance with the following key management measures**
Unplanned minor hydrocarbon release may occur due to: • Loss of primary containment • Pipework failure or rupture, hydraulic hose failure • Lifting – dropped objects damaging diesel infrastructure • Human error during tank filling or storage container transfers Minor releases refer to relatively small volumes of hydrocarbons from storage containers, transfer equipment and pipework on the MODU or support vessels that enters the marine environment. Most of these types of release occur within bunded deck areas, and are less than $1m^3$, however it remains possible for such spills to enter the marine environment. A localised decrease in water quality may occur, however due to the relatively small volumes impacts are expected to be short term as the hydrocarbon would rapidly dilute and dissolve into the ocean. Marine fauna may transit through the OA and encounter the release. However, it is expected impacts to fauna would be short term and result in behavioural changes, as they move away from the area where the spill occurred. Minor hydrocarbon releases are not expected to impact any socio-economic receptors such as commercial fisheries and/or cultural features.	• Dropped object prevention procedures to reduce the potential for dropped objects during lifting operations (including tote tanks and drum lifts) • Hazardous chemical management procedures to reduce the potential of spills and leaks (discharges) to the marine environment by controlling the storage, handling and clean-up of hazardous chemicals • General chemical management procedures to reduce spills, leaks and discharges by implementing procedures for the safe handling and storage of chemicals • Dangerous goods managed in accordance with International Maritime Dangerous Goods Code to reduce the potential of an accidental minor spills • MODUs and vessels have spill response plans • Remotely operated vehicle (ROV) inspection and maintenance procedures • Documented maintenance program is in place for equipment on vessels and MODU that provides a status on the maintenance of equipment • Emergency response capability (including equipment, personnel contracts, MOUs) will be maintained in accordance with approved SOPEPS accepted EPs and OPEPs • Bulk liquid transfer procedure to provide detail about chemical bunkering processes being undertaken • Well test procedures to reduce the risk of hydrocarbons being released to sea and air

Table 7. Potential activity risks ... continued

Unplanned marine diesel oil (MDO) release	

Description of risks
An unplanned release of MDO to the marine environment could occur from:
• A collision between the activity vessels and an errant third-party vessel due to factors such as human error, poor navigation, vessel equipment failure or poor weather. Such events could have sufficient impact to result in the rupture of a diesel tank leading to a loss of integrity and releasing 325 m^3 in the environment. This is considered credible given the diesel tanks may not be protected or double-hulled and fuel tank ruptures resulting in a hydrocarbon release have occurred before within the maritime industry.
Vessel - MODU Refuelling:
• spills during refuelling can occur through several pathways, including fuel hose breaks, coupling failure or tank overfilling, where fuel bunkering would need to be stopped manually.
• Fuel released prior to the cessation of pumping as well as fuel remaining in the transfer line may escape to the environment releasing 37.5m^3 of MDO.
Potential impacts that may occur as a result of hydrocarbon exposure could include:
• Sub-lethal stress and, in some cases, total or partial mortality of sensitive benthic organisms (e.g., corals) and the early life stages of resident fish and invertebrate species.
• A reduction in water quality has the potential to impact marine fauna. Some species of marine fauna may have cultural significance.
• Seabirds that encounter sea surface hydrocarbons may experience secondary effects through ingestion of condensate after eating exposed fish or preening.
Potential for temporary disruption to fishing activities e.g. disruption/ displacement of Fishing activities caused by the physical presence of the slick, loss of catch, decline in commercially important fish stocks and/or suspension of fishing operations
	Compliance with the following key management measures
	• Bulk liquids transferred in accordance with the bulk transfer procedure to reduce the risk of a release to sea.
	• MODUs and vessels have spill response plans.
	• Remotely operated vehicle (ROV) inspection and maintenance procedures.
	• Documented maintenance program is in place for equipment on vessels and MODU that provides a status on the maintenance of equipment.
	• All project vessels operating within the OA will adhere to the navigation safety requirements including:
	  • International Regulations for Preventing Collisions at Sea 1972,
	  • Chapter 5 of International Convention for the Safety of Life at Sea 1974,
	  • International Convention on Standards of Training, Certification and Watchkeeping for Seafarers 1978, and
	  • the *Navigation Act 2012* and any subsequent Marine Orders that specify standards for crew training and competency, navigation, communication, and safety measures.
	• The AHS will be advised of project activities to facilitate issuing Notices to Mariners and maintaining nautical charts prior to commencement of the activities.
	• Accepted OPEP in place for all activities.
	• A 500 m exclusion zone will be established and maintained around the MODU/LWIV
	• Oil-spill modelling and environmental risk assessments for development of this EP and OPEP will consider the full range of credible worst-case scenario consequences based on best available oil-spill modelling.
	• The MODU and vessels will maintain navigation aids.
	Santos will undertake consultation with relevant persons for all petroleum activities within the scope of these activities in accordance with the OPGGS (E) Regulations.

Table 7. Potential activity risks ... continued

Unplanned hydrocarbon release from loss of well control	
Description of risks Based on industry statistics and Santos' risk assessments, the likelihood of a loss of well control event leading to a spill of this size is considered 'remote' – requires exceptional circumstances and is unlikely even in the long term. The combination of the standard prevention control measures (i.e., safe drilling methods), and the spill response strategies, as presented in the OPEP, together reduce the hydrocarbon spill risk to a low level Potential impacts that may occur as a result of hydrocarbon exposure could include: • Sub-lethal stress and, in some cases, total or partial mortality of sensitive benthic organisms (e.g., corals) and the early life stages of resident fish and invertebrate species. • A reduction in water quality has the potential to impact marine fauna. Some species of marine fauna may have cultural significance. • Seabirds that encounter sea surface hydrocarbons may experience secondary effects through ingestion of condensate after eating exposed fish or preening. • Potential for temporary disruption to fishing activities e.g. disruption/ displacement of • Fishing activities caused by the physical presence of the slick, loss of catch, decline in commercially important fish stocks and/or suspension of fishing operations	**Compliance with the following key management measures** • Industry standard safe drilling methodologies, including inherently safe well designs and well control measures, are to be implemented • Drilling and Completions Management Process, including well integrity standards and NOPSEMA accepted Well Operations Management Plan (WOMP) • MODU and support vessel spill response plans including predrilling source control plan • A 500 m exclusion zone will be established and maintained around the LWIV/MODU • Oil-spill modelling and environmental risk assessments for development of the EP and OPEP will consider the full range of credible worst-case scenario consequences based on best available oil-spill modelling • The AHS will be advised of project activities to facilitate issuing Notices to Mariners and maintaining nautical charts prior to commencement of activities • Marine assurance standards and planned maintenance to ensure that MODU and vessels are operated, maintained and crewed in accordance with industry standards and regulatory requirements • Documented maintenance program is in place for equipment on MODU that provides a status on the maintenance of equipment • Prior to each campaign commencement, an assurance check will be undertaken in accordance with Santos Environment Management of Change Procedure • Source control emergency response plans will be in place for all drilling activities, including but not limited to relief well drilling.

Consultation

In preparing an EP for submission to NOPSEMA, a titleholder must consult with each 'relevant person', including relevant Commonwealth and State Departments or agencies, and persons (or organisations) whose functions, interests or activities may be affected by the activity proposed to be carried out under an EP.

Your input is important:

- So that Santos can understand the environmental values in the OA and the EMBA, and the environmental impacts and risks associated with the proposed activity;
- To inform Santos how consultation processes may need to be adapted for different relevant persons; and
- To ensure that Santos provides information to relevant persons in an appropriate and accessible manner.

Consultation also helps Santos to identify values and sensitivities where information is not publicly available, such as spiritual and cultural connections to land and sea country. This enables Santos to receive first-hand feedback on commercial and recreational fishing, tourism and local community activities and interests.

Consultation provides Santos with an opportunity to receive feedback from authorities, persons and organisations whose interests or activities may be affected by proposed petroleum activities.

This feedback helps Santos to refine or change the management measures it plans to address any potential activity impacts and risks. Santos' objective for the proposed activities will be carried out in a manner by which the environmental impacts and risks of the activity will be reduced to a level that is ALARP and acceptable over the life of the activity.

Providing feedback

You might be a relevant person if, for example, you have spiritual or cultural connections to land and sea country in accordance with Indigenous tradition that might be affected by our activity, or if you otherwise carry out recreational or commercial fishing, tourism or other activities that might be affected by our proposed activity, or if you are part of a local community that might be affected by our proposed activity.

Relevant persons being consulted on EPs under the OPGGS Environment Regulations should note that they:

- are entitled to be given sufficient information to allow them to make an informed assessment of the possible consequences of the activity on their functions, interests or activities;
- are entitled to be allowed a reasonable period for the consultation; and
- may request particular information provided in consultation not be published.

If you consider you may be a relevant person, please contact us to initiate consultation with you, so you can tell us how you would like to be consulted throughout the consultation process or if you need additional information. Consultation dates for proposed activities are published on Santos' Consultation Hub website.

The merits of relevant person feedback provided through the consultation process will be considered during the EP development with a summary of responses summarised and included in the EP submitted to NOPSEMA for assessment. Please let us know if you would like your personal/organisational details or any particular information provided during consultation to not be published, and we will ensure that it is included in a separate report which is not published on NOPSEMA's website.

More information about how community members can participate in environmental approvals for activities proposed in Commonwealth waters has been published in a **brochure** by NOPSEMA.

Contact

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CONSULTATION
SEEKING RELEVENT PERSONS

Santos

Van Gogh Coniston Novara VGA-4H GI ST1 Well Intervention /Plug and Abandonment Environment Plan

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These activities will be managed under the **Van Gogh Coniston Novara VGA-4H GI ST1 Well Intervention / Plug and Abandonment Environment Plan.**

The environment plan (EP) revision is required to support the associated decommissioning activities.

The environment that may be affected by proposed activities

Santos is assessing impacts and risks to ecosystems (including people and communities), natural and physical resources, the qualities and characteristics of locations, places and areas and the heritage value of places. This will include assessment of the social, economic and cultural features of the environment.

The map opposite depicts the Operational Area for proposed activities and the environment that may be affected (EMBA) which represents the widest geographic extent of potential ecological and socio-economic impacts resulting from unplanned 'worst case' spill scenarios, before any measures to reduce risk are considered.

Santos is proposing to implement measures to reduce the impacts and risks of the activities. It is a requirement under relevant environmental legislation that these impacts and risks are reduced to as low as reasonably practicable and to an acceptable level.

We welcome your input

Consultation provides Santos with an opportunity to receive feedback from authorities, persons and organisations whose functions, interests or activities may be affected by proposed petroleum activities. This feedback helps us to refine or change the management measures we are planning to address potential activity impacts and risks.

Santos' objective for proposed activities is to reduce environmental impacts and risks to a level that is as low as reasonably practicable (ALARP) and acceptable over the life of the activity.

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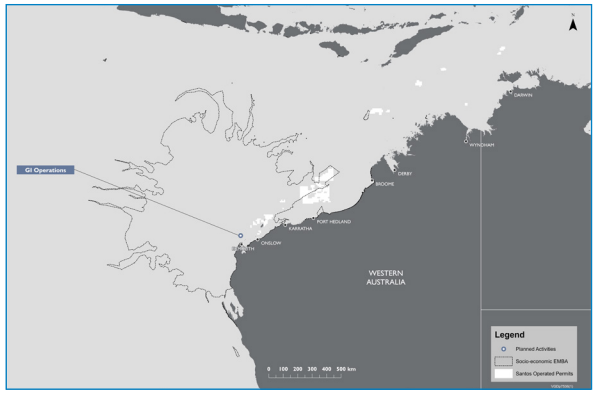

Santos Offshore: Western Australia Activity Map.

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If you consider you may be a relevant authority or other relevant interested persons or organisations, please contact us by **10 November 2025** to allow Santos time to initiate consultation with you, so you can tell us how you would like to be consulted throughout this process or if you need additional information.

Santos is committed to undertaking genuine and meaningful consultation. We want to provide information for people to make informed assessments of the possible consequences of the proposed activity on them.

Your feedback and input are important to us and input will be considered in the development of our environment plans.

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for more information, to self-identify or to provide feedback.

Santos

Santos is seeking to identify and consult with authorities, persons and organisations whose functions, interests or activities may be affected by our proposed Van Gogh Coniston Novara VGA-4H GI ST1 Well Intervention/Plug and Abandonment activity located approximately 44 kilometres off Western Australia's north west coast.

Please contact Santos now if these activities affect you and you would like to be consulted.

Consultation closes on 10 November 2025.

New journal celebrates red-dirt art

PHOEBE SOLON

Redbill Studio Galley in Broome hosted the launch of Upwelling Press' inaugural publication, Pindan, earlier this month.

Guests gathered at the gallery on October 4 to hear readings from contributors to the journal, as well as live music from Kimberley artists Elena Dakota and Kallum Mungulu.

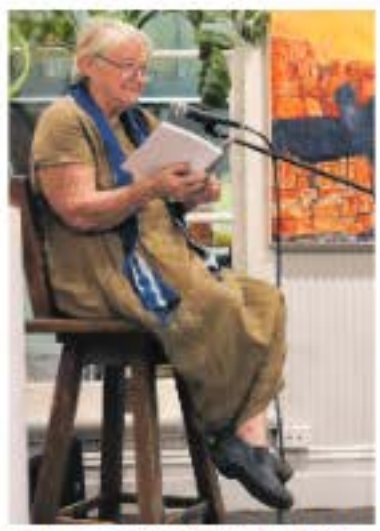
An Upwelling Press spokesman said it was a joy to see such a large turnout for the publication's launch, and an honour to be at Redbill for the event.

"It's such a beautiful old master pearler's shack, and iconic to Broome's history," he said.

The publication is a collection of works by 18 Kimberley artists, photographers, musicians and writers who have shared their reflections on pindan, the red-soil country of the West Kimberley.

"This project was sparked by a desire to celebrate the pindan," the spokesman said.

"The journal showcases over a dozen talented artists, writers and photographers who are inspired to create in this part of the world.



Pindan contributor Wendy Albert.

"The pindan is a place that we have a shared responsibility to, and is a place that deserves to be appreciated."

Redbill Studio Gallery representative Amelia Jajko said they were honoured to host the launch.

Copies of Pindan can be at upwellingpress.co. They are also stocked at Kimberley Bookshop and Redbill Studio Gallery.

Pindan launch at Redbill Gallery Broome. Pictures: Rachel Kelly

New publication, Pindan.

CONSULTATION
SEEKING RELEVENT PERSONS

Santos

Van Gogh Coniston Novara VGA-4H GI ST1 Well Intervention /Plug and Abandonment Environment Plan

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These activities will be managed under the **Van Gogh Coniston Novara VGA-4H GI ST1 Well Intervention / Plug and Abandonment Environment Plan.**

The environment plan (EP) revision is required to support the associated decommissioning activities.

The environment that may be affected by proposed activities

Santos is assessing impacts and risks to ecosystems (including people and communities), natural and physical resources, the qualities and characteristics of locations, places and areas and the heritage value of places. This will include assessment of the social, economic and cultural features of the environment.

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Santos is proposing to implement measures to reduce the impacts and risks of the activities. It is a requirement under relevant environmental legislation that these impacts and risks are reduced to as low as reasonably practicable and to an acceptable level.

We welcome your input

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We have prepared a consultation fact sheet which includes information about planned activities, identified environmental, social, economic and cultural aspects within the EMBA and how we propose to manage impacts and risks.

Santos Offshore: Western Australia Activity Map.

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St Francis Xavier wins title of top fundraiser

STUART QUINN

Geraldton's St Francis Xavier Primary School has been named WA's top fundraising school in the 2025 Premier's Telethon Challenge, raising more than $25,000 for sick and vulnerable children.

Premier Roger Cook announced the winners of the Statewide fundraiser on Thursday, with inspired students from 79 schools across WA raising a combined $115,181 for Telethon.

The group of Year 6 students from St Francis Xavier led the charge, channelling months of creativity, teamwork and compassion into dozens of fundraising ideas.

As part of the challenge, the school also submitted pieces to the Kids Helping Kids storytelling competition in which they reflected on their experiences of charitable giving via short stories, posters and photography.

Participants were invited to explore the subject via short stories, posters and photography.

St Francis Xavier Primary School principal Justine Smith said the effort of the school's 32 Year 6 students had been nothing short of inspiring.

"Their focus on Kids Helping Kids and their dedication has been inspiring, showing the true spirit of compassion and leadership," she said.

The students were inspired during a school camp visit to Perth Children's Hospital earlier this year.

Over the following months, the group held bake sales, raffles, pyjama days, fun runs, sausage sizzles and free-dress events.

By the end of Term 3, their total raised had surged to $25,083, securing the title of WA's top medium-sized school as well as the highest overall fundraiser. For their effort, the class will receive a VIP Telethon experience this weekend.

St Francis Xavier Primary School Year 6 class won the Telethon challenge. Picture: Stuart Quinn

Driver dies after his car strikes tree

JESSICA EVENSEN

A 44-year-old man has died after his car ploughed into a tree on a remote stretch of road in the State's Mid West region.

Police say a black Mercedes-Benz sedan was driving along Morawa Three Springs Road, in Dudawa — about 157km south-east of Geraldton — when it drifted off the road and smashed into a tree about 6.55pm on Wednesday.

The 44-year-driver died at the scene.

The 20-year-old male passenger suffered serious but non-life-threatening injuries and was taken to Geraldton Regional Hospital where he remains in a stable condition.

Major crash investigators are examining the scene and are appealing for witnesses to call Crime Stoppers on 1800 333 000 or report the information online.

That fatality was one of three crashes that left three dead on WA roads in less than 100 minutes last Wednesday night, prompting authorities to urge motorcyclists and drivers to be more cautious on the road.

The other two fatal crashes involved motorcyclists.

WA Police road policing commander Mike Peters said all road users needed to look out for each other. "It's everybody's responsibility," he said.

Road Safety Minister Reece Whitby added: "These are tragic deaths, let's not forget every single fatality has enormous impact and ripple effect throughout the community."

As of Tuesday morning, 150 people had lost their lives on WA roads this year, including 77 in regional WA.

CONSULTATION
SEEKING RELEVENT PERSONS

Santos

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Friends take on Atlantic

The Atlantic Waterbirds, Karla Pound, Fiona McTavish, Ena Ladd and Charlie Smith. Picture: Charlie Smith

PHOEBE SOLON

Four lifelong Port Hedland friends will take on the World's Toughest Row — a 3000 nautical-mile unassisted row across the Atlantic Ocean in December 2026 to raise money for Telethon.

For six weeks, the team will row 24/7 in two-hour shifts, fully self-sufficient, with nothing but their 9m carbon-fibre boat to rely on.

The team, known as the Atlantic Waterbirds, includes Charlie Smith, a former super yacht deckhand and dive instructor; Fiona McTavish, a marine biologist and skipper in the Whitsunday Islands; Karla Pound, an expedition leader with National Geographic; and Ena Ladd, a tugboat driver escorting massive iron ore carriers in the Pilbara.

For Smith, the decision to take on the row was born out of a personal struggle with mental health.

"I needed something that would push me, make me grow, and give me a target to work towards," she said. "And honestly, it's been the best decision I've made."

Pound, who has led remote expeditions around the world, said she was both excited and terrified for the journey.

"I'm most excited to experience the wild, untamed side of the ocean — the wildlife, the sunrises, and sunsets," she said.

"But I'm also nervous about the uncontrollable elements, like rogue waves or the risk of capsizing. Facing those fears head-on is part of what makes this adventure so powerful."

Despite living in different parts of Australia and holding full-time jobs, the team have been balancing their demanding careers with organising fundraising events, raffles, and boat show appearances across the country.

They've already raised $123,000 and bought their ocean rowing

CONSULTATION
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New homes for energy staff

LAURA NEWELL

Two local builders have been chosen to construct 30 new homes for Karratha-based Woodside employees.

Under the contracts, 20 new homes will be built by Thomas Building and 10 by traditional owner business Yurra Building, all of which are expected to be completed by the middle of next year.

The houses are in addition to the recent construction of 20 new homes under a 15-year build-to-lease agreement with Karratha Housing, a subsidiary of Yurra Building.

The contracts also include provisions for the employment of local apprentices and trainees.

Thomas Building regional operations manager Jason Strange said the agreement was a positive result for the Pilbara.

"Partnering with Woodside offers a fantastic opportunity for local businesses to thrive, emphasising a commitment to prioritising local trades and supplies," he said.

"It's all about putting local people first."

Tim Clune, general manager of Yurra Building, added the new builds were also an opportunity for equipping local talent with the skills needed for the construction industry through apprenticeship opportunities.

"We are proud to continue building not just homes but opportunities for our local community," he said.

Woodside manager property and services Tanya Vautier; Yurra Building manager Tim Clune; local member, Kevin Michel; Thomas Building regional operations manager Jason Strange; and Woodside senior corporate affairs adviser Camille Vissouarn. Picture: Woodside

Woodside Pluto asset manager Kate Bardill said the new contracts were part of the company's Karratha housing approach, which aimed to provide quality housing options for employees while balancing the needs of the local housing market. "Woodside's approach to housing includes investment in new builds, the sale of older housing stock on the open market and support for local housing affordability initiatives such as the City of Karratha's Service Worker Accommodation program," she said.

CONSULTATION
SEEKING RELEVENT PERSONS

Santos

Van Gogh Coniston Novara VGA-4H GI ST1 Well Intervention /Plug and Abandonment Environment Plan

Santos is seeking to consult with relevant authorities and other relevant interested persons and organisations considering the activity type, location, environmental impacts and risks (planned activities and unplanned events) of proposed decommissioning activities approximately 44 km off Western Australia's north west coast, offshore in Commonwealth Waters.

These activities will be managed under the **Van Gogh Coniston Novara VGA-4H GI ST1 Well Intervention / Plug and Abandonment Environment Plan.**

The environment plan (EP) revision is required to support the associated decommissioning activities.

The environment that may be affected by proposed activities

Santos is assessing impacts and risks to ecosystems (including people and communities), natural and physical resources, the qualities and characteristics of locations, places and areas and the heritage value of places. This will include assessment of the social, economic and cultural features of the environment.

The map opposite depicts the Operational Area for proposed activities and the environment that may be affected (EMBA) which represents the widest geographic extent of potential ecological and socio-economic impacts resulting from unplanned 'worst case' spill scenarios, before any measures to reduce risk are considered.

Santos is proposing to implement measures to reduce the impacts and risks of the activities. It is a requirement under relevant environmental legislation that these impacts and risks are reduced to as low as reasonably practicable and to an acceptable level.

We welcome your input

Consultation provides Santos with an opportunity to receive feedback from authorities, persons and organisations whose functions, interests or activities may be affected by proposed petroleum activities. This feedback helps us to refine or change the management measures we are planning to address potential activity impacts and risks.

Santos' objective for proposed activities is to reduce environmental impacts and risks to a level that is as low as reasonably practicable (ALARP) and acceptable over the life of the activity.

Consultation also helps us to identify values and sensitivities where information is not publicly available, such as spiritual and cultural connection to land and sea country, as well as first-hand feedback on commercial and recreational fishing, tourism and local community activities and interests.

We have prepared a consultation fact sheet which includes information about planned activities, identified environmental, social, economic and cultural aspects within the EMBA and how we propose to manage impacts and risks.

Santos Offshore: Western Australia Activity Map.

Contact Us

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Cost of living and online dating blamed for record-low fertility rate

INCONCEIVABLE

Picture: Ross Swanborough

KATE EMERY & STEPHEN JOHNSON

WA women are having fewer babies than just about anywhere else in the country, with a leading demographer blaming the cost of living and online dating for the nation's record-low fertility rate.

As Australia's fertility fell to a new low, Australian Bureau of Statistics data shows WA is the least fertile State in the country.

With a fertility rate — the average number of babies per woman — of 1.434 it lags only behind the Australian Capital Territory and is well behind the national rate of 1.481.

Ten years ago WA's fertility rate was 1.906, ranking it fourth in the country. In real terms the State recorded 30,516 births in 2024 compared with 34,516 in 2014.

Speaking about the national decline Simon Kuestenmacher, a director of The Demographics Group, said unaffordable housing was making millennials reluctant to have children..

"That's very, very much ingrained in the Australian mindset is that each kid, once they are of school age must have their own bedroom," he said.

FERTILITY RATES

	2014	RANK (2014)	2024	RANK (2024)
NSW	1.723	7	1.460	5
VIC	1.715	8	1.521	2
QLD	1.910	3	1.505	3
SA	1.850	5	1.458	6
WA	1.906	4	1.434	7
TAS	1.963	2	1.485	4
NT	2.041	1	1.629	1
ACT	1.738	6	1.273	8
AUS	1.795		1.481	

"Millennials, now parents of school-age kids: that's how they grew up in the households of baby boomers."

The data also shows parents are getting older, with the median age of mothers nationally now 32.1 and 33.9 for fathers. In WA the median age of mothers was slightly lower at 31.9.

Since a brief uptick in the late 2000s, during the China-led mining boom, Australia's fertility rate has consistently been below the "replacement level" of two. That level is the average number of children per woman required for a population to remain stable from one generation to the next.

This has also coincided with the rise of dating apps like Tinder and a housing crisis, which Mr Kuestenmacher said was making millennials in particular less upbeat about wanting to have children if they couldn't get a mortgage.

"Millennials will be the first generation that on average will be poorer than their parental generation," he said. "We also stay single for longer: it's the tyranny of choice.

"You can blame online dating for it but a big reason why we have fewer kids is a lack of optimism."

Perth occupational therapist Andrea Bruens said the decision to have Charlie, her 10-month old son, was an emotional one but still required her to consider the financial implications and the logistics of being a single mother. She has seen some of her friends opt against having children because they failed to meet someone they wanted to raise them with.

"I knew I always wanted to be a mother," Ms Bruens, left, said.

"Obviously being a solo mum a lot of thought and planning went into it.

"I'm 41, and most of my friends do have kids who are older. There are a few who didn't, who — similar to me didn't meet the right person. I decided to go it alone and some of them didn't."

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Presentation

ID-1608 Ngarluma Aboriginal Corporation presentation

Santos

SANTOS & NGARLUMA

VARANUS ISLAND HUB P&A (STATE ENVIRONMENT PLAN WA)

VAN GOGH CONISTON NOVARA WELL INTERVENTION / P&A (COMMONWEALTH ENVIRONMENT PLAN)

November 2025

Santos

Acknowledgement of Country

“Santos acknowledges the traditional owners of the lands on which we meet on today and we pay our respects to Elders past and present.”

Welcome and Introductions

We are here today to share information about our company, seek information from you and listen to your questions about Santos' upcoming activities.

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Senior Environmental Adviser

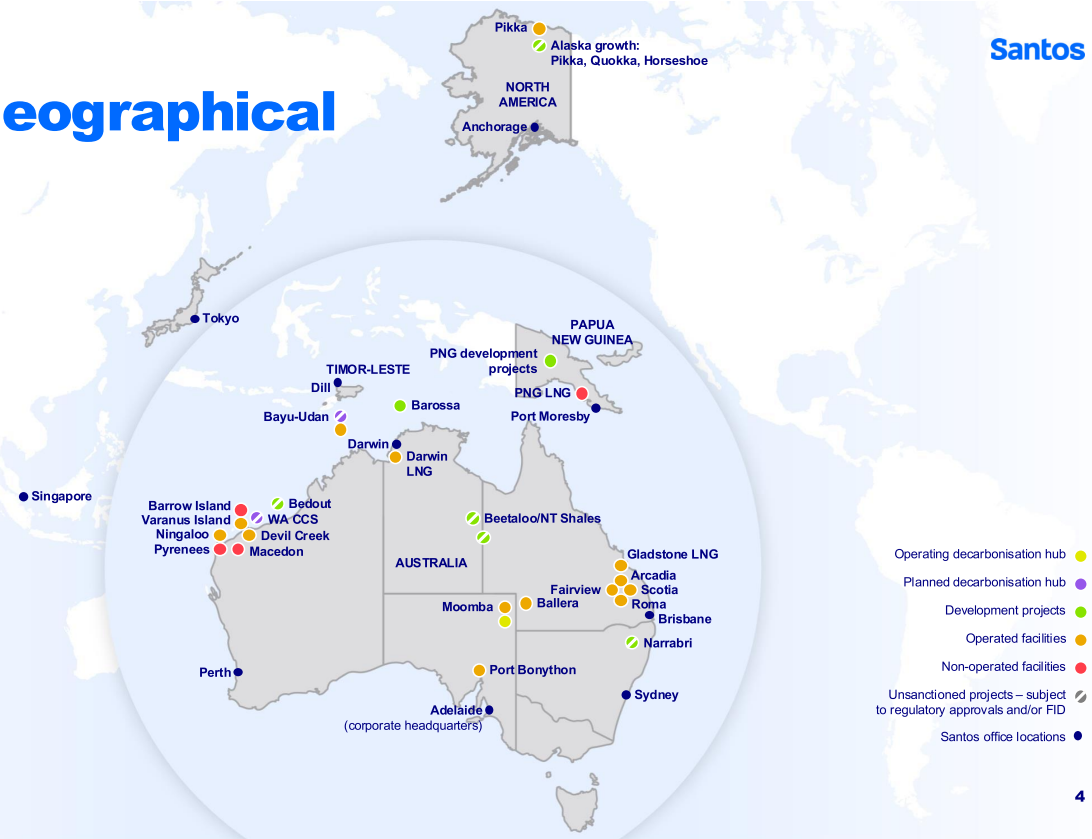
Aileen Stewart
Manager Community Affairs

Mark Salera
Offshore Drilling & Completions Manager

Anpa Sockalingam
Lead Oil Spill Risk & Planning Coordinator

Michael Marren
Principal Stakeholder Engagement and Consultation

Santos' geographical footprint



Santos

Why we are here today

Consulting on two proposed activities/Environment Plans (EPs):

1) VI State Waters Plug & Abandonment EP (WA State)
2) Van Gogh Coniston Novara VGA-4H GI ST1 Well Intervention/Plug & Abandonment EP (Commonwealth)

- Purpose is to safely remove well equipment no longer required for gas production at the Varanus Island Hub and Ningaloo Vision facilities
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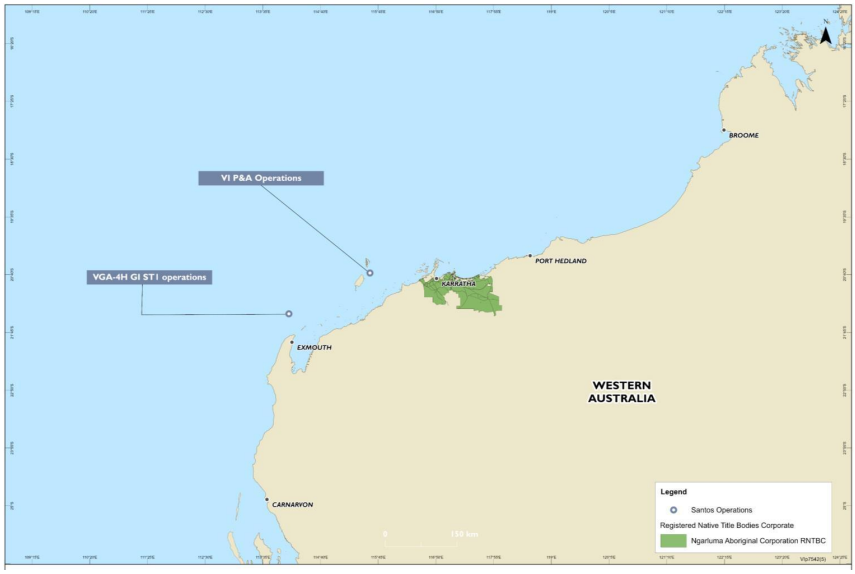

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  - Minimise impacts and risks to the environment
- A summary of information received during consultation will be included in the Environment Plan (EP)

Santos

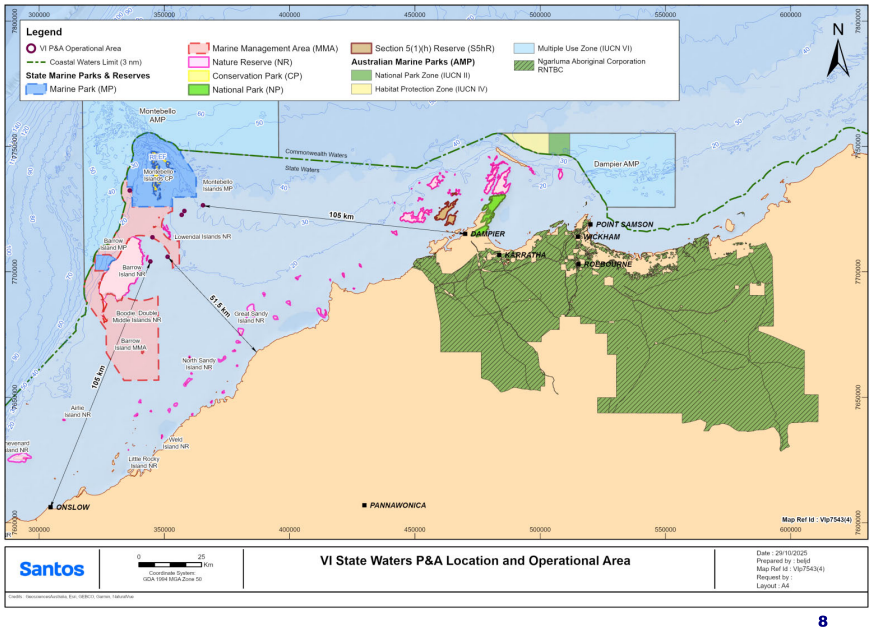
VARANUS ISLAND STATE WATERS PLUG & ABANDONMENT

Santos

Varanus Island State Waters Plug & Abandonment

State Environment Plan – Submitted to Department of Mines, Petroleum & Exploration (DMPE) WA

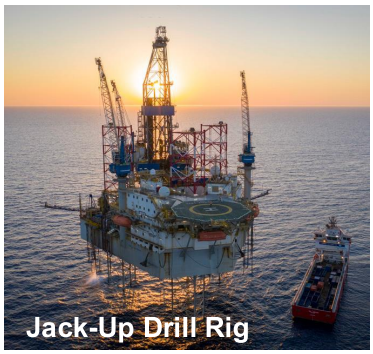
- Santos is preparing for next phase of its ongoing decommissioning of assets no longer required to support gas production at Varanus Island Hub
- Purpose is to safely remove well equipment – known as plug and abandonment
- 24 wells to be plugged and abandoned beginning late 2027 in WA state waters
- The operational area is located offshore of WA approximately 105km away from Dampier and Onslow
- **Consultation closes 10 November 2025**
- For more details, please refer to Consultation Information Sheet – Varanus Island State Waters Plug and Abandonment Environment Plan (State)



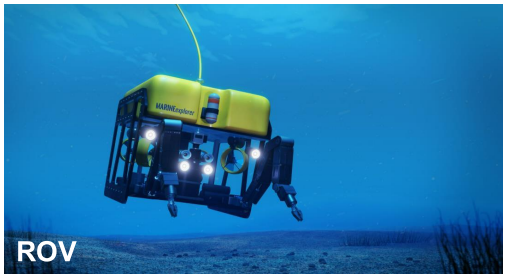
Varanus Island – Santos Facility

Activities for this Environment Plan

- Part of ongoing decommissioning of equipment no longer required to support production at the Varanus Island Hub facility on the North West Shelf of WA
- Remotely Operated Vehicles (ROV) will undertake seabed surveys
- ~24 wells that are no longer used for production will be plugged and abandoned using a jack-up drill rig
- Equipment such as production trees, tubing, casing, wellheads etc. will be removed from the wells
- Santos will install permanent cement barriers to make the wells safe (plug and abandon)
- The process will take between approximately 15 to 90 days at each platform- depending on number of wells at each platform



Jack-Up Drill Rig



ROV

Activity impacts and risks

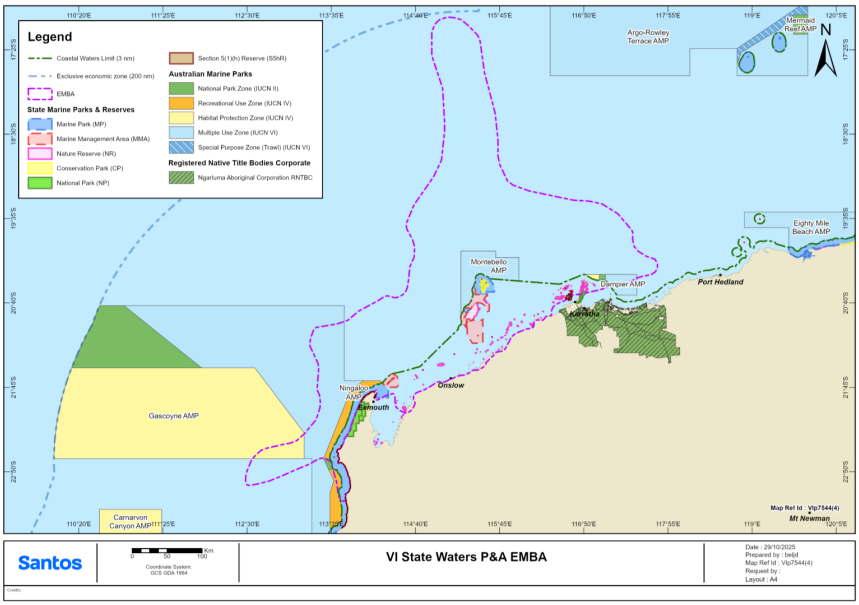
Santos

Impacts

- Activity impacts typically occur within Operational Areas

Risks - Environment that May Be Affected(EMBA) Details

- A spill cannot affect all areas of the EMBA at the same time
- The widest geographic extent of activity risk is defined by potential impacts resulting from hundreds of computer modelled credible worst case spill scenarios



For more details, please refer to Consultation Information Sheet – Varanus Island State Waters Plug and Abandonment Environment Plan (State

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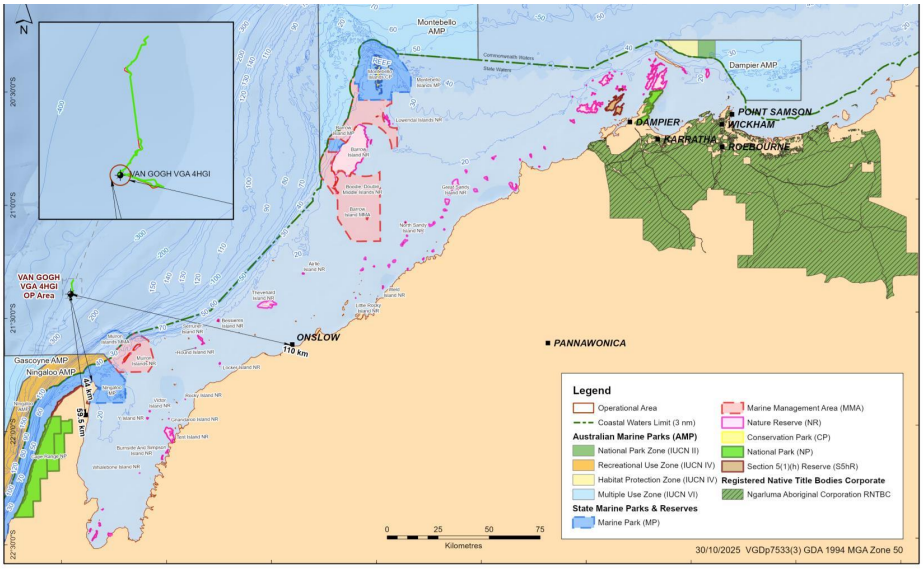
VAN GOGH CONISTON NOVARA VGA-4H GI ST1 WELL INTERVENTION/PLUG & ABANDONMENT

Santos

Van Gogh Coniston Novara G1 Well Intervention / Plug and Abandonment

Commonwealth Environment Plan – Submitted to NOPSEMA

- Santos is proposing to either permanently suspend or plug and abandon one of the wells formerly used to support production at its Ningaloo Vision operations
- A broader campaign will be part of a separate EP and subject to additional consultation
- Well suspension activities may commence any time between Q3 2026 and Q4 2027
- The closest Local Government Area is the Shire of Exmouth, located approximately 60 km from the operational area
- Consultation closes **12 November 2025**
- For more details, please refer to Consultation Information Sheet –Van Gogh Coniston Novara VGA-4H GI ST1 Well Intervention / Plug and Abandonment Fact Sheet



13

Santos

Activities for this Environment Plan

- This EP is part of Santos' ongoing decommissioning of equipment no longer required to support production at the Ningaloo Vision facility located offshore approximately 60km north of Exmouth
- The well will either be suspended or plugged and abandoned, depending on the condition of each well on its inspection
- Remotely Operated Vehicles (ROV) will undertake seabed surveys
- Well suspension involves installing a temporary mechanical plug in the well using a light-weight intervention vessel or drill rig. The well is then fully decommissioned in the future.
- Plug and abandonment is when equipment such as production trees, tubing, casing, wellheads etc. is removed from the wells and permanent cement barriers are installed to make the wells safe.
- The process will take between approximately 10 to 40 days per well

Semi-submersible Drill Rig

Light Weight Intervention Vessel

14

For more details, please refer to Consultation Information Sheet –Van Gogh Coniston Novara VGA-4H GI ST1 Well Intervention / Plug and Abandonment Fact Sheet

Activity impacts and risks

Santos

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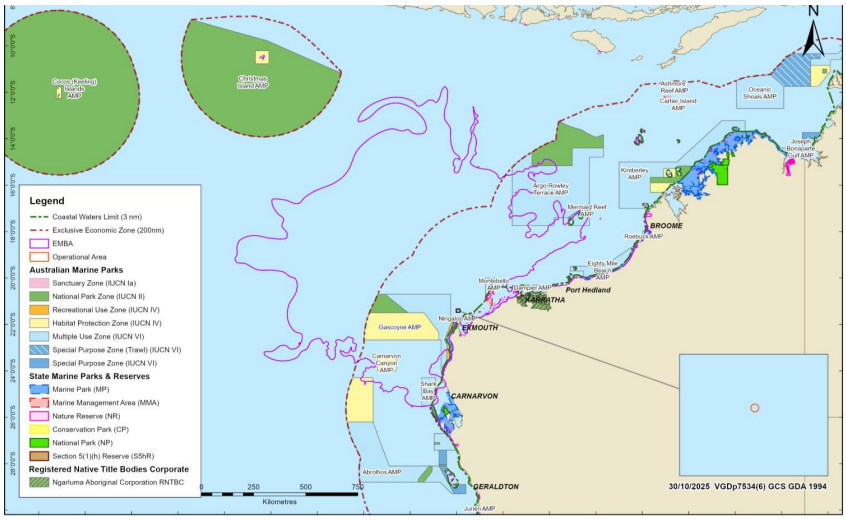

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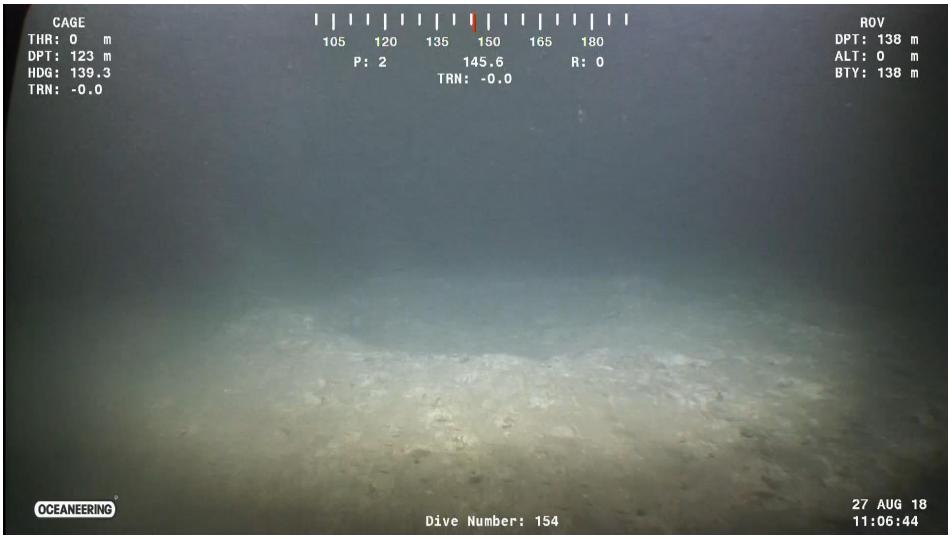
Santos

ENVIRONMENTAL IMPACTS

Santos

About the environment

- “Environment” refers to ecological, socio-economic and cultural features
- Ecological environment is where living things (e.g. plants and animals) interact with their non-living surroundings (e.g. air, water, soil)
- Seabed within the Operational Areas is generally flat and featureless, mainly sand with some silt and clay



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How will this impact environment?

Potential Impacts (operational areas)
• Noise emissions
• Light emissions
• Physical presence and interaction with other marine users
• Seabed and above seabed level habitat disturbance
• Operational discharges from vessels
• Operational discharges from drilling
• Atmospheric emissions

Unplanned Events / Risks (EMBA)
• Unplanned introduction of invasive marine species
• Unplanned introduction of non-indigenous flora and fauna
• Unplanned interaction with marine fauna
• Unplanned release of solid objects
• Unplanned hazardous liquid release to the marine environment (non-hydrocarbon)
• Unplanned minor hydrocarbon release
• Unplanned marine diesel oil release
• Unplanned hydrocarbon release from loss of well control during drilling

An example of how we manage impacts

Unplanned hydrocarbon release from loss of well control during activities

- The likelihood of a loss of well control event leading to a spill is considered 'remote'
- Reduction of a hydrocarbon spill risk to 'low level' is supported by the combination of safe drilling methods and spill response strategies, such as the Oil Pollution Emergency Plan

Potential Impacts:

- Reduction in water quality
- Potential temporary disruption to fishing activities
- Total or partial mortality of marine flora and early life stages of resident fish and invertebrate species

Key Management Measures:

- 500m exclusion zone around drilling activities
- Drilling rig and support vessel spill response plans
- Documented maintenance program in place for equipment on drilling rig that provides a status on maintenance of equipment
- Source control emergency response plans in place for all drilling activities, such as but not limited to:
  - Relief Well Drilling
  - Activation of blow-out preventer stack

For more details, please refer to **Consultation Information Sheet - Bedout Multi-well Exploration and Appraisal Drilling Program Fact Sheet**

Oil Spill Response

Under National Plan arrangements:

- **Santos** is the Control Agency in Commonwealth Waters for spills originating from its petroleum activities, with responsibility for initiating and managing an effective response.
- The **Australian Maritime Safety Authority** (AMSA) is the Control Agency for ship-based spills in Commonwealth Waters.
- The WA **Department of Transport (DoT)** is the Control Agency in State Waters.

"Culture and heritage management is the incorporation of local and traditional knowledge to limit the impact of oil and resultant response activities on cultural and heritage values or resources."

"Culture and heritage management may take place as part of marine response or shoreline response and relies on the incorporation of local knowledge and local concerns."

"The effectiveness of culture and heritage management can be severely limited however by not engaging with the correct stakeholders and failing to incorporate or understand specific cultural or heritage needs or concerns."

Department of Transport, Incident Management Plan, September 2023

Oil Spill Prevention and Preparedness

- Santos is required to prepare an Oil Pollution Emergency Plan (OPEP) for each activity, which forms part of the EP and is assessed by the NOPSEMA in Commonwealth waters and DMPE in WA State waters.
- The OPEP sets out the process to manage a spill.
- The OPEP identifies and prioritises spill response strategies for all potential spill events and describes how Santos prepares to respond in the remote event of a spill.

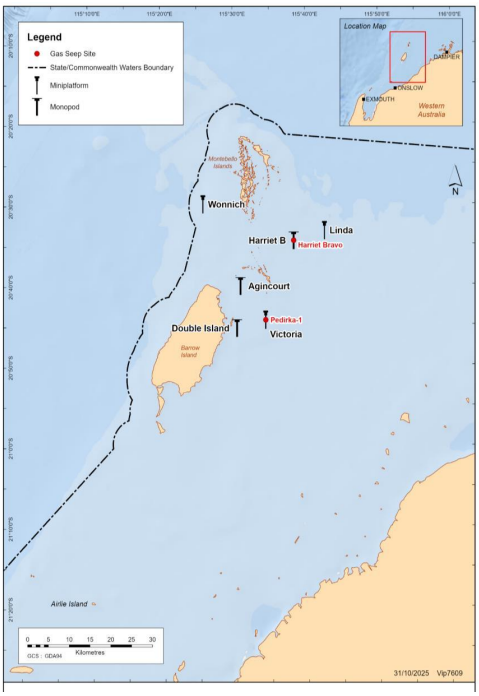
Above photos: Annual offshore field deployment exercise done in April 2024 near Varanus Island with the Santos Current Buster (on water oil containment and recovery system)

END OF CONSULTATION

Monitoring of Gas Seepages

Santos

- There are 13 known gas seepage locations being monitored, 2 of which are in the P&A Operational Area
- Main gas bubble composition is methane which is not toxic to marine life
- Gas seepages are likely to result in localised concentrations of methane in the water within tens of metres of the seep
- Any contamination of sediments from the gas seepage is likely to be highly localised to where gas bubbles leave the sediment (i.e. any contamination present is not spreading through the sediment).
- Monitoring data will provide input into developing staged control measures, which are listed in the separate Varanus Hub Operations (State) EP.



Santos

DEPARTMENT OF TRANSPORT - TRAINING

First Nations Ranger Training

WA Department of Transport (DoT) is leading the development of a new oil spill response training program for rangers from First Nations groups in coastal areas.

- Aim - to deliver training, during the initial roll out, that provides an understanding of hydrocarbon spills focusing on spill monitoring and reporting.
- The training could be offered as early as 2026.
- Santos is working with DoT, the Australian Marine Oil Spill Centre (AMOSC) and other companies to advance this training relevant to the oil and gas industries oil spill response capacity.

The Department of Transport encourage Traditional Owner groups to contact them at:

marine.pollution@transport.wa.gov.au

to express their interests in the oil spill response training program and provide input on areas of cultural or heritage importance.

This sensitive information (if shared) can be integrated into DoT's existing data sets.

Santos

THANK YOU FOR YOUR TIME

ID-1606 Nhuwala Claim Group presentation

Santos

SANTOS & NHUWALA

VARANUS ISLAND HUB P&A (STATE ENVIRONMENT PLAN WA)

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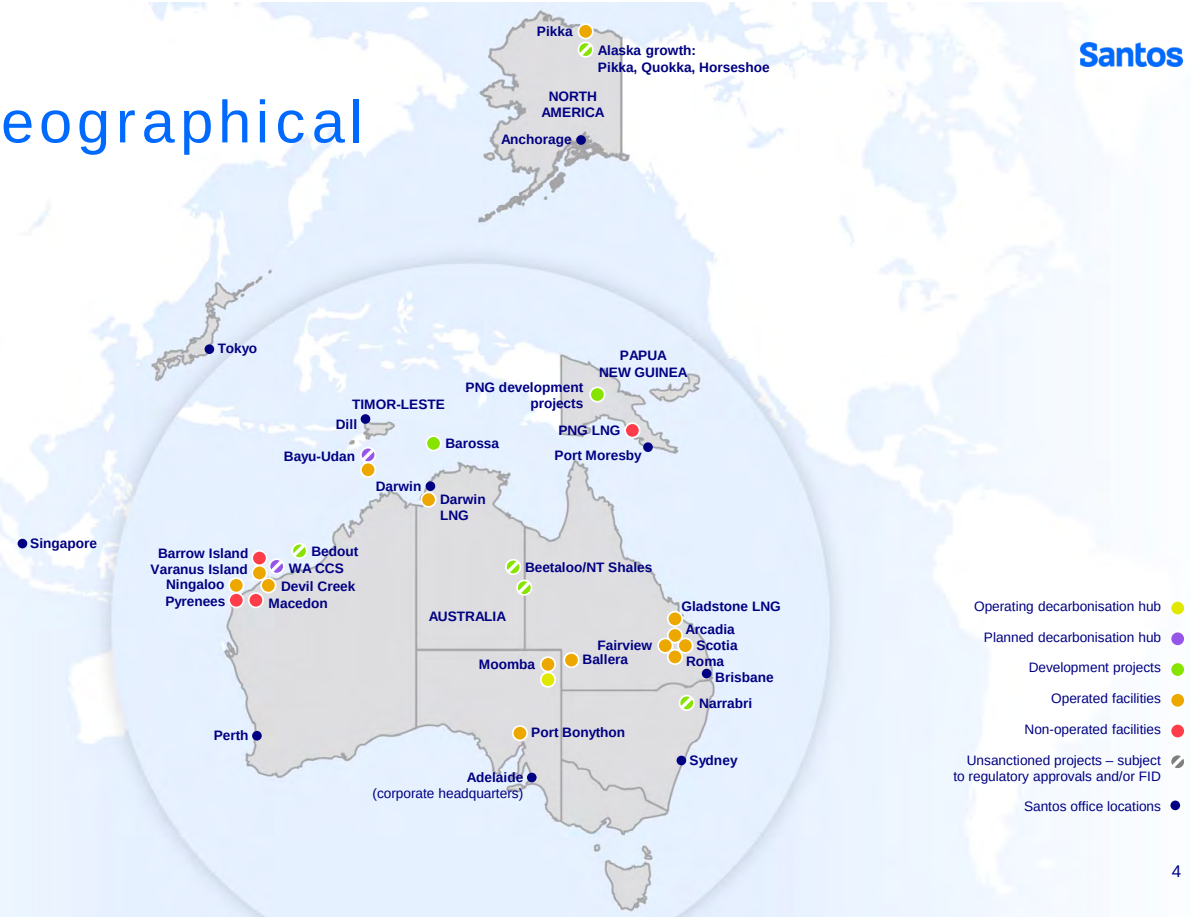

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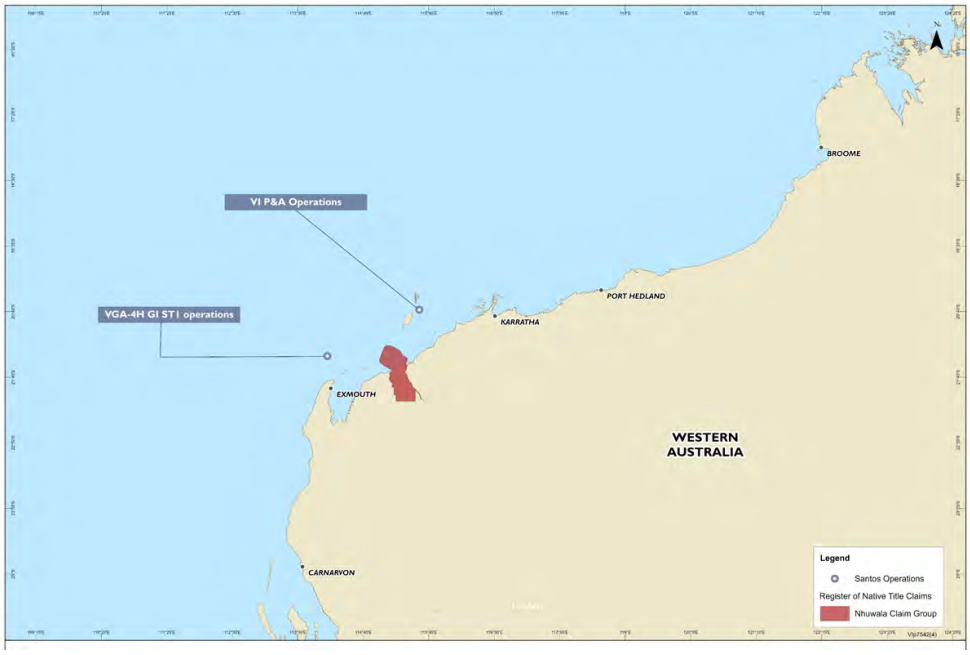

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Santos

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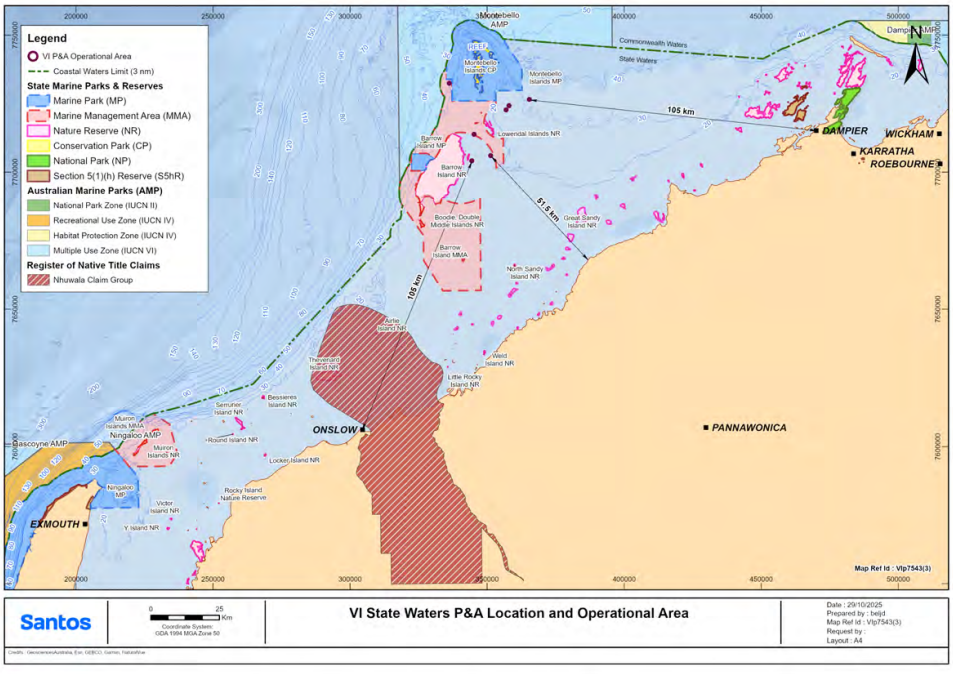
- **Consultation closes 10 November 2025**
- For more details, please refer to Consultation Information Sheet – Varanus Island State Waters Plug and Abandonment Environment Plan (State)



Varanus Island – Santos Facility

For more details, please refer to Consultation Information Sheet – Varanus Island State Waters Plug and Abandonment Environment Plan (State

Activities for this Environment Plan

- Part of Santos' ongoing decommissioning of equipment no longer required to support production at the Varanus Island Hub facility on the North West Shelf of WA
- Remotely Operated Vehicles (ROV) will undertake seabed surveys
- ~24 wells that are no longer used for production will be plugged and abandoned using a jack-up drill rig
- Equipment such as production trees, tubing, casing, wellheads etc. will be removed from the wells
- Santos will install permanent cement barriers to make the wells safe (plug and abandon)
- Seabed is restored
- The process will take between approximately 15 to 90 days per well

Jack-Up Drill Rig

ROV

For more details, please refer to Consultation Information Sheet – Varanus Island State Waters Plug and Abandonment Environment Plan (State

Activity impacts and risks

Santos

Impacts

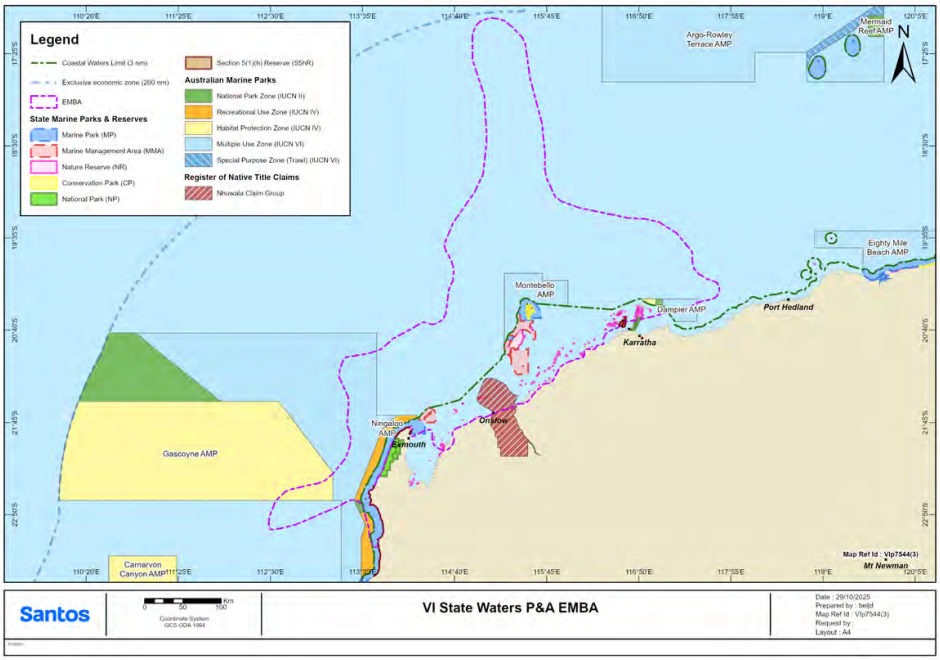
- Activity impacts typically occur within Operational Areas

Risks

- The widest geographic extent of activity risk is defined by potential impacts resulting from hundreds of computer modelled credible worst case spill scenarios

Environment that May Be Affected (EMBA) Details

- A spill cannot affect all areas of the EMBA at the same time



For more details, please refer to Consultation Information Sheet – Varanus Island State Waters Plug and Abandonment Environment Plan (State

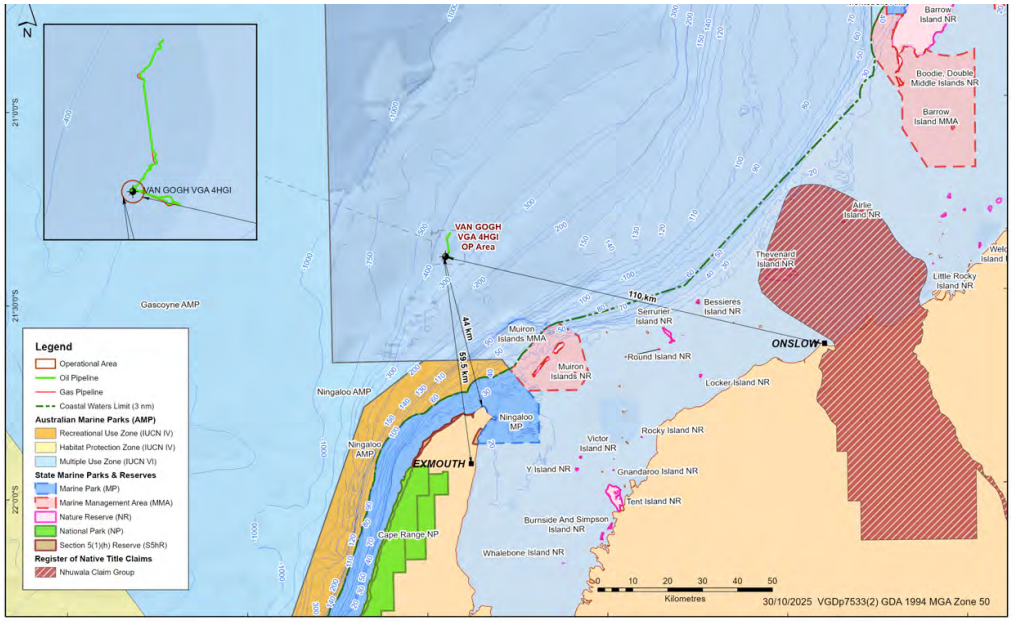
Santos

VAN GOGH CONISTON NOVARA VGA-4H GI ST1 WELL INTERVENTION/PLUG & ABANDONMENT

Van Gogh Coniston Novara G1 Well Intervention / Plug and Abandonment

Commonwealth Environment Plan – Submitted to NOPSEMA

- Santos is proposing to either permanently suspend or plug and abandon one of the wells formerly used to support production at its Ningaloo Vision operations
- A broader campaign will be part of a separate EP and subject to additional consultation
- Well suspension activities may commence any time between Q3 2026 and Q4 2027
- The closest Local Government Area is the Shire of Exmouth, located approximately 60 km from the operational area
- Consultation closes **12 November 2025**
- For more details, please refer to Consultation Information Sheet –Van Gogh Coniston Novara VGA-4H GI ST1 Well Intervention / Plug and Abandonment Fact Sheet



13

Activities for this Environment Plan

- This EP is part of Santos' ongoing decommissioning of equipment no longer required to support production at the Ningaloo Vision facility located offshore approximately 60km north of Exmouth
- The well will either be suspended or plugged and abandoned, depending on the condition of each well on its inspection
- Remotely Operated Vehicles (ROV) will undertake seabed surveys
- Well suspension involves installing a temporary mechanical plug in the well using a light weight intervention vessel. The well is then fully decommissioned in the future.
- Plug and abandonment is when equipment such as production trees, tubing, casing, wellheads etc. is removed from the wells and permanent cement barriers are installed to make the wells safe.
- The process will take between approximately 10 to 40 days per well

Semi-submersible Drill Rig

Light Weight Intervention Vessel

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For more details, please refer to Consultation Information Sheet –Van Gogh Coniston Novara VGA-4H GI ST1 Well Intervention / Plug and Abandonment Fact Sheet

Activity impacts and risks

Santos

Impacts

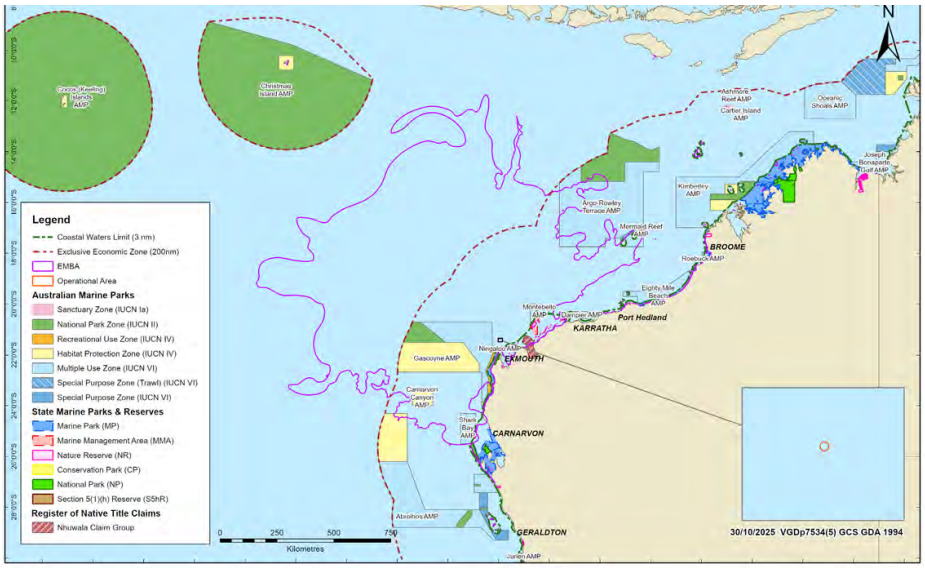
- Activity impacts typically occur within Operational Areas

Risks

- The widest geographic extent of activity risk is defined by potential impacts resulting from hundreds of computer modelled credible worst case spill scenarios

Environment that May Be Affected (EMBA) Details

- A spill cannot affect all areas of the EMBA at the same time



For more details, please refer to Consultation Information Sheet –Van Gogh Coniston Novara VGA-4H GI ST1 Well Intervention / Plug and Abandonment Fact Sheet

Santos

ENVIRONMENTAL IMPACTS

Santos

About the environment

- “Environment” refers to ecological, socio-economic and cultural features
- Ecological environment is where living things (e.g. plants and animals) interact with their non-living surroundings (e.g. air, water, soil)
- Seabed within the Operational Areas is generally flat and featureless, mainly sand with some silt and clay

Santos

How will this impact environment?

Potential Impacts (operational areas)
• Noise emissions
• Light emissions
• Physical presence and interaction with other marine users
• Seabed and above seabed level habitat disturbance
• Operational discharges from vessels
• Operational discharges from drilling
• Atmospheric emissions

Unplanned Events / Risks (EMBA)
• Unplanned introduction of invasive marine species
• Unplanned introduction of non-indigenous flora and fauna
• Unplanned interaction with marine fauna
• Unplanned release of solid objects
• Unplanned hazardous liquid release to the marine environment (non-hydrocarbon)
• Unplanned minor hydrocarbon release
• Unplanned marine diesel oil release
• Unplanned hydrocarbon release from loss of well control during drilling

An example of how we manage impacts

Unplanned hydrocarbon release from loss of well control during activities

- The likelihood of a loss of well control event leading to a spill is considered ‘remote’
- Reduction of a hydrocarbon spill risk to ‘low level’ is supported by the combination of safe drilling methods and spill response strategies, such as the Oil Pollution Emergency Plan

Potential Impacts:

- Reduction in water quality
- Potential temporary disruption to fishing activities
- Total or partial mortality of marine flora and early life stages of resident fish and invertebrate species

Key Management Measures:

- 500m exclusion zone around drilling activities
- Drilling rig and support vessel spill response plans
- Documented maintenance program in place for equipment on drilling rig that provides a status on maintenance of equipment
- Source control emergency response plans in place for all drilling activities, such as but not limited to:
  - Relief Well Drilling
  - Activation of blow-out preventer stack

OIL SPILL RESPONSE

Santos

Oil Spill Response

Under National Plan arrangements:

- **Santos** is the Control Agency in Commonwealth Waters for spills originating from its petroleum activities, with responsibility for initiating and managing an effective response.
- The **Australian Maritime Safety Authority** (AMSA) is the Control Agency for ship-based spills in Commonwealth Waters.
- The WA **Department of Transport (DoT)** is the Control Agency in State Waters.

"Culture and heritage management is the incorporation of local and traditional knowledge to limit the impact of oil and resultant response activities on cultural and heritage values or resources."

"Culture and heritage management may take place as part of marine response or shoreline response and relies on the incorporation of local knowledge and local concerns."

"The effectiveness of culture and heritage management can be severely limited however by not engaging with the correct stakeholders and failing to incorporate or understand specific cultural or heritage needs or concerns."

Department of Transport, Incident Management Plan, September 2023

Santos

Oil Spill Prevention and Preparedness

- Santos is required to prepare an Oil Pollution Emergency Plan (OPEP) for each activity, which forms part of the EP and is assessed by the NOPSEMA in Commonwealth waters and DMPE in WA State waters.
- The OPEP sets out the process to manage a spill.
- The OPEP identifies and prioritises spill response strategies for all potential spill events and describes how Santos prepares to respond in the remote event of a spill.

Above photos: Annual offshore field deployment exercise done in April 2024 near Varanus Island with the Santos Current Buster (on water oil containment and recovery system)

Santos

END OF CONSULTATION

Santos

First Nations Ranger Training

WA Department of Transport (DoT) is leading the development of a new oil spill response training program for rangers from First Nations groups in coastal areas.

- Aim - to deliver training, during the initial roll out, that provides an understanding of hydrocarbon spills focusing on spill monitoring and reporting.
- The training could be offered as early as 2026.
- Santos is working with DoT, the Australian Marine Oil Spill Centre (AMOSC) and other companies to advance this training relevant to the oil and gas industries oil spill response capacity.

The Department of Transport encourage Traditional Owner groups to contact them at:

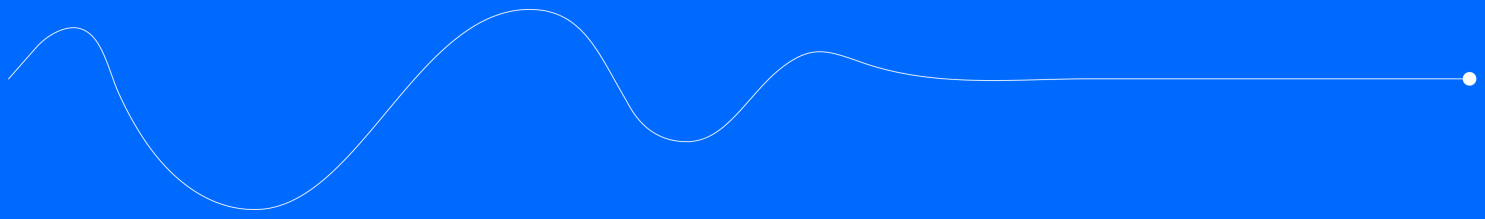
marine.pollution@transport.wa.gov.au

to express their interests in the oil spill response training program and provide input on areas of cultural or heritage importance.

This sensitive information (if shared) can be integrated into DoT's existing data sets.

Santos

THANK YOU FOR YOUR TIME



Consultation Report

Stakeholder Groups	Organisation	Id	Date	Sent / Re	Record Type	Consultation mater	Consultation Summary	Assessment of merits of objection or claim about the adverse impacts of EP activity	Santos response to objection or claim	EP Reference
01 Department or Agency:Department or agency of the Commonwealth	**Australian Border Force**	772	13/10/2025 12:01 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		998	3/11/2025 9:51 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.
01 Department or Agency:Department or agency of the Commonwealth	**Australian Communications and Media Authority**	774	13/10/2025 12:07 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		806	13/10/2025 12:08 pm	Sent	Email	N/A	Australian Communications and Media Authority sent an auto-generated email to Santos acknowledging receipt of the campaign email.			
		1016	3/11/2025 10:34 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.			
		982	3/11/2025 10:35 am	Received	Email	N/A	Australian Communications and Media Authority sent an auto-generated email to Santos acknowledging receipt of the campaign email.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.

Stakeholder Groups	Organisation	Id	Date	Sent / Re	Record Type	Consultation mater	Consultation Summary	Assessment of merits of objection or claim about the adverse impacts of EP activity	Santos response to objection or claim	EP Reference
01 Department or Agency:Department or agency of the Commonwealth	**Australian Fisheries Management Authority**	775	13/10/2025 12:10 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		818	14/10/2025 12:00 pm	Received	Email	N/A	Australian Fisheries Management Authority sent a response email to Santos informing of no direct comments on the EP, and that Australian Fisheries Management Authority would like to be included in future consultation on this matter. In addition, Australian Fisheries Management Authority confirmed Santos' correct identification of relevant fisheries for consultation and encouraged Santos to directly contact them. Australian Fisheries Management Authority also advised Santos that Southern Tuna and Billfish Fishery should be removed from the fisheries that have spatial overlap with the Operational Area and the EMBA table enclosed within the campaign email 2a. Australian Fisheries Management Authority recommended Santos continue to consult Commonwealth Fisheries Association, Tuna Australia, Australian Southern Bluefin Tuna Industry Association, on this matter and provided contact details for fishing industry representative organisations.			
		862	22/10/2025 11:16 am	Sent	Email	N/A	Santos sent an email to the Australian Fisheries Management Authority acknowledging that it had no comments on proposed activities. Santos confirmed that it had consulted the relevant fishery representative organisations. Santos also confirmed it would remove reference of Southern Tuna and Billfish Fishery from its commercial fishery table.	Santos notes the feedback from Australian Fisheries Management Authority that it had no comments on proposed activities. Santos notes confirmation from Australian Fisheries Management Authority that Santos had corrected identified Commonwealth fisheries for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Fisheries are listed in Section 3.2.7.3
01 Department or Agency:Department or agency of the Commonwealth	**Australian Hydrographic Office**	772	13/10/2025 12:01 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		815	15/10/2025 6:50 am	Received	Email	N/A	Santos received an auto-generated reply email from Australian Hydrographic Office in response to courtesy email.			
		999	3/11/2025 9:51 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.			

Stakeholder Groups	Organisation	Id	Date	Sent / Re	Record Type	Consultation mater	Consultation Summary	Assessment of merits of objection or claim about the adverse impacts of EP activity	Santos response to objection or claim	EP Reference
		992	3/11/2025 11:22 am	Received	Email	N/A	Santos received an auto-generated reply email from Australian Hydrographic Office in response to courtesy email.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	In line with current standing arrangements, Santos will notify Australian Hydrographic Office four weeks prior to the start of activities and upon activity completion.	Consultation and Standing arrangement notifications Table 8-6.
01 Department or Agency:Department or agency of the Commonwealth	**Australian Institute of Marine Science**	777	13/10/2025 12:12 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1109	3/11/2025 10:55 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.
01 Department or Agency:Department or agency of the Commonwealth	**Australian Maritime Safety Authority - Marine Pollution**	774	13/10/2025 12:07 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1017	3/11/2025 10:34 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.			

Stakeholder Groups	Organisation	Id	Date	Sent / Re	Record Type	Consultation mater	Consultation Summary	Assessment of merits of objection or claim about the adverse impacts of EP activity	Santos response to objection or claim	EP Reference
01 Department or Agency:Department or agency of the Commonwealth	**Australian Maritime Safety Authority - Maritime Safety**	772	13/10/2025 12:01 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1000	3/11/2025 9:51 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.			
		1497	13/11/2025 12:55 pm	Received	Email	Map	Australian Maritime Safety Authority - Maritime Safety sent an email to Santos providing comments on this environment plan in relation to: 1) Vessel traffic plot map 2) Incident and activity notification 3) Vessel lights; and 4) Anti-collision measures	Santos notes Australian Maritime Safety Authority - Maritime Safety (AMSA - Maritime Safety) comments and have informed ASMA - Maritime Safety on the appropriate sections of the environment plan to address their comments. Santos' assessment of merits for each comment made by AMSA - Maritime Safety are listed below.	Refer ID 1498	
		1498	18/11/2025 3:25 pm	Sent	Email	N/A	Santos sent an email to Australian Maritime Safety Authority - Maritime Safety (AMSA - Maritime Safety) responding to the comments on this environment plan: 1) Vessel traffic plot map (ID: 1499) 2) Incident and activity notifications (ID: 1500) 3) Vessel lights (ID 1501); and 4) Anti-collision measures (ID 1502)	Santos' assessment of merits for each comment made by AMSA - Maritime Safety are listed below. Santos considers each request from AMSA - Maritime Safety. AMSA does not raise an objection or claim about the adverse impacts of each activity to which the EP relates. As such, Santos considers s25 consultation requirements to have been met.	Refer ID 1499-1502	
		1499	18/11/2025 3:25 pm	Sent	Email	N/A	1) Vessel traffic plot map ASMA - Maritime Safety provided an attachment of a vessel traffic plot of the area of interest,	Santos noted feedback from AMSA that there is support craft activity in and around the blocks WA-35-L, WA-43-L and WA-42-L and heavy vessels, support and local craft may be encountered throughout the activities.	Santos' response to AMSA - Maritime Safety is set out in the assessment of merits column. No further response required.	Not applicable.
		1500	18/11/2025 3:25 pm	Sent	Email	N/A	2) Incident and activity notifications AMSA - Maritime Safety requests Santos to notify the Joint Rescue Coordination Centre (JRCC) for promulgation of radio-navigation warnings 24-48 hours before operations commence. ASMA - Maritime Safety also requested Santos to notify the Australian Hydrographic Office four weeks prior to the start of activities.	Santos acknowledges the activity notification requests.	In line with current standing arrangements, Santos will notify the Joint Rescue Coordination Centre 24-48 hours before the start of activities. Santos will also notify Australian Hydrographic Office four weeks prior to the start of activities and upon completion of activities.	Consultation and Standing arrangement notifications Table 8-6.

Stakeholder Groups	Organisation	Id	Date	Sent / Re	Record Type	Consultation mater	Consultation Summary	Assessment of merits of objection or claim about the adverse impacts of EP activity	Santos response to objection or claim	EP Reference
		1501	18/11/2025 3:25 pm	Sent	Email	N/A	3) Vessel lights Santos confirmed that vessels would exhibit appropriate lights and shapes to reflect the nature of operations, noting Santos' obligation to comply with the International Rules for Preventing Collisions at Sea (COLREGs), in particular, the use of appropriate lights and shapes, as well as ensuring the navigation status was set correctly in the vessel's AIS unit.	Santos notes the request with respect to maritime safety.	Santos has assessed and developed control measures with respect to maritime safety.	Lighting and navigation controls are included in Table 8-2
		1502	18/11/2025 3:25 pm	Sent	Email	N/A	4) Anti-collision measures Santos confirmed it would evaluate and implement adequate anti-collision measures, as per Santos's standard approach to all vessel activities.	Santos notes the request with respect to maritime safety.	Santos has assessed and developed control measures with respect to maritime safety.	Anti- collision measures are considered in Section 6.2.3
01 Department or Agency:Department or agency of the Commonwealth	**Department of Agriculture, Fisheries and Forestry - Biosecurity marine pests**	774	13/10/2025 12:07 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		910	13/10/2025 12:37 pm	Received	Email	N/A	Department of Agriculture, Fisheries and Forestry - Conveyance Policy sent an auto-generated email to Santos acknowledging receipt of the campaign email.			
		1031	3/11/2025 10:34 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.			
		981	3/11/2025 10:35 am	Received	Email	N/A	Department of Agriculture, Fisheries and Forestry - Conveyance Policy sent an auto-generated email to Santos acknowledging receipt of the campaign email.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.

Stakeholder Groups	Organisation	Id	Date	Sent / Re	Record Type	Consultation mater	Consultation Summary	Assessment of merits of objection or claim about the adverse impacts of EP activity	Santos response to objection or claim	EP Reference
01 Department or Agency:Department or agency of the Commonwealth	**Department of Agriculture, Fisheries and Forestry - Fisheries Division**	775	13/10/2025 12:10 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1096	3/11/2025 10:43 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.
01 Department or Agency:Department or agency of the Commonwealth	**Department of Climate Change, Energy, the Environment and Water - Director of National Parks**	772	13/10/2025 12:01 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1002	3/11/2025 9:51 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.			
		1251	5/11/2025 12:42 pm	Sent	Phone call	N/A	Santos called the Department of Climate Change, Energy, the Environment and Water and asked to be directed to the Director of National Parks Division. The Department contact person advised they would take a message and send it to the Director of National Parks Division.			
		1252	5/11/2025 1:55 pm	Received	Phone call	N/A	A contact from the Director of National Parks called Santos and requested Santos to re-send the consultation campaign email to the representative's contact details.			
		1254	5/11/2025 2:05 pm	Sent	Email	General Factsheet	Santos re-sent the consultation campaign email to Department of Climate Change, Energy, the Environment and Water - Director of National Parks.			
		1255	5/11/2025 2:15 pm	Received	Email	N/A	Department of Climate Change, Energy, the Environment and Water - Director of National Parks sent an email to Santos to confirm receipt and confirmed the representative has forwarded the email to the relevant team.			

Stakeholder Groups	Organisation	Id	Date	Sent / Re	Record Type	Consultation mater	Consultation Summary	Assessment of merits of objection or claim about the adverse impacts of EP activity	Santos response to objection or claim	EP Reference
		1432	11/11/2025 10:05 am	Sent	Phone call	N/A	Santos called the Department of Climate Change, Energy, the Environment and Water to remind them of the closing date for consultation being 12th November 2025. Santos asked to be directed to the Director of National Parks - Marine team. The Department contact person informed Santos they would take a message and send it to the Director of National Parks - Marine team, Santos' provided the consultation email information, contact details and consultation closing date information.			
		1492	12/11/2025 1:20 pm	Received	Email	N/A	Director of National Parks (DNP) sent an email to Santos providing comments on this environment plan in relation to: 1) The location of Australian Marine Parks in relation to the Operational Area; 2) Information on guidance notes relating to evaluating impacts and risks on Australian marine park values; 3) Its understanding of the Operational Area (OA); and 4) Emergency response	Santos notes Director of National Parks (DNP) comments and have informed the department on the appropriate sections of the environment plan to address their comments.	Refer ID 1503	
		1503	19/11/2025 10:10 am	Sent	Email	N/A	Santos sent an email to Director of National Parks (DNP) responding to the comments on this environment plan in relation to: 1) The location of Australian Marine Parks in relation to the Operational Area (ID 1504) 2) Information on guidance notes relating to evaluating impacts and risks on Australian marine park values (ID 1505) 3) Its understanding of the Operational Area (OA) (ID 1506); and 4) Emergency response (ID 1507)	Santos' assessment of merits for each comment made by DNP are listed below. Santos considers each request from DNP does not raise an objection or claim about the adverse impacts of each activity to which the EP relates. As such, Santos considers s25 consultation requirements to have been met.	Refer ID 1504-1507	
		1504	19/11/2025 10:10 am	Sent	Email	N/A	1) The location of Australian Marine Parks in relation to the Operational Area	Santos acknowledges feedback from DNP that the activity Operational Area does not overlap with any Australian Marine Parks and therefore does not require any authorisations from DNP. As such, this response does not raise an objection or claim about the adverse impact of each activity to which the EP relates.	No response required.	
		1505	19/11/2025 10:10 am	Sent	Email	N/A	2) Information on guidance notes relating to evaluating impacts and risks on Australian marine park values. - Australian Marine Parks - North-west Marine Parks Network Management Plan 2018 (July 2018)	Santos notes feedback with respect to provision of government guidance and management plans. As such this response does not raise an objection or claim about the adverse impact of each activity to which the EP relates.	No response required.	
		1506	19/11/2025 10:10 am	Sent	Email	N/A	3) Its understanding of the Operational Area (OA) DNP confirms that it does not require further notification of progress made in relation to the proposed activity unless details regarding the activity change and result in an overlap with or new impact to a marine parks. DNP also noted that it considers the OA to encompass all operational activities and that these activities should be included in the EP so relevant risks are assess and effective mitigation applied.	Santos confirmed proposed activities covered in the EP will occur within the operational area and no operational activities are proposed within Australian Marine Parks. As such this response does not raise an objection or claim about the adverse impact of each activity to which the EP relates.	No response required.	Proposed activity is described in Section 2
		1507	19/11/2025 10:10 am	Sent	Email	N/A	4) Emergency response DNP provided Santos with emergency response information in the event there is an oil/gas pollution incident.	Santos notes feedback with respect to notifications in the event of a oil/gas pollution incident that may impact the values of a marine park. As such this response does not raise an objection or claim about the adverse impact of each activity to which the EP relates.	In line with current standing arrangements, Santos will notify Director of National Parks in the event of a oil/gas pollution incident that has the potential to impact the values of a marine park..	Consultation and Standing arrangement notifications Table 8-6.

Stakeholder Groups	Organisation	Id	Date	Sent / Re	Record Type	Consultation mater	Consultation Summary	Assessment of merits of objection or claim about the adverse impacts of EP activity	Santos response to objection or claim	EP Reference
01 Department or Agency:Department or agency of the Commonwealth	**Department of Climate Change, Energy, the Environment and Water - Underwater cultural heritage**	772	13/10/2025 12:01 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1003	3/11/2025 9:51 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.			
		1250	5/11/2025 12:26 pm	Sent	Phone call	N/A	Santos called the Department of Climate Change, Energy, the Environment and Water and asked to be directed to the Underwater Cultural Heritage Division. The Department conact person advised that the Underwater Cultural Heritage Division did not have a direct line and advised that the preferred communications channel was visa email to underwaterheritage@dcceew.gov.au email. The contact person also asked for Santos' contact details for passing on to the Underwater Cultural Heritage Division.			
		1430	11/11/2025 10:05 am	Sent	Phone call	N/A	Santos called the Department of Climate Change, Energy, the Environment and Water to remind them of the closing date for consultation being 12th November 2025. Santos asked to be directed to the Underwater Cultural Heritage Division. The Department contact person informed Santos they would take a message and send it to the Underwater Cultural Heritage Division, Santos' provided the consultation email information, contact details and consultation closing date information.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.
01 Department or Agency:Department or agency of the Commonwealth	**Department of Defence**	772	13/10/2025 12:01 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1004	3/11/2025 9:51 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.

Stakeholder Groups	Organisation	Id	Date	Sent / Re	Record Type	Consultation mater	Consultation Summary	Assessment of merits of objection or claim about the adverse impacts of EP activity	Santos response to objection or claim	EP Reference
01 Department or Agency:Department or agency of the Commonwealth	**Department of Foreign Affairs and Trade**	774	13/10/2025 12:07 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		804	13/10/2025 12:08 pm	Sent	Email	N/A	Department of Foreign Affairs and Trade sent an auto-generated email advising Santos the recipient was away on leave.			
		1049	3/11/2025 10:34 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.
01 Department or Agency:Department or agency of the Commonwealth	**Department of Industry, Science and Resources**	772	13/10/2025 12:01 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1005	3/11/2025 9:51 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.

Stakeholder Groups	Organisation	Id	Date	Sent / Re	Record Type	Consultation mater	Consultation Summary	Assessment of merits of objection or claim about the adverse impacts of EP activity	Santos response to objection or claim	EP Reference
01 Department or Agency:Department or agency of the Commonwealth	**Department of Infrastructure, Transport , Regional Development, Communications and the Arts**	774	13/10/2025 12:07 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1033	3/11/2025 10:34 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.
01 Department or Agency:Department or agency of the Commonwealth	**Fisheries Research and Development Corporation**	777	13/10/2025 12:12 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1806	12/1/2026 12:35 pm	Sent	Reminder Email		Santos sent an email by way of reminder that the consultation period was closing on 19 January 2026.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.

Stakeholder Groups	Organisation	Id	Date	Sent / Re	Record Type	Consultation mater	Consultation Summary	Assessment of merits of objection or claim about the adverse impacts of EP activity	Santos response to objection or claim	EP Reference
01 Department or Agency:Department or agency of the Commonwealth	**Regional Development Australia Kimberley**	788	14/10/2025 11:17 am	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1069	3/11/2025 10:34 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.
01 Department or Agency:Department or agency of the Commonwealth	**Regional Development Australia Mid West Gascoyne**	774	13/10/2025 12:07 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1070	3/11/2025 10:34 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.

Stakeholder Groups	Organisation	Id	Date	Sent / Re	Record Type	Consultation mater	Consultation Summary	Assessment of merits of objection or claim about the adverse impacts of EP activity	Santos response to objection or claim	EP Reference
01 Department or Agency:Department or agency of the Commonwealth	**Regional Development Australia Pilbara**	774	13/10/2025 12:07 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		808	13/10/2025 12:09 pm	Sent	Email	N/A	Regional Development Australia - Pilbara sent an auto-generated email advising Santos the recipient was away on leave.			
		1071	3/11/2025 10:34 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.
01 Department or Agency:Department or agency of Western Australia	**Department of Biodiversity, Conservation and Attractions**	772	13/10/2025 12:01 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		799	13/10/2025 12:02 pm	Received	Email	N/A	Department of Biodiversity, Conservation and Attractions sent an auto-generated email to Santos indicating that Santos email will be forwarded to the relevant area of the department for direct response.			
		1001	3/11/2025 9:51 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.			
		973	3/11/2025 9:52 am	Received	Email	N/A	Department of Biodiversity, Conservation and Attractions sent an auto-generated email to Santos indicating that Santos email will be forwarded to the relevant area of the department for direct response.			
		1433	11/11/2025 10:33 am	Sent	Phone call	N/A	Santos called the Department of Biodiversity, Conservation and Attractions - Environmental Management Branch. Santos left a voicemail informing the Department that the consultation closing date was 12 November 2025.			

Stakeholder Groups	Organisation	Id	Date	Sent / Re	Record Type	Consultation mater	Consultation Summary	Assessment of merits of objection or claim about the adverse impacts of EP activity	Santos response to objection or claim	EP Reference
		1491	11/11/2025 4:00 pm	Received	Email	N/A	Department of Biodiversity, Conservation and Attractions (DBCA) sent an email to Santos providing comment on this environment plan in relation to: 1) Proposed activities in proximity to biologically important areas for conservation; 2) Baseline survey data; 3) Monitoring reports; 4) Planning activities to avoid peak migration periods. 5) Department of Climate Change, Energy, the Environment and Water's National Light Pollution Guidelines for Wildlife; 6) Incidents and emergency response; and 7) Marine pollution.	Santos notes Department of Biodiversity, Conservation and Attractions' (DBCA) comments and have informed the department on the appropriate sections of the environment plan to address their comments.	Ref ID 1593	
		1593	24/11/2025 8:17 am	Sent	Email	N/A	Santos sent an email to Department of Biodiversity, Conservation and Attractions (DBCA) responding to the comments on this environment plan: 1) Proposed activities in proximity to biologically important areas for conservation (ID 1594); 2) Baseline survey data (ID 1595); 3) Monitoring reports (ID 1596); 4) Planning activities to avoid peak migration periods (ID 1597); 5) Department of Climate Change, Energy, the Environment and Water's National Light Pollution Guidelines for Wildlife (ID 1598); 6) Incidents and emergency response (ID 1599); and 7) Marine pollution (ID 1600).	Santos' assessment of merits for each comment made by DBCA are listed below. Santos considers each request from DBCA. DBCA does not raise an objection or claim about the adverse impacts of each activity to which the EP relates. As such, Santos considers s25 consultation requirements to have been met.	Ref ID 1594-1600	
		1594	24/11/2025 8:17 am	Sent	Email	N/A	1) Proposed activities in proximity to biologically important areas for conservation; DBCA commented that it is considered essential that baseline values and the state of potentially affected environment are documented prior to operations commencing that have the potential to lead to hydrocarbon releases.	Santos acknowledges there are ecologically important areas located in the vicinity of the proposed operations, and within the wider environment that may be affected (EMBA). The values and sensitivities are documented in Section 3 (Existing Environment) of the Environment Plan (EP) describes the state of environment to inform the risk and impacts of the proposed activities. In addition, the potential area that could be affected by an unplanned hydrocarbon release are risk and impact assessed in Sections 7.6 (Unplanned Hydrocarbon Release - Loss of Well Control) and 7.7 (Unplanned Hydrocarbon Release – Marine Diesel oil) of the EP, with appropriate measures applied to reduce the potential risk and impacts to ALARP and acceptable levels. As such, this response does not raise an objection or claim about the adverse impact of each activity to which the EP relates.	Santos' response to DBCA is set out in the assessment of merits column. No further response required.	Refer to Sections 3, 7.6 and 7.7 of the EP.

Stakeholder Groups	Organisation	Id	Date	Sent / Re	Record Type	Consultation mater	Consultation Summary	Assessment of merits of objection or claim about the adverse impacts of EP activity	Santos response to objection or claim	EP Reference
		1595	24/11/2025 8:17 am	Sent	Email	N/A	2) Baseline survey data; DBCA commented that it would like like to have confidence that Santos has established appropriate baseline data on the current state of areas supporting important ecological values and any current contamination, if present within the EMBA.	Santos acknowledges DBCA's comment and informed DBCA that existing baseline data is reviewed every year. Where current baseline data is not in place, not suitable or not sufficient; post-spill pre-impact baseline data collection may be prioritised in line with Santos' Operational and Scientific Monitoring Plan (OSMP). However, the ability to undertake this monitoring will depend on the time for the oil to contact the sensitive receptors. The predicted time for oil to contact key sensitive receptors is outlined in Sections 7.6 (Unplanned Hydrocarbon Release - Loss of Well Control) and 7.7 (Unplanned Hydrocarbon Release - Marine Diesel oil) of the EP. Section 5 (Environmental Risk and Impact Assessment) of the EP outlines the process Santos follows to identify and manage the potential risk and impact of an activity to ALARP and Acceptable levels. Further, Sections 7.6 (Unplanned Hydrocarbon Release - Loss of Well Control) and 7.7 (Unplanned Hydrocarbon Release - Marine Diesel oil) of the EP details the risk and impact assessment on High Environment Value areas and the OPEP identifies Priority Protection Areas for response arrangements in the event of an unplanned hydrocarbon release. Santos is confident that its risk and impact assessment process, baseline survey data review, and OSMP, addresses potential impacts on ecological values and recovery of these values. As such, this response does not raise an objection or claim about the adverse impact of each activity to which the EP relates.	Santos' response to DBCA is set out in the assessment of merits column. No further response required.	Refer to Sections 7.6 and 7.7 of the EP.
		1596	24/11/2025 8:17 am	Sent	Email	N/A	3) Monitoring reports; DBCA commented that Santos should be aware that the monitoring in marine parks and reserves is to inform DBCA's values and objectives in relation to marine park management. Further encourages Santos to implement a before-after, control-impact framework in planning and evaluating its management response.	Santos has a process for ensuing sufficient baseline data as outlined in Santos' Operational and Scientific Monitoring Plan. Santos acknowledges the monitoring reports available from the DBCA website. As such, this response does not raise an objection or claim about the adverse impact of each activity to which the EP relates.	Santos' response to DBCA is set out in the assessment of merits column. No further response required.	Not applicable.
		1597	24/11/2025 8:17 am	Sent	Email	N/A	4) Planning activities to avoid peak migration periods. DBCA recommended that Santos where possible consideration should be given to planning activities to avoid peak migration periods for species such as humpback whale and pygmy blue whale.	Planning of activities to avoid peak migration periods for species such as pygmy blue whale and humpback whale has been assessed in Section 6.1 Noise Emissions and Section 6.2 Light Emissions of the EP. The Operational Area overlaps the pygmy blue whale and humpback whale migration BIA. These species could be present all year round. Based on the short duration of the proposed activity and the widespread distribution and transitory nature of the whale species, rescheduling the activity would result in minimal environmental benefit. As such, this response does not raise an objection or claim about the adverse impact of each activity to which the EP relates.	Santos' response to DBCA is set out in the assessment of merits column. No further response required.	Refer to Sections 6.1 and 6.2 of the EP.
		1598	24/11/2025 8:17 am	Sent	Email	N/A	5) Department of Climate Change, Energy, the Environment and Water's National Light Pollution Guidelines for Wildlife; DBCA recommended that Santos to refer to the Commonwealth Department of Climate Change, Energy, the Environment and Water's National Light Pollution Guidelines for Wildlife as best practice industry standard for managing potential impacts of light pollution on marine fauna.	Santos has referred to the Commonwealth Department of Climate Change, Energy, the Environment and Water's National Light Pollution Guidelines for Wildlife as a best-practice industry standard for managing potential impacts of light pollution on marine fauna (https://www.dcceew.gov.au/environment/biodiversity/publications/national-light-pollution-guidelines-wildlife) for its impact assessment of light emissions within Section 6.2 of the EP. As such, response does not raise an objection or claim about the adverse impact of each activity to which the EP relates.	Santos' response to DBCA is set out in the assessment of merits column. No further response required.	Refer to Section 6.2 of EP.

Stakeholder Groups	Organisation	Id	Date	Sent / Re	Record Type	Consultation mater	Consultation Summary	Assessment of merits of objection or claim about the adverse impacts of EP activity	Santos response to objection or claim	EP Reference
		1599	24/11/2025 8:17 am	Sent	Email	N/A	6) Incidents and emergency response; DBCA requested that Santos notify DBCA's Pilbara regional office in the event of a hydrocarbon release.	Santos confirms in the event of a hydrocarbon release, it will notify DBCA's Pilbara office as soon as practicable on telephone number 08 9182 2000. Santos will also work with the Department of Transport and Major Infrastructure (DTMI) (formerly Department of Transport) to ensure effective management, monitoring and clean-up of any DBCA interests if affected by an oil spill, in consultation with DBCA. Santos also acknowledges DBCA's advice that it will not implement an oiled wildlife management response on behalf of a petroleum operator except as part of a whole of government response mandated by regulatory decision makers led by DTMI (state's Hazard Management Agency) and any advice or assistance from DBCA, at any scale, will occur on a full cost recovery basis. Santos also commits to consult with DBCA as required on monitoring and clean-up activity in the event of an oil spill and this commitment will be reflected in the OPEP. As such, response does not raise an objection or claim about the adverse impact of each activity to which the EP relates.	Santos' response to DBCA is set out in the assessment of merits column. No further response required.	OPEP
		1600	24/11/2025 8:17 am	Sent	Email	N/A	7) Marine pollution DBCA has referred Santos to the Department of Transport's documents providing information on the WA emergency management arrangements for marine oil pollution incidents in state waters.	Santos has referred to the Department of Transport and Major Infrastructure (DTMI) web content regarding marine pollution (https://www.transport.wa.gov.au/imarine/marine-pollution.asp), and the Offshore Petroleum Industry Guidance Note of July 2020 titled Marine Oil Pollution: Response and Consultation Arrangements in developing the EP and the OPEP. This includes providing the final draft of the OPEP DTMI's review. As such, this response does not raise an objection or claim about the adverse impact of each activity to which the EP relates.	Santos' response to DBCA is set out in the assessment of merits column. No further response required.	OPEP
01 Department or Agency:Department or agency of Western Australia	**Department of Creative Industries, Tourism and Sport**	774	13/10/2025 12:07 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1032	3/11/2025 10:34 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.

Stakeholder Groups	Organisation	Id	Date	Sent / Re	Record Type	Consultation mater	Consultation Summary	Assessment of merits of objection or claim about the adverse impacts of EP activity	Santos response to objection or claim	EP Reference
01 Department or Agency:Department or agency of Western Australia	**Department of Mines, Petroleum and Exploration**	785	13/10/2025 3:07 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1006	3/11/2025 9:51 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.			
		1493	14/11/2025 9:40 am	Received	Email	N/A	Department of Mines, Petroleum and Exploration (DMPE) sent an email to Santos acknowledging that the proposed activity will be assessed under the Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2023 and regulated by the National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA). DMPE informs Santos that it does not require further information, however notes potential environmental risks to State jurisdiction sensitivities, as outlined in Table 3 of the Consultation Information Sheet. Santos is requested to: - Provide pre-start notification confirming the activity start date and a cessation notification upon completion to petroleum.environment@dmpe.wa.gov.au. - Ensure the environment plan includes procedures for reporting incidents that could affect land or water in State jurisdiction, with notifications sent to petroleum.environment@dmpe.wa.gov.au.			
		1496	18/11/2025 3:25 pm	Sent	Email	N/A	Santos sent an email to Department of Mines, Petroleum and Exploration (DMPE) acknowledging that it does not require any further information about the planned activities. Santos confirmed that it will include DMPE and on the activity notification table for commencement and cessation of the proposed activities. Santos will also notify DMPE of any incidents that could potentially impact land or water in State jurisdiction.	Santos notes feedback that it had no concerns about proposed activities and comments with respect to activity notifications. Santos considers Regulation 25 consultation requirements to have been met.	Santos has included Department of Mines, Petroleum and Exploration for activity notifications.	Consultation and Standing arrangement notifications Table 8-6.
01 Department or Agency:Department or agency of Western Australia	**Department of Planning, Lands and Heritage**	774	13/10/2025 12:07 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		800	13/10/2025 12:08 pm	Received	Email	N/A	Department of Planning, Lands and Heritage sent an auto-generated email to Santos acknowledging receipt of the campaign email.			

Stakeholder Groups	Organisation	Id	Date	Sent / Re	Record Type	Consultation mater	Consultation Summary	Assessment of merits of objection or claim about the adverse impacts of EP activity	Santos response to objection or claim	EP Reference
		969	24/10/2025 2:29 pm	Received	Email	N/A	The WA Department of Planning, Lands & Heritage emailed Santos to advise that it had no comment on the proposed activities, but recommended Department of Water and Environmental Regulations, Department of Climate Change, Energy, the Environment and Water and National Trust to be consulted.			
		971	3/11/2025 11:00 am	Sent	Email	N/A	Santos emailed the Department of Planning, Lands and Heritage thanking it for its response stating it had no comments on the proposed activities. Santos acknowledged the consultation recommendations from the Department and outlined the assessment of merits for each.	The Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEW) has been consulted by Santos for the EP. The Western Australian Department of Water and Environmental Regulation (DWER) is engaged separately from the EP process, as it is responsible for regulating the Varanus Island Prescribed Premises Licence under the WA Environmental Protection Act. The WA office of the National Trust of Australia has confirmed there is no requirement to consult them regarding the Ningaloo Coast UNESCO World Heritage site. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.
01 Department or Agency:Department or agency of Western Australia	**Department of Primary Industries and Regional Development**	1097	3/11/2025 10:43 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.
01 Department or Agency:Department or agency of Western Australia	**Department of Transport - Marine pollution**	774	13/10/2025 12:07 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1034	3/11/2025 10:34 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.

Stakeholder Groups	Organisation	Id	Date	Sent / Re	Record Type	Consultation mater	Consultation Summary	Assessment of merits of objection or claim about the adverse impacts of EP activity	Santos response to objection or claim	EP Reference
01 Department or Agency:Department or agency of Western Australia	**Gascoyne Development Commission**	774	13/10/2025 12:07 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1030	3/11/2025 10:34 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.
01 Department or Agency:Department or agency of Western Australia	**Kimberley Development Commission**	774	13/10/2025 12:07 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1045	3/11/2025 10:34 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.

Stakeholder Groups	Organisation	Id	Date	Sent / Re	Record Type	Consultation mater	Consultation Summary	Assessment of merits of objection or claim about the adverse impacts of EP activity	Santos response to objection or claim	EP Reference
01 Department or Agency:Department or agency of Western Australia	**Ningaloo Coast World Heritage Advisory Committee**	774	13/10/2025 12:07 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		801	13/10/2025 12:08 pm	Received	Email	N/A	Ningaloo Coast World Heritage Advisory Committee sent an auto-generated email advising Santos the recipient was away on leave.			
		1059	3/11/2025 10:34 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.
01 Department or Agency:Department or agency of Western Australia	**Pilbara Development Commission**	774	13/10/2025 12:07 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1064	3/11/2025 10:34 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.

Stakeholder Groups	Organisation	Id	Date	Sent / Re	Record Type	Consultation mater	Consultation Summary	Assessment of merits of objection or claim about the adverse impacts of EP activity	Santos response to objection or claim	EP Reference
01 Department or Agency:Department or agency of Western Australia	**Shark Bay World Heritage Advisory Committee**	774	13/10/2025 12:07 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1073	3/11/2025 10:34 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.
01 Department or Agency:Department or agency of Western Australia	**Western Australian Museum**	774	13/10/2025 12:07 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1090	3/11/2025 10:34 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.			
		976	3/11/2025 10:35 am	Received	Email	N/A	Western Australian Museum sent an auto-generated email to Santos stating that it has received a high volume of enquiries and will respond as soon as possible.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.

Stakeholder Groups	Organisation	Id	Date	Sent / Re	Record Type	Consultation mater	Consultation Summary	Assessment of merits of objection or claim about the adverse impacts of EP activity	Santos response to objection or claim	EP Reference
02 Academic Organisation	**Curtin University Centre for Marine Science and Technology**	777	13/10/2025 12:12 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1130	3/11/2025 10:55 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.
02 Academic Organisation	**Edith Cowan University**	777	13/10/2025 12:12 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1136	3/11/2025 10:55 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.

Stakeholder Groups	Organisation	Id	Date	Sent / Re	Record Type	Consultation mater	Consultation Summary	Assessment of merits of objection or claim about the adverse impacts of EP activity	Santos response to objection or claim	EP Reference
02 Academic Organisation	**James Cook University**	777	13/10/2025 12:12 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1151	3/11/2025 10:55 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.
02 Academic Organisation	**Murdoch University**	777	13/10/2025 12:12 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1646	2/12/2025 1:43 pm	Sent	Reminder Email	General Factsheet	Santos sent an email advising that Murdoch University was not sent a reminder email due to Santos system error. In response Santos issued the reminder email and extended the consultation closing date to 8 December 2025.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.

Stakeholder Groups	Organisation	Id	Date	Sent / Re	Record Type	Consultation mater	Consultation Summary	Assessment of merits of objection or claim about the adverse impacts of EP activity	Santos response to objection or claim	EP Reference
02 Academic Organisation	**University of Western Australia Oceans Institute**	777	13/10/2025 12:12 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1211	3/11/2025 10:55 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.
03 Research Organisation	**Australian Institute of Marine Science - WA Branch**	777	13/10/2025 12:12 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		863	17/10/2025 2:48 pm	Received	Email	N/A	The Australian Institute of Marine Science – WA Branch acknowledged Santos' consultation email of the proposed activities and advised that, due to the late start date, it is currently unclear if Australian Institute of Marine Science – WA Branch's operations will be impacted. Australian Institute of Marine Science – WA Branch requested Santos to provide ongoing updates as the commencement date approaches to help assess any potential impact.			
		864	22/10/2025 11:28 am	Sent	Email	N/A	Santos sent an email to Australian Institute of Marine Science – WA Branch and acknowledged the challenges activity scheduled due to the late start date, it is currently unclear if Australian Institute of Marine Science – WA Branch's operations will be impacted. Santos has advised that it will include Australian Institute of Marine Science – WA Branch on Santos' activity notification table, which will notify Australian Institute of Marine Science – WA Branch, at least for weeks prior to the activity commencement date. Santos also committed to providing Australian Institute of Marine Science – WA Branch with its WA Quarterly Update.	Santos notes feedback that it had no concerns about proposed activities and comments with respect to activity notifications. Santos considers Regulation 25 consultation requirements to have been met.	Santos has included Australian Institute of Marine Science – WA for activity notifications.	Consultation and Standing arrangement notifications Table 8-6.

Stakeholder Groups	Organisation	Id	Date	Sent / Re	Record Type	Consultation mater	Consultation Summary	Assessment of merits of objection or claim about the adverse impacts of EP activity	Santos response to objection or claim	EP Reference
03 Research Organisation	**Commonwealth Scientific and Industrial Research Organisation-ACT Corporate Headquarters**	777	13/10/2025 12:12 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		812	13/10/2025 12:14 pm	Received	Email	N/A	Commonwealth Scientific and Industrial Research Organisation sent an auto-generated email to Santos acknowledging receipt of the campaign email.			
		1125	3/11/2025 10:55 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.			
		989	3/11/2025 10:56 am	Received	Email	N/A	Commonwealth Scientific and Industrial Research Organisation sent an auto-generated email to Santos acknowledging receipt of the campaign email.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.
03 Research Organisation	**Dampier Archipelago Environmental Advisory Group**	777	13/10/2025 12:12 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		810	13/10/2025 12:13 pm	Sent	Email	N/A	Dampier Archipelago Environmental Advisory Group sent an auto-generated email to Santos indicating that Santos email will be forwarded to the relevant area of the department for direct response.			
		1132	3/11/2025 10:55 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.			

Stakeholder Groups	Organisation	Id	Date	Sent / Re	Record Type	Consultation mater	Consultation Summary	Assessment of merits of objection or claim about the adverse impacts of EP activity	Santos response to objection or claim	EP Reference
		983	3/11/2025 10:56 am	Received	Email	N/A	Dampier Archipelago Environmental Advisory Group sent an auto-generated email to Santos indicating that Santos email will be forwarded to the relevant area of the department for direct response.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.
03 Research Organisation	**Exmouth Gulf Taskforce**	777	13/10/2025 12:12 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1143	3/11/2025 10:55 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.
03 Research Organisation	**Kimberley Marine Research Station**	777	13/10/2025 12:12 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1156	3/11/2025 10:55 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.

Stakeholder Groups	Organisation	Id	Date	Sent / Re	Record Type	Consultation mater	Consultation Summary	Assessment of merits of objection or claim about the adverse impacts of EP activity	Santos response to objection or claim	EP Reference
03 Research Organisation	**Ningaloo Research Centre (Murdoch University)**	791	13/10/2025 3:40 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1173	3/11/2025 10:55 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.
03 Research Organisation	**Roebuck Bay Working Group**	777	13/10/2025 12:12 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1193	3/11/2025 10:55 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.

Stakeholder Groups	Organisation	Id	Date	Sent / Re	Record Type	Consultation mater	Consultation Summary	Assessment of merits of objection or claim about the adverse impacts of EP activity	Santos response to objection or claim	EP Reference
03 Research Organisation	**Shark Bay Dolphin Project**	777	13/10/2025 12:12 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1201	3/11/2025 10:55 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.
03 Research Organisation	**The Pew Charitable Trusts**	777	13/10/2025 12:12 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1207	3/11/2025 10:55 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.

Stakeholder Groups	Organisation	Id	Date	Sent / Re	Record Type	Consultation mater	Consultation Summary	Assessment of merits of objection or claim about the adverse impacts of EP activity	Santos response to objection or claim	EP Reference
03 Research Organisation	**Western Australian Coastal and Marine Network**	1649	2/12/2025 4:55 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 9 January 2026. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1805	19/12/2025 10:05 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 9 January 2026, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.
03 Research Organisation	**Western Australian Marine Science Institution**	777	13/10/2025 12:12 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1218	3/11/2025 10:55 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.

Stakeholder Groups	Organisation	Id	Date	Sent / Re	Record Type	Consultation mater	Consultation Summary	Assessment of merits of objection or claim about the adverse impacts of EP activity	Santos response to objection or claim	EP Reference
05 Energy Industry:Greenhouse Gas licence holder	**InCapture P/L**	774	13/10/2025 12:07 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		841	16/10/2025 10:52 am	Received	Email	N/A	InCapture sent an email to Santos to acknowledge receipt of campaign email and commented that they do not expect to be impacted by these activities and have no objections.			
		842	20/10/2025 11:55 am	Sent	Email	N/A	Santos sent an email to InCapture acknowledging it did not expect to be impacted by activities and had no objections.	Santos notes the feedback from InCapture that it did not expect to be impacted by proposed activities and had no objections. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.
05 Energy Industry:Greenhouse Gas licence holder;05 Energy Industry:Petroleum titleholder	**Chevron Australia**	774	13/10/2025 12:07 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1027	3/11/2025 10:34 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.			
		1494	10/11/2025 11:40 am	Received	Email	N/A	Chevron sent an email to Santos to acknowledge receipt of campaign email and commented that they do not have any concerns or feedback regarding the proposed activities.			
		1495	18/11/2025 1:07 pm	Sent	Email	N/A	Santos sent an email to Chevron acknowledging it did not expect to be impacted by activities and had no objections.	Santos notes the feedback from Chevron that it did not expect to be impacted by proposed activities and had no objections. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.

Stakeholder Groups	Organisation	Id	Date	Sent / Re	Record Type	Consultation mater	Consultation Summary	Assessment of merits of objection or claim about the adverse impacts of EP activity	Santos response to objection or claim	EP Reference
05 Energy Industry:Greenhouse Gas licence holder;05 Energy Industry:Petroleum titleholder	**Woodside Energy Group Ltd**	774	13/10/2025 12:07 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1092	3/11/2025 10:34 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.
05 Energy Industry:Petroleum titleholder	**Beagle No.1 Pty Ltd**	774	13/10/2025 12:07 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1018	3/11/2025 10:34 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.

Stakeholder Groups	Organisation	Id	Date	Sent / Re	Record Type	Consultation mater	Consultation Summary	Assessment of merits of objection or claim about the adverse impacts of EP activity	Santos response to objection or claim	EP Reference
05 Energy Industry:Petroleum titleholder	**BP Developments Australia**	774	13/10/2025 12:07 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1019	3/11/2025 10:34 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.			
		979	3/11/2025 10:40 am	Received	Email	N/A	BP sent an email to Santos advising that it did not have any objections to the proposed activities and had no other feedback.			
		980	4/11/2025 10:33 am	Sent	Email	N/A	Santos sent an email to BP Developments Australia acknowledging it did not expect to be impacted by activities and had no objections.	Santos notes the feedback from BP Developments Australia that it did not expect to be impacted by proposed activities and had no objections. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.
05 Energy Industry:Petroleum titleholder	**ExxonMobil**	774	13/10/2025 12:07 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1036	3/11/2025 10:34 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.

Stakeholder Groups	Organisation	Id	Date	Sent / Re	Record Type	Consultation mater	Consultation Summary	Assessment of merits of objection or claim about the adverse impacts of EP activity	Santos response to objection or claim	EP Reference
05 Energy Industry:Petroleum titleholder	**Finder Energy Holdings Ltd**	774	13/10/2025 12:07 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1037	3/11/2025 10:34 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.
05 Energy Industry:Petroleum titleholder	**Jadestone Energy (Australia) Pty Ltd**	774	13/10/2025 12:07 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1039	3/11/2025 10:34 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.			
		1248	5/11/2025 7:19 am	Received	Email	N/A	Jadestone sent an email to Santos and advised it did not have any comments regarding this project and do not need any further information.			
		1249	5/11/2025 1:38 pm	Sent	Email	N/A	Santos sent an email to Jadestone acknowledging it did not expect to be impacted by activities and had no objections.	Santos notes the feedback from Jadestone that it did not expect to be impacted by proposed activities and had no objections. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.

Stakeholder Groups	Organisation	Id	Date	Sent / Re	Record Type	Consultation mater	Consultation Summary	Assessment of merits of objection or claim about the adverse impacts of EP activity	Santos response to objection or claim	EP Reference
05 Energy Industry:Petroleum titleholder	**KATO Energy**	774	13/10/2025 12:07 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1043	3/11/2025 10:34 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.
05 Energy Industry:Petroleum titleholder	**KUFPEC Australia Pty Ltd**	774	13/10/2025 12:07 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1047	3/11/2025 10:34 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.

Stakeholder Groups	Organisation	Id	Date	Sent / Re	Record Type	Consultation mater	Consultation Summary	Assessment of merits of objection or claim about the adverse impacts of EP activity	Santos response to objection or claim	EP Reference
05 Energy Industry:Petroleum titleholder	**Melbana Energy Ltd**	774	13/10/2025 12:07 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1052	3/11/2025 10:34 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.
05 Energy Industry:Petroleum titleholder	**Pathfinder Energy Pty Ltd**	774	13/10/2025 12:07 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1053	3/11/2025 10:34 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.

Stakeholder Groups	Organisation	Id	Date	Sent / Re	Record Type	Consultation mater	Consultation Summary	Assessment of merits of objection or claim about the adverse impacts of EP activity	Santos response to objection or claim	EP Reference
05 Energy Industry:Petroleum titleholder	**Western Gas Pty Ltd**	787	13/10/2025 3:26 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1091	3/11/2025 10:34 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.
06 Environmental (non-Government) conservation organisation	**Australian Conservation Foundation**	777	13/10/2025 12:12 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1103	3/11/2025 10:55 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.

Stakeholder Groups	Organisation	Id	Date	Sent / Re	Record Type	Consultation mater	Consultation Summary	Assessment of merits of objection or claim about the adverse impacts of EP activity	Santos response to objection or claim	EP Reference
06 Environmental (non-Government) conservation organisation	**Australian Marine Conservation Society**	777	13/10/2025 12:12 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1110	3/11/2025 10:55 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.
06 Environmental (non-Government) conservation organisation	**Cape Conservation Group**	777	13/10/2025 12:12 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1150	3/11/2025 10:55 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.

Stakeholder Groups	Organisation	Id	Date	Sent / Re	Record Type	Consultation mater	Consultation Summary	Assessment of merits of objection or claim about the adverse impacts of EP activity	Santos response to objection or claim	EP Reference
06 Environmental (non-Government) conservation organisation	**Care for Hedland Environmental Association**	777	13/10/2025 12:12 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1124	3/11/2025 10:55 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.
06 Environmental (non-Government) conservation organisation	**Conservation Council of WA**	777	13/10/2025 12:12 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1126	3/11/2025 10:55 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.

Stakeholder Groups	Organisation	Id	Date	Sent / Re	Record Type	Consultation mater	Consultation Summary	Assessment of merits of objection or claim about the adverse impacts of EP activity	Santos response to objection or claim	EP Reference
06 Environmental (non-Government) conservation organisation	**Coral Bay Progress Association**	777	13/10/2025 12:12 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1128	3/11/2025 10:55 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.
06 Environmental (non-Government) conservation organisation	**Environs Kimberley**	777	13/10/2025 12:12 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1138	3/11/2025 10:55 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.

Stakeholder Groups	Organisation	Id	Date	Sent / Re	Record Type	Consultation mater	Consultation Summary	Assessment of merits of objection or claim about the adverse impacts of EP activity	Santos response to objection or claim	EP Reference
06 Environmental (non-Government) conservation organisation	**Greenpeace Australia Pacific**	777	13/10/2025 12:12 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		813	13/10/2025 12:14 pm	Received	Email	N/A	Greenpeace Australia sent an auto-generated email to Santos acknowledging receipt of the campaign email.			
		1145	3/11/2025 10:55 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.			
		987	3/11/2025 10:56 am	Received	Email	N/A	Greenpeace Australia sent an auto-generated email to Santos acknowledging receipt of the campaign email.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.
06 Environmental (non-Government) conservation organisation	**International Fund for Animal Welfare**	777	13/10/2025 12:12 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1149	3/11/2025 10:55 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.

Stakeholder Groups	Organisation	Id	Date	Sent / Re	Record Type	Consultation mater	Consultation Summary	Assessment of merits of objection or claim about the adverse impacts of EP activity	Santos response to objection or claim	EP Reference
06 Environmental (non-Government) conservation organisation	**Protect Ningaloo**	777	13/10/2025 12:12 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1190	3/11/2025 10:55 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.
06 Environmental (non-Government) conservation organisation	**Save the Kimberley**	777	13/10/2025 12:12 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1187	3/11/2025 10:55 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.

Stakeholder Groups	Organisation	Id	Date	Sent / Re	Record Type	Consultation mater	Consultation Summary	Assessment of merits of objection or claim about the adverse impacts of EP activity	Santos response to objection or claim	EP Reference
06 Environmental (non-Government) conservation organisation	**Sea Shepherd Australia**	777	13/10/2025 12:12 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1196	3/11/2025 10:55 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.
06 Environmental (non-Government) conservation organisation	**Whale and Dolphin Conservation**	777	13/10/2025 12:12 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1219	3/11/2025 10:55 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.

Stakeholder Groups	Organisation	Id	Date	Sent / Re	Record Type	Consultation mater	Consultation Summary	Assessment of merits of objection or claim about the adverse impacts of EP activity	Santos response to objection or claim	EP Reference
06 Environmental (non-Government) conservation organisation	**Wilderness Society**	777	13/10/2025 12:12 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1220	3/11/2025 10:55 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.			
		1508	13/11/2025 8:10 am	Received	Email	N/A	The Wilderness Society sent an email to Santos to confirm that it does not have any feedback to provide on this EP.		Refer ID 1511	
		1511	20/11/2025 10:55 am	Sent	Email	N/A	Santos sent an email to The Wilderness Society acknowledging it did not have any feedback on this EP.	Santos notes the feedback from The Wilderness Society that it had no comments on proposed activities. Santos notes confirmation that Santos had corrected identified Commonwealth fisheries for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.
06 Environmental (non-Government) conservation organisation	**World Wide Fund for Nature**	777	13/10/2025 12:12 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1223	3/11/2025 10:55 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.

Stakeholder Groups	Organisation	Id	Date	Sent / Re	Record Type	Consultation mater	Consultation Summary	Assessment of merits of objection or claim about the adverse impacts of EP activity	Santos response to objection or claim	EP Reference
07 First Nations:Aboriginal Corporations and Representative Body - Western Australia	**Murujuga Aboriginal Corporation**	774	13/10/2025 12:07 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1044	3/11/2025 10:34 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.
07 First Nations:Aboriginal Corporations and Representative Body - Western Australia	**Yamatji Southern Regional Corporation**	774	13/10/2025 12:07 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1025	3/11/2025 10:34 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.

Stakeholder Groups	Organisation	Id	Date	Sent / Re	Record Type	Consultation mater	Consultation Summary	Assessment of merits of objection or claim about the adverse impacts of EP activity	Santos response to objection or claim	EP Reference
07 First Nations:Native Title Representative Body - Western Australia	**Kimberley Land Council**	774	13/10/2025 12:07 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1088	3/11/2025 10:34 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.
07 First Nations:Native Title Representative Body - Western Australia	**Yamatji Marlpa Aboriginal Corporation**	774	13/10/2025 12:07 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1083	3/11/2025 10:34 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.
07 First Nations:Registered and Pending Native Title Claim - Western Australia	**Nhuwala Claim Group**	1262	30/9/2025 2:50 pm	Sent	Sent Email		Santos sent an email to the Nhuwala Claim Group contact person to advise that Santos would soon be consulting on two environmental plans that may be of interest to them, including the Varanus Island State Waters Plug & Abandonment EP. Santos advised consultation materials for the planned activities under the two EPs would be sent to the Nhuwala Claim Group. Santos sought interest from the Claim Group in a meeting to discuss the two proposed EPs in more detail.			
		1263	6/10/2025 12:10 pm	Received	Received Email		Santos received an email from Nhuwala Claim Group contact person acknowledging upcoming consultations and confirming they would revert in relation to Nhuwala consultation.			

Stakeholder Groups	Organisation	Id	Date	Sent / Re	Record Type	Consultation mater	Consultation Summary	Assessment of merits of objection or claim about the adverse impacts of EP activity	Santos response to objection or claim	EP Reference
		774	13/10/2025 12:07 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1264	16/10/2025 2:30 pm	Sent	Sent Email		Santos sent an email to Nhuwala Claim Group contact person to follow on earlier communications and to see if Nhuwala was interested in discussing the consultation materials in more detail.			
		1265	16/10/2025 3:00 pm	Received	Received Email		Santos and Nhuwala Claim Group exchanged emails to schedule a consultation meeting in Karratha on 5 November 2025.			
		1267	28/10/2025 1:50 pm	Received	Received Email		Santos received an email from Nhuwala Claim Group confirming arrangements for a consultation meeting in Karratha on 5 November.			
		1537	28/10/2025 4:13 pm	Sent	Email		Santos emailed Nhuwala Claim Group contact person to follow up on consultation meeting arrangements for 5 November 2025 in Karratha.			
		1268	30/10/2025 3:30 pm	Received	Received Email		Santos received an email from Nhuwala Claim Group advising Nhuwala was unable to meet on 5 November and asked to reschedule the meeting. Santos responded same day and confirmed rescheduling was suitable and please advise alternative date to meet.			
		1063	3/11/2025 10:34 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.			
		1538	6/11/2025 9:25 am	Received	Email		Santos received an email from Nhuwala Claim Group suggesting a consultation meeting in Karratha on 19 or 20 November 2025.			
		1539	6/11/2025 3:30 pm	Sent	Email		Santos and Nhuwala exchanged a series of emails to confirm arrangements for a consultation meeting in Karratha on 19 November 2025.			
		1540	10/11/2025 11:50 am	Sent	Email		Santos and Nhuwala Claim Group exchanged emails to confirm arrangements for the consultation meeting on 19 November 2025 in Karratha.			
		1541	18/11/2025 10:10 am	Sent	Email		Santos emailed Nhuwala Claim Group as a courtesy ahead of the scheduled consultation meeting on 19 November 2025.			
		1606	19/11/2025 12:45 pm	Received	Meeting	Presentation;Meeting	Santos met with Nhuwala Claim Group on 19 November 2025 to discuss the Van Gogh Coniston Novara VGA-4H GI ST1 Well Intervention/Plug & Abandonment Environment Plan.	No claims or objections in relation to proposed activities were raised during the meeting.	Refer ID 1612	
		1612	25/11/2025 10:10 am	Sent	Email	Poster;Presentation	Santos sent an email to Nhuwala Claim Group providing a summary of the comments from the meeting held on 19 November 2025. 1) Oil spill response (ID 1613)	Santos notes these requests and no objections or claims were raised to proposed activities at this meeting. Santos considers Section 25 consultation requirements to have been met.	Ref ID 1613	

Stakeholder Groups	Organisation	Id	Date	Sent / Re	Record Type	Consultation mater	Consultation Summary	Assessment of merits of objection or claim about the adverse impacts of EP activity	Santos response to objection or claim	EP Reference
		1613	25/11/2025 10:10 am	Sent	Email	N/A	1) Oil spill response Nhuwala requested to be notified in the event of a spill that may contact their area of interest. This notification to be provided via their Contact Person at Yamatji Marlpa Aboriginal Corporation.	Nhuwala Claim Group (via Yamatji Marlpa Aboriginal Corporation contact person) will be notified in the event of a spill that may contact their area of interest. This will appear in the Consultation and Standing notifications Table of the Environment Plan and Section 7 of the Oil Pollution Emergency Plan.	Santos has included Nhuwala Claim Group (via Yamatji Marlpa Aboriginal Corporation contact person) for activity notifications.	Refer to Section 7 of the OPEP and Consultation and Standing arrangement notifications in Table 8.6.
07 First Nations:Registered and Pending Native Title Claim - Western Australia	**Thalanyji Nhuwala People**	851	30/9/2025 2:55 pm	Sent	Sent Email		Santos emailed Thalanyji Nhuwala People contact person to advise that Santos would soon be consulting on two environmental plans: Van Gogh Coniston Novara VGA-4H GI ST1 Well Intervention/Plug & Abandonment EP, and Varanus Island State Waters Plug & Abandonment EP, that may be of interest to the Thalanyji Nhuwala People. Santos offered Thalanyji Nhuwala contact person an opportunity to meet to discuss the environment plans.			
		774	13/10/2025 12:07 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1618	21/10/2025 2:02 pm	Sent	Phone call		Santos phoned Thalanyji/Nhuwala People contact person to discuss receipt of consultation material for the environment plan. A message was left with reception for a call back to discuss the materials if required.			
		1619	21/10/2025 2:04 pm	Received	Phone call		Santos received a phone call from Thalanyji/Nhuwala People contact person confirming receipt of all consultation emails and confirming that all consultation emails were forward to Buurabalayji Thalanyji Aboriginal Corporation for their attention.	No claims or objections in relation to proposed activities were raised during the phone call.	No response required.	Not applicable.
		1084	3/11/2025 10:34 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.

Stakeholder Groups	Organisation	Id	Date	Sent / Re	Record Type	Consultation mater	Consultation Summary	Assessment of merits of objection or claim about the adverse impacts of EP activity	Santos response to objection or claim	EP Reference
07 First Nations:Registered Native Title Bodies Corporate - Western Australia	**Bundi Yamatji Aboriginal Corporation**	774	13/10/2025 12:07 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1024	3/11/2025 10:34 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.
07 First Nations:Registered Native Title Bodies Corporate - Western Australia	**Buurabalayji Thalanyji Aboriginal Corporation**	774	13/10/2025 12:07 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1048	3/11/2025 10:34 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	Refer ID 1619 No response required.	Not applicable.

Stakeholder Groups	Organisation	Id	Date	Sent / Re	Record Type	Consultation mater	Consultation Summary	Assessment of merits of objection or claim about the adverse impacts of EP activity	Santos response to objection or claim	EP Reference
07 First Nations:Registered Native Title Bodies Corporate - Western Australia	**Dambimangari Aboriginal Corporation**	774	13/10/2025 12:07 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1062	3/11/2025 10:34 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.
07 First Nations:Registered Native Title Bodies Corporate - Western Australia	**Gogolanygor Aboriginal Corporation**	1674	12/12/2025 11:15 am	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 19 January 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1808	12/1/2026 12:34 pm	Sent	Reminder Email		Santos sent an email by way of reminder that the consultation period was closing on 19 January 2026.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.

Stakeholder Groups	Organisation	Id	Date	Sent / Re	Record Type	Consultation mater	Consultation Summary	Assessment of merits of objection or claim about the adverse impacts of EP activity	Santos response to objection or claim	EP Reference
07 First Nations:Registered Native Title Bodies Corporate - Western Australia	**Karajarri Traditional Lands Association**	774	13/10/2025 12:07 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1042	3/11/2025 10:34 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.
07 First Nations:Registered Native Title Bodies Corporate - Western Australia	**Kariyarra Aboriginal Corporation**	774	13/10/2025 12:07 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1040	3/11/2025 10:34 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.

Stakeholder Groups	Organisation	Id	Date	Sent / Re	Record Type	Consultation mater	Consultation Summary	Assessment of merits of objection or claim about the adverse impacts of EP activity	Santos response to objection or claim	EP Reference
07 First Nations:Registered Native Title Bodies Corporate - Western Australia	**Malgana Aboriginal Corporation**	774	13/10/2025 12:07 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1050	3/11/2025 10:34 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.
07 First Nations:Registered Native Title Bodies Corporate - Western Australia	**Mayala Inninalang Aboriginal Corporation**	774	13/10/2025 12:07 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1072	3/11/2025 10:34 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.

Stakeholder Groups	Organisation	Id	Date	Sent / Re	Record Type	Consultation mater	Consultation Summary	Assessment of merits of objection or claim about the adverse impacts of EP activity	Santos response to objection or claim	EP Reference
07 First Nations:Registered Native Title Bodies Corporate - Western Australia	**Nanda Aboriginal Corporation**	774	13/10/2025 12:07 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		819	13/10/2025 12:08 pm	Received	Email	N/A	Nanda Aboriginal Corporation sent an auto-generated email to Santos noting that the recipient is no longer with the Nanda Aboriginal Corporation, within the auto-response email new contact details have been provided.			
		820	15/10/2025 1:30 pm	Sent	Campaign Email	General Factsheet	Santos sent the consultation campaign email to the updated contact details provided by Nanda Aboriginal Corporation.			
		1057	3/11/2025 10:34 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 14 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.
07 First Nations:Registered Native Title Bodies Corporate - Western Australia	**Nganhurra Thanardi Garrbu Aboriginal Corporation**	845	30/9/2025 2:40 pm	Sent	Sent Email		Santos emailed Nganhurra Thanardi Garrbu Aboriginal Corporation to advise it would soon be consulting on two environmental plans that may be of interest to Nganhurra Thanardi Garrbu Aboriginal Corporation and to see if Nganhurra Thanardi Garrbu Aboriginal Corporation may be interested in a meeting to discuss the proposed environment plans in more detail.			
		772	13/10/2025 12:01 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		847	20/10/2025 11:07 am	Sent	Phone call		Santos phoned Nganhurra Thanardi Garrbu Aboriginal Corporation via contact Yamatji Marlpa Aboriginal Corporation to discuss receipt of consultation material. A message was left on the Yamatji Marlpa Aboriginal Corporation messages asking for a return call to Santos.			
		848	21/10/2025 1:10 pm	Sent	Phone call		Santos phoned Nganhurra Thanardi Garrbu Aboriginal Corporation via Yamatji Marlpa Aboriginal Corporation contact to follow up on receipt of consultation material. A message was left with Yamatji Marlpa Aboriginal Corporation reception for a return call to Santos to discuss if required.			

Stakeholder Groups	Organisation	Id	Date	Sent / Re	Record Type	Consultation mater	Consultation Summary	Assessment of merits of objection or claim about the adverse impacts of EP activity	Santos response to objection or claim	EP Reference
		1009	3/11/2025 9:51 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.			
		1253	5/11/2025 2:53 pm	Sent	Phone call		Santos phoned Nganhurra Thanardi Garrbu Aboriginal Corporation, via representative body Yamatji Marlpa Aboriginal Corporation, to follow up on consultation materials sent in relation to the Environment Plan and to enquire if any further information or if a meeting was required to discuss the consultation materials. A message of this nature was left with Yamatji Marlpa Aboriginal Corporation reception with a request for a call back if any further action was required.			
		1256	5/11/2025 3:11 pm	Sent	Email	General Factsheet	Santos emailed Nganhurra Thanardi Garrbu Aboriginal Corporation to follow up on consultation emails sent to Nganhurra Thanardi Garrbu Aboriginal Corporation on 13 October and 3 November in relation to the Van Gogh Coniston Novara VGA-4H-GI-ST1 Well-Intervention Plug and Abandonment Environment Plan. A copy of the Consultation Information Fact Sheet was attached for reference. The purpose of the email was to enquire if Nganhurra Thanardi Garrbu Aboriginal Corporation would be interested in a meeting to discuss the proposed environment plan. The email also noted the consultation closing date for the Environment Plan.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	Not applicable.	No response required.
07 First Nations:Registered Native Title Bodies Corporate - Western Australia	**Ngarluma Aboriginal Corporation**	1542	30/9/2025 2:25 pm	Sent	Email		Santos emailed Ngarluma Aboriginal Corporation advising it would soon be consulting on two environment plans that may be of interest to Ngarluma should they be interested in a meeting to discuss.			
		1543	30/9/2025 4:30 pm	Received	Email		Santos and Ngarluma Aboriginal Corporation exchanged emails to discuss potential consultation meeting in early November 2025.			
		1550	2/10/2025 2:50 pm	Sent	Email		Santos and Ngarluma Aboriginal Corporation exchanged a series of emails between 1 October and 2 October 2025 to tentatively schedule a consultation meeting for 4 November 2025 in Karratha.			
		774	13/10/2025 12:07 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1551	16/10/2025 11:41 am	Sent	Phone call		Santos phoned Ngarluma Aboriginal Corporation to discuss arrangements for the consultation meeting scheduled on 4 November 2025 in Karratha to discuss the following two environment plans: •Varanus Island State Waters Plug & Abandonment Environment Plan •Van Gogh Coniston Novara VGA-4H GI ST1 Well Intervention/Plug & Abandonment Environment Plan			
		1553	16/10/2025 2:10 pm	Sent	Email		Santos sent an email to Ngarluma Aboriginal Corporation to confirm arrangements for the consultation meeting scheduled for 4 November in Karratha.			
		1555	24/10/2025 11:10 am	Received	Email		Santos received an email from Ngarluma Aboriginal Corporation confirming meeting arrangements for 4 November 2025.			
		1559	30/10/2025 9:00 am	Sent	Email		Santos and Ngarluma Aboriginal Corporation exchanged a series of emails between 28 October and 30 October 2025 to finalise arrangements for the consultation meeting on 4 November 2025 in Karratha.			
		1014	3/11/2025 10:34 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.			

Stakeholder Groups	Organisation	Id	Date	Sent / Re	Record Type	Consultation mater	Consultation Summary	Assessment of merits of objection or claim about the adverse impacts of EP activity	Santos response to objection or claim	EP Reference
		1608	4/11/2025 10:00 am	Sent	Meeting	Presentation;Meetin	Santos met with Ngarluma Aboriginal Corporation on 4 November 2025 to discuss the Van Gogh Coniston Novara VGA-4H GI ST1 Well Intervention/Plug & Abandonment Environment Plan.		Refer ID 1558	
		1558	4/11/2025 12:25 pm	Sent	Email		Santos met with Ngarluma Aboriginal Corporation on 4 November 2025 to discuss the: •Varanus Island State Waters Plug & Abandonment Environment Plan, and •Van Gogh Coniston Novara VGA-4H GI ST1 Well Intervention/Plug & Abandonment Environment Plan During that meeting, Ngarluma asked for a list of oil spill response equipment held by AMSA in Karratha.	Santos provided a list of oil spill response equipment held by AMSA in Karratha via email link on 4 November 2025. Santos notes these requests and no objections or claims were raised to proposed activities.	Refer ID 1609	Not Applicable
		1609	25/11/2025 10:10 am	Sent	Email	N/A	Santos sent an email to Ngarluma Aboriginal Corporation providing a summary of the comments from the meeting held on 4 November 2025. 1) Information relating to the primary barrier for GI well (ID 1610); and 2) Oil spill response (ID 1611)	Santos notes these requests and no objections or claims were raised to proposed activities at this meeting. Santos considers Section 25 consultation requirements to have been met.	Ref ID 1610-1611	
		1610	25/11/2025 10:10 am	Sent	Email	N/A	1) Information relating to the primary barrier for GI well; Santos to provide a response to Ngarluma outlining what the primary barrier is for the GI well.	Santos informed Ngarluma the primary barrier for the VGA-4H GI well is provided by the production packer, well completion and subsea production tree. There has been no hydrocarbon loss of containment to the environment and the primary barrier in the well is intact. The current well status is included in the field's Well Operations Management Plan (WOMP) accepted by the federal government regulator NOPSEMA.	No response required.	Activity description is in Section 2 of the EP.
		1611	25/11/2025 10:10 am	Sent	Email	N/A	2) Oil spill response A standing requirement, Ngarluma has requested that their CEO and Chair be notified in the event of a spill that may contact their area of interest. Ngarluma confirmed they did not want areas of importance to the Ngarluma people identified in any public documents (EP or OPEP), but reference to areas of importance, such as Depuch Island and the Maitland River could be referenced in the Confidential and Sensitive Information Report submitted to NOPSEMA if required.	Santos confirmed that Ngarluma Aboriginal Corporation (CEO & Chair) would be notified in the event of a spill that may contact their area of interest. This would appear in the Activity Notifications Table of the Environment Plan and Section 7 of the Oil Pollution Emergency Plan for both the VGA-4H GI ST1 Well Intervention/Plug & Abandonment (Commonwealth) Santos confirmed that any areas of importance to the Ngarluma people will not be identified in any public documents (EP or OPEP).	Santos has included Ngarluma for activity notifications.	Refer to Section 7 of the OPEP and Consultation and Standing arrangement notifications Table 8.6.
07 First Nations:Registered Native Title Bodies Corporate - Western Australia	**Nyangumarta Karajarri Aboriginal Corporation**	774	13/10/2025 12:07 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		816	13/10/2025 12:08 pm	Received	Email	N/A	An auto-generated email was sent advising Santos the recipient was away on annual leave.			

Stakeholder Groups	Organisation	Id	Date	Sent / Re	Record Type	Consultation mater	Consultation Summary	Assessment of merits of objection or claim about the adverse impacts of EP activity	Santos response to objection or claim	EP Reference
		817	14/10/2025 12:05 pm	Sent	Email	General Factsheet	Santos sent an email to confirm receipt of the Van Gogh Coniston Novara VGA-4H GI ST1 Well Intervention/Plug & Abandonment EP consultation materials that were sent on 13 October 2025.			
		860	20/10/2025 3:16 pm	Received	Email	N/A	Nyangumarta Karajarri Aboriginal Corporation sent an email to Santos to confirm the contact details of registered person to send consultation information to.	Santos updated its contact database as per Nyangumarta Karajarri Aboriginal Corporation's request. Santos notes these requests and no objections or claims were raised to the proposed activities.	Refer ID 861	Not applicable.
		861	20/10/2025 3:58 pm	Sent	Email	General Factsheet	Santos sent an email to Nyangumarta Karajarri Aboriginal Corporation's nominated contact person noting the Carnarvon Basin | Van Gogh Coniston Novara VGA-4H GI ST1 Well Intervention/Plug & Abandonment Environment Plan consultation email and fact sheet.			
		1026	3/11/2025 10:34 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.			
		994	3/11/2025 11:35 am	Received	Email	N/A	Nyangumarta Karajarri Aboriginal Corporation sent an auto-generated email advising Santos the recipient was away on leave.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.
07 First Nations:Registered Native Title Bodies Corporate - Western Australia	**Nyangumarta Warrarn Aboriginal Corporation**	774	13/10/2025 12:07 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1060	3/11/2025 10:34 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.
07 First Nations:Registered Native Title Bodies Corporate - Western Australia	**Nyul Nyul PBC Aboriginal Corporation**	1667	12/12/2025 11:04 am	Sent	Phone call		Santos rang to speak with Chantelle Smith to confirm if Chantelle is still the appropriate Point of Contact for Nyul Nyul Aboriginal Corporation. Anna from the office will call Santos back with further details.			

Stakeholder Groups	Organisation	Id	Date	Sent / Re	Record Type	Consultation mater	Consultation Summary	Assessment of merits of objection or claim about the adverse impacts of EP activity	Santos response to objection or claim	EP Reference
		1671	12/12/2025 11:52 am	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 19 January 2026. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1807	12/1/2026 12:35 pm	Sent	Reminder Email		Santos sent an email by way of reminder that the consultation period was closing on 19 January 2026.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.
07 First Nations:Registered Native Title Bodies Corporate - Western Australia	**Wanjina Wunggurr Aboriginal Corporations**	816	13/10/2025 12:08 pm	Received	Email	N/A	An auto-generated email was sent advising Santos the recipient was away on annual leave.			
		817	14/10/2025 12:05 pm	Sent	Email	General Factsheet	Santos sent an email to confirm receipt of the Van Gogh Coniston Novara VGA-4H GI ST1 Well Intervention/Plug & Abandonment EP consultation materials that were sent on 13 October 2025.			
		858	20/10/2025 3:14 pm	Received	Email	N/A	Wanjina Wunggurr Aboriginal Corporation sent an email to Santos providing contact details of a new registered contact for Wanjina Wunggurr Aboriginal Corporation.	Santos updated its contact database as per Wanjina Wunggurr Aboriginal Corporation's request. Santos notes these requests and no objections or claims were raised to the proposed activities.	Refer ID 859	Not applicable.
		859	20/10/2025 3:42 pm	Sent	Email	General Factsheet	Santos sent an email to the new registered Wanjina-Wungurr Native Title Aboriginal Corporation contact details, noting that Santos has updated its contact database and enclosed the Van Gogh Coniston Novara VGA-4H GI ST1 Well Intervention/Plug & Abandonment Environment Plan consultation information and fact sheet.			
		1068	3/11/2025 10:34 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.

Stakeholder Groups	Organisation	Id	Date	Sent / Re	Record Type	Consultation mater	Consultation Summary	Assessment of merits of objection or claim about the adverse impacts of EP activity	Santos response to objection or claim	EP Reference
07 First Nations:Registered Native Title Bodies Corporate - Western Australia	**Wanparta Aboriginal Corporation**	774	13/10/2025 12:07 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1086	3/11/2025 10:34 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.
07 First Nations:Registered Native Title Bodies Corporate - Western Australia	**Wirrawandi Aboriginal Corporation**	1533	30/9/2025 2:25 pm	Sent	Email		Santos send an email to Wirrawandi Aboriginal Corporation to inform Wirrawandi that Santos will soon be consulting on two environmental plans that may be of interest to them, and would they like to meet to discuss.			
		774	13/10/2025 12:07 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		802	13/10/2025 12:08 pm	Received	Email	N/A	Wirrawandi Aboriginal Corporation sent an auto-generated email advising Santos the recipient was away on leave.			
		1534	16/10/2025 2:45 pm	Sent	Email		Santos emailed Wirrawandi Aboriginal Corporation to follow up on consultation materials sent on the Van Gogh Coniston Novara VGA-4H GI ST1 Well Intervention/Plug & Abandonment Environment Plan and to see if Wirrawandi Aboriginal Corporation would be interested in discussing the environment plan.			
		1535	21/10/2025 1:02 pm	Sent	Phone call		Santos phoned Wirrawandi Aboriginal Corporation to follow up on consultation materials sent and to see if Wirrawandi wanted to discuss the environment plan. A message was left with the Wirrawandi contact person. Wirrawandi contact person acknowledged by text the call and advised they would phone back.			

Stakeholder Groups	Organisation	Id	Date	Sent / Re	Record Type	Consultation mater	Consultation Summary	Assessment of merits of objection or claim about the adverse impacts of EP activity	Santos response to objection or claim	EP Reference
		1536	21/10/2025 4:31 pm	Received	Phone call		Santos received a call from Wirrawandi Aboriginal Corporation in response to receipt of Santos consultation material on the Van Gogh Coniston Novara VGA-4H GI ST1 Well Intervention/Plug & Abandonment Environment Plan. Wirrawandi advised it had no specific comment on the environment plan, however, Wirrawandi requested to be kept informed of Santos' ongoing activities in the area.	Santos notes these requests and no objections or claims were raised to proposed activities during this phone call	Refer ID 1532	Not applicable.
		1085	3/11/2025 10:34 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.			
		1532	5/11/2025 5:10 pm	Sent	Email		Santos emailed Wirrawandi Aboriginal Corporation to follow up on the phone call of 21 October 2025 and to confirm the action to be taken by Santos on the Van Gogh Coniston Novara VGA-4H GI ST1 Well Intervention/Plug & Abandonment Environment Plan. The email confirmed: - Wirrawandi Aboriginal Corporation had no specific comment on the environment plan but requested to be kept informed of Santos' ongoing activities in the area. - In support, Santos will ensure Wirrawandi remains on the distribution list for WA Quarterly Updates, as well as carry forward standing arrangements for notifications in the event that a spill has implications for Wirrawandi interests.	Wirrawandi Aboriginal Corporation will be notified in the event of a spill that may contact their area of interest. This will appear in the Consultation and Standing notifications Table of the Environment Plan and Section 7 of the Oil Pollution Emergency Plan. Santos considers Section 25 consultation requirements to have been met.	Santos has included Wirrawandi Aboriginal Corporation for activity notifications.	Refer to Section 7 of the OPEP and Consultation and Standing arrangement notifications Table 8.6.
07 First Nations:Registered Native Title Bodies Corporate - Western Australia	**Yawuru Native Title Holders Aboriginal Corporation**	774	13/10/2025 12:07 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1054	3/11/2025 10:34 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.

Stakeholder Groups	Organisation	Id	Date	Sent / Re	Record Type	Consultation mater	Consultation Summary	Assessment of merits of objection or claim about the adverse impacts of EP activity	Santos response to objection or claim	EP Reference
07 First Nations:Registered Native Title Bodies Corporate - Western Australia	**Yinggarda Aboriginal Corporation**	774	13/10/2025 12:07 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1055	3/11/2025 10:34 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.
08 Industry Association:Commercial fishing	**Aquaculture Council of Western Australia**	775	13/10/2025 12:10 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1093	3/11/2025 10:43 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.

Stakeholder Groups	Organisation	Id	Date	Sent / Re	Record Type	Consultation mater	Consultation Summary	Assessment of merits of objection or claim about the adverse impacts of EP activity	Santos response to objection or claim	EP Reference
08 Industry Association:Commercial fishing	**Australian Southern Bluefin Tuna Industry Association**	775	13/10/2025 12:10 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		809	13/10/2025 12:10 pm	Sent	Email	N/A	Australian Southern Bluefin Tuna Industry Association sent an auto-generated email advising Santos the recipient was away on leave from 13 October to 17 October 2025.			
		1094	3/11/2025 10:43 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.
08 Industry Association:Commercial fishing	**Commonwealth Fisheries Association**	775	13/10/2025 12:10 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1095	3/11/2025 10:43 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.

Stakeholder Groups	Organisation	Id	Date	Sent / Re	Record Type	Consultation mater	Consultation Summary	Assessment of merits of objection or claim about the adverse impacts of EP activity	Santos response to objection or claim	EP Reference
08 Industry Association:Commercial fishing	**Tuna Australia**	775	13/10/2025 12:10 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1098	3/11/2025 10:43 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.
08 Industry Association:Commercial fishing	**Western Australian Fishing Industry Council**	775	13/10/2025 12:10 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1099	3/11/2025 10:43 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Santos notes the Western Australian Fishing Industry Council (WAFIC) published guidance to oil and gas operators for the consultation of commercial fishers. In summary, this guidance supports the consultation of commercial fishers that are likely to be impacted by proposed activities, while retaining a list of fisheries likely to be impacted in the event of a spill. For this activity no commercial fishers are likely to be impacted based on historical fishing effort. Further, Santos has established standing arrangements with WAFIC in the event of unplanned incidents. For any unplanned spill event, Santos will include WAFIC as a contact within its oil spill response planning documents to ensure WAFIC is notified within 24 hours of event notification. Noting there are currently no active fisheries in the operational area and standing arrangements are already in place, Santos considers the consultation requirements under Regulation 25 to have been met.	Santos has included Western Australian Fishing Industry Council for activity notifications.	Section 4.3 - Government and Industry Guidance Consultation and Standing arrangement notifications Table 8.6. Section 3.2.7.3 - Commercial Fisheries

Stakeholder Groups	Organisation	Id	Date	Sent / Re	Record Type	Consultation mater	Consultation Summary	Assessment of merits of objection or claim about the adverse impacts of EP activity	Santos response to objection or claim	EP Reference
08 Industry Association:Commercial fishing	**Western Rock Lobster Council**	775	13/10/2025 12:10 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1100	3/11/2025 10:43 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.
08 Industry Association:Commercial shipping	**Maritime Industry Australia Ltd**	777	13/10/2025 12:12 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1166	3/11/2025 10:55 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.

Stakeholder Groups	Organisation	Id	Date	Sent / Re	Record Type	Consultation mater	Consultation Summary	Assessment of merits of objection or claim about the adverse impacts of EP activity	Santos response to objection or claim	EP Reference
08 Industry Association:Energy Industry	**Australian Energy Producers**	777	13/10/2025 12:12 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1108	3/11/2025 10:55 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.
08 Industry Association:Local government	**WA Local Government Association**	774	13/10/2025 12:07 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1089	3/11/2025 10:34 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.			
		974	3/11/2025 11:35 am	Received	Email	N/A	WA Local Government Association sent an auto-generated email advising Santos the recipient was away on leave.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.

Stakeholder Groups	Organisation	Id	Date	Sent / Re	Record Type	Consultation mater	Consultation Summary	Assessment of merits of objection or claim about the adverse impacts of EP activity	Santos response to objection or claim	EP Reference
08 Industry Association:Local industry	**Broome Chamber of Commerce and Industry**	774	13/10/2025 12:07 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1020	3/11/2025 10:34 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.
08 Industry Association:Local industry	**Carnarvon Chamber of Commerce and Industry**	774	13/10/2025 12:07 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1022	3/11/2025 10:34 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.

Stakeholder Groups	Organisation	Id	Date	Sent / Re	Record Type	Consultation mater	Consultation Summary	Assessment of merits of objection or claim about the adverse impacts of EP activity	Santos response to objection or claim	EP Reference
08 Industry Association:Local industry	**Christmas Island of Commerce and Industry**	786	13/10/2025 3:23 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1028	3/11/2025 10:34 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.
08 Industry Association:Local industry	**Exmouth Chamber of Commerce and Industry**	774	13/10/2025 12:07 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1035	3/11/2025 10:34 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.

Stakeholder Groups	Organisation	Id	Date	Sent / Re	Record Type	Consultation mater	Consultation Summary	Assessment of merits of objection or claim about the adverse impacts of EP activity	Santos response to objection or claim	EP Reference
08 Industry Association:Local industry	**Karratha & Districts Chamber of Commerce and Industry**	774	13/10/2025 12:07 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1041	3/11/2025 10:34 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.
08 Industry Association:Local industry	**Mid West Chamber of Commerce and Industry**	774	13/10/2025 12:07 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1056	3/11/2025 10:34 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.

Stakeholder Groups	Organisation	Id	Date	Sent / Re	Record Type	Consultation mater	Consultation Summary	Assessment of merits of objection or claim about the adverse impacts of EP activity	Santos response to objection or claim	EP Reference
08 Industry Association:Local industry	**Onslow Chamber of Commerce and Industry**	774	13/10/2025 12:07 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1061	3/11/2025 10:34 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.
08 Industry Association:Local industry	**Port Hedland Chamber of Commerce & Industry**	774	13/10/2025 12:07 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1065	3/11/2025 10:34 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.

Stakeholder Groups	Organisation	Id	Date	Sent / Re	Record Type	Consultation mater	Consultation Summary	Assessment of merits of objection or claim about the adverse impacts of EP activity	Santos response to objection or claim	EP Reference
08 Industry Association:Local industry	**Port Hedland Industries Council**	774	13/10/2025 12:07 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1067	3/11/2025 10:34 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.
08 Industry Association:Recreation and Community	**Ashburton Anglers Incorporated**	774	13/10/2025 12:07 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1015	3/11/2025 10:34 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.

Stakeholder Groups	Organisation	Id	Date	Sent / Re	Record Type	Consultation mater	Consultation Summary	Assessment of merits of objection or claim about the adverse impacts of EP activity	Santos response to objection or claim	EP Reference
08 Industry Association:Recreation and Community	**Broome Fishing Club Inc**	774	13/10/2025 12:07 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1021	3/11/2025 10:34 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.
08 Industry Association:Recreation and Community	**Carnarvon Fishing Club Incorporated**	774	13/10/2025 12:07 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1023	3/11/2025 10:34 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.

Stakeholder Groups	Organisation	Id	Date	Sent / Re	Record Type	Consultation mater	Consultation Summary	Assessment of merits of objection or claim about the adverse impacts of EP activity	Santos response to objection or claim	EP Reference
08 Industry Association:Recreation and Community	**Exmouth Community Liaison Group**	772	13/10/2025 12:01 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1007	3/11/2025 9:51 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.
08 Industry Association:Recreation and Community	**Exmouth Game Fishing Club Inc**	772	13/10/2025 12:01 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1008	3/11/2025 9:51 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.

Stakeholder Groups	Organisation	Id	Date	Sent / Re	Record Type	Consultation mater	Consultation Summary	Assessment of merits of objection or claim about the adverse impacts of EP activity	Santos response to objection or claim	EP Reference
08 Industry Association:Recreation and Community	**Geraldton & Districts Fishing Club Inc**	774	13/10/2025 12:07 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1038	3/11/2025 10:34 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.
08 Industry Association:Recreation and Community	**King Bay Game Fishing Club Inc**	774	13/10/2025 12:07 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1046	3/11/2025 10:34 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.

Stakeholder Groups	Organisation	Id	Date	Sent / Re	Record Type	Consultation mater	Consultation Summary	Assessment of merits of objection or claim about the adverse impacts of EP activity	Santos response to objection or claim	EP Reference
08 Industry Association:Recreation and Community	**Nickol Bay Sportfishing Club Inc**	774	13/10/2025 12:07 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1058	3/11/2025 10:34 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.
08 Industry Association:Recreation and Community	**Port Hedland Game Fishing Club Inc**	774	13/10/2025 12:07 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1066	3/11/2025 10:34 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.

Stakeholder Groups	Organisation	Id	Date	Sent / Re	Record Type	Consultation mater	Consultation Summary	Assessment of merits of objection or claim about the adverse impacts of EP activity	Santos response to objection or claim	EP Reference
08 Industry Association:Recreational fishing	**Recfishwest**	772	13/10/2025 12:01 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1011	3/11/2025 9:51 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.			
		1238	4/11/2025 2:30 pm	Received	Email	N/A	Santos received a reply email from Recfishwest in response to the reminder email on consultation of this environment plan. Recfishwest did not have any objections to the activities within the operational areas but requested to be kept informed as activities progress.	Santos notes these requests and no objections or claims were raised to proposed activities.	Refer ID 1247	Not applicable.
		1247	5/11/2025 1:11 pm	Sent	Email	N/A	Santos sent an email to Recfishwest acknowledging that Recfishwest did not have any objections about the activity. Santos also noted Recfishwest's advice that charter and recreational fishing limited to larger vessels may be present in the area. Santos confirms that it will ensure Recfishwest receives an activity update four weeks prior to the start of activities and will also provide Recfishwest the WA Quarterly Update.	Santos notes the feedback from Recfishwest that it did not have any obejctions about proposed activities and asked to be kept informed about proposed activities. Santos considers Regulation 25 consultation requirements to have been met.	In line with current standing arrangements, Santos will notify Recfishwest four weeks prior to the start of activities and upon activity completion.	Consultation and Standing arrangement notifications Table 8-6.
08 Industry Association:Recreational fishing	**Western Australian Game Fishing Association**	772	13/10/2025 12:01 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			

Stakeholder Groups	Organisation	Id	Date	Sent / Re	Record Type	Consultation mater	Consultation Summary	Assessment of merits of objection or claim about the adverse impacts of EP activity	Santos response to objection or claim	EP Reference
		1013	3/11/2025 9:51 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.
08 Industry Association:Tourism	**Marine Tourism Western Australia**	777	13/10/2025 12:12 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1647	2/12/2025 1:43 pm	Sent	Reminder Email	General Factsheet	Santos sent an email noting that there was a system error and therefore Marine Tourism Western Australia did not receive a reminder email. In response Santos has extended the consultation closing date to 8 December 2025.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.
		777	13/10/2025 12:12 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1209	3/11/2025 10:55 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.

Stakeholder Groups	Organisation	Id	Date	Sent / Re	Record Type	Consultation mater	Consultation Summary	Assessment of merits of objection or claim about the adverse impacts of EP activity	Santos response to objection or claim	EP Reference
08 Industry Association:Tourism	**Western Australian Indigenous Tourism Operators Council**	777	13/10/2025 12:12 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1217	3/11/2025 10:55 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.
09 Port Infrastructure Organisation	**Pilbara Ports Authority**	772	13/10/2025 12:01 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1010	3/11/2025 9:51 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.

Stakeholder Groups	Organisation	Id	Date	Sent / Re	Record Type	Consultation mater	Consultation Summary	Assessment of merits of objection or claim about the adverse impacts of EP activity	Santos response to objection or claim	EP Reference
10 Telecommunications Infrastructure Organisation	**Telstra**	777	13/10/2025 12:12 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1205	3/11/2025 10:55 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.			
		985	3/11/2025 10:56 am	Received	Email	N/A	Telstra sent an auto-generated email advising Santos the recipient was away on leave.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.
10 Telecommunications Infrastructure Organisation	**Vocus Group Ltd**	777	13/10/2025 12:12 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1152	3/11/2025 10:55 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.

Stakeholder Groups	Organisation	Id	Date	Sent / Re	Record Type	Consultation mater	Consultation Summary	Assessment of merits of objection or claim about the adverse impacts of EP activity	Santos response to objection or claim	EP Reference
12 Local Government Authorities:Western Australia	**City of Greater Geraldton**	774	13/10/2025 12:07 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1029	3/11/2025 10:34 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.
12 Local Government Authorities:Western Australia	**City of Karratha**	774	13/10/2025 12:07 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		972	23/10/2025 11:25 am	Received	Email	N/A	The City of Karratha acknowledged receipt of Santos' campaign email and provided feedback regarding Protected Areas and Aboriginal Heritage, recommending the inclusion of the Murujuga Cultural Landscape. The City also requested clarification on the post-decommissioning management of removed production trees, completion tubing, casing, conductors, wellheads and associated components.	Santos responded to City Karratha's queries and Santos notes no objections or claims were raised to the proposed activities.	Refer ID 1417	

Stakeholder Groups	Organisation	Id	Date	Sent / Re	Record Type	Consultation mater	Consultation Summary	Assessment of merits of objection or claim about the adverse impacts of EP activity	Santos response to objection or claim	EP Reference
		1417	10/11/2025 8:27 am	Sent	Email	N/A	Santos sent an email to City of Karratha responding to the points raised. Santos confirms that the EP addresses the Murujuga Cultural Landscape World Heritage Area, recognising its protected and Aboriginal heritage values. Consultation for the proposed activity has included relevant government agencies, Traditional Owner groups and the Murujuga Aboriginal Corporation. Santos informs City of Karratha the EP scope covers only plugging and abandonment of wells. Decommissioning of other infrastructure will be managed under a future EP with further consultation. Santos also informs City of Karratha that it manages decommissioned materials safely and responsibly, using local contractors and the Port of Dampier for previous decommissioning activities including the MEFF field. Santos also collaborates with industry, government and the Centre of Decommissioning Australia.	Santos notes the feedback from City of Karratha and that City of Karratha had no objections or claims were raised to the proposed activities. Santos considers Section 25 consultation requirements to have been met.	No response required.	World Heritage is addressed in Section 3.2.5
12 Local Government Authorities:Western Australia	**Shire of Ashburton**	774	13/10/2025 12:07 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1074	3/11/2025 10:34 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.
12 Local Government Authorities:Western Australia	**Shire of Broome**	774	13/10/2025 12:07 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		807	13/10/2025 12:08 pm	Sent	Email	N/A	Shire of Broome sent an auto-generated email to Santos indicating that Santos email will be forwarded to the relevant officer for direct response within approximately ten days.			

Stakeholder Groups	Organisation	Id	Date	Sent / Re	Record Type	Consultation mater	Consultation Summary	Assessment of merits of objection or claim about the adverse impacts of EP activity	Santos response to objection or claim	EP Reference
		1075	3/11/2025 10:34 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.			
		975	3/11/2025 11:35 am	Received	Email	N/A	Shire of Broome sent an auto-generated email to Santos indicating that Santos email will be forwarded to the relevant officer for direct response within approximately ten days.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.
12 Local Government Authorities:Western Australia	**Shire of Carnarvon**	774	13/10/2025 12:07 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1076	3/11/2025 10:34 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.
12 Local Government Authorities:Western Australia	**Shire of Christmas Island**	774	13/10/2025 12:07 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1077	3/11/2025 10:34 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.

Stakeholder Groups	Organisation	Id	Date	Sent / Re	Record Type	Consultation mater	Consultation Summary	Assessment of merits of objection or claim about the adverse impacts of EP activity	Santos response to objection or claim	EP Reference
12 Local Government Authorities:Western Australia	**Shire of Derby/West Kimberley**	774	13/10/2025 12:07 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		803	13/10/2025 12:08 pm	Received	Email	N/A	Shire of Derby/West Kimberley sent an auto-generated email to Santos indicating that the Santos email will be forwarded to the relevant Shire Officer for direct response within ten working days.			
		1078	3/11/2025 10:34 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.
12 Local Government Authorities:Western Australia	**Shire of East Pilbara**	774	13/10/2025 12:07 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1079	3/11/2025 10:34 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.

Stakeholder Groups	Organisation	Id	Date	Sent / Re	Record Type	Consultation mater	Consultation Summary	Assessment of merits of objection or claim about the adverse impacts of EP activity	Santos response to objection or claim	EP Reference
12 Local Government Authorities:Western Australia	**Shire of Exmouth**	772	13/10/2025 12:01 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1012	3/11/2025 9:51 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.
12 Local Government Authorities:Western Australia	**Shire of Northampton**	774	13/10/2025 12:07 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1080	3/11/2025 10:34 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.

Stakeholder Groups	Organisation	Id	Date	Sent / Re	Record Type	Consultation mater	Consultation Summary	Assessment of merits of objection or claim about the adverse impacts of EP activity	Santos response to objection or claim	EP Reference
12 Local Government Authorities:Western Australia	**Shire of Shark Bay**	774	13/10/2025 12:07 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1081	3/11/2025 10:34 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.
12 Local Government Authorities:Western Australia	**Shire of Wyndham-East Kimberley**	774	13/10/2025 12:07 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		805	13/10/2025 12:08 pm	Sent	Email	N/A	Shire of Wyndham-East Kimberley sent an auto-generated email advising Santos the recipient was away on leave.			
		1082	3/11/2025 10:34 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.

Stakeholder Groups	Organisation	Id	Date	Sent / Re	Record Type	Consultation mater	Consultation Summary	Assessment of merits of objection or claim about the adverse impacts of EP activity	Santos response to objection or claim	EP Reference
12 Local Government Authorities:Western Australia	**Town of Port Hedland**	774	13/10/2025 12:07 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1087	3/11/2025 10:34 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.
13 Tourism Organisation	**Abrolhos Island Charters**	777	13/10/2025 12:12 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1101	3/11/2025 10:55 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.

Stakeholder Groups	Organisation	Id	Date	Sent / Re	Record Type	Consultation mater	Consultation Summary	Assessment of merits of objection or claim about the adverse impacts of EP activity	Santos response to objection or claim	EP Reference
13 Tourism Organisation	**Absolute Ocean Charters**	777	13/10/2025 12:12 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1102	3/11/2025 10:55 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.
13 Tourism Organisation	**All the Gear No Idea Sportfishing**	777	13/10/2025 12:12 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1104	3/11/2025 10:55 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.

Stakeholder Groups	Organisation	Id	Date	Sent / Re	Record Type	Consultation mater	Consultation Summary	Assessment of merits of objection or claim about the adverse impacts of EP activity	Santos response to objection or claim	EP Reference
13 Tourism Organisation	**Apache Charters**	777	13/10/2025 12:12 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1105	3/11/2025 10:55 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.
13 Tourism Organisation	**Aqualand Charters**	777	13/10/2025 12:12 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1106	3/11/2025 10:55 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.

Stakeholder Groups	Organisation	Id	Date	Sent / Re	Record Type	Consultation mater	Consultation Summary	Assessment of merits of objection or claim about the adverse impacts of EP activity	Santos response to objection or claim	EP Reference
13 Tourism Organisation	**Archipelago Adventures**	777	13/10/2025 12:12 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1107	3/11/2025 10:55 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.
13 Tourism Organisation	**Baiyungu Dreaming**	777	13/10/2025 12:12 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1111	3/11/2025 10:55 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.

Stakeholder Groups	Organisation	Id	Date	Sent / Re	Record Type	Consultation mater	Consultation Summary	Assessment of merits of objection or claim about the adverse impacts of EP activity	Santos response to objection or claim	EP Reference
13 Tourism Organisation	**Batavia Sea Safaris**	777	13/10/2025 12:12 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1112	3/11/2025 10:55 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.
13 Tourism Organisation	**Blue Horizon Charters**	777	13/10/2025 12:12 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1113	3/11/2025 10:55 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.

Stakeholder Groups	Organisation	Id	Date	Sent / Re	Record Type	Consultation mater	Consultation Summary	Assessment of merits of objection or claim about the adverse impacts of EP activity	Santos response to objection or claim	EP Reference
13 Tourism Organisation	**Blue Juice Charters**	777	13/10/2025 12:12 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1114	3/11/2025 10:55 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.
13 Tourism Organisation	**Blue Lightning Charters**	777	13/10/2025 12:12 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1115	3/11/2025 10:55 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.

Stakeholder Groups	Organisation	Id	Date	Sent / Re	Record Type	Consultation mater	Consultation Summary	Assessment of merits of objection or claim about the adverse impacts of EP activity	Santos response to objection or claim	EP Reference
13 Tourism Organisation	**BlueSun2 Boat Charters**	777	13/10/2025 12:12 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1116	3/11/2025 10:55 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.
13 Tourism Organisation	**Brian Lee Hunters Creek Tagalong Tours**	777	13/10/2025 12:12 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1117	3/11/2025 10:55 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.

Stakeholder Groups	Organisation	Id	Date	Sent / Re	Record Type	Consultation mater	Consultation Summary	Assessment of merits of objection or claim about the adverse impacts of EP activity	Santos response to objection or claim	EP Reference
13 Tourism Organisation	**Broome Hovercraft**	777	13/10/2025 12:12 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1119	3/11/2025 10:55 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.
13 Tourism Organisation	**Broome Tours Pty Ltd**	777	13/10/2025 12:12 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1120	3/11/2025 10:55 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.

Stakeholder Groups	Organisation	Id	Date	Sent / Re	Record Type	Consultation mater	Consultation Summary	Assessment of merits of objection or claim about the adverse impacts of EP activity	Santos response to objection or claim	EP Reference
13 Tourism Organisation	**Broome Whale Watching & Eco Tours**	777	13/10/2025 12:12 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1121	3/11/2025 10:55 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.
13 Tourism Organisation	**Bunda Bunda NJ Tours**	792	14/10/2025 9:45 am	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1122	3/11/2025 10:55 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.

Stakeholder Groups	Organisation	Id	Date	Sent / Re	Record Type	Consultation mater	Consultation Summary	Assessment of merits of objection or claim about the adverse impacts of EP activity	Santos response to objection or claim	EP Reference
13 Tourism Organisation	**Bundy's Cultural Tours**	790	13/10/2025 3:42 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		977	3/11/2025 12:28 pm	Sent	Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.
13 Tourism Organisation	**Cannon Charters The Kimberley**	777	13/10/2025 12:12 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1123	3/11/2025 10:55 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.

Stakeholder Groups	Organisation	Id	Date	Sent / Re	Record Type	Consultation mater	Consultation Summary	Assessment of merits of objection or claim about the adverse impacts of EP activity	Santos response to objection or claim	EP Reference
13 Tourism Organisation	**Coral Bay Ecotours**	777	13/10/2025 12:12 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1127	3/11/2025 10:55 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.
13 Tourism Organisation	**Coral Coast Tours**	777	13/10/2025 12:12 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1129	3/11/2025 10:55 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.

Stakeholder Groups	Organisation	Id	Date	Sent / Re	Record Type	Consultation mater	Consultation Summary	Assessment of merits of objection or claim about the adverse impacts of EP activity	Santos response to objection or claim	EP Reference
13 Tourism Organisation	**Dampier Archipelago and Murujuga Sea Kayak Expedition**	777	13/10/2025 12:12 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1131	3/11/2025 10:55 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.
13 Tourism Organisation	**Dive Ningaloo**	777	13/10/2025 12:12 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1133	3/11/2025 10:55 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.

Stakeholder Groups	Organisation	Id	Date	Sent / Re	Record Type	Consultation mater	Consultation Summary	Assessment of merits of objection or claim about the adverse impacts of EP activity	Santos response to objection or claim	EP Reference
13 Tourism Organisation	**Diversity Charters**	777	13/10/2025 12:12 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1134	3/11/2025 10:55 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.
13 Tourism Organisation	**Eco Abrolhos**	777	13/10/2025 12:12 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1135	3/11/2025 10:55 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.

Stakeholder Groups	Organisation	Id	Date	Sent / Re	Record Type	Consultation mater	Consultation Summary	Assessment of merits of objection or claim about the adverse impacts of EP activity	Santos response to objection or claim	EP Reference
13 Tourism Organisation	**Eighty Mile Beach Caravan Park WA**	777	13/10/2025 12:12 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1137	3/11/2025 10:55 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.
13 Tourism Organisation	**Evolution Fishing Charters Exmouth**	777	13/10/2025 12:12 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1139	3/11/2025 10:55 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.

Stakeholder Groups	Organisation	Id	Date	Sent / Re	Record Type	Consultation mater	Consultation Summary	Assessment of merits of objection or claim about the adverse impacts of EP activity	Santos response to objection or claim	EP Reference
13 Tourism Organisation	**Exmouth Adventure Co**	777	13/10/2025 12:12 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1140	3/11/2025 10:55 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.
13 Tourism Organisation	**Exmouth Dive & Whalesharks Ningaloo**	777	13/10/2025 12:12 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		814	13/10/2025 12:14 pm	Received	Email	N/A	Exmouth Dive & Whalesharks Ningaloo sent an auto-generated email to Santos acknowledging receipt of the campaign email.			
		1141	3/11/2025 10:55 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.			
		984	3/11/2025 10:56 am	Received	Email	N/A	Exmouth Dive & Whalesharks Ningaloo sent an auto-generated email to Santos acknowledging receipt of the reminder email.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.

Stakeholder Groups	Organisation	Id	Date	Sent / Re	Record Type	Consultation mater	Consultation Summary	Assessment of merits of objection or claim about the adverse impacts of EP activity	Santos response to objection or claim	EP Reference
13 Tourism Organisation	**Exmouth Fishing Adventures**	777	13/10/2025 12:12 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1142	3/11/2025 10:55 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.
13 Tourism Organisation	**Fishabout Tours**	777	13/10/2025 12:12 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1144	3/11/2025 10:55 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.

Stakeholder Groups	Organisation	Id	Date	Sent / Re	Record Type	Consultation mater	Consultation Summary	Assessment of merits of objection or claim about the adverse impacts of EP activity	Santos response to objection or claim	EP Reference
13 Tourism Organisation	**GT Diving A**	777	13/10/2025 12:12 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1146	3/11/2025 10:55 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.
13 Tourism Organisation	**Image Dive and Charters**	777	13/10/2025 12:12 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1147	3/11/2025 10:55 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.

Stakeholder Groups	Organisation	Id	Date	Sent / Re	Record Type	Consultation mater	Consultation Summary	Assessment of merits of objection or claim about the adverse impacts of EP activity	Santos response to objection or claim	EP Reference
13 Tourism Organisation	**InnKeeper Sport Fishing Charter**	777	13/10/2025 12:12 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1148	3/11/2025 10:55 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.
13 Tourism Organisation	**Karma IV Charters**	777	13/10/2025 12:12 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1153	3/11/2025 10:55 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.

Stakeholder Groups	Organisation	Id	Date	Sent / Re	Record Type	Consultation mater	Consultation Summary	Assessment of merits of objection or claim about the adverse impacts of EP activity	Santos response to objection or claim	EP Reference
13 Tourism Organisation	**Karratha Adventure Sports**	777	13/10/2025 12:12 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1154	3/11/2025 10:55 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.
13 Tourism Organisation	**Kimberley Day Cruise**	777	13/10/2025 12:12 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1155	3/11/2025 10:55 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.

Stakeholder Groups	Organisation	Id	Date	Sent / Re	Record Type	Consultation mater	Consultation Summary	Assessment of merits of objection or claim about the adverse impacts of EP activity	Santos response to objection or claim	EP Reference
13 Tourism Organisation	**Kimberley Outback Tours**	777	13/10/2025 12:12 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1645	2/12/2025 1:43 pm	Sent	Reminder Email	General Factsheet	Santos sent an email noting that there was a system error and therefore Kimberley Outback Tours did not receive a reminder email. In response Santos has extended the consultation closing date to 8 December 2025.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.
13 Tourism Organisation	**Kimberley Pearl Charters**	793	14/10/2025 11:11 am	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1157	3/11/2025 10:55 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.

Stakeholder Groups	Organisation	Id	Date	Sent / Re	Record Type	Consultation mater	Consultation Summary	Assessment of merits of objection or claim about the adverse impacts of EP activity	Santos response to objection or claim	EP Reference
13 Tourism Organisation	**Kings Ningaloo Reef tours**	777	13/10/2025 12:12 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1158	3/11/2025 10:55 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.
13 Tourism Organisation	**Lethal Adventures**	777	13/10/2025 12:12 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1159	3/11/2025 10:55 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.

Stakeholder Groups	Organisation	Id	Date	Sent / Re	Record Type	Consultation mater	Consultation Summary	Assessment of merits of objection or claim about the adverse impacts of EP activity	Santos response to objection or claim	EP Reference
13 Tourism Organisation	**Live Ningaloo**	777	13/10/2025 12:12 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1160	3/11/2025 10:55 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.
13 Tourism Organisation	**Lombadina**	777	13/10/2025 12:12 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1161	3/11/2025 10:55 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.

Stakeholder Groups	Organisation	Id	Date	Sent / Re	Record Type	Consultation mater	Consultation Summary	Assessment of merits of objection or claim about the adverse impacts of EP activity	Santos response to objection or claim	EP Reference
13 Tourism Organisation	**Mac Attack Fishing Charters**	777	13/10/2025 12:12 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1162	3/11/2025 10:55 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.
13 Tourism Organisation	**Maccy Dave's Kayak Fishing Adventures**	777	13/10/2025 12:12 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1163	3/11/2025 10:55 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.

Stakeholder Groups	Organisation	Id	Date	Sent / Re	Record Type	Consultation mater	Consultation Summary	Assessment of merits of objection or claim about the adverse impacts of EP activity	Santos response to objection or claim	EP Reference
13 Tourism Organisation	**Mackerel Islands Pty Ltd**	777	13/10/2025 12:12 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1164	3/11/2025 10:55 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.
13 Tourism Organisation	**Mahi Mahi Fishing Charters**	777	13/10/2025 12:12 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1165	3/11/2025 10:55 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.

Stakeholder Groups	Organisation	Id	Date	Sent / Re	Record Type	Consultation mater	Consultation Summary	Assessment of merits of objection or claim about the adverse impacts of EP activity	Santos response to objection or claim	EP Reference
13 Tourism Organisation	**Montebello Island Safaris**	777	13/10/2025 12:12 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1167	3/11/2025 10:55 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.
13 Tourism Organisation	**Murujuga Rock Art & Cultural Tours Pilbara WA**	777	13/10/2025 12:12 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1648	2/12/2025 1:43 pm	Sent	Reminder Email	General Factsheet	Santos sent an email noting that there was a system error and therefore Murujuga Rock Art & Cultural Tours Pilbara WA did not receive a reminder email. In response Santos has extended the consultation closing date to 8 December 2025.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.

Stakeholder Groups	Organisation	Id	Date	Sent / Re	Record Type	Consultation mater	Consultation Summary	Assessment of merits of objection or claim about the adverse impacts of EP activity	Santos response to objection or claim	EP Reference
13 Tourism Organisation	**Ningaloo Car & Boat Hire**	777	13/10/2025 12:12 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1169	3/11/2025 10:55 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.
13 Tourism Organisation	**Ningaloo Coral Bay Boats**	777	13/10/2025 12:12 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1170	3/11/2025 10:55 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.

Stakeholder Groups	Organisation	Id	Date	Sent / Re	Record Type	Consultation mater	Consultation Summary	Assessment of merits of objection or claim about the adverse impacts of EP activity	Santos response to objection or claim	EP Reference
13 Tourism Organisation	**Ningaloo Marine Interaction**	777	13/10/2025 12:12 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1171	3/11/2025 10:55 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.
13 Tourism Organisation	**Ningaloo Reef Dive**	777	13/10/2025 12:12 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1172	3/11/2025 10:55 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.

Stakeholder Groups	Organisation	Id	Date	Sent / Re	Record Type	Consultation mater	Consultation Summary	Assessment of merits of objection or claim about the adverse impacts of EP activity	Santos response to objection or claim	EP Reference
13 Tourism Organisation	**Ningaloo Safari Tours**	777	13/10/2025 12:12 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1174	3/11/2025 10:55 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.
13 Tourism Organisation	**Ningaloo Sportfishing Charters**	777	13/10/2025 12:12 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1175	3/11/2025 10:55 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.

Stakeholder Groups	Organisation	Id	Date	Sent / Re	Record Type	Consultation mater	Consultation Summary	Assessment of merits of objection or claim about the adverse impacts of EP activity	Santos response to objection or claim	EP Reference
13 Tourism Organisation	**Ningaloo Whale Shark N Dive**	777	13/10/2025 12:12 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1176	3/11/2025 10:55 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.
13 Tourism Organisation	**Ocean Dream Charters**	777	13/10/2025 12:12 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1177	3/11/2025 10:55 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.

Stakeholder Groups	Organisation	Id	Date	Sent / Re	Record Type	Consultation mater	Consultation Summary	Assessment of merits of objection or claim about the adverse impacts of EP activity	Santos response to objection or claim	EP Reference
13 Tourism Organisation	**Odyssey Expeditions**	777	13/10/2025 12:12 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1179	3/11/2025 10:55 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.
13 Tourism Organisation	**Offshore Charters WA**	777	13/10/2025 12:12 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1180	3/11/2025 10:55 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.

Stakeholder Groups	Organisation	Id	Date	Sent / Re	Record Type	Consultation mater	Consultation Summary	Assessment of merits of objection or claim about the adverse impacts of EP activity	Santos response to objection or claim	EP Reference
13 Tourism Organisation	**On Point Spearfishing**	777	13/10/2025 12:12 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1181	3/11/2025 10:55 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.
13 Tourism Organisation	**On Strike Charters**	777	13/10/2025 12:12 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1182	3/11/2025 10:55 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.

Stakeholder Groups	Organisation	Id	Date	Sent / Re	Record Type	Consultation mater	Consultation Summary	Assessment of merits of objection or claim about the adverse impacts of EP activity	Santos response to objection or claim	EP Reference
13 Tourism Organisation	**Onslow Beach Resort**	777	13/10/2025 12:12 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1183	3/11/2025 10:55 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.
13 Tourism Organisation	**Peak Sportfishing Charters**	777	13/10/2025 12:12 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1184	3/11/2025 10:55 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.

Stakeholder Groups	Organisation	Id	Date	Sent / Re	Record Type	Consultation mater	Consultation Summary	Assessment of merits of objection or claim about the adverse impacts of EP activity	Santos response to objection or claim	EP Reference
13 Tourism Organisation	**Pelican Charters**	777	13/10/2025 12:12 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1185	3/11/2025 10:55 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.
13 Tourism Organisation	**Perfect Nature Cruises**	777	13/10/2025 12:12 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1186	3/11/2025 10:55 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.

Stakeholder Groups	Organisation	Id	Date	Sent / Re	Record Type	Consultation mater	Consultation Summary	Assessment of merits of objection or claim about the adverse impacts of EP activity	Santos response to objection or claim	EP Reference
13 Tourism Organisation	**Pilbara Dive and Tours**	777	13/10/2025 12:12 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1188	3/11/2025 10:55 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.
13 Tourism Organisation	**Pilbara Tours**	777	13/10/2025 12:12 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1189	3/11/2025 10:55 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.

Stakeholder Groups	Organisation	Id	Date	Sent / Re	Record Type	Consultation mater	Consultation Summary	Assessment of merits of objection or claim about the adverse impacts of EP activity	Santos response to objection or claim	EP Reference
13 Tourism Organisation	**Reef Seeker Charters**	777	13/10/2025 12:12 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1191	3/11/2025 10:55 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.
13 Tourism Organisation	**Reel Teaser Fishing Adventures**	777	13/10/2025 12:12 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1192	3/11/2025 10:55 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.

Stakeholder Groups	Organisation	Id	Date	Sent / Re	Record Type	Consultation mater	Consultation Summary	Assessment of merits of objection or claim about the adverse impacts of EP activity	Santos response to objection or claim	EP Reference
13 Tourism Organisation	**Sail Ningaloo**	777	13/10/2025 12:12 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1194	3/11/2025 10:55 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.
13 Tourism Organisation	**Sal Salis**	777	13/10/2025 12:12 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		811	13/10/2025 12:13 pm	Received	Email	N/A	Sal Salis Ningaloo Reef sent an auto-generated email to Santos acknowledging receipt of the campaign email.			
		1195	3/11/2025 10:55 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.			
		991	3/11/2025 10:58 am	Received	Email	N/A	Sal Salis Ningaloo Reef sent an auto-generated email to Santos acknowledging receipt of the campaign email.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.

Stakeholder Groups	Organisation	Id	Date	Sent / Re	Record Type	Consultation mater	Consultation Summary	Assessment of merits of objection or claim about the adverse impacts of EP activity	Santos response to objection or claim	EP Reference
13 Tourism Organisation	**Seaforce Fishing Charters**	777	13/10/2025 12:12 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1197	3/11/2025 10:55 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.
13 Tourism Organisation	**Seastar Boat Charters**	777	13/10/2025 12:12 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1198	3/11/2025 10:55 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.

Stakeholder Groups	Organisation	Id	Date	Sent / Re	Record Type	Consultation mater	Consultation Summary	Assessment of merits of objection or claim about the adverse impacts of EP activity	Santos response to objection or claim	EP Reference
13 Tourism Organisation	**Shark Bay Charters**	777	13/10/2025 12:12 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1199	3/11/2025 10:55 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.
13 Tourism Organisation	**Shark Bay Coastal Tours**	777	13/10/2025 12:12 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1200	3/11/2025 10:55 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.

Stakeholder Groups	Organisation	Id	Date	Sent / Re	Record Type	Consultation mater	Consultation Summary	Assessment of merits of objection or claim about the adverse impacts of EP activity	Santos response to objection or claim	EP Reference
13 Tourism Organisation	**Shark Bay Eco Tours**	777	13/10/2025 12:12 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1202	3/11/2025 10:55 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.
13 Tourism Organisation	**Silverado Charters**	777	13/10/2025 12:12 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1203	3/11/2025 10:55 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.

Stakeholder Groups	Organisation	Id	Date	Sent / Re	Record Type	Consultation mater	Consultation Summary	Assessment of merits of objection or claim about the adverse impacts of EP activity	Santos response to objection or claim	EP Reference
13 Tourism Organisation	**Southern Cross Cultural Tours at Lullumb**	777	13/10/2025 12:12 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1204	3/11/2025 10:55 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.
13 Tourism Organisation	**The Great Escape**	777	13/10/2025 12:12 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1206	3/11/2025 10:55 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.

Stakeholder Groups	Organisation	Id	Date	Sent / Re	Record Type	Consultation mater	Consultation Summary	Assessment of merits of objection or claim about the adverse impacts of EP activity	Santos response to objection or claim	EP Reference
13 Tourism Organisation	**Top Gun Charters**	777	13/10/2025 12:12 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1208	3/11/2025 10:55 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.
13 Tourism Organisation	**True North Fishing Charters**	777	13/10/2025 12:12 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1210	3/11/2025 10:55 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.

Stakeholder Groups	Organisation	Id	Date	Sent / Re	Record Type	Consultation mater	Consultation Summary	Assessment of merits of objection or claim about the adverse impacts of EP activity	Santos response to objection or claim	EP Reference
13 Tourism Organisation	**Unreel Adventure Safaris**	777	13/10/2025 12:12 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1212	3/11/2025 10:55 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.
13 Tourism Organisation	**View Ningaloo**	777	13/10/2025 12:12 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1213	3/11/2025 10:55 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.

Stakeholder Groups	Organisation	Id	Date	Sent / Re	Record Type	Consultation mater	Consultation Summary	Assessment of merits of objection or claim about the adverse impacts of EP activity	Santos response to objection or claim	EP Reference
13 Tourism Organisation	**West Kimberley Fishing Tours**	777	13/10/2025 12:12 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1216	3/11/2025 10:55 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.
13 Tourism Organisation	**Willie Pearl Lugger Cruises**	777	13/10/2025 12:12 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1221	3/11/2025 10:55 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.

Stakeholder Groups	Organisation	Id	Date	Sent / Re	Record Type	Consultation mater	Consultation Summary	Assessment of merits of objection or claim about the adverse impacts of EP activity	Santos response to objection or claim	EP Reference
13 Tourism Organisation	**Wula Gura Nyinda Eco Cultural Adventures**	777	13/10/2025 12:12 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1224	3/11/2025 10:55 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.
14 Union Organisation	**Maritime Union of Australia**	774	13/10/2025 12:07 pm	Sent	Campaign Email	General Factsheet	Santos sent an email regarding consultation on the proposed activities to be managed under this EP, advising that consultation would close on 10 November 2025. The email included an activity summary with a link to a general fact sheet published on the Santos' Consultation Hub website, Santos' consultation obligations under relevant Commonwealth Environmental Regulations, directions on how to provide input into EP development and a link to NOPSEMA environmental approval process. The linked Santos fact sheet included an overview of the proposed activities; the presence of environmental, social, economic and cultural features and/or values within the Environment That May Be Affected (EMBA) based on a review of publicly available information; and potential impacts, risks and associated management measures.			
		1051	3/11/2025 10:34 am	Sent	Reminder Email	General Factsheet	Santos sent an email by way of reminder that the consultation period was closing on 12 November 2025, noting that the consultation closing date had been extended to allow for a 30-day consultation period.	Notwithstanding the consultation information provided and the consultation effort described, no objections, no comments or input were received on this EP. Santos considers it has provided sufficient information and allowed a reasonable period of time for consultation. Santos considers Regulation 25 consultation requirements to have been met.	No response required.	Not applicable.

Appendix G Santos Environment Consequence Descriptors

Environmental Consequence Descriptions

	Consequence Level	I	II	III	IV	V	VI
	Acceptability	**Acceptable**	**Acceptable**	**Unacceptable**	**Unacceptable**	**Unacceptable**	**Unacceptable**
	Severity Description	**Negligible** ***No impact or negligible impact.***	**Minor** ***Detectable but insignificant change to local population, industry or ecosystem factors. Localised effect***	**Moderate** ***Significant impact to local population, industry or ecosystem factors.***	**Major** ***Major long-term effect on local population, industry or ecosystem factors.***	**Severe** ***Complete loss of local population, industry or ecosystem factors AND/ OR extensive regional impacts with slow recovery.***	**Critical** ***Irreversible impact to regional population, industry or ecosystem factors.***
Environmental Receptors	**Fauna** In particular, EPBC Act listed threatened/migratory fauna or WA Biodiversity Conservation Act 2016 specially protected fauna	Short term behavioural impacts only to small proportion of local population and not during critical lifecycle activity; No decrease in local population size; No reduction in area of occupancy of species; No loss/disruption of habitat critical to survival of a species; No disruption to the breeding cycle of any individual; No introduction of disease likely to cause a detectable population decline.	Detectable but insignificant decrease in local population size; Insignificant reduction in area of occupancy of species; Insignificant loss/disruption of habitat critical to survival of a species; Insignificant disruption to the breeding cycle of local population.	Significant decrease in local population size but no threat to overall population viability; Significant behavioural disruption to local population; Significant disruption to the breeding cycle of a local population; Significant reduction in area of occupancy of species; Significant loss of habitat critical to survival of a species; Modify, destroy, remove, isolate or decrease availability of quality of habitat to the extent that a significant decline in local population is likely; Introduce disease likely to cause a significant population decline.	Long term decrease in local population size and threat to local population viability; Major disruption to the breeding cycle of local population; Major reduction in area of occupancy of species; Fragmentation of existing population; Major loss of habitat critical to survival of a species; Modify, destroy, remove, isolate or decrease availability of quality of habitat to the extent that a long term decline in local population is likely; Introduce disease likely to cause a long term population decline.	Complete loss of local population; Complete loss of habitat critical to survival of local population; Wide spread (regional) decline in population size or habitat critical to regional population.	Complete loss of regional population; Complete loss of habitat critical to survival of regional population.
	Physical Environment / Habitat Includes: air quality; water quality; benthic habitat (biotic/abiotic), particularly habitats that are rare or unique; habitat that represents a Key Ecological Feature[3]; habitat within a protected area; habitats that include benthic primary producers[4] and/ or epi-fauna[5]	No or negligible reduction in physical environment / habitat area/function.	Detectable but localised and insignificant loss of area/function of physical environment / habitat. Rapid recovery evident within ~ 2 year (two season recovery)	Significant loss of area and/or function of local physical environment / habitat. Recovery over medium term (2–10 years)	Major, large-scale loss of area and/or function of physical environment / local habitat. Slow recovery over decades.	Extensive destruction of local physical environment / habitat with no recovery; Long term (decades) and wide spread loss of area or function of primary producers on a regional scale.	Complete destruction of regional physical environment / habitat with no recovery. Complete loss of area or function of primary producers on a regional scale.
	Threatened ecological communities (EPBC Act listed ecological communities)	No decline in threatened ecological community population size, diversity or function; No reduction in area of threatened ecological community; No introduction of disease likely to cause decline in threatened ecological community population size, diversity or function.	Detectable but insignificant decline in threatened ecological community population size, diversity or function; Insignificant reduction in area of threatened ecological community.	Significant decline in threatened ecological community population size, diversity or function; Significant reduction in area of threatened ecological community; Introduction of disease likely to cause significant decline in threatened ecological community population size, diversity or function.	Major, long term decline in threatened ecological community population size, diversity or function; Major reduction in area of threatened ecological community; Fragmentation of threatened ecological community; Introduce disease likely to cause long term decline in threatened ecological community population size, diversity or function.	Extensive, long term decline in threatened ecological community population size, diversity or function; Complete loss of threatened ecological community.	Complete loss of threatened ecological community with no recovery.

Consequence Level	I	II	III	IV	V	VI
Acceptability	Acceptable	Acceptable	Unacceptable	Unacceptable	Unacceptable	Unacceptable
Severity Description	**Negligible** ***No impact or negligible impact.***	**Minor** ***Detectable but insignificant change to local population, industry or ecosystem factors. Localised effect***	**Moderate** ***Significant impact to local population, industry or ecosystem factors.***	**Major** ***Major long-term effect on local population, industry or ecosystem factors.***	**Severe** ***Complete loss of local population, industry or ecosystem factors AND/ OR extensive regional impacts with slow recovery.***	**Critical** ***Irreversible impact to regional population, industry or ecosystem factors.***
Protected Areas Includes: World Heritage Properties; Ramsar wetlands; Commonwealth/ National Heritage Areas; Land/ Marine Conservation Reserves.	No or negligible impact on protected area values; No decline in species population within protected area; No or negligible alteration, modification, obscuring or diminishing of protected area values.*	Detectable but insignificant impact on one of more of protected area's values. Detectable but insignificant decline in species population within protected area. Detectable but insignificant alteration, modification, obscuring or diminishing of protected area values*	Significant impact on one of more of protected area's values; Significant decrease in population within protected area; Significant alteration, modification, obscuring or diminishing of protected area values.	Major long term effect on one of more of protected area's values Long term decrease in species population contained within protected area and threat to that population's viability Major alteration, modification, obscuring or diminishing of protected area values	Extensive loss of one or more of protected area's values; Extensive loss of species population contained within protected area.	Complete loss of one or more of protected area's values with no recovery; Complete loss of species population contained within protected area with no recovery.
Socio-economic receptors Includes: fisheries (commercial and recreational); tourism; oil and gas; defence; commercial shipping.	No or negligible loss of value of the local industry; No or negligible reduction in key natural features or populations supporting the activity.	Detectable but insignificant short-term loss of value of the local industry. Detectable but insignificant reduction in key natural features or population supporting the local activity.	Significant loss of value of the local industry; Significant medium term reduction of key natural features or populations supporting the local activity.	Major long-term loss of value of the local industry and threat to viability. Major reduction of key natural features or populations supporting the local activity.	Shutdown of local industry or widespread major damage to regional industry; Extensive loss of key natural features or populations supporting the local industry.	Permanent shutdown of local or regional industry; Permanent loss of key natural features or populations supporting the local or regional industry.

Appendix H Spill Modelling Results

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Appendix H1: Summary of oil spill modelling results

Surface release of 8,073 m³ of Van Gogh crude over 77 days from LOWC (RPS, 2025)

Receptor	Receptor Type	Minimum Time to Contact: days (d), hours (hrs)										Maximum Hydrocarbon Concentrations		
		Low Exposure Values				Moderate Exposure Values			High Exposure Values					
		Floating oil (1 g/m²)	Shoreline accumulation (10 g/m²)	Entrained hydrocarbons (1,000 ppb)	Dissolved hydrocarbons (10 ppb)	Floating oil (10 g/m²)	Shoreline accumulation (100 g/m²)	Dissolved hydrocarbons (50 ppb)	Floating oil (50 g/m²)	Shoreline accumulation (1,000 g/m²)	Dissolved hydrocarbons (400 ppb)	Shoreline accumulation (g/m²)	Dissolved hydrocarbons (ppb)	Entrained hydrocarbons (ppb)
Ningaloo – Outer NW	Submerged	4 hrs	NA	4 hrs	4 hrs	4 hrs	NA	5 hrs	6 hrs	NA	NC	NA	12 hrs	4,709
Gascoyne AMP	Submerged	NA	NA	NA	2 d, 23 hrs	NA	NA	NC	NA	NA	NC	NA	1 d, 11 hrs	NA
Ningaloo – Outer Coast North	Submerged	NA	NA	NA	2 d, 8 hrs	NA	NA	NC	NA	NA	NC	NA	1 d, 2 hrs	NA
Ningaloo Coast North	Submerged	NA	NA	NA	5 d, 22 hrs	NA	NA	NC	NA	NA	NC	NA	7 d, 8 hrs	NA
State Waters – WA	NA	NA	NA	NA	5 d, 22 hrs	NA	NA	NC	NA	NA	NC	NA	12 hrs	NA

NC = No contact.

NA = Not applicable, receptor Is submerged or intertidal.

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	Receptor Type	Minimum Time to Contact: days (d), hours (hrs)										Maximum Hydrocarbon Concentrations		
		Low Exposure Values			Moderate Exposure values			High Exposure Values						
		Floating oil (1 g/m²)	Shoreline accumulation (10 g/m²)	Entrained hydrocarbons (1,000 ppb)	Dissolved hydrocarbons (10 ppb)	Floating oil (10 g/m²)	Shoreline accumulation (100 g/m²)	Dissolved hydrocarbons (50 ppb)	Floating oil (50 g/m²)	Shoreline accumulation (1,000 g/m²)	Dissolved hydrocarbons (400 ppb)	Shoreline accumulation (g/m²)	Dissolved hydrocarbons (ppb)	Entrained hydrocarbons (ppb)
Abrolhos Islands Easter Group	Emergent	NC	60 d, 15 hrs	NC	NC	NC	NC	NC	NC	NC	NC	22	NC	NC
Abrolhos Islands Pelsaert Group	Emergent	NC	67 d, 9 hrs	NC	NC	NC	NC	NC	NC	NC	NC	20	NC	NC
Abrolhos Islands Wallabi Group	Emergent	NC	61 d, 6 hrs	NC	NC	NC	NC	NC	NC	NC	NC	24	NC	NC
Barrow-Montebello Surrounds	Intertidal	34 d, 21 hrs	NA	NC	NC	NC	NA	NC	NC	NA	NC	NA	NC	NC
Barrow Island	Emergent	35 d, 0 hrs	11 d, 16 hrs	NC	NC	NC	29 d, 4 hrs	NC	NC	35 d, 8 hrs	NC	3,001	NC	NC
Bedout Island	Emergent	NC	47 d, 21 hrs	NC	NC	NC	NC	NC	NC	NC	NC	78	NC	NC
Brewis Reef	Submerged	50 d, 14 hrs	NA	NC	NC	NC	NA	NC	NC	NA	NC	NA	NC	NC
Broome – Roebuck	Emergent	NC	67 d, 18 hrs	NC	NC	NC	76 d, 0 hrs	NC	NC	NC	NC	223	NC	NC
Broome North Coast	Emergent	NC	68 d, 12 hrs	NC	NC	NC	90 d, 3 hrs	NC	NC	NC	NC	158	NC	NC

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	Receptor Type	Minimum Time to Contact: days (d), hours (hrs)										Maximum Hydrocarbon Concentrations		
		Low Exposure Values			Moderate Exposure values			High Exposure Values						
		Floating oil (1 g/m²)	Shoreline accumulation (10 g/m²)	Entrained hydrocarbons (1,000 ppb)	Dissolved hydrocarbons (10 ppb)	Floating oil (10 g/m²)	Shoreline accumulation (100 g/m²)	Dissolved hydrocarbons (50 ppb)	Floating oil (50 g/m²)	Shoreline accumulation (1,000 g/m²)	Dissolved hydrocarbons (400 ppb)	Shoreline accumulation (g/m²)	Dissolved hydrocarbons (ppb)	Entrained hydrocarbons (ppb)
Browse Island	Emergent	NC	88 d, 19 hrs	NC	NC	NC	NC	NC	NC	NC	NC	16	NC	NC
Camden Sound	Emergent	NC	84 d, 5 hrs	NC	NC	NC	NC	NC	NC	NC	NC	19	NC	NC
Carnarvon – Inner Shark Bay	Emergent	66 d, 15 hrs	40 d, 0 hrs	NC	NC	NC	69 d, 21 hrs	NC	NC	NC	NC	537	NC	NC
Carnarvon Canyon AMP	Submerged	46 d, 0 hrs	NA	NC	NC	NC	NA	NC	NC	NA	NC	NA	NC	NC
Christmas Island	Emergent	NC	65 d, 14 hrs	NC	NC	NC	86 d, 20 hrs	NC	NC	NC	NC	119	NC	NC
Clerke Reef Marine Park	Emergent	NC	51 d, 7 hrs	NC	NC	NC	77 d, 11 hrs	NC	NC	NC	NC	141	NC	NC
Cod Bank	Submerged	74 d, 23 hrs	NA	NC	NC	NC	NA	NC	NC	NA	NC	NA	NC	NC
Dampier Archipelago	Emergent	61 d, 9 hrs	29 d, 15 hrs	NC	NC	NC	43 d, 13 hrs	NC	NC	66 d, 11 hrs	NC	1,765	NC	NC
Eighty Mile Beach	Emergent	NC	60 d, 18 hrs	NC	NC	NC	74 d, 15 hrs	NC	NC	NC	NC	234	NC	NC
Exmouth Gulf Coast	Emergent	33 d, 3 hrs	31 d, 0 hrs	NC	NC	NC	38 d, 2 hrs	NC	NC	83 d, 19 hrs	NC	1,040	NC	NC

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	Receptor Type	Minimum Time to Contact: days (d), hours (hrs)										Maximum Hydrocarbon Concentrations		
		Low Exposure Values			Moderate Exposure values			High Exposure Values						
		Floating oil (1 g/m²)	Shoreline accumulation (10 g/m²)	Entrained hydrocarbons (1,000 ppb)	Dissolved hydrocarbons (10 ppb)	Floating oil (10 g/m²)	Shoreline accumulation (100 g/m²)	Dissolved hydrocarbons (50 ppb)	Floating oil (50 g/m²)	Shoreline accumulation (1,000 g/m²)	Dissolved hydrocarbons (400 ppb)	Shoreline accumulation (g/m²)	Dissolved hydrocarbons (ppb)	Entrained hydrocarbons (ppb)
Exmouth Reef	Submerged	81 d, 2 hrs	NA	NC	NC	NC	NA	NC	NC	NA	NC	NA	NC	NC
Gascoyne AMP	Submerged	25 d, 11 hrs	NA	NC	NC	55 d, 8 hrs	NA	NC	NC	NA	NC	NA	NC	NC
Glomar Shoals	Submerged	52 d, 11 hrs	NA	NC	NC	NC	NA	NC	NC	NA	NC	NA	NC	NC
Imperieuse Reef Marine Park	Emergent	NC	43 d, 5 hrs	NC	NC	NC	56 d, 22 hrs	NC	NC	NC	NC	554	NC	NC
Indonesia East and Timor Leste	Emergent	NC	84 d, 14 hrs	NC	NC	NC	NC	NC	NC	NC	NC	25	NC	NC
Indonesia – West	Emergent	NC	87 d, 14 hrs	NC	NC	NC	NC	NC	NC	NC	NC	44	NC	NC
Kalbarri-Geraldton	Emergent	NC	89 d, 10 hrs	NC	NC	NC	NC	NC	NC	NC	NC	20	NC	NC
Karratha-Port Hedland	Emergent	NC	52 d, 13 hrs	NC	NC	NC	NC	NC	NC	NC	NC	26	NC	NC
Kimberley Coast Population Management Zone	Emergent	NC	78 d, 8 hrs	NC	NC	NC	NC	NC	NC	NC	NC	25	NC	NC

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	Receptor Type	Minimum Time to Contact: days (d), hours (hrs)										Maximum Hydrocarbon Concentrations		
		Low Exposure Values			Moderate Exposure values			High Exposure Values						
		Floating oil (1 g/m²)	Shoreline accumulation (10 g/m²)	Entrained hydrocarbons (1,000 ppb)	Dissolved hydrocarbons (10 ppb)	Floating oil (10 g/m²)	Shoreline accumulation (100 g/m²)	Dissolved hydrocarbons (50 ppb)	Floating oil (50 g/m²)	Shoreline accumulation (1,000 g/m²)	Dissolved hydrocarbons (400 ppb)	Shoreline accumulation (g/m²)	Dissolved hydrocarbons (ppb)	Entrained hydrocarbons (ppb)
King Sound	Emergent	NC	80 d, 8 hrs	NC	NC	NC	NC	NC	NC	NC	NC	42	NC	NC
Lowendal Islands	Emergent	37 d, 0 hrs	29 d, 14 hrs	NC	NC	NC	31 d, 5 hrs	NC	NC	NC	NC	911	NC	NC
Middle Islands Coast	Emergent	60 d, 15 hrs	32 d, 18 hrs	NC	NC	NC	47 d, 0 hrs	NC	NC	NC	NC	510	NC	NC
Montebello AMP	Submerged	34 d, 3 hrs	NA	NC	NC	NC	NA	NC	NC	NA	NC	NA	NC	NC
Montebello Islands	Emergent	37 d, 9 hrs	20 d, 2 hrs	NC	NC	NC	30 d, 18 hrs	NC	NC	48 d, 20 hrs	NC	2,118	NC	NC
Muiron Islands	Emergent	33 d, 8 hrs	16 d, 1 hrs	NC	NC	NC	31 d, 3 hrs	NC	NC	57 d, 16 hrs	NC	2,238	NC	NC
Ningaloo – Offshore	Submerged	13 d, 18 hrs	NA	34 d, 14 hrs	NC	24 d, 6 hrs	NA	NC	58 d, 10 hrs	NA	NC	NA	NC	3,457
Ningaloo – Outer Coast North	Submerged	23 d, 0 hrs	NA	NC	NC	45 d, 6 hrs	NA	NC	NC	NA	NC	NA	NC	NC
Ningaloo – Outer NW	Submerged	20 d, 23 hrs	NA	NC	NC	38 d, 22 hrs	NA	NC	NC	NA	NC	NA	NC	NC
Ningaloo Coast North	Emergent	24 d, 20 hrs	9 d, 4 hrs	NC	NC	42 d, 2 hrs	23 d, 13 hrs	NC	NC	36 d, 6 hrs	NC	4,757	NC	NC

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	Receptor Type	Minimum Time to Contact: days (d), hours (hrs)										Maximum Hydrocarbon Concentrations		
		Low Exposure Values			Moderate Exposure values			High Exposure Values						
		Floating oil (1 g/m²)	Shoreline accumulation (10 g/m²)	Entrained hydrocarbons (1,000 ppb)	Dissolved hydrocarbons (10 ppb)	Floating oil (10 g/m²)	Shoreline accumulation (100 g/m²)	Dissolved hydrocarbons (50 ppb)	Floating oil (50 g/m²)	Shoreline accumulation (1,000 g/m²)	Dissolved hydrocarbons (400 ppb)	Shoreline accumulation (g/m²)	Dissolved hydrocarbons (ppb)	Entrained hydrocarbons (ppb)
Ningaloo Coast South	Emergent	73 d, 19 hrs	36 d, 1 hrs	NC	NC	NC	70 d, 2 hrs	NC	NC	NC	NC	232	NC	NC
Northern Islands Coast	Emergent	52 d, 16 hrs	26 d, 1 hrs	NC	NC	NC	31 d, 17 hrs	NC	NC	NC	NC	903	NC	NC
Outer Argo-Rowley Terrace AMP	Submerged	73 d, 3 hrs	NA	NC	NC	NC	NA	NC	NC	NA	NC	NA	NC	NC
Penguin Bank	Submerged	52 d, 16 hrs	NA	NC	NC	NC	NA	NC	NC	NA	NC	NA	NC	NC
Poivre Reef	Intertidal	46 d, 18 hrs	NA	NC	NC	NC	NA	NC	NC	NA	NC	NA	NC	NC
Port Hedland-Eighty Mile Beach	Emergent	NC	45 d, 19 hrs	NC	NC	NC	67 d, 2 hrs	NC	NC	NC	NC	141	NC	NC
Rankin Bank	Submerged	46 d, 5 hrs	NA	NC	NC	NC	NA	NC	NC	NA	NC	NA	NC	NC
Ripple Shoals	Submerged	52 d, 9 hrs	NA	NC	NC	NC	NA	NC	NC	NA	NC	NA	NC	NC
Roebuck-Eighty Mile Beach	Emergent	NC	64 d, 12 hrs	NC	NC	NC	74 d, 0 hrs	NC	NC	NC	NC	333	NC	NC
Rosily Shoals	Submerged	56 d, 13 hrs	NA	NC	NC	NC	NA	NC	NC	NA	NC	NA	NC	NC

Santos

	Receptor Type	Minimum Time to Contact: days (d), hours (hrs)										Maximum Hydrocarbon Concentrations		
		Low Exposure Values			Moderate Exposure values			High Exposure Values						
		Floating oil (1 g/m²)	Shoreline accumulation (10 g/m²)	Entrained hydrocarbons (1,000 ppb)	Dissolved hydrocarbons (10 ppb)	Floating oil (10 g/m²)	Shoreline accumulation (100 g/m²)	Dissolved hydrocarbons (50 ppb)	Floating oil (50 g/m²)	Shoreline accumulation (1,000 g/m²)	Dissolved hydrocarbons (400 ppb)	Shoreline accumulation (g/m²)	Dissolved hydrocarbons (ppb)	Entrained hydrocarbons (ppb)
Rowley Shoals surrounds	Submerged	88 d, 0 hrs	NA	NC	NC	NC	NA	NC	NC	NA	NC	NA	NC	NC
Scott Reef South	Emergent	NC	66 d, 5 hrs	NC	NC	NC	83 d, 17 hrs	NC	NC	NC	NC	167	NC	NC
Shark Bay – Coast Outer	Emergent	72 d, 14 hrs	35 d, 19 hrs	NC	NC	NC	65 d, 14 hrs	NC	NC	87 d, 16 hrs	NC	1,081	NC	NC
Shark Bay AMP	Submerged	64 d, 4 hrs	NA	NC	NC	NC	NA	NC	NC	NA	NC	NA	NC	NC
Southern Islands Coast	Emergent	46 d, 9 hrs	11 d, 13 hrs	NC	NC	NC	32 d, 1 hrs	NC	NC	50 d, 21 hrs	NC	2,882	NC	NC
Sultan Reef	Submerged	56 d, 5 hrs	NA	NC	NC	NC	NA	NC	NC	NA	NC	NA	NC	NC
Thevenard Island	Emergent	37 d, 0 hrs	10 d, 6 hrs	NC	NC	NC	37 d, 7 hrs	NC	NC	77 d, 0 hrs	NC	1,068	NC	NC
Trap Reef	Submerged	57 d, 4 hrs	NA	NC	NC	NC	NA	NC	NC	NA	NC	NA	NC	NC
Western Abrolhos AMP	Submerged	66 d, 5 hrs	NA	NC	NC	NC	NA	NC	NC	NA	NC	NA	NC	NC
Western Shark Bay AMP	Submerged	61 d, 11 hrs	NA	NC	NC	NC	NA	NC	NC	NA	NC	NA	NC	NC

	Receptor Type	Minimum Time to Contact: days (d), hours (hrs)										Maximum Hydrocarbon Concentrations		
		Low Exposure Values			Moderate Exposure values			High Exposure Values						
		Floating oil (1 g/m²)	Shoreline accumulation (10 g/m²)	Entrained hydrocarbons (1,000 ppb)	Dissolved hydrocarbons (10 ppb)	Floating oil (10 g/m²)	Shoreline accumulation (100 g/m²)	Dissolved hydrocarbons (50 ppb)	Floating oil (50 g/m²)	Shoreline accumulation (1,000 g/m²)	Dissolved hydrocarbons (400 ppb)	Shoreline accumulation (g/m²)	Dissolved hydrocarbons (ppb)	Entrained hydrocarbons (ppb)
WA State Waters*	Submerged	24 d, 20 hrs	NA	NC	NC	42 d, 2 hrs	NA	NC	NC	NA	NC	NA	NC	NC
Zuytdorp Cliffs – Kalbarri	Emergent	NC	67 d, 16 hrs	NC	NC	NC	NC	NC	NC	NC	NC	43	NC	NC

NC = No contact.

NA = Not applicable, receptor Is submerged or intertidal.

Appendix H2: Hotspot Consequence Summary

Receptor (Hotspot) Name	HEV Ranking	Values	Oil spill Modelling Parameter NC = No Contact		MDO	LOWC	Consequence Category	Consequence Ranking	Final
Barrow Island (Emergent)	3	Physical habitats Bandicoot Bay – conservation area Fisheries Act (benthic fauna/seabird protection), mudflats, rock platforms, mangroves, clay pans Mangroves in Bandicoot Bay (considered globally unique) Coral reefs (eastern side) – Biggada Reef (coral spawning: Mar and Oct) Biggada Creek Marine fauna *Turtles* Regionally and nationally significant green turtle (western side) and flatback turtle (eastern side) nesting beaches Turtle Bay north beach North and west coasts – John Wayne Beach also loggerhead and hawksbill turtles Peak turtle nesting periods – Loggerhead turtle nesting: Dec to Jan; green turtle nesting: Nov to Apr, peak period from Jan to Feb; flatback turtle nesting: Dec to Jan; hawksbill turtle nesting: Oct to Jan *Seabirds* Migratory birds (important habitat) (important bird area) 10th of top 147 bird sites Highest population of migratory birds in Barrow Island Nature Reserve (south-southeast island) Double Island important bird nesting (shearwaters, sea eagles) *Whales* Pygmy blue whale northern migration (Apr to Aug) Socio-economic Significant for recreational fishing and charter boat tourism Nominated place (national heritage) Cultural heritage Important Aboriginal cultural: 13 listed sites incl. pearling camps	Probability of contact by floating oil at 10 g/m²	%	NC	NC	Threatened/Migratory Fauna Physical Environment/ Habitat Protected Areas Socio-Economic Receptors	IV IV IV IV	IV
			Minimum time to contact by floating oil 10 g/m²	Time (days)	NC	NC			
			Maximum accumulated oil ashore >100 g/m²	m³	NC	343			
			Maximum accumulated concentration >100 g/m²	g/m²	NC	3,001			
			Maximum length of shoreline oiled (>100 g/m²)	km	NC	38			
			Maximum concentration of dissolved hydrocarbon >10 ppb	ppb	NC	NC			
Lowendal Islands (Emergent)	3	Physical habitats Important shallow lagoons with seagrass for dugongs Deep-water benthic (soft-sediment) habitats Dugong Reef and Batman Reef (eastern side Island) Mangroves are considered globally unique as they are offshore Macroalgal reefs (40%) Marine fauna *Turtles* Important hawksbill (Beacon, Parakeelya, Kaia and Pipeline), loggerhead and green turtle nesting (minor) (Varanus pipeline, Harriet and Andersons Beaches) Nesting is reported to occur throughout the year in WA, peaking between October and January Significant flatback rookery, nesting season for flatback turtles peaks in December and January with subsequent peak hatchling emergence in February and March *Seabirds* Approximately 89 species of avifauna, 12 to 14 species of migratory and threatened seabirds *Marine mammals* *Seagrass beds* around the Lowendal Islands thought to provide valuable food source for dugongs Protected areas The Barrow Island Marine Management Area, most of the waters around Barrow Island, the Lowendal Islands and the Barrow Island Marine Park Socio-economic and heritage values Social amenities and other tourism, very significant for recreational fishing and charter boat tourism	Probability of contact by floating oil at 10 g/m²	%	NC	NC	Threatened/Migratory Fauna Physical Environment/ Habitat Protected Areas Socio-Economic Receptors	IV IV IV IV	IV
			Minimum time to contact by floating oil 10 g/m²	Time (days)	NC	NC			
			Maximum accumulated oil ashore >100 g/m²	m³	NC	30			
			Maximum accumulated concentration >100 g/m²	g/m²	NC	911			
			Maximum length of shoreline oiled (>100 g/m²)	km	NC	9			
			Maximum concentration of dissolved hydrocarbon >10 ppb	ppb	NC	NC			

Receptor (Hotspot) Name	HEV Ranking	Values	Oil spill Modelling Parameter NC = No Contact		MDO	LOWC	Consequence Category	Consequence Ranking	Final
Montebello Islands (Emergent)	3	<u>Physical habitats</u> Reefs – coral spawning: Mar and Oct Algae (40%) Mangroves (considered globally unique as they are offshore) Fish habitat Intertidal sand flat communities <u>Marine fauna</u> *Turtles* Loggerhead and green (significant rookery), hawksbill, flatback turtles – Loggerhead turtle nesting: Dec to Jan; green turtle nesting: Nov to Apr, peak period from Jan to Feb; flatback turtle nesting: Dec to Jan; hawksbill turtle nesting: Oct to Jan Northwest and Eastern Trimouille Islands (hawksbill) Western Reef and Southern Bay at Northwest Island (green) *Seabirds* Migratory and threatened seabirds – 14 species Significant nesting (Sept to Feb), foraging and resting areas *Whales* Humpback (Jun to Jul), Pygmy blue (Apr to Aug) whale migration <u>Socio-economic</u> Pearling (inactive/pearling zones) Very significant for recreational fishing and charter boat tourism Social amenities and other tourism Nominated place (national heritage)	Probability of contact by floating oil at 10 g/m²	%	NC	NC	Threatened/Migratory Fauna Physical Environment/ Habitat Protected Areas Socio-Economic Receptors	IV IV IV IV	IV
			Minimum time to contact by floating oil 10 g/m²	Time (days)	NC	NC			
			Maximum accumulated oil ashore >100 g/m²	m³	NC	241			
			Maximum accumulated concentration >100 g/m²	g/m²	NC	2,118			
			Maximum length of shoreline oiled (>100 g/m²)	km	NC	25			
			Maximum concentration of dissolved hydrocarbon >10 ppb	ppb	NC	NC			
Muiron Islands (Emergent)	2	The Muiron Islands are part of the Ningaloo World Heritage area <u>Physical habitats</u> *Coral reefs* Soft coral communities dominate the reefs on the western side of the Muiron Islands whilst habitats on the eastern side of the Muiron Islands are more sheltered, consisting of sandy beaches and shallow lagoons with diverse soft and hard coral communities (Cassata & Collins, 2008) The northern boundary substrate can be described as a combination of sand covered limestone pavement (Quadrant Energy, 2016) *Seagrasses* Identified on the eastern side of the Muiron Islands *Macroalgae* Seagrass and macroalgal habitats are present within the NWS region including Muiron Islands (eastern side) *Sandy beaches* The western shores comprise sandy beaches sloping away to the shelf backed by low dunes	Probability of contact by floating oil at 10 g/m²	%	NC	NC	Threatened/Migratory Fauna Physical Environment/ Habitat Protected Areas Socio-Economic Receptors	IV IV IV IV	IV
			Minimum time to contact by floating oil 10 g/m²	Time (days)	NC	NC			
			Maximum accumulated oil ashore >100 g/m²	m³	NC	96			
			Maximum accumulated concentration >100 g/m²	g/m²	NC	2,238			
			Maximum length of shoreline oiled (>100 g/m²)	km	NC	15			

Receptor (Hotspot) Name	HEV Ranking	Values	Oil spill Modelling Parameter NC = No Contact		MDO	LOWC	Consequence Category	Consequence Ranking	Final
		Marine fauna *Invertebrates* Not identified within the area although noted in the deeper offshore environment or the more protected environment of the nearby Exmouth Gulf (refer Ningaloo Hotspots) *Fish and sharks* Shark aggregations are seasonally reported and manta rays are commonly found in the area *Seabirds* Significant bird breeding; several BIAs for breeding/nesting/roosting, foraging and resting include the Muiron Islands There are five known rookeries as well isolated rookeries on the Muiron and Sunday Islands *Marine reptiles – turtles* Provides important aggregation and nesting areas for turtle populations, including the loggerhead (*Caretta caretta*) and green (*Chelonia mydas*) The North West Cape and Muiron Islands are major nesting sites for loggerhead turtles, with approximately 400 and 600 females nesting annually on the Ningaloo Coast (particularly, North West Cape area) and Muiron Islands respectively (Department of Environment Protection, 2001) The Recovery Plan for Marine Turtles in Australia (2017) identifies the Muiron Islands (as a principal rookery), and all waters within a 20 km radius as habitat critical to the survival of loggerhead turtles The Muiron Islands are minor nesting sites for flatback and hawksbill turtles (Department of Environment Conservation, 2009a) *Marine mammals* Seasonal aggregations of whale sharks, manta rays, sea turtles and rays. Whale sharks Mar to Jul Pygmy blue whale feeding Protected areas The Ningaloo Coast World Heritage Area also includes the Muiron Islands as having outstanding universal value for the Ningaloo Coast (Refer to Ningaloo Coast Hotspot) The Ningaloo Coast World Heritage Area includes Muiron Island Marine Management Area (including the Muiron Islands) category IA – Sanctuary Zone (islands) and II – Marine National Park Zone Socio-economic and heritage values Significant for recreational fishing and charter boat tourism Social amenities and other tourism such as commercial dive charters The unclassified waters of the Muiron Islands Marine Management area are also open to commercial fishing in accordance with the *Fish Resources Management Act* 1994 The Management Plan for the Ningaloo Marine Park and Muiron Islands Marine Management Area (2005 to 2015) identifies that the area has significant Indigenous heritage value associated with historical and current use but the linkage appears to be directly related to the Ningaloo Reef and the adjacent foreshore as opposed to the Muiron Islands	Maximum concentration of dissolved hydrocarbon >10 ppb	ppb	NC	NC			
Ningaloo – Offshore (Submerged)	2	Physical habitats The Ningaloo Reef itself and its juxtaposition with coastal terraces, limestone plains, reef sediments; the contact of the reef by entrained oil may reduce the aesthetic appeal and diminish these values Marine fauna *Marine mammals* Seasonal aggregations of whale sharks, manta rays, sea turtles and rays Whale sharks Mar to Jul Loggerhead turtles Green turtles Dec to Mar Low density hawksbill turtles Pygmy blue whale feeding Socio-economic and heritage values Very significant for recreational fishing, game fishing and charter boat tourism	Probability of contact by floating oil at 10 g/m²	%	NC	99.9	Threatened/Migratory Fauna Physical Environment/ Habitat Protected Areas Socio-Economic Receptors	III III III III III	III
			Minimum time to contact by floating oil 10 g/m²	Time (days)	NC	24 days, 6 hrs			
			Maximum accumulated oil ashore >100 g/m²	m³	NC	NC			
			Maximum accumulated concentration >100 g/m²	g/m²	NC	NC			
			Maximum length of shoreline oiled (>100 g/m²)	km	NC	NC			

Receptor (Hotspot) Name	HEV Ranking	Values	Oil spill Modelling Parameter NC = No Contact		MDO	LOWC	Consequence Category	Consequence Ranking	Final
		Protected Areas World Heritage areas Australian Marine Park	Maximum concentration of dissolved hydrocarbon >10 ppb	ppb	NC	NC			
Ningaloo Coast North (Emergent)	1	Physical habitats Contains part of the largest fringing reef in Australia Lagoonal, intertidal and subtidal coral communities Nine species of seagrass + macroalgae beds Mangrove Bay – significant for mangroves Yardie Creek – significant mangroves and tidal creek Marine mammals Seasonal aggregations of whale sharks, manta rays, sea turtles and rays Whale sharks Mar to Jul Loggerhead turtles Green turtles Dec to Mar Low density hawksbill turtles Pygmy blue whale feeding Seabirds 33 species of seabirds and avifauna; main breeding areas at Mangrove Bay, Mangrove Point, Point Maud, the Mildura Wreck Site and Fraser Island Protected areas Includes 13 out of the 18 sanctuary zones under the state marine park World Heritage areas Exmouth Peninsula Karst System is an official value of the National Heritage area Socio-economic and heritage values Tourism Recreational fishing Fishing and charter boat tourism	Probability of contact by floating oil at 10 g/m²	%	NC	1	Threatened/Migratory Fauna Physical Environment/ Habitat Protected Areas Socio-Economic Receptors	IV IV IV IV	IV
			Minimum time to contact by floating oil 10 g/m²	Time (days)	NC	42 days, 2 hrs			
			Maximum accumulated oil ashore >100 g/m²	m³	NC	1,012			
			Maximum accumulated concentration >100 g/m²	g/m²	NC	4,757			
			Maximum length of shoreline oiled (>100 g/m²)	km	NC	160			
			Maximum concentration of dissolved hydrocarbon >10 ppb	ppb	12	NC			
Ningaloo Outer NW (Submerged)	3	Physical habitats Coral reef Seagrasses Macroalgal beds Non-coral benthic habitats high and unique sponge biodiversity Marine fauna *Invertebrates* Cetacean migration Whale sharks – migratory and aggregation site Manta rays aggregation 500 finfish species recorded *Birds* 33 species seabirds and avifauna present (13 resident and 20 migratory) 13 JAMBA/CAMBA species *Marine mammals* 13 species of toothed whale and dolphin and seven species of baleen whale Protected area KEF (Commonwealth waters adjacent to Ningaloo Reef) and Continental Slope Demersal Fish Communities Socio-economic and heritage values Sanctuary zones under state marine park National Heritage place Shipwrecks important as diving sites	Probability of contact by floating oil at 10 g/m²	%	3.33	24.31	Threatened/Migratory Fauna Physical Environment/ Habitat Protected Areas Socio-Economic Receptors	III III III III III	III
			Minimum time to contact by floating oil 10 g/m²	Time (days)	4 hrs	38 days, 22 hrs			
			Maximum accumulated oil ashore >100 g/m²	m³	NC	NC			
			Maximum accumulated concentration >100 g/m²	g/m²	NC	NC			
			Maximum length of shoreline oiled (>100 g/m²)	km	NC	NC			
			Maximum concentration of dissolved hydrocarbon >10 ppb	ppb	176	NC			

Receptor (Hotspot) Name	HEV Ranking	Values	Oil spill Modelling Parameter NC = No Contact		MDO	LOWC	Consequence Category	Consequence Ranking	Final
Northern Islands Coast	3	Physical habitats Seagrass Macroalgae Marine fauna *Turtles* Hawksbill, flatback and green turtle nesting (minor) Nesting is reported to occur throughout the year in WA, peaking between October and January *Seabirds* Migratory and threatened seabirds *Marine mammals* Socio-economic and heritage values Social amenities and other tourism, significant for recreational fishing and charter boat tourism	Probability of contact by floating oil at 10 g/m²	%	NC	NC	Threatened/Migratory Fauna Physical Environment/ Habitat Protected Areas Socio-Economic Receptors	IV IV IV IV	IV
			Minimum time to contact by floating oil 10 g/m²	Time (days)	NC	NC			
			Maximum accumulated oil ashore >100 g/m²	m³	NC	79			
			Maximum accumulated concentration >100 g/m²	g/m²	NC	903			
			Maximum length of shoreline oiled (>100 g/m²)	km	NC	32			
			Maximum concentration of dissolved hydrocarbon >10 ppb	ppb	NC	NC			
Southern Islands Coast	4	Physical habitats Seagrass Macroalgae Marine fauna *Turtles* Hawksbill, flatback and green turtle nesting (minor) Nesting is reported to occur throughout the year in WA, peaking between October and January *Seabirds* Migratory and threatened seabirds *Marine mammals* Socio-economic and heritage values Social amenities and other tourism, significant for recreational fishing and charter boat tourism Adjacent to Exmouth Gulf Coast and Ningaloo hotspot (refer above) Onslow port within area	Probability of contact by floating oil at 10 g/m²	%	NC	NC	Threatened/Migratory Fauna Physical Environment/ Habitat Protected Areas Socio-Economic Receptors	IV IV IV IV IV	IV
			Minimum time to contact by floating oil 10 g/m²	Time (days)	NC	NC			
			Maximum accumulated oil ashore >100 g/m²	m³	NC	631			
			Maximum accumulated concentration >100 g/m²	g/m²	NC	2,882			
			Maximum length of shoreline oiled (>100 g/m²)	km	NC	99			
			Maximum concentration of dissolved hydrocarbon >10 ppb	ppb	NC	NC			

Receptor (Hotspot) Name	HEV Ranking	Values	Oil spill Modelling Parameter NC = No Contact		MDO	LOWC	Consequence Category	Consequence Ranking	Final
Thevenard Island	4	Physical habitats Seagrass Macroalgae Marine fauna *Turtles* Hawksbill, flatback and green turtle nesting (minor) Nesting is reported to occur throughout the year in WA, peaking between October and January *Seabirds* Migratory and threatened seabirds *Marine mammals* Socio-economic and heritage values Social amenities and other tourism, significant for recreational fishing and charter boat tourism	Probability of contact by floating oil at 10 g/m²	%	NC	NC	Threatened/Migratory Fauna Physical Environment/ Habitat Protected Areas Socio-Economic Receptors	IV IV IV IV	IV
			Minimum time to contact by floating oil 10 g/m²	Time (days)	NC	NC			
			Maximum accumulated oil ashore >100 g/m²	m³	NC	42			
			Maximum accumulated concentration >100 g/m²	g/m²	NC	1,068			
			Maximum length of shoreline oiled (>100 g/m²)	km	NC	14			
			Maximum concentration of dissolved hydrocarbon >10 ppb	ppb		NC			