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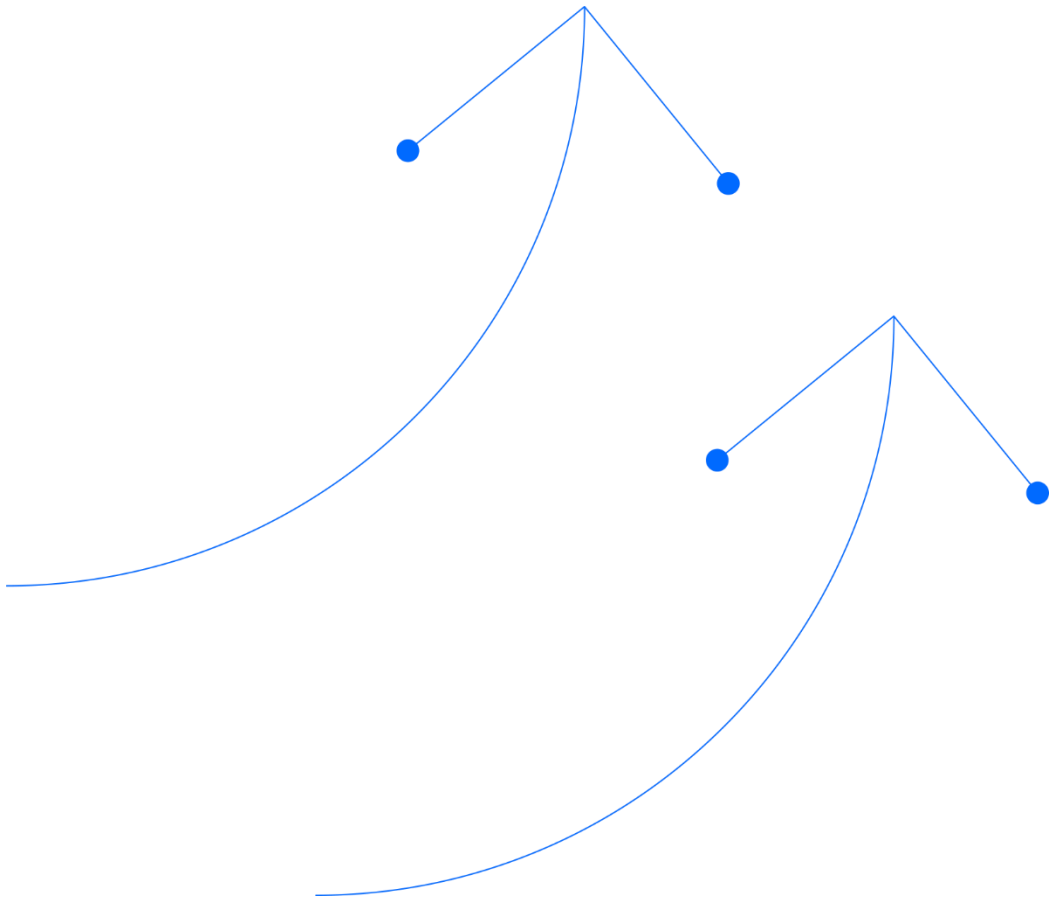
Operational and Scientific Monitoring

Bridging Implementation Plan: North West Shelf

21 August 2024



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Bridging Implementation Plan: North West Shelf

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Terms

Term	Definition
AEP	Australian Energy Producers (formerly Australian Petroleum Production and Exploration Association [APPEA]; from 13 September 2023)
ALA	Atlas of Living Australia
AMOSC	Australian Marine Oil Spill Centre
AMP	Australian Marine Park
AMSA	Australian Marine Safety Authority
AODN	Australian Ocean Data Network
BACI	Before-After Control-Impact
BIP	Bridging Implementation Plan
BRUVS	Baited Remote Underwater Video Stations
BTEXN	Benzene, Toluene, Ethylbenzene and Xylenes And Naphthalene
CoC	Chain of Custody
CSIRO	Commonwealth Scientific and Industrial Research Organisation
DBCA	Western Australian Department of Biodiversity Conservation and Attractions
DCCEEW	Commonwealth Department of Climate Change, Energy, the Environment and Water
DWER	Western Australian Department of Water and Environmental Regulation
DPIRD	Western Australian Department of Primary Industries and Regional Development
DPLH	Western Australian Department of Planning, Lands and Heritage
EMBA	Environment that may be Affected
EP	Environment Plan
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999 (Cth)
EPS	Environmental Performance Standard
ESC	Environmental Scientific Coordinator
FOB	Forward Operating Base
FPSO	Floating Production, Storage and Offloading
GIS	Geographic Information System
GPS	Geographic Positioning System
HFO	Heavy Fuel Oil
IAP	Incident Action Plan
ICS	Incident Command System
IMOS	Integrated Marine Observing System
IMSA	Index of Marine Surveys for Assessments
IMT	Incident Management Team
KEF	Key Ecological Feature
LEL	Lower Explosive Limits
LOWC	Loss Of Well Control
MDO	Marine Diesel Oil
MoC	Management of Change
Monitoring Service Providers	The subcontracted specialist monitoring service providers subcontracted by OSRL to perform certain operational and scientific monitoring services
NATA	National Association of Testing Authorities

Term	Definition
NEBA	Net Environmental Benefit Analysis
OM	Operational Monitoring
OMP	Operational Monitoring Plan
OPEP	Oil Pollution Emergency Plan
OPGGS (E)	Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2009 Regulations
OSCP	Oil Spill Contingency Plan
OSM	Operational and Scientific Monitoring
OSM-BIP	Operational and Scientific Monitoring-Bridging Implementation Plan
OSM Services Provider	The operational and scientific monitoring services to be provided by OSRL via the OSM Supplementary Service Agreement
OSRA	Oil Spill Response Atlas
OSRL	Oil Spill Response Limited
OSTM	Oil Spill Trajectory Modelling
PAH	Polycyclic aromatic hydrocarbons
PPE	Personal Protective Equipment
QA/QC	Quality Assurance and Quality Control
ROV	Remotely Operated Vehicle
SBRUVS	Stereo Baited Remote Underwater Video Stations
SCAT	Shoreline Clean-up Assessment Technique
SM	Scientific Monitoring
SMP	Scientific Monitoring Plan
SSDI	Subsea Dispersant Injection
TRH	Total Recoverable Hydrocarbons
TPH	Total Petroleum Hydrocarbons
VOC	Volatile Organic Compound
VOO	Vessel of Opportunity
WA	Western Australia
WA DoT	Western Australian Department of Transport
WANATL	Western Australia, Northern Australia and Timor Leste
WAMSI	Western Australian Marine Science Institution

Part A – Preparedness

This Plan is presented in two parts. Part A outlines the relationship between Santos' environmental management document framework and the Joint Industry Operational and Scientific Monitoring (OSM) Framework (APPEA, 2021). Part B provides operationally focussed guidance for Santos personnel, OSM Services Provider and sub-contracted Monitoring Service Providers to coordinate the implementation of monitoring plans.

1. Introduction

OSM is a key component of the environmental management document framework for offshore petroleum activities, which also include an Environment Plan (EP) and Oil Pollution Emergency Plan (OPEP). Operational Monitoring is instrumental in providing situational awareness of a hydrocarbon spill, enabling Incident Management Teams (IMT) to mount a timely and effective spill response and continually monitor the effectiveness of the response. Scientific Monitoring is also the principle tool for determining the extent, severity and persistence of environmental impacts from a hydrocarbon spill and for informing resultant remediation activities.

Santos has elected to use the Joint Industry OSM Framework and supporting operational monitoring plans (OMPs) and scientific monitoring plans (SMPs) as the foundation of its OSM approach. The Joint Industry OSM Framework is available on the AEP Environment Publications Webpage.

Use of the Joint Industry OSM Framework requires each Titleholder to develop a Bridging Implementation Plan (this plan) which fully describes how the Framework interfaces with the Titleholder's own activities, spill risks and internal management systems.

Table 1-1 describes key documents that form Santos' environmental management document framework. Note that this is not an exhaustive list and additional documents are listed in the activity specific Santos OPEPs.

Mobilisation of OSM should follow the process listed in Part B: Section 12: Mobilisation and activation process.

Table 1-1: Key documents in Santos' environmental management framework

Document	Description
Activity specific Environment Plan (EP)	Each activity specific EP describes the activity and the location, the environment, the risks to the environment as a result of the activity and the associated management controls. Of particular relevance to this BIP, it identifies sensitive receptors, potential impacts from hydrocarbon spills and the environment that may be affected (EMBA)
Activity specific Oil Pollution Emergency Plan (OPEP) / Oil Spill Contingency Plan (OSCP)	Each activity specific OPEP / OSCP provides the activation and response process for the credible spill scenarios, including incident management, the net environmental benefit analysis (NEBA) process and detailed implementation guidance for individual response strategies. Of particular relevance to this BIP, it identifies the credible spill scenarios and protection priorities
Incident Management Plan – Upstream Offshore (SO-00-ZF-00025)	The incident management plan establishes Santos incident management arrangements to: • Guide Western Australia, Northern Australia and Timor Leste (WANATL) Incident Management in emergency preparedness, emergency response and operational recovery; • Support site/facility Emergency Response Teams during emergencies; • Undertake incident action planning to manage the consequences of an emergency event, and; • Ensure WANATL incident management preparedness.
Santos Incident Management Handbook	The incident management handbook is a quick reference job aid to assist a response team member in filling specific Incident Command System (ICS) positions, understanding their position responsibilities, and how that position fits within the ICS structure
Incident Response Telephone Directory (SO-00-ZF-00025.020)	Contains all relevant contact and communications information to enable effective communication amongst the response personnel and external stakeholders, including relevant OSM contacts

1.1 Scope

This Operational and Scientific Monitoring - Bridging Implementation Plan (OSM-BIP) addresses the requirements of the Offshore Petroleum Greenhouse Gas Storage (Environment) Regulations 2023 for all Santos activities within the North West Shelf zone of Western Australia (Figure 1-1), and has been submitted with the Ningaloo Vision Cessation of Production and Floating Asset Removal EP (7750-650-EIS-0007) and OPEP (7750-650-EIS-0008). This BIP applies to all Santos activities which have an EP accepted by Commonwealth and State regulators in the North West Shelf. This Plan supersedes Santos' Oil Spill Scientific Monitoring Standby and Response Manual (EA-00-RI-10162).

For all new activities, there are three main steps for assessing whether this OSM-BIP adequately covers the OSM requirements for each new activity, these include the following, and are summarised in Appendix A:

1. Determine if the new activity Environment that May be Affected (EMBA) fits within the North West Shelf OSM-BIP Combined EMBA, as outlined in Section 2.1.
2. Determine the locations requiring a baseline review (as described in Section 2.2) and whether these locations are currently included in Table 2-2.
3. Determine whether the capability requirements and monitoring arrangements of the new activity exceed or are met by the capability requirements outlined in Section 8 and capability arrangements described in Sections 9 and 10.

Prior to submission for regulatory approval, each new/revised OPEP shall document whether the OSM-BIP adequately covers the OSM requirements as per the three elements described above. If additional operational and/or scientific monitoring capability is required for a new activity above the OSM capability described in Sections 9 and 10, prior to submission the Environment/Project Team will follow Santos' EP MOC process, and the OSM-BIP will be updated with the new capability requirements before the activity commences.

Santos activities within the Northern Australia zone are addressed by the Santos Northern Australia OSM-BIP (7715-650-ERP-0003).

Santos will implement OSM, as applicable, for oil spills across both State and Commonwealth waters. In the event that control of scientific monitoring in WA State waters is taken over by the Western Australian Department of Transport (WA DoT) under advice from the State Environmental Scientific Coordinator (ESC), Santos will follow the direction of WA DoT as Control Agency and provide all necessary resources (monitoring personnel, equipment and planning) to assist as a supporting agency.

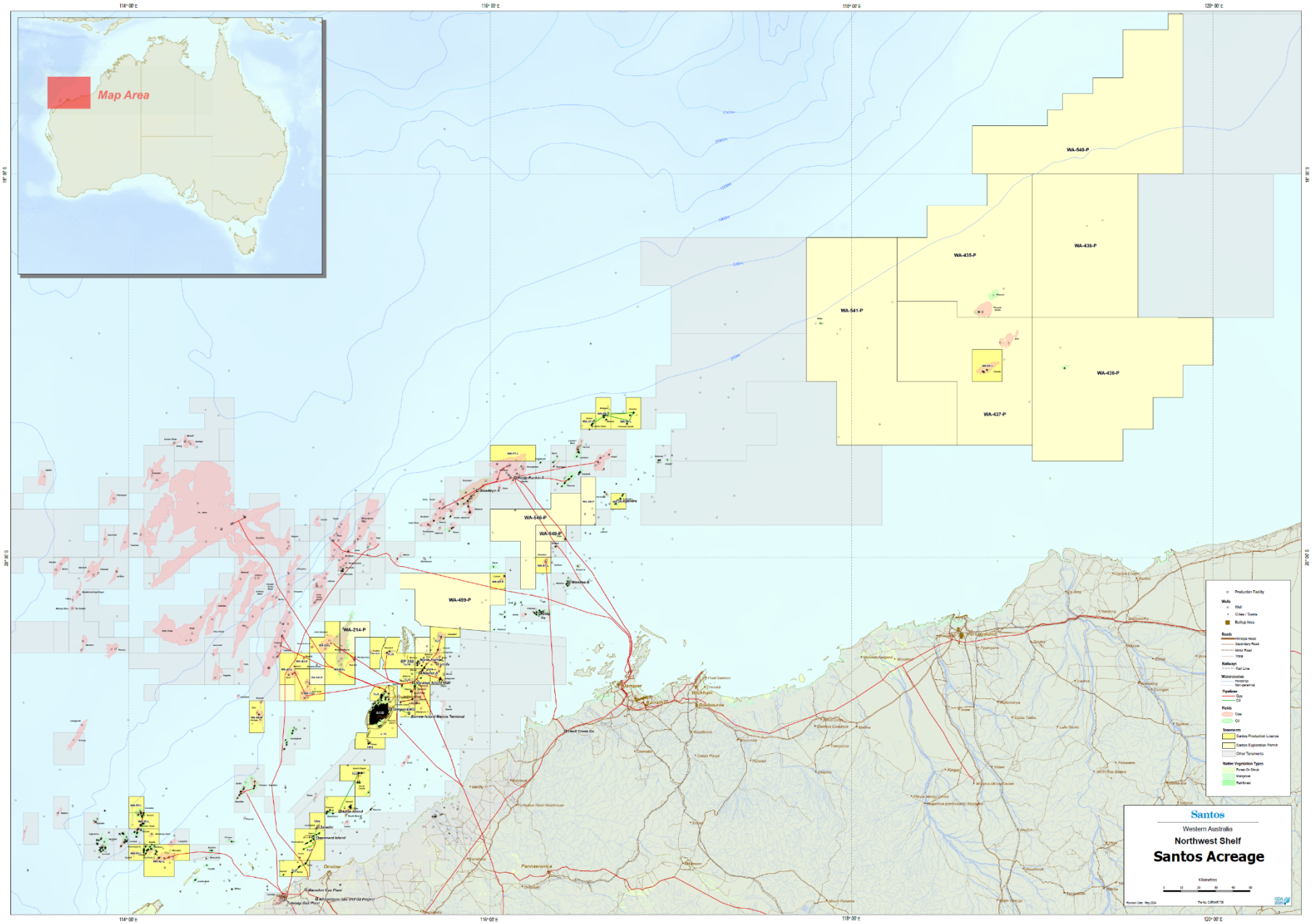


Figure 1-1: Santos acreage Western Australia – North West Shelf (May 2024)

2. EMBA and Identification of Locations for Baseline Review

2.1 Consolidated EMBA

This OSM-BIP provides monitoring guidance and arrangements for all Santos activities referred in the North West Shelf Region. Therefore, a single consolidated EMBA has been prepared to represent all of these activities and the resultant geographical extent of this OSM-BIP (Figure 2-1). The Consolidated EMBA corresponds to the low exposure values using stochastic modelling results applying the following thresholds:

- 1 g/m^2 floating oil thickness, which is considered to be below levels which would cause environmental harm and is more indicative of the areas perceived to be affected due to its visibility on the sea-surface
- 10 g/m^2 for accumulated (shoreline) oil, which represents the area visibly contacted by the spill
- 10 ppb for dissolved hydrocarbons, which corresponds generally with potential for exceedance of water quality triggers
- 10 ppb entrained hydrocarbons[1] represents the low exposure zone and corresponds generally with potential for exceedance of water quality triggers.

The Consolidated EMBA has been determined based on the modelling results for the activities and worst-case credible spill scenarios outlined in Table 2-1. These spill scenarios are considered representative of Santos' worst-case credible scenarios given the extent of their EMBAs, hydrocarbon type, proximity to receptors, minimum time to contact and their representation of Santos' activity locations within the North West Shelf of Western Australia.

For a description of the environment within each EMBA, refer to the activity-specific EPs and the Environmental Values and Sensitivities section. This section includes the following pertinent information: protected matters and any associated recovery plans/conservation advice, key ecological features (KEFs), protected areas, significant socio-economic industries, and culturally significant places.

2.2 Locations requiring a baseline review

Baseline monitoring provides information on the condition of ecological receptors prior to, or spatially independent of (e.g. if used in control chart analyses) of, a spill event and is used for comparison with post-impact scientific monitoring, where required. This is particularly important for scientific monitoring where the ability to detect changes between pre-impact and post-impact conditions and evaluate impact from the spill (compared to natural variation and/or impacts unrelated to the spill) is necessary. Therefore, an enhanced understanding of the extent, quality and suitability of any existing baseline data is required to prioritise the monitoring response.

Locations that are ecologically significant and require a baseline data review have been drawn from the worst-case spill scenarios listed in Table 2-1 and based on the stochastic modelling results of each activity, provided in the activity specific OPEPs. Locations and associated receptors requiring a baseline data review were identified as those sensitive receptors contacted by hydrocarbons at the low threshold for entrained (≥10 ppb), dissolved (≥10 ppb), floating (≥1 g/m^2), and shoreline contact (≥10 g/m^2), within 7.0 days (7.0 days was used to delineate the first-strike monitoring response) at a probability >5%. Table 2-2 provides a cumulative list of all the locations identified and Appendix B lists the background information on key receptors/sensitivities associated with each of these locations.

Monitoring priorities are subsequently identified as those locations and associated receptors predicted to be contacted within 7.0 days at a probability >5%, and where baseline data is either not available or not sufficient (as depicted in Table 4-3 and outlined in Section 4).

[1] *Note that Santos will use the threshold of 1,000 ppb for entrained hydrocarbons as the low threshold when finalising monitoring design. However, OSM planning and capability assessments have used 10 ppb in the absence of historical modelling reports having data available on 1,000 ppb entrained hydrocarbons.*

Table 2-1: Santos worst-case spill scenarios used to determine the planning area for operational and scientific monitoring for the North West Shelf Region

Environment Plan / OPEP	Hydrocarbon Type	Scenario	Release Duration	Volume (m^3)
Ningaloo Vision Operations OPEP (Van Gogh and Coniston-Novara fields) (TV-00-RI-00003.02)	Van Gogh Crude (Group 4)	Production Well Leak (subsea spill)	100 days	10,236
	Van Gogh Crude (Group 4)	Flowline rupture (subsea spill)	24 hours	1,681
	Van Gogh Crude (Group 4)	Floating Production, Storage and Offloading (FPSO) collision with third-party vessel (surface spill)	1 hour	8,630
	Marine Diesel Oil (MDO) (Group 2)	Surface MDO release	1 hour	1,519
	Heavy Fuel Oil (HFO) (Group 4)	Surface HFO release	1 hour	950
Mutineer, Exeter, Fletcher, Finucane Plug and Abandonment OPEP(9885-236-ERP-0001)	Mutineer-Exeter Crude (Group 2)	Surface loss of well control (LOWC)	77 days	15,980
	Mutineer-Exeter Crude (Group 2)	Subsea LOWC	77 days	15,980
	MDO (Group 2)	Surface diesel release	20 minutes	604
Varanus Island Hub Operations OPEP (EA-60-RI-00186.02)	John Brookes Condensate (Group 1)	LOWC/damage to infrastructure causing condensate with gas release from John Brookes wellheads at surface	100 days	39,011
	MDO (Group 2)	Vessel spill – release from support/ supply vessel fuel tank (due to vessel collision or lifting operations) at the Wonnich Platform	1 hour	329
	HFO (Group 4)	Vessel spill – release from offtake tanker due to vessel collision / vessel grounding	30 hour	1,900
	Varanus Island Crude Blend (Group 1)	Vessel spill – release from offtake tanker due to vessel collision / vessel grounding	1 hour	8,629
	John Brookes Condensate (Group 1)	Loss of integrity / Impact damage causing condensate with gas release from the John Brookes 18” Pipeline	5.4 hours	210

Environment Plan / OPEP	Hydrocarbon Type	Scenario	Release Duration	Volume (m^3)
Devil Creek Pipeline and Reindeer Well Head Platform OPEP (EA-14-RI-10001.02)	Reindeer Condensate (Group 1)	Complete loss of well control at surface at the Reindeer wellhead platform (100% full bore flow rate release)	70 days	4,029
	Reindeer Condensate (Group 1)	Condensate spill from a subsea pipeline leak near the Commonwealth/State Boundary	3.71 hours	121.4
	MDO (Group 2)	Surface release of MDO following a vessel collision at the wellhead platform	1 hour	325
	MDO (Group 2)	Surface release of MDO following a vessel collision at the Commonwealth/State Boundary	1 hour	325
Ningaloo Vision Cessation of Production and Floating Asset Removal OPEP (7750-650-EIS-0008)	Van Gogh Crude (Group 4)	Subsea crude oil; spill from a LOWC	100 days	1,255
	MDO (Group 2)	Surface diesel release involving the FPSO	1 hour	1,519

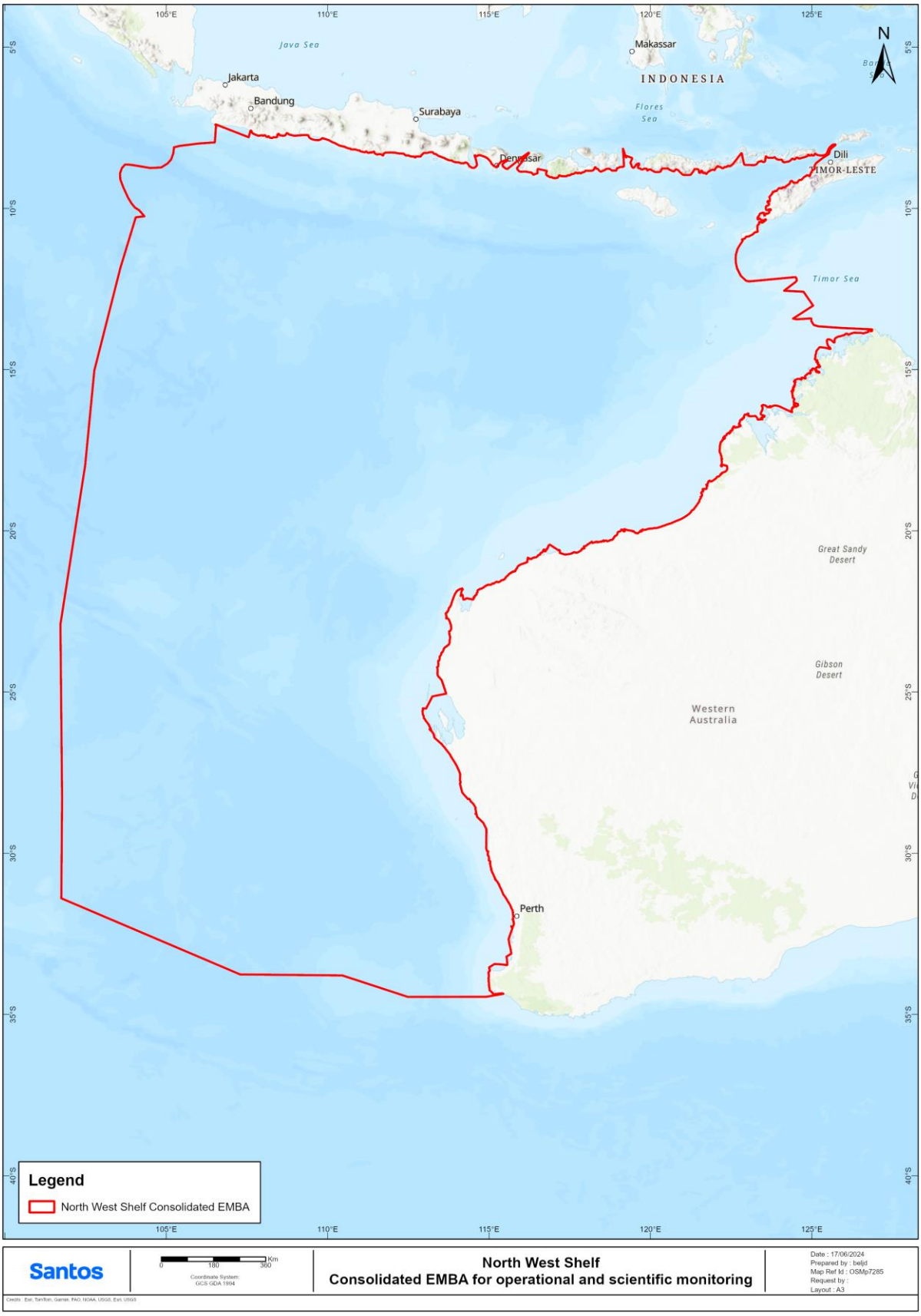


Figure 2-1: Consolidated EMBA for Santos North West Shelf OSM-BIP

Table 2-2: Locations in the North West Shelf OSM-BIP Combined EMBA requiring a baseline review (all locations predicted by stochastic modelling to be contacted within 7 days at the low thresholds and a probability > 5% from all worst-case scenarios presented in Table 2-1)

Location
Australian Marine Parks (AMP)
Dampier AMP
Eighty Mile Beach AMP
Gascoyne AMP (includes Santos receptor locations of Ningaloo Outer NW and Ningaloo Offshore)
Montebello AMP
Ningaloo AMP
Coastlines[2]
Dampier Archipelago
Eighty Mile Beach (includes RPS oil spill modelling default receptor location of Eighty Mile Beach-Broome)
Ningaloo Coast North (includes RPS oil spill modelling default receptor locations of Exmouth) including locations known in baseline literature as Ningaloo World Heritage Area, Ningaloo, Cape Range, North West Cape and Exmouth Gulf
Ningaloo Coast South (includes RPS oil spill modelling default receptor locations of Carnarvon) including locations known in baseline literature as Ningaloo World Heritage Area, Coral Bay, Gnaraloo, Quobba and Carnarvon
Karratha-Port Hedland
Port Hedland-Eighty Mile Beach
Southern Islands Coast (includes RPS oil spill modelling default receptor locations of Southern Pilbara Shoreline, Onslow Area Coastline and Ashburton)
Northern Islands Coast (includes RPS oil spill modelling default receptor locations of Northern Pilbara – Islands and Shoreline and Karratha)
Islands
Barrow Island
Bedout Island
Lowendal Islands
Montebello Islands
Muiron Islands
Thevenard Island
State Marine Parks
Barrow Island MMA
Barrow Island MP (State)
Montebello Island MP
Muiron Island MP
Ningaloo Marine Park
National Park
Ningaloo Coast World Heritage Area (extending from North West Cape to Quobba, including the Muiron Islands)
Nature Reserves
Boodie, Double Middle Islands Nature Reserve NP
Great Sand Island NR
Ramsar
Eighty Mile Beach

[2] *Coastline locations are listed in accordance with the Santos defined receptors provided in Santos' Oil Spill Risk Assessment and Response Planning Procedure (SO-91-II-20003). It should be noted that not all available oil spill modelling reports list receptor locations in accordance with the Santos defined receptors. Where sectors have alternative names, these are included here for cross reference.*

Location
Reefs, Shoals and Banks
Brewis Reef
Cod Bank
Golmar Shoals
Madeleine Shoals
Penguin Bank
Poivre Reef
Rankin Bank
Rosily Shoals
Trap Reef

3. Relevant existing baseline information sources

Santos has access to a number of different baseline data sources that are relevant to the high-value receptors in the North West Shelf OSM-BIP Combined EMBA. These include the Santos Geographic Information System (GIS) (including habitat/fauna distribution layers and satellite imagery) and the following external data sources:

3.1 Data.gov.au

Data.gov.au is the central source of Australian open government data published by federal, state and local government agencies. In addition, it includes publicly-funded research data and datasets from private institutions that are in the public interest.

3.2 Australian Ocean Data Network

The Australian Ocean Data Network (AODN) is the primary access point for search, discovery, access and download of data collected by the Australian marine community. Data is presented as a regional view of all the data available from the AODN. Primary datasets are contributed to by Commonwealth Government agencies, State Government agencies, Universities, the Integrated Marine Observing System (IMOS – an Australian Government Research Infrastructure project), and the Western Australian Marine Science Institution (WAMSI).

3.3 Western Australian Oil Spill Response Atlas

The Western Australian Oil Spill Response Atlas (OSRA) is a spatial database of environmental, logistical and oil spill response data. Using a GIS platform, OSRA displays datasets collated from a range of custodians allowing decision makers to visualise environmental sensitivities and response considerations in a selected location. Oil spill trajectory modelling (OSTM) can be overlaid to assist in determining protection priorities, establishing suitable response strategies and identifying available resources for both contingency and incident planning. OSRA is managed by the Oil Spill Response Coordination unit within WA DoT Marine Safety and is part funded through the National Plan for Maritime Environmental Emergencies and the Australian Maritime Safety Authority (AMSA). Santos IMT members can log in to the OSRA on the Santos SharePoint site.

3.4 The Atlas of Living Australia

The Atlas of Living Australia (ALA) is a collaborative, online, open resource that contains information on all the known species in Australia aggregated from a wide range of data providers. It provides a searchable database when considering species within the EMBA. The ALA receives support from the Australian Government through the National Collaborative Research Infrastructure Strategy and is hosted by the Commonwealth Scientific and Industrial Research Organisation (CSIRO).

3.6 Index of Marine Surveys Assessment

The Index of Marine Surveys for Assessments (IMSA) is an online portal to information about marine-based environmental surveys in Western Australia. IMSA is a project of the WA Department of Water and Environmental Regulation (DWER) for the systematic capture and sharing of marine data created as part of an environmental impact assessment.

3.7 Other Sources

Other sources include:

- the WA Department of Biodiversity and Attractions (DBCA) Biodiversity and Conservation Science Annual Reports;
- Australian Institute for Marine Science (AIMS) Research Data Platform;
- WA State of Fisheries Report;
- eAtlas.org.au;
- North West Atlas;
- Western Australian Marine Science Institution;
- Geosciences Australia data and publications;
- Australian Marine Parks Science Atlas; and
- Birdlife Data Zone.

Reports and peer reviewed journal articles were also accessed via research and journal databases such as PubMed and Google Scholar, as well as unpublished monitoring reports.

4. Baseline data review

Understanding the presence or absence, suitability and quality of baseline data for locations and associated receptors predicted to be contacted within 7 days is an important preparatory measure for OSM first strike. During a spill event, the first strike monitoring capability will be prioritised to those receptors with insufficient baseline data (deemed first-strike monitoring priorities) to collect baseline data post-spill pre-impact. An overview of the process used to identify first-strike monitoring priorities is outlined in Figure 4-1, with additional detail provided in the steps below. Where post-spill pre-impact monitoring is not feasible due to short contact times, understanding which receptors have insufficient baseline data will help quickly guide the finalisation of each SMP design and the need to include alternative designs (e.g. the Gradient Approach versus Before-After Control-Impact (BACI) design).

The baseline data assessment includes the following steps:

1) **Identification of locations requiring a baseline review:** Receptor locations predicted to be contacted within 7 days, at a probability greater than 5%, are identified and aligned with OMPs and SMPs

2) **Collection of baseline data:** Environmental baseline monitoring data relevant to the locations and receptors is located (as per sources outlined in Section 3)

3) **Assessment of baseline data**: The relevance of each data source is assessed:

   For each data source obtained, a meta-analysis is performed to determine if the parameters and methods align with the key parameters and methods outlined in the Joint Industry SMPs (Table 4-1), the spatial extent of the data, the sampling effort/duration, and the temporal relevance is also noted. Table 4-2 outlines the overall assessment criteria used for each data source.

4) **Assessment of baseline data:** An annual evaluation of the adequacy (in terms of the likely ability to detect changes between pre-impact and post-impact conditions) of the collective baseline data for each location and associated receptors is undertaken. This evaluation takes into consideration the following:

   a) Background historical information on the presence, distribution, seasonality, and if applicable, the reproductive state of the receptor (as outlined in Appendix B) is compared with the data available from monitoring within the last 5 years. Depending on the receptor and associated Joint Industry SMP, the following is considered:

      i) Does the data collectively cover the required spatial extent of the receptor within a location (taking into consideration any background historical information on the distribution of the receptor)?

      ii) Does the data collectively cover all the species/biological communities required for the relevant Joint Industry SMP and that may be present at the location?

5) **Assessment outcome:** Each location and associated receptor is then categorised as either 'First-Strike Monitoring Priority' or 'Lower Priority for First-Strike Monitoring', as outlined below, and summarised in Table 4-3:

   a) **First-Strike Monitoring Priority -** current baseline data is not in place, not suitable or not sufficient; and post-spill pre-impact baseline data collection should be prioritised; and

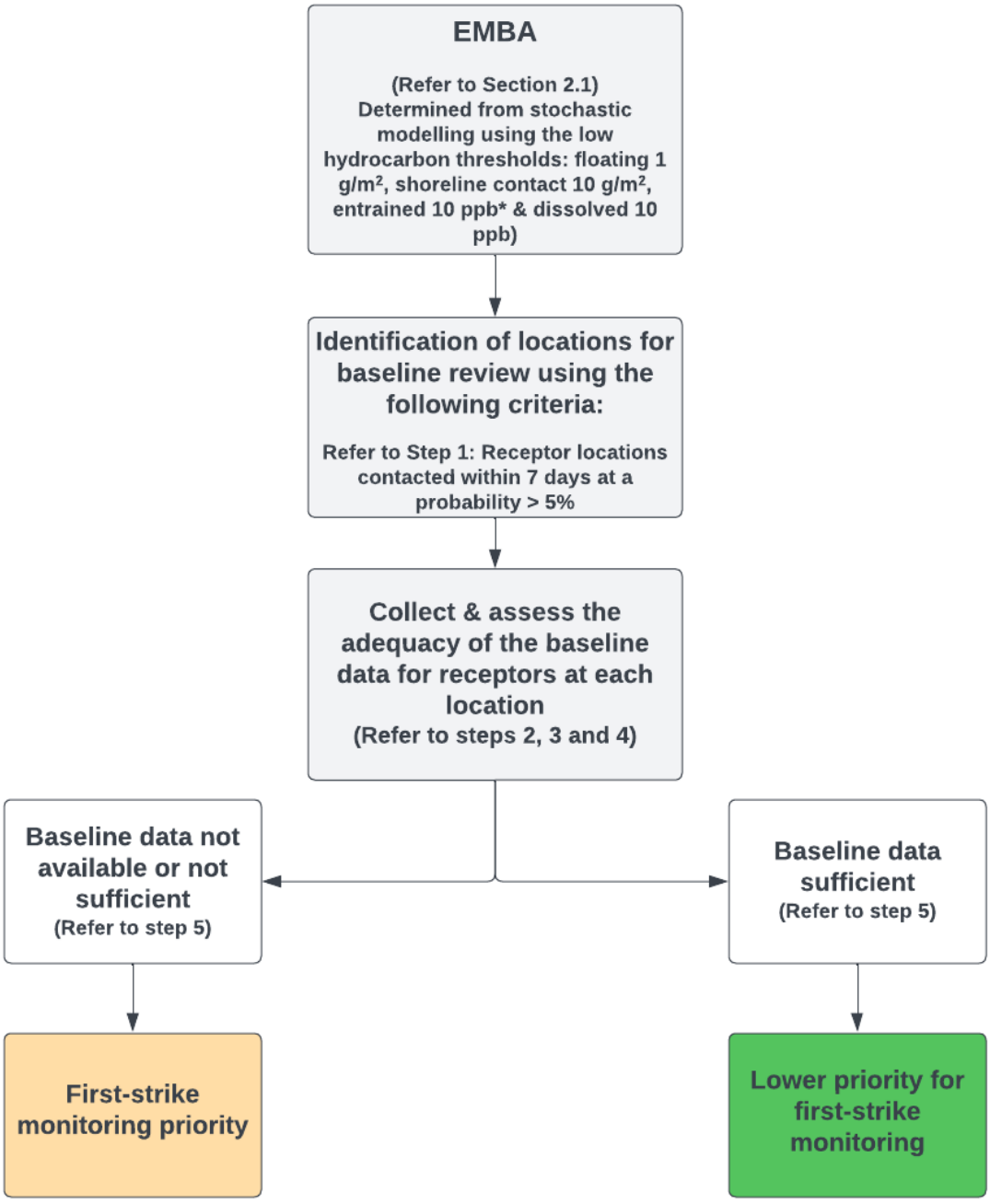
   b) **Lower Priority for First-Strike Monitoring –** collectively there is substantial baseline data or on-going monitoring from within the last 5 years. This data aligns with the key parameters and methodologies of the relevant Joint Industry SMP, encompasses the required species/biological communities, and covers the required spatial extent of the location. The current baseline data is therefore considered sufficient and could likely be used to detect a level of change in the event of a significant impact. Hence this receptor is considered a lower priority for post-spill, pre-impact data collection.

During an actual spill, the monitoring priorities will vary according to the spill event and it should be noted that the monitoring priorities provided in Table 4-3 are listed for planning and guidance purposes (note: the first-strike monitoring priorities listed are a cumulative list based on all the worst-case spill scenarios outlined in Table 2-1). There was a paucity of baseline data for all of the reefs, shoals and banks listed in Table 2-2. Monitoring should focus on locations most at risk of consequences, such as in shallow waters, in sensitive habitats, and in areas with protected species. Consequently, shorelines and adjacent nearshore areas will generally take priority over reefs, shoals and banks, unless they are the main locations impacted by a spill event. The DoT protection priority rankings, determined as part of the Western Australian Marine Oil Pollution Risk Assessment, may also be consulted to provide further focus and prioritisation.

At the time of a spill, Santos will work with its OSM Services Provider, sub-contracted Monitoring Service Providers and key stakeholders in the initial stages of the spill to identify priority monitoring receptors and to assist in the finalisation of the monitoring design, ensuring that resources are allocated appropriately and according to the greatest risk of impact. This process is outlined in Section 13.

It is noted that it is difficult to obtain absolute statistical proof of oil spill impacts, due to the variability (spatially and temporally) of the natural environment, the lack of experimental control due to the nature of spills and because suitable baseline data may not be available (Kirby, *et al*. 2018). Alternative approaches exist for detecting impacts where post-spill, pre-impact monitoring may not be feasible. These include impact versus control design approaches and/or a gradient approach. The Joint Industry OSM Framework provides guidance and considerations for survey designs to enable the acquisition of sufficiently powerful data during SMP implementation.

Once SMP monitoring reports are drafted (post-spill) they will be peer reviewed by an expert panel (Refer to Section 10.10 of the Joint Industry OSM Framework).



** Note that Santos will use the threshold of 1,000 ppb for entrained hydrocarbons as the low threshold when finalising monitoring design. However, OSM planning and capability assessments have used 10 ppb in the absence of historical modelling reports having data available on 1,000 ppb entrained hydrocarbons.*

Figure 4-1: Summary of the process for identifying first-strike monitoring priorities

Table 4-1: Key parameters and key methodology from the Joint Industry SMPs

SMP	Key parameter	Key methodology
Water quality impact assessment	At least one key parameter: • Total recoverable hydrocarbons (TRH); • Total petroleum hydrocarbons (TPH); • Benzene, toluene, ethylbenzene and xylenes and naphthalene (BTEXN); or • Polycyclic aromatic hydrocarbons (PAH)	In situ UV fluorometer and/or samples analysed at National Association of Testing Authorities (NATA) accredited lab using NATA accredited method
Sediment quality impact assessment	At least one key parameter: TRH, TPH, BTEXN, PAH, heavy metals	Sediment collected by corer/grab and samples analysed at NATA accredited lab using NATA accredited method
Intertidal and coastal habitat assessment	At least one key parameter: presence, diversity, distribution	Any of the following, as appropriate to the parameters: • Ground and vessel-based intertidal surveys (e.g. quadrats, transects, including video and still photography) • Remote sensing • Infauna sampling
Benthic habitat assessment	At least one key parameter: presence, diversity, distribution	Any of the following, as appropriate to the parameters: • Transects • Towed camera • Drop camera • Remotely Operated Vehicle (ROV) camera • Diver-based camera surveys • Remote sensing (coral & seagrass broad scale survey) • Sediment grab for infauna
Marine fish and elasmobranch assemblages assessment	At least one key parameter: species identification, abundance, habitat type	Any of the following, as appropriate to the parameters: • Baited remote underwater video stations (BRUVS) • Stereo Baited Remote Underwater Video Stations (SBRUVS) • ROV • Towed video survey
Fisheries impact assessment	At least one key parameter: Abundance, catch-rate, stock structure, size structure	Catch and effort for stock assessment
Marine megafauna - reptile	At least one key parameter: species identification, abundance / counts, key behaviour (foraging, mating, nesting, internesting)	As appropriate to the species and behaviour / life stage: • Nesting turtles: ground surveys • In water turtles: vessel and aerial surveys • Sea snakes: manta board and snorkel surveys • Estuarine crocodiles: vessel-based spotlight surveys at night
Marine megafauna-whale sharks, dugong and cetaceans	At least one key parameter: species identification, abundance / counts, key behaviour	Aerial or vessel surveys, acoustic monitoring
Seabirds and shorebirds	At least one key parameter: species present, abundance / counts, behaviour (resting, roosting, foraging, nesting)	Ground surveys and standardised methodology for counting birds

Table 4-2: Assessment criteria for baseline data review

Year of most recent data capture	Duration of monitoring program	Frequency of data capture	Similarity of methods to Joint Industry SMP	Similarity of parameters to Joint Industry SMP
High = 2019–2024	High = > 4 years	High = 4+ sampling trips per year	High	High
Medium = 2013–2018	Medium = 2–4 years	Medium = 2–3 sampling trips per year	-	-
Low = <2012	Low = <2 years	Low = one-off sampling trip	Low	Low

Table 4-3: Proposed priority monitoring locations versus SMPs for the worst-case spill scenarios in the North West Shelf OSM-BIP Combined EMBA

Grouping / Location	SMP									
	Water quality impact assessment	Sediment quality impact assessment	Intertidal and coastal habitat assessment	Seabirds and shorebirds	Marine mega-fauna assessment – reptiles	Marine mega-fauna assessment – whale sharks, dugong and cetaceans	Benthic habitat assessment	Marine fish and elasmobranch assemblages assessment	Fisheries impact assessment	Heritage and social impact assessment
Dampier Archipelago										
Eighty Mile Beach				Shorebirds	Flatback turtle					
Ningaloo Coast North (includes Exmouth Gulf)										
Ningaloo Coast North and Ningaloo Coast South (includes Ningaloo World Heritage Area)					Turtle	Whale shark				
Karratha-Port Hedland					Flatback turtle					
Port Hedland- Eighty Mile Beach										
Southern Islands Coast										
Northern Islands Coast										
Barrow Island					Flatback turtle					
Bedout Island										
Lowendal Islands				Shearwater	Turtles at Varanus Is					
Montebello Islands										

Grouping / Location	SMP									
	Water quality impact assessment	Sediment quality impact assessment	Intertidal and coastal habitat assessment	Seabirds and shorebirds	Marine mega-fauna assessment – reptiles	Marine mega-fauna assessment – whale sharks, dugong and cetaceans	Benthic habitat assessment	Marine fish and elasmobranch assemblages assessment	Fisheries impact assessment	Heritage and social impact assessment
Muiron Islands										
Thevenard Island					Flatback turtle					
Reefs, Shoal, Banks										
Key										
	First-strike monitoring priority									
	Lower priority for first-strike monitoring									

5. OSM organisational structure

Santos uses the ICS to respond to incidents and therefore adopts the key roles and responsibilities used in this system, as described in the activity EPs and/or OPEPs. The IMT will be responsible for coordinating OSM activities, which will be implemented by the Planning Section within the IMT, with support from each Section, in particular the Operations Section.

The full Santos IMT structure is shown in the activity specific OPEPs. Where the WA DoT is the Control Agency, the IMT will be managed through coordinated command and Santos will still be expected to continue monitoring activities in State waters, with oversight from the WA DoT.

Figure 5-1 illustrates the structure of the IMT, including key OSM roles during the response phase. The IMT Incident Commander is ultimately accountable for managing the response operation, which includes this plan. Depending on the scale of the event, individual people may perform multiple roles; similarly, multiple people may share the same role.

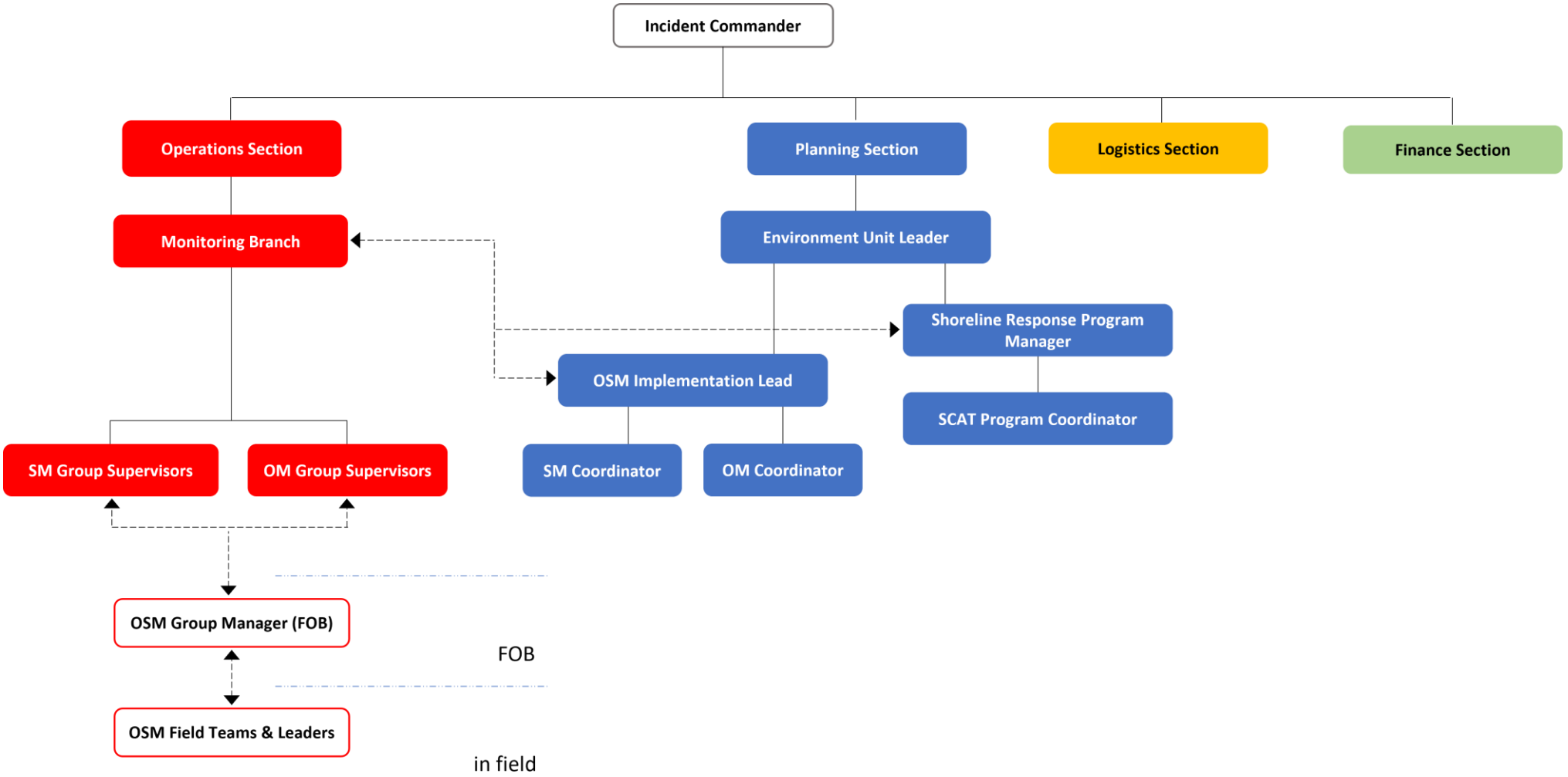


Figure 5-1: Santos IMT structure with key OSM roles

6. OSM roles and responsibilities

OSM roles and responsibilities are listed in Section 10.13.2 of the Joint Industry OSM Framework. Table 6-1 outlines the roles held by Santos and the OSM Services Provider.

During the post-response phase the Santos Environment Unit Lead and the Santos OSM Implementation Lead and/or OSM Services Provider OSM Implementation Lead will continue to be responsible for the coordination and delivery of monitoring plans.

Table 6-1: Roles and responsibilities for OSM

Role	Held by
Environment Unit Lead	Santos (IMT)
OSM Implementation Lead	Santos / OSM Services Provider
Operational Monitoring Coordinator and/or Scientific Monitoring Coordinator	OSM Services Provider
OM and/or SM Group Supervisors and Managers	Santos / OSM Services Provider
OSM Field Teams	OSM Services Provider

7. Mobilisation and timing of OMP and SMP implementation

Table 7-1 provides an indicative implementation schedule for OMPs and SMPs in the North West Shelf OSM-BIP Combined EMBA and adjacent waters. ‘Implementation’ of an OMP/SMP is defined as being ready, at the point of staging or departure, to mobilise for monitoring. If the monitoring plan is desktop-based, implementation is defined as commencing the work (e.g. computer model inputs). Refer to activity specific OPEPs for an indication of worst-case minimum contact times based on stochastic modelling (stochastic modelling represents all possible outcomes that could potentially occur, in reality, only a subset of locations will likely be contacted during a spill event).

Due to short contact times, there may be instances where post-spill pre-impact monitoring is not feasible. For these locations, and where baseline data does not exist, or may not be recent and applicable, the application of a BACI design may not be possible. The finalisation of each SMP design will consider this and may need to include alternative designs (e.g. data from an expected BACI design may need to be analysed as a Gradient Approach).

Table 7-1: Indicative OMP and SMP implementation schedule for OSM activities if initiation criteria are met

Proximity to spill source	Monitoring type	0–48 hours from OSM activation	Within 72 hours of OSM activation	~5-7 days from OSM activation	1-2 weeks from OSM activation	Ongoing
Spill site and surrounding waters	OM	Activation of OMP Team Leads. Finalise OMPs. Commence activation and mobilisation of OM personnel.	• OMP: Hydrocarbon Properties And Weathering Behaviour, where resources are available (e.g. Supply Vessel with onboard sampling equipment). • OMP: Water Quality Assessment • OMP: Sediment Quality Assessment • OMP: Air Quality Modelling • OMP: Marine Fauna Assessment • OMP: Surface Chemical Dispersant Effectiveness (commencing with Tier 1 SMART Protocol) • Continue to finalise OMPs. • Continue to activate and mobilise OM personnel.	Continued (as per on-going arrangements)	Continued (as per on-going arrangements)	As results from implemented OMPs are available, data are provided to relevant personnel in IMT (e.g. Situation/Intelligence Unit) and used in the Incident Action Planning process for the next operational period. OMP is redesigned or reallocated according to the specifics of the actual spill.
	SM	Commence activation and mobilisation process. Activation of SMP Team Leads.	• Continue to activate and mobilise personnel. • Work on finalising SMPs.	• SMP: Water quality impact assessment • SMP: Sediment quality impact assessment • SMP: Benthic Habitat Assessment • SMP: Marine fish and elasmobranch assemblages assessment	Continued	Continue SMP monitoring until termination criteria are met
Sensitive receptors (including	OM	Activation of OMP Team Leads.	• OMP: Hydrocarbon properties and	Continued (as per on-going arrangements)	Continued (as per on-going arrangements)	As results from implemented OMPs are available, data are

Proximity to spill source	Monitoring type	0–48 hours from OSM activation	Within 72 hours of OSM activation	~5-7 days from OSM activation	1-2 weeks from OSM activation	Ongoing
shorelines, reefs, banks and shoals) predicted to be contacted within 7 days		Finalise OMPs. Commence activation and mobilisation of OM personnel.	weathering behaviour at sea • OMP: Water quality assessment • OMP: Sediment quality assessment • OMP: Shoreline clean-up assessment • OMP: Marine fauna assessment • Continue to finalise OMPs. • Continue to activate and mobilise OM personnel.			provided to relevant personnel in IMT (Situation Unit Lead) and used in the Incident Action Planning process for the next operational period. OMP is redesigned or reallocated according to the specifics of the actual spill until termination criteria are met
	SM	Activation of SMP Team Leads and finalisation of SMPs	Continue to activate and mobilise personnel. Work on finalising SMPs.	• SMP: Water Quality Impact Assessment • SMP: Sediment Quality Impact Assessment • SMP: Benthic Habitat Assessment • SMP: Intertidal and Coastal Habitat Assessment • SMP: Seabirds and Shorebirds • SMP: Marine Mega-fauna Assessment-Reptiles • SMP: Marine Mega-fauna Assessment-Cetaceans, Whale Sharks, Dugong • SMP: Marine Fish and Elasmobranch Assemblages assessment	Continued.	Continue SMP implementation until termination criteria are met.

Proximity to spill source	Monitoring type	0–48 hours from OSM activation	Within 72 hours of OSM activation	~5-7 days from OSM activation	1-2 weeks from OSM activation	Ongoing
				• SMP: Commercial and recreational fisheries impact assessment • SMP: Heritage Assessment • SMP: Social Impact Assessment		
Sensitive receptors (including shorelines, reefs, banks and shoals) predicted to be contacted week 1-2	OM	-	-	• Additional Activation of OMP Team Leads. • Commence activation and mobilisation of additional OM personnel.	• Continue to finalise OMPs. • Continue to activate and mobilise OM personnel. • OMP: Hydrocarbon properties and weathering behaviour at sea • OMP: Water quality assessment • OMP: Sediment quality assessment • OMP: Shoreline clean-up assessment • OMP: Marine fauna assessment	As results from implemented OMPs are available, data are provided to relevant personnel in IMT (Situation Unit Lead) and used in the Incident Action Planning process for the next operational period. OMP is redesigned or reallocated according to the specifics of the actual spill until termination criteria are met
	SM	-	-	• Additional Activation of SMP Team Leads. • Commence activation and mobilisation of additional SM personnel.	• SMP: Water quality impact assessment • SMP: Sediment quality impact assessment • SMP: Marine mega-fauna assessment - reptiles • SMP: Marine fish and elasmobranch assemblages assessment • SMP: Intertidal and coastal habitat assessment	Continue SMP monitoring until termination criteria are met

Proximity to spill source	Monitoring type	0–48 hours from OSM activation	Within 72 hours of OSM activation	~5-7 days from OSM activation	1-2 weeks from OSM activation	Ongoing
					• SMP: Seabirds and shorebirds • SMP: Benthic habitat assessment • SMP: Commercial and recreational fisheries impact assessment • SMP: Heritage Assessment • SMP: Social Impact Assessment	

8. Resourcing requirements

To guide resourcing requirements, the spill scenario most likely to require the greatest first-strike and on-going capability was selected from those informing the North West Shelf OSM-BIP Combined EMBA. Selection was based on stochastic modelling results (refer to Table 2-1), focussing on the scenario with the greatest predicted number of locations contacted at the low thresholds (Section 2.1) within 7 days; followed by the greatest number of locations contacted with 7-14 days; and at the highest contact probabilities. Other factors influencing the selection of the scenario with the highest capability requirements were location of the spill, proximity to receptors, and hydrocarbon properties. The Ningaloo Vision Production Well Leak of 10,236 m^3 of Van Gogh Crude over 100 days was determined to be Santos' worst-case spill scenario requiring the greatest OSM capability in the North West Shelf Region. This scenario was selected as having the greatest resourcing demand on OSM capability as it had the highest number of shoreline locations predicted to be contacted within the first 7 days (first-strike) and 7-14 days. Shoreline locations typically require activation of more OMPs and SMPs to assess impacts to emergent features and receptors, whereas submerged receptors (e.g. banks, reefs and shoals) have an absence of emergent features and therefore will not require the corresponding OMPs and SMPs (e.g. SCAT, intertidal and coastal habitats, shorebirds) to be monitored.

To further guide first-strike resource requirements for OSM, deterministic modelling was undertaken and the run with the most receptors contacted where shoreline accumulation exceeded 10 g/m^2 within 7.0 days was selected. Run 102 had the most receptors contacted by shoreline accumulation ≥10 g/m^2 within 7 days, including Ningaloo Coast North, Muiron Islands and Southern Islands Coast; and additional receptors contacted within 7-14 days, including Exmouth Gulf Coast, Thevenard Island and Barrow Island (Table 8-1).

The resources required to assist the IMT in the coordination and management of OSM for this worst-case scenario (Ningaloo Vision Production Well Leak run 102) are outlined in Table 8-2. The resources required to commence OM and SM components during weeks 1-2 are presented in Table 8-3 and Table 8-4 respectively, which are based on the locations requiring baseline review in Section 2.2, the implementation schedule outlined in Table 7-1, and the worst-case deterministic trajectory (Ningaloo Vision Production Well Leak run 102) outlined in Table 8-1. If required, additional resources will be mobilised from weeks 2-3 onwards via the OSM Services Provider Contract, which includes provision of scale-up resources.

Note: Each new activity will be assessed, as outlined in Section 1.1 and Appendix A, to determine whether their spill scenario(s) exceed the resourcing requirements of Ningaloo Vision Production Well Leak run 102.

Table 8-1: Deterministic modelling results (Run 102) - Ningaloo Vision Production Well Leak of 10,236 m^3 of Van Gogh Crude over 100 days (GHD, 2024)

Location	Arrival time (days) for deterministic run No. 102			
	Shoreline Accumulation ≥10 g/m^2	Floating oil ≥1 g/m^2	Total Entrained Oil ≥10 ppb	Dissolved Hydrocarbons ≥ 10 ppb
Ningaloo Coast North	3.2	NC	3.5	NC
Muiron Islands	4.9	NC	NC	NC
Southern Islands Coast	6.7	NC	6.3	NC
Exmouth Gulf Coast	7.8	NC	NC	NC
Thevenard Island	9.0	NC	NC	NC
Barrow Island	10.6	NC	10.9	NC
Shark Bay - Coast Outer	65.9	NC	88.3	NC
Jurien Bay-Yanchep	105.9	NC	NC	NC
Augusta-Walpole	106.0	NC	NC	NC
Abrolhos - Outer Island Shoals*	NC	NC	70.7	NC
Montebello AMP	NC	NC	11.2	NC
Ningaloo - Outer Coast North	NC	NC	2.4	NC
Shark Bay AMP	NC	NC	88.1	NC
Abrolhos West	NC	NC	122.2	NC
Ningaloo - Outer NW*	NC	NC	1.6	NC

Location	Arrival time (days) for deterministic run No. 102			
	Shoreline Accumulation ≥10 g/m^2	Floating oil ≥1 g/m^2	Total Entrained Oil ≥10 ppb	Dissolved Hydrocarbons ≥ 10 ppb
Offshore Ningaloo*	NC	NC	1.2	NC
Abrolhos - Offshore NW*	NC	NC	58.8	NC
Abrolhos - Offshore Perth North*	NC	NC	123.8	NC

Submerged receptor that has no features above the sea surface. Modelling indicates 'contact' with these receptors when the hydrocarbons pass over the receptor on the sea surface.

NC: No contact to receptor predicted for specified threshold

Table 8-2: Resources required for key OSM coordination roles

Role	Resources required	Arrangement
OSM Implementation Lead (Santos / OSM Services Provider)	1 x OSM Implementation Lead	Oil Spill Response Limited (OSRL) OSM Supplementary Service Agreement
Operational Monitoring Coordinator and Scientific Monitoring Coordinator (OSM Services Provider)	1 x Operational Monitoring Coordinator 1 x Scientific Monitoring Coordinator	
OM and/or SM Group Supervisors and Managers (Santos / OSM Services Provider)	1 x OM Group Supervisor 1 x SM Group Supervisor 1 x OM Group Manager 1 x SM Group Manager	

Table 8-3: Resources required for implementing operational monitoring plans for the identified worst-case scenario from the North West Shelf OSM-BIP Combined EMBA

OMP	Week 1 (total)	Week 2 (total)	Arrangement
Hydrocarbon properties and weathering behaviour at sea)*	1 team (spill site and surrounds) 1 team per site (e.g. for worst-case estimating as per Table 8-1 this amounts to 3 sites [Ningaloo Coast North, Muiron Islands and Southern Islands Coast[#]]) Total 4 teams	1 team (spill site and surrounds) 1 team per site (e.g. for worst-case estimating as per Table 8-1 this amounts to 6 sites [Ningaloo Coast North, Muiron Islands and Southern Islands Coast, Exmouth Gulf Coast, Thevenard Island and Barrow Island]) Total 7 teams Note: these resources may not be required if relevant scientific monitoring components initiation criteria have been triggered.	OSRL OSM Supplementary Service Agreement Santos Contracted Vessel Providers Laboratory arrangements
Shoreline clean-up assessment	Detail on resources required for SCAT are presented in the activity-specific OPEP		AMOSC Participant Member Agreement and/or OSRL OSM Supplementary Service Agreement Santos Contracted Vessel Providers State/Territory Response Teams and AMSA National Response Team
Surface chemical dispersant effectiveness and fate	1 team for visual observations, which may be performed by trained aerial observers used during monitor and evaluate if trained in observation and verification of chemical dispersant effectiveness For water quality observations, refer to OMP: Water quality assessment		OSRL OSM Supplementary Service Agreement AMOSC Participant Member Agreement Santos Contracted Vessel Providers
Subsea dispersant injection monitoring	No subsea dispersant injection until week 2 due to transportation requirements	1 team	OSRL OSM Supplementary Service Agreement

OMP	Week 1 (total)	Week 2 (total)	Arrangement
			AMOSC Participant Member Agreement Santos Contracted Vessel Providers
Water quality assessment*	Refer to OMP: Hydrocarbon properties and weathering behaviour at sea resourcing* (all sites)		OSRL OSM Supplementary Service Agreement Santos Contracted Vessel Providers
Sediment quality assessment*	Refer to OMP: Hydrocarbon properties and weathering behaviour at sea resourcing* (all sites)		OSRL OSM Supplementary Service Agreement Santos Contracted Vessel Providers
Marine fauna assessment	1 team to conduct initial aerial surveys for all sites (2 observers per aircraft) Note: these resources may not be required if relevant scientific monitoring components initiation criteria have been triggered.		OSRL OSM Supplementary Service Agreement Santos Contracted Vessel Providers Aviation contractors
Air quality modelling (responder health and safety)	1 model	1 model	RPS via Santos contract

** Initial co-mobilisation between OMP: Hydrocarbon properties and weathering behaviour at sea, OMP: Surface chemical dispersant effectiveness and fate, OMP: Water quality assessment and OMP: Sediment quality assessment*

[#] Specific locations are mentioned for planning and guidance purposes based on a worst case planning approach. In the event of an actual spill, other locations and/or receptors may be contacted. This would be identified and managed as part of implementation as per the guidance in Section 13.

Table 8-4: Resources required for implementing scientific monitoring plans for the identified worst-case scenario from the North West Shelf OSM-BIP Combined EMBA

SMP	Week 1 (total)	Week 2 (total)	Arrangement
Water quality impact assessment	1 team (spill site and surrounds) 1 team per site (e.g. for worst-case estimating as per Table 8-1 this amounts to 3 sites [Ningaloo Coast North, Muiron Islands and Southern Islands Coast[#]]) Total 4 teams Note: can initially be performed by the same team as OMP: Water quality assessment. This SMP may replace OMP: Water quality assessment if the OMPs termination criteria are triggered	1 team (spill site and surrounds) 1 team per site (e.g. for worst-case estimating as per Table 8-1 this amounts to 6 sites [Ningaloo Coast North, Muiron Islands and Southern Islands Coast, Exmouth Gulf Coast, Thevenard Island and Barrow Island]) Total 7 teams Note: can initially be performed by the same team as OMP: Water quality assessment. This SMP may replace OMP: Water quality assessment if the OMPs termination criteria are triggered	OSRL OSM Supplementary Service Agreement Santos Contracted Vessel Providers Laboratory arrangement
Sediment quality impact assessment	Refer to SMP: Water quality impact assessment* (all sites)		OSRL OSM Supplementary Service Agreement

SMP	Week 1 (total)	Week 2 (total)	Arrangement
			Santos Contracted Vessel Providers Laboratory arrangement
Intertidal and coastal habitat assessment	1 team per site (e.g. for worst-case estimating as per Table 8-1 this amounts to 3 sites [Ningaloo Coast North, Muiron Islands and Southern Islands Coast]) Total 3 teams	1 team per site (e.g. for worst-case estimating as per Table 8-1 this amounts to 6 sites [Ningaloo Coast North, Muiron Islands and Southern Islands Coast, Exmouth Gulf Coast, Thevenard Island and Barrow Island] Total 6 teams	OSRL OSM Supplementary Service Agreement Santos Contracted Vessel Providers Laboratory arrangement
Seabirds and shorebirds	Based on worst-case estimating as per Table 8-1: 1 team to conduct initial aerial surveys for Ningaloo Coast North, Muiron Islands and Southern Islands Coast (2 observers per aircraft) 1 team to conduct initial aerial surveys for Muiron Islands and Onslow region (2 observers per aircraft) Total 1 team Note: can initially be performed by the same team as OMP: Marine fauna assessment – seabirds and shorebirds. This SMP may replace OMP: Marine fauna assessment – seabirds and shorebirds if the OMPs termination criteria are triggered	Based on worst-case estimating as per Table 8-1: 1 team to conduct aerial surveys for Ningaloo Coast North, Muiron Islands and Southern Islands Coast (2 observers per aircraft) 1 team to conduct initial aerial surveys for, Exmouth Gulf Coast, Thevenard Island and Barrow Island (2 observers per aircraft) Total 2 aerial teams 1 team to conduct vessel-based surveys per site (Ningaloo Coast North, Muiron Islands and Southern Islands Coast, Exmouth Gulf Coast, Thevenard Island and Barrow Island) (surveys would include all fauna [birds, reptiles, cetaceans, dugong and whale shark]) Total 6 vessel-based teams 1 team to conduct ground-based surveys per site (Ningaloo Coast North, Muiron Islands and Southern Islands Coast, Exmouth Gulf Coast, Thevenard Island and Barrow Island) (1 experienced ornithologists per team) Total 6 ground-based teams	OSRL OSM Supplementary Service Agreement Santos Contracted Vessel Providers Laboratory arrangement
Marine mega-fauna assessment (whale shark, dugong and cetaceans)	Aerial surveys refer to SMP: Seabirds and shorebirds This SMP may replace the relevant OMP: Marine fauna assessment if the OMPs termination criteria are triggered	Aerial surveys refer to SMP: Seabirds and shorebirds Vessel surveys refer to SMP: Seabird and shorebirds	OSRL OSM Supplementary Service Agreement Santos Contracted Vessel Providers Laboratory arrangement

SMP	Week 1 (total)	Week 2 (total)	Arrangement
Marine mega-fauna assessment (reptiles)	Aerial surveys refer to SMP: Seabirds and shorebirds This SMP may replace the relevant OMP: Marine fauna assessment if the OMPs termination criteria are triggered	Aerial surveys refer to SMP: Seabirds and shorebirds Vessel surveys refer to SMP: Seabird and shorebirds Ground based survey refer to SMP: Seabird and shorebirds (including 1 member experienced with ground turtle surveys)	OSRL OSM Supplementary Service Agreement Santos Contracted Vessel Providers Laboratory arrangement
Benthic habitat assessment	1 team (spill site and surrounds) 1 team per site (e.g. for worst-case estimating as per Table 8-1 this amounts to 3 sites [Ningaloo Coast North, Muiron Islands and Southern Islands Coast]) Total 4 teams	1 team (spill site and surrounds) 1 team per site (e.g. for worst-case estimating as per Table 8-1 this amounts to 6 sites [Ningaloo Coast North, Muiron Islands and Southern Islands Coast, Exmouth Gulf Coast, Thevenard Island and Barrow Island]) Total 7 teams	OSRL OSM Supplementary Service Agreement Santos Contracted Vessel Providers Laboratory arrangement
Marine fish and elasmobranch assemblages assessment	1 team (spill site and surrounds) 1 team per site (e.g. for worst-case estimating as per Table 8-1 this amounts to 3 sites [Ningaloo Coast North, Muiron Islands and Southern Islands Coast]) Total 4 teams	1 team (spill site and surrounds) 1 team per site (e.g. for worst-case estimating as per Table 8-1 this amounts to 6 sites [Ningaloo Coast North, Muiron Islands and Southern Islands Coast, Exmouth Gulf Coast, Thevenard Island and Barrow Island]) Total 7 teams	OSRL OSM Supplementary Service Agreement Santos Contracted Vessel Providers Laboratory arrangement
Fisheries impact assessment	Total 2 teams to cover all relevant Commonwealth and State fisheries.		OSRL OSM Supplementary Service Agreement Santos Contracted Vessel Providers Laboratory arrangement
Heritage features assessment	1 team	1 team	OSRL OSM Supplementary Service Agreement Santos Contracted Vessel Providers Laboratory arrangement
Social impact assessment	1 team	1 team	OSRL OSM Supplementary Service Agreement

[#] *Specific locations are mentioned for planning and guidance purposes based on a worst case planning approach. In the event of an actual spill, other locations and/or receptors may be contacted. This would be identified and managed as part of implementation as per the guidance in Section 13.*

** Initial co-mobilisation between SMP: Water quality impact assessment and SMP: Sediment quality impact assessment.*

9. Capability arrangements

Santos is a Member of the OSRL OSM Supplementary Service Agreement, which provides shared OSM Annual Services and Response Services to members who have subscribed this supplementary service. This OSM Supplementary Service Agreement includes access to OSRL's sub-contracted Monitoring Service Providers in Australia and internationally (who will report through OSRL) to deliver monitoring capability.

Details of OSM services are provided in Table 9-1. Santos will maintain responsibility for implementing OMP: Air Quality Modelling (responder health and safety).

OSRL (referred to as the OSM Services Provider in this BIP), via the OSM Supplementary Service Agreement is contracted to provide Members with a monthly Capability Register, which details personnel requirements for OMPs/SMPs, numbers of available personnel and competencies for service provider and sub-contracted personnel.

Personnel listed on the monthly update are accessible following a Member's initial activation of OSM Services.

Table 9-1: OSM services provider preparedness and activation / monitoring services

OSM Services Provided During Preparedness and Activation / Monitoring Phases
Preparedness[3]
24/7 Duty Manager accessed through 24 hr. hotline
Provision of suitably trained operational monitoring personnel
Monthly reports on personnel and equipment availability
Access to OSM Services Provider's sub-contracted Monitoring Service Providers
Access to OSM Services Provider's network of laboratories and equipment providers
Activation / Monitoring[4]
Provision of an OSM Services Lead and OSM Implementation Lead to the Santos IMT within 12 hours of notification
Provision of a first-strike monitoring team within 72 hours of notification, ready to deploy from a nominated port(s) or staging location (e.g. Forward Operating Base [FOB])
Assisting Santos in the finalisation of monitoring plans
Provision of scientific monitoring personnel within 5-7 days of notification
Access to OSM Services Provider laboratories and equipment

9.1 Personnel competencies

The OSRL OSM Supplementary Service Agreement specifies the training and competency requirements for key OSM personnel consistent with the Joint Industry OSM Framework. Where the key OSM role is held by the Member, this is outlined in the Santos Crisis, Incident Management & Emergency Response Procedure (SMS-HSS-OS05-PD01) and Incident Management Plan (SO-00-ZF-00025).

In addition and where practicable, Santos will engage its most qualified local environmental advisors in the initial stages of the monitoring program to help activate and mobilise monitoring teams and support the OSM Services Provider in the finalisation of monitoring designs.

9.2 Equipment

Equipment requirements are listed in the individual OMPs and SMPs. A generalised breakdown of equipment types and the source is listed in Table 9-2.

In accordance with the OSRL OSM Supplementary Service Agreement, the OSM Services Provider will provide specialised field monitoring equipment to implement individual OMPs and SMPs. Santos will remain responsible for support and field logistics, including monitoring platforms (e.g. vessels, vehicles and aircraft), flights and accommodation for personnel and transportation/couriers for samples to be sent back to laboratories.

[3] *Defined as Annual OSM Services in OSM Supplementary Service Agreement*

[4] *Defined as Response Services in OSM Supplementary Service Agreement*

Santos also maintains its own initial sampling kits, as shown in Table 9-2.

Availability of key equipment will be listed in the OSM Services Provider's Equipment Register.

Table 9-2: OSM equipment

Equipment type	Source
Santos and third-party equipment	
Desktop equipment (e.g. Oil Spill Response Atlas, GIS)	Coordinated through IMT GIS Team
Logistical equipment (e.g. in-field accommodation, vessels, aircraft)	Refer to list of external support agencies and contracts held by Santos as listed in the activity specific OPEPs
Dispersant shake test kits (initial shake jar test only)	Santos (2 x test kits in Exmouth), AMSA (2 x test kits in Fremantle; 2 x test kits in Karratha)
Oil sampling kits (full kit) – 1 located on Varanus Island, 1 located in Exmouth	Santos
Oil sampling kits (rapid kit) – 2 located on Varanus Island, 1 located in Exmouth	Santos
Bulk oil sampling bottles	Intertek and/or Leeder Analytical (via Santos managed contract)
OSM Services Provider equipment	
In-field specialised monitoring equipment (e.g. fluorometers, sample bottles, ROVs)	Coordinated through the OSM Services Provider's OSM response and implementation services

9.3 Exercises

The OSM Services Provider, via the OSM Supplementary Service Agreement, is contracted to maintain an OSM Services Annual Assurance Program. As part of this program, the OSM Services Provider conducts a number of different exercise types, which are outlined in Table 9-3. The purpose of this testing is to confirm that the response arrangements and capability in place are available when needed and function as intended. Following the Notification and Tabletop excises listed in Table 9-3, the OSM Services Provider will prepare exercise reports and track any action items to complete.

In addition, Santos will conduct an annual notification test of the OSM Services Provider, outlined in Santos Offshore Oil Spill Response Readiness Guideline (7710-650-GDE-0001).

Table 9-3: Exercise types

Exercise Type	Description	Frequency
Assurance Program Workshop	The outputs from the annual OSM Services and Assurance Program Workshop will form the basis of the OSM Annual Services and Assurance Program for the coming Contract Year.	Annually
Notification exercise	Test procedures to notify and activate the OSM Services, including subcontracted Monitoring Service Providers.	Annually
Tabletop exercise	A discussion-based exercise that involves no physical deployment of personnel or equipment. The exercise will simulate all actions to validate the enactment of plans, procedures, protocols, roles and tasks during a simulated incident.	Annually
Desktop review	A desktop review of capability for any OMP and/or SMP not tested during the annual table-top exercise. The review can also be based on the outcomes/findings of the OMPs and/or SMPs that were tested.	Annually

10. Capability assessment

Table 10-1 provides a comparison of Santos' worst-case OSM capability requirements (as outlined in Table 8-3 and Table 8-4) with the OSRL OSM Supplementary Service Agreement capability to implement each OMP and SMP. Where there are synergies between OMPs and SMPs, the same personnel may implement multiple OMPs/SMPs simultaneously, as identified in Table 10-1. For example, personnel assigned to the OMP for Hydrocarbon Properties and Weathering Behaviour at Sea can also carry out the OMPs for Water Quality Assessment and Sediment Quality Assessment concurrently.

Table 10-1: OSM capability

Component	Total personnel required (Weeks 1–2) [5]	Personnel available via OSM Services Provider	Personnel available via OSROs	Santos	Total personnel available
OSM Personnel embedded in IMT	1 OSM Implementation Lead 1 OM Coordinator 1 SM Coordinator 2 Group Supervisors 2 Group Managers	1 OSM Implementation Lead 1 OM Coordinator 1 SM Coordinator 1 OM/SM Group Manager	-	1 OSM Implementation Lead (initial) 3 x Group Supervisors and/or Group Managers	2 OSM Implementation Leads 1 OM Coordinator 1 SM Coordinator 2 Group Supervisors 2 Group Managers
OMPs					
Hydrocarbon properties and weathering behaviour at sea*	7 teams	7 teams#	-	Initial sampling kits and procedures for untrained personnel to obtain samples[6]	7 teams
Shoreline clean-up assessment	As per activity specific OPEP				
Surface chemical dispersant effectiveness and fate	Visual observations: 1 team Water quality assessment – refer to OMP: Water quality assessment	1 visual observation team# Refer to OMP: Water quality assessment	4 AMOSC Staff 2 AMOSC Core Group trained personnel	7 Santos trained aerial observers	Visual observations: 1 team (OSM Services Provider) 4 AMOSC Staff 2 AMOSC Core Group trained personnel
Subsea chemical dispersant injection monitoring	1 team (week 2 onwards)	1 team#	-	-	1 team
Water quality assessment*	Refer to OMP: Hydrocarbon properties and weathering behaviour at sea				
Sediment quality assessment*	Refer to OMP: Hydrocarbon properties and weathering behaviour at sea				
Marine fauna assessment	1 aerial team	1 team#	N/A	N/A	1 team

[5] *If additional resources are required for week 3 onwards then this will be identified early in the monitoring process and Santos will activate additional contracted resources through its OSM Services Provider to increase capacity*

[6] *For Hydrocarbon properties and weathering behaviour at sea only*

Component	Total personnel required (Weeks 1–2) [5]	Personnel available via OSM Services Provider	Personnel available via OSROs	Santos	Total personnel available
Air quality modelling (responder health and safety)	1 model	-	-	RPS Contract for Air Quality Modelling held by Santos	RPS Contract for Air Quality Modelling held by Santos
SMPs					
Water quality impact assessment	7 teams Note: can initially be performed by the same team as OMP: Water quality assessment. This SMP may replace OMP: Water quality assessment if the OMPs termination criteria are triggered	7 teams[#]	-	-	7 teams
Sediment quality impact assessment	Refer to SMP: Water quality impact assessment* (all sites)				
Intertidal and coastal habitat assessment	6 teams	6 teams[#]	-	-	6 teams
Seabirds and shorebirds	2 aerial teams Note: can initially be performed by the same team as OMP: Marine fauna assessment – seabirds and shorebirds. This SMP may replace OMP: Marine fauna assessment – seabirds and shorebirds if the OMPs termination criteria are triggered 6 vessel teams (surveys would include all fauna [birds, reptiles, cetaceans, dugong and whale shark]) 6 ground-based teams	2 aerial teams[#] 6 vessel teams[#] 6 ground based teams (plus 1 team member per team experienced with ground turtle surveys – see Marine mega-fauna assessment [reptiles]) [#]	-	-	2 aerial teams 6 vessel teams 6 ground based teams (plus 1 team member per team experienced with ground turtle surveys – see Marine mega-fauna assessment [reptiles])
Marine mega-fauna assessment (whale shark, dugong and cetaceans)	Refer to SMP: seabirds and shorebirds				

Component	Total personnel required (Weeks 1–2) [5]	Personnel available via OSM Services Provider	Personnel available via OSROs	Santos	Total personnel available
Marine mega-fauna assessment (reptiles)	Aerial and vessel - Refer to SMP: seabirds and shorebirds Ground surveys - Refer to SMP: seabirds and shorebirds (plus 1 team member per team experienced with ground turtle surveys)	Refer to SMP: seabirds and shorebirds			
Benthic habitat assessment	7 teams	7 teams[#]	-	-	7 teams
Marine fish and elasmobranch assemblages assessment	7 teams	7 teams[#]	-	-	7 teams
Fisheries impact assessment	2 teams	2 teams[#]	-	-	2 teams
Heritage features assessment	1 team	1 team[#]	-	-	1 team
Social impact assessment	1 team	1 team[#]	-	-	1 team

** Initial co-mobilisation between OMP: Hydrocarbon properties and weathering behaviour at sea, OMP: Surface chemical dispersant effectiveness and fate, OMP: Water quality assessment and OMP: Sediment quality assessment.*

[#] During capability assessment, available personnel were allocated to one monitoring team only.

11. Document review

As part of the Environment Plan review cycle, this document will be reviewed annually and revised, if required, in accordance with the Santos Offshore Division Environment Management of Change Procedure (EA-91-IQ-10001). This could include changes required in response to one or more of the following:

- When major changes have occurred which affect Operational and/or Scientific Monitoring coordination or capabilities (e.g. change of services provider);
- Changes to the activity that affect Operational and/or Scientific Monitoring coordination or capabilities (e.g. a significant increase in spill risk);
- Changes to legislative context related to Operational and/or Scientific Monitoring (e.g. *Environment Protection and Biodiversity Conservation Act 1999* [EPBC Act] protected maters requirements);
- Following routine testing of the OSM if improvements or corrections are identified; or
- After a Level 2/3 spill incident.

The extent of changes made to this OSM Bridging Implementation Plan and resultant requirements for regulatory resubmission will be informed by the relevant Commonwealth regulations, i.e. the Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2009 Regulations (OPGGS (E) Regulations).

Part B – Implementation

Control Agencies and Jurisdictional Authorities

Section 4 of Santos OPEPs provide detailed information on Control Agency responsibilities, and should be referred to when planning operational and scientific monitoring activities, particularly in WA State Waters and along WA shorelines. Where the WA DoT is the Control Agency, OMP: Shoreline Clean-up Assessment will be implemented under their direction, with resources provided by Santos.

In addition, Section 7 of Santos OPEPs provide regulatory and stakeholder notification and reporting requirements. Whilst all notification and reporting will be performed by Santos IMT personnel, monitoring personnel should be aware of these requirements, and confirm all relevant notifications and reporting have been completed prior to undertaking monitoring activities.

The Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW) are the designated Jurisdictional Authority for all spills that contact the shorelines within Ashmore Reef AMP and Cartier Island AMP; the Santos IMT (as Control Agency for Commonwealth waters) will liaise with DCCEEW to direct resources for the purposes of shoreline assessment (and clean-up) activities.

12. Mobilisation and activation process

The Santos IMT Environment Unit Lead is responsible for activating OSM components, subject to approval from the Incident Commander. Table 12-1 outlines Santos' OSM activation process.

Table 12-1: OSM mobilisation and activation process

Responsibility	Task	Timeframe	Complete
Santos Environment Unit Lead	Review initiation criteria of OMPs and SMPs (provided in Table 9-1 (OMPs) and Table 9-2 (SMPs) of the Joint Industry Operational and Scientific Monitoring Framework) during the preparation of the initial Incident Action Plan (IAPs) and subsequent IAPs; and if any criteria are met, activate relevant OMPs and SMPs	Within 4 hours of spill notification	☐
	Obtain approval from Incident Commander to activate OSM Services Provider	Within 4 hours of spill notification	☐
	Initiate initial oil and water sampling, if safe and possible, using the procedures in Appendix D	Within 24 hours of spill notification	☐
	Contact OSM Services Provider and verbally notify their Duty Manager of the incident, requesting provision of OSM Implementation Lead (if required by Santos) to the IMT. Complete Call Off Order Form (Appendix E) and submit to OSM Services Provider[7] to confirm activation of OSM Services	Within 4 hours of spill notification	☐
	Provide monitor and evaluate data (e.g. aerial surveillance, fate and weathering modelling, tracking buoy data, current IAPs) to OSM Services Provider	Within 1 hour of data being received by IMT	☐
	Liaise with Santos' Logistics Section Chief to identify potential staging and departure location/s for monitoring activities. Provide this information to OSM Services Provider	Within 4-6 hours of spill notification	☐
	Record tasks in Personal Log	At time of completion of task	☐
Safety Officer (Santos)	Develop and maintain ICS 201-5 – Site Safety and Control Analysis (refer Santos Oil Spill Response HSE Management Manual [SO-91-RF-10016])	Within 6 hours of spill notification	☐

[7] *A copy of the Call Off Order Form is provided in Appendix E, however a copy of the Call-off Order Form will also be available via OSRL Duty Manager upon request.*

Responsibility	Task	Timeframe	Complete
Logistics Section Chief (Santos)	Commence arrangements for vessels, accommodation and transport to mobilise monitoring teams	Within 24 hours of spill notification	☐
OSM Services Provider	Duty Manager to activate relevant Monitoring Service Providers	Within 30 minutes of Call Off Order Form being received by OSM Services Provider	☐
	OSM personnel (OSM Implementation Lead and OM/SM Coordinators) requested by Titleholder (via Call Off Order Form) to be sent to Titleholder's IMT	Within 12 hours of notification being made to OSM Services Provider	☐
	Liaise directly with Environment Unit Lead to confirm which OMPs and SMPs are to be fully activated	Within 4 hours of monitor and evaluate data being received from IMT	☐
	Confirm availability of initial personnel and equipment resources	Within 5 hours of monitor and evaluate data being received from IMT	☐

13. Monitoring priorities

As described in Section 2 and Section 4, the available stochastic spill modelling has been analysed to understand the likely first-strike monitoring priorities. Table 4-3 provides a summary of available baseline data for receptors, to assist in identifying where post-spill, pre-impact monitoring should be prioritised.

The monitoring priorities provided in Section 2 and Table 4-3 are to be used for guidance when confirming monitoring priorities in consultation with key stakeholders and sub-contracted Monitoring Service Providers (including subject matter experts, where available) at the time of the spill. Table 13-1 provides a checklist to assist in the confirmation of monitoring priorities for individual spills.

Table 13-1: Checklist for determining monitoring priorities

Responsibility	Task	Timeframe	Complete
Santos Environment Unit Lead	Evaluate monitoring priorities in consultation with key stakeholders, including the appointed State / Territory Environmental Scientific Coordinator	Within 12 hours of monitor and evaluate data being received from IMT	☐
Santos Environment Unit Lead with input from OSM Services Provider	Confirm monitoring locations for activated OMPs and SMPs based on: • Current monitor and evaluate data (i.e. situational awareness data, including predicted time to receptor impact, aerial/vessel surveillance observations, tracking buoy data, satellite data); • Nature of hydrocarbon spill (i.e. subsea blow out, surface release, hydrocarbon characteristics, volume, expected duration of release); • Seasonality and presence of receptors impacted or at risk of being impacted; • Current information on transient and broadscale receptors (surface and subsea); • Current operational considerations (e.g. weather, logistics); • Nature of hydrocarbon spill (i.e. subsea blow out, surface release, hydrocarbon characteristics, volume, expected duration of release); • Monitoring priorities identified in Section 2; and • Existing literature, baseline data, and monitoring programs.	Within 12 hours of monitor and evaluate data being received from IMT	☐
	Using the results of the baseline data analysis in Table 4-3 and the information above, determine priority locations for post-spill, pre-impact monitoring	Within 12 hours of monitor and evaluate data being received from IMT	☐
	Confirm the need for any additional reactive baseline monitoring data for SMPs and determine suitable locations, noting that suitable control or reference sites may be outside of the EMBA	Within 12 hours of monitor and evaluate data being received from IMT	☐
	Continually re-evaluate monitoring priorities in consultation with Environment Unit Lead and relevant key stakeholders throughout spill response	Ongoing	☐

14. Protected Matters requirements

Table 14-1 provides a checklist to ensure monitoring personnel consider protected matters requirements in the finalisation of OMPs and SMPs.

Santos' Values and Sensitivities of the Marine and Coastal Environment (EA-00-RI-10062) outlines the management plans, recovery plans and conservation advice statements relevant for the protected matters within the EMBA that are likely to be relevant to the final design of the OMPs and SMPs. The Santos Values and Sensitivities of the Marine and Coastal Environment (EA-00-RI-10062) and Appendix B also includes relevant locations where these receptors are known to occur in order to expedite consideration of relevant information into finalised monitoring designs.

Table 14-1: Checklist for inclusion of protected matters into monitoring designs

Responsibility	Task	Complete
Santos Environment Unit Lead with input from OSM Services Provider	Review Monitoring, Evaluation and Surveillance data and available OMP data to determine likely presence and encounter of protected species in predicted trajectory of the spill	☐
	Review the relevant recovery plan/conservation advice/management plan in Santos Values and Sensitivities of the Marine and Coastal Environment (EA-00-RI-10062) and online protected matters search tool and determine if there have been any updates to the relevant conservation threats/actions. Integrate relevant considerations into the final monitoring design for affected OMPs and SMPs	☐
	Review restrictions on marine mammal buffer distances in SMP: Marine mega-fauna and ensure this is included in all relevant response and monitoring IAPs (e.g. Shoreline Protection Plan, Shoreline Clean-up Plan, OSM Plan), so that response and monitoring field teams maintain required buffer distances from fauna during operations	☐

15. Finalising monitoring design

The methods presented in the Joint Industry OMPs and SMPs are designed to allow the OSM Services Provider and their sub-contracted Monitoring Service Providers with the flexibility to modify the standard operating procedures, so that the latest research, technologies, equipment, sampling methods and variables may be used. Monitoring designs may also be varied in-situ, according to the factors presented in Section 10.6 of the Joint Industry OSM Framework.

Santos' checklist for finalising monitoring designs post-spill is provided in Table 15-1. The OSM Implementation Lead will be responsible for approving the finalised monitoring design used in the OMPs and SMPs.

Table 15-1: Checklist for finalising monitoring design

Responsibility	Task	Timeframe	Complete
Santos Environment Unit Lead with input from OSM Services Provider	Confirm survey objectives, sampling technique, for each initiated OMP and SMP	Within 48 hours of initial monitoring priorities being confirmed by IMT	☐
	Determine suitable sampling frequency	Within 48 hours of initial monitoring priorities being confirmed by IMT	☐
	Finalise standard operating procedures	Within 48 hours of initial monitoring priorities being confirmed by IMT	☐
	Review Table 10-4 of the Joint Industry OSM Framework to ensure potential impacts from response activities are considered and incorporated into relevant OMP/SMP designs	Prior to the finalisation of monitoring designs	☐
	Liaise with the Santos Environment Unit Lead to review the Environmental Performance Standards listed in the activity-specific OPEP and integrate checks into the monitoring design that will help determine if relevant Environmental Performance Standards are being met	Prior to the finalisation of monitoring designs	☐

Responsibility	Task	Timeframe	Complete
	Scientific monitoring: • Establish benchmarks and guidelines to be used • Confirm indicator species • Confirm parameters and metrics	Within 96 hours of initial monitoring priorities being confirmed by IMT	☐

16. Mobilisation of monitoring teams

When the monitoring design has been finalised for each OMP and SMP, the OSM Services Provider shall work in conjunction with Santos to develop and execute a monitoring mobilisation plan, which will be incorporated into the Incident Action Planning process.

The OSM Services Provider will be required to coordinate the availability of personnel and equipment for all monitoring programs, with the exception of OMP: Air Quality Modelling, which will be coordinated by Santos. Santos is responsible for flights, accommodation and victualing for field personnel. Santos will also be required to procure all vessels, aerial platforms and vehicles for OMP and SMP implementation.

A checklist for mobilising monitoring teams is provided in Table 16-1.

Note: OMP: Air quality modelling is a desk top assessment and should be mobilised as soon as practicable as it is not reliant on any mobilisation of field personnel.

Table 16-1: Checklist for mobilisation of monitoring teams

Responsibility	Task	Complete
OSM Services Provider with input from Santos Environment Unit Lead	Confirm availability of all monitoring personnel (noting required competencies in Section 9.1 and individual OMPs/SMPs)	☐
	Allocate number of teams, personnel, equipment and supporting resource requirements	☐
	Undertake HAZIDs as required and consolidate/review field documentation including safety plans, emergency response plans, and daily field reports	☐
	Develop site-specific health and safety plans which is compliant with health safety and environment systems (including call in timing and procedures)	☐
	Conduct pre-mobilisation meeting with monitoring team/s on survey objectives, logistics, safety issues, reporting requirements and data management collection requirements	☐
	Determine data management delivery needs of the IMT and process requirements, including data transfer approach and frequency/timing	☐
	Confirm data formats and metadata requirements with personnel receiving data	☐
	Logistics	
	Confirm Santos Logistics Section have arranged flights, accommodation, and car hire arrangements are in place	☐
	Develop field survey schedules, detailing staff rotation	☐
	Equipment	
	Confirm Santos Logistics Section have arranged survey platforms (vessel, vehicle, aircraft) as required to survey or access survey sites and ensure they are equipped with appropriate fridge and freezer space for transportation of samples (and carcasses if collecting)	☐
	Confirm Santos Logistics Section have arranged vessels with correct fit-out specifications (e.g. winches, Geographic Positioning System [GPS], satellite, deck crane, sufficient deck space, water supplies (fresh and/or salt), accommodation)	☐
	Confirm consumables (including personal protective equipment) have been purchased and will be delivered to required location	☐
	Liaise with NATA-accredited laboratories to confirm availability, limits of detection, sampling holding times, transportation, obtain sample analysis quotes and arrange provision of appropriate sample containers, Chain of Custody (CoC) forms and	☐

Responsibility	Task	Complete
	suitable storage options for all samples. Make arrangements for couriers (if necessary)	
	Confirm specialist equipment requirements and availability (including redundancy)	☐
	Check GPS units and digital cameras are working and that sufficient spare batteries and memory cards are available	☐
	Confirm sufficient equipment to allow integration of survey software and navigational systems (e.g. GPS, additional equipment and adaptors), and additional GPS units prepared	☐
	Confirm GPS survey positions (where available) have been Quality Assurance and Quality Control (QA/QC) checked and pre-loaded into navigation software/positioning system	☐
	Check field laptops, ensuring they have batteries (including spares), power cable, and are functional	☐
	Check if a first aid kit or specialist personal protective equipment (PPE) is required	☐
	Confirm arrangements for freight to mobilisation port is in place	☐

17. Permits and access requirements

Permit and access requirements apply to Marine Parks, Marine Protected Areas, restricted heritage areas, operational areas of industrial sites, defence locations, certain fauna and managed fisheries, as listed in Table 17-1. For a list of all relevant locations and fisheries refer to the Santos Values and Sensitivities of the Marine and Coastal Environment (EA-00-RI-10062).

The OSM Services Provider will work with Santos to request access and permit applications to all relevant Jurisdictional Authorities to conduct monitoring for OMPs and SMPs.

Safety Note: Due to the risk posed by unexploded ordnances, landing on Cartier Island or anchoring anywhere within the Cartier Island Marine Park is strictly prohibited without express prior written approval.

If anchoring is unavoidable due to emergency (e.g. extreme weather conditions), great care should be taken to ensure anchoring is on sand, and anchors do not drag.

Any metal objects or suspicious objects found in the reserve should not be touched or disturbed and reported immediately to the police and the Parks Australia Work Health and Safety Advisor on 02 6274 2369 or parkshealthandsafety@dcceew.gov.au .

Table 17-1: Permits required in EMBA

Receptor	Jurisdictional Authority	Relevant information on permits
Permits for monitoring fauna	DCCEEW DBCA	Any interactions involving nationally listed threatened fauna may require approval from DCCEEW (http://www.environment.gov.au/biodiversity/threatened/permits) WA- appropriate permits can be found at: https://www.dbca.wa.gov.au/licences-and-permits/fauna
State Marine Protected Area	DBCA	No specific permitting requirements exist for monitoring in WA marine protected areas, but additional information is available at: https://www.dbca.wa.gov.au/management/marine-planning
Ramsar wetland	DCCEEW	Additional information on Ramsar wetlands and how they are protected as a matter of national environmental significance under the EPBC Act is available at: https://www.environment.gov.au/epbc/what-is-protected/wetlands
Australian (Commonwealth) Marine Parks	Director of National Parks Parks Australia	Permit and licence application information for Marine Protected Areas (including monitoring) can be found at: https://onlineservices.environment.gov.au/parks/australian-marine-parks and https://onlineservices.environment.gov.au/parks/australian-marine-parks/permits Additional information on permitting requirements in Australian Marine Parks can be obtained through Parks Australia via email marineparks@environment.gov.au or phone 1800 069 352 Information on permits to access biological resources in Commonwealth areas can be found at: http://www.environment.gov.au/topics/science-and-research/australias-biological-resources/access-biological-resources-commonwealth
State Managed Fisheries	Department of Primary Industries and Regional Development (DPIRD)	No specific permitting requirements exist for WA Fisheries, but additional information is available at – https://www.fish.wa.gov.au/Fishing-and-Aquaculture/Pages/default.aspx
Commonwealth Managed Fisheries	Australian Fishing Management Authority	Commonwealth Managed Fisheries (scientific permit for research/monitoring in an Australian Fishing Zone) https://www.afma.gov.au/fisheries-services/fishing-rights-permits
Indigenous Cultural Heritage	Department of Planning, Lands and Heritage (DPLH)	Entry access permits to Aboriginal Lands in WA: https://www.wa.gov.au/service/aboriginal-affairs/aboriginal-heritage-conservation/apply-permit-access-or-travel-through-aboriginal-land Aboriginal heritage sites in WA: https://www.wa.gov.au/service/aboriginal-affairs/aboriginal-cultural-heritage/search-aboriginal-sites-or-heritage-places
Defence/restricted military area	Department of Defence	Unexploded Ordnance (mapping information): https://www.defence.gov.au/UXO/default.asp Maritime military firing practice and exercise areas: https://www.hydro.gov.au/n2m/2010/annual/n2m/9.pdf
Industry (e.g. operational zone of offshore oil or gas platform)	Operating company	Safety zones (up to 500 m from outer edge of well or equipment) – https://www.nopsema.gov.au/safety/safety-zones/
Shipwrecks	DCCEEW	Refer to the Underwater Cultural Heritage Act 2018 (Commonwealth): https://www.dcceew.gov.au/parks-heritage/heritage/underwater-heritage/underwater-cultural-heritage-act

18. Use of data in response decision-making

18.1 Operational monitoring to inform response activities

The OSM Services Provider is responsible for the collection of data by field teams, which shall be QA/QC checked by the Field Team Lead in accordance with the requirements listed in the finalised OMPs and SMPs (where applicable). Table 18-1 provides a checklist to assist in utilising OM data to inform decision making.

The Field Team Lead will be responsible for communicating data back to the Monitoring Branch via field reporting forms, debriefs and reports. Laboratory analysis reports should also be directed to the Monitoring Branch.

The OSM Implementation Lead is responsible for the interpretation and analysis of data. OMP data should be analysed rapidly so that it may be used to inform response planning and decisions in the current and/or next operating period. SMP data is designed to be more scientifically robust and long-term in nature and is not relied upon by the IMT for decision-making. Therefore, SMP data will be analysed more thoroughly by the OSM Implementation Lead.

Once OM data is analysed and checked by the Field Team Lead, it will be provided to the Monitoring Branch and OSM Implementation Lead , who will then distribute the data from each monitoring component to the relevant IMT Section. Table 18-2 provides guidance on the type of data generated from each OMP, which IMT Section / Unit requires the data and how the data may be used during a response. All SMP data received during a response will be received by the Planning Section via the Monitoring Branch.

Analysed data will then be incorporated into the Common Operating Picture (managed by the Situation Unit Lead) and used by the Environment Unit Lead during development of the operational NEBA, which would be included in the IAP for the current or next operating period.

As ultimately responsible for the IAPs, the Planning Section Chief will be required to utilise the OMP data to aid in decision making and determine if the response strategies can be commenced, continued, escalated, terminated, or if controls need to be put in place to manage impacts of the response activities. These decisions will be communicated to the broader IMT during regular situation debriefs.

Table 18-1: Checklist for utilising OMP data to inform IMT decision making

Responsibility	Task	Timeframe	Complete
OSM Services Provider - Field Team Lead	Data collected whilst implementing OMPs and SMPs is checked that it aligns with the requirements listed in the finalised OMPs and SMPs (where applicable)	Ongoing	☐
	OMP data provided to the IMT Situation Unit Lead	Daily and ongoing	☐
Shoreline Response Program Manager	Reports from OMP: Shoreline Clean-up Assessment will be provided to the IMT daily, detailing the assessed areas to maximise effective utilisation of resources.	Daily reporting	☐
Santos Situation Unit Lead	Incorporate OMP data into Common Operating Picture	Daily and ongoing	☐
Santos Environment Unit Lead	Incorporate OMP data into operational NEBA and IAP for the next operating period	Each operational period	☐

Table 18-2: Data generated from each OMP and how this may be used by IMT in decision-making

OMP	Data generated[8]	IMT Section requiring data	How data may be used by IMT
Hydrocarbon properties and weathering behaviour at sea	Hydrocarbon physical characteristics (e.g. viscosity, asphaltene content, fingerprinting, weathering ratios of hydrocarbon chains)	Planning Section to aid in response option selection / modification	Changes to the hydrocarbon properties will affect the window of opportunity for particular responses and the associated logistical requirements of these responses, such as use of chemical dispersants, recovery and pumping equipment suitability, hydrocarbon storage and hydrocarbon disposal requirements
Shoreline clean-up assessment	Assessment of shoreline character; assessment of shoreline oiling; recommendations for response activities; post-treatment surveys	Planning Section to aid in IAP development and response option selection / modification	• Confirmation of shoreline character, habitats and fauna present which may influence selection of response tactics (e.g. no mechanical recovery if turtles are known to be nesting); • Oil deposition and/or removal rate for a shoreline sector will help determine effectiveness of relevant tactics (e.g. shoreline protection and/or clean-up operations); • Assessment teams provide ground truthing of sites that are not possible via satellite imagery, therefore the IMT can rely on the recommendations of Assessment Teams (e.g. flagging access issues, suitable tactics, likely resourcing needs).
Surface chemical dispersant effectiveness and fate	Visual observations of dispersant efficacy; Fluorometric readings in water column (see also water quality assessment);	Environment Unit for use in operational NEBA; Planning Section to aid in IAP development; Operations Section to confirm dispersant effectiveness for decision-making purposes in current operations period.	Determine the effectiveness of dispersant in removing oil from sea surface and how dispersed oil is being distributed through the water column. This information can be used in NEBA to help decide if dispersants are being effective at minimising oil reaching sensitive receptors (NEBA to evaluate any trade-offs between receptors)
Subsea dispersant injection	Visual observations of dispersant efficacy; Fluorometric readings in water column (see also water quality assessment)	Source Control Branch to aid decision-making for other source control operations; Environment Unit for use in operational NEBA; Planning Section to aid in IAP development.	Determine efficacy of subsea dispersant in treating oil to help understand if injection should continue or be modified; understand the nature and extent of the subsea plume; and provide an initial assessment of potential ecological effects. This information can be used in NEBA to help decide if dispersants are being effective at minimising oil reaching sensitive receptors (NEBA to evaluate any trade-offs between receptors) and also if subsea dispersants are effectively reducing volatile organic compound (VOC) levels so that operations are within lower explosive limits (LEL)
Water quality assessment	Distribution of oil in water column and change in hydrocarbon concentrations (e.g. total recoverable hydrocarbons, BETEXN, PAH), physio-chemical parameters and dispersant detection	Situation Unit Lead to validate surveillance and modelling data; Planning Section for use in IAP	Confirm spatial extent of spill within the water column and verify spill modelling and surveillance data; extent of spill can in turn influence location of other OMP and SMP monitoring components and sites. Data can also influence ongoing use of dispersant through ongoing operational NEBA.

[8] *Summary only. For additional detail, please refer to individual OMPs. Also note data outputs will be reliant on finalised monitoring design.*

OMP	Data generated[8]	IMT Section requiring data	How data may be used by IMT
Sediment quality assessment	Distribution of oil in sediment and change in hydrocarbon concentrations (e.g. Total recoverable hydrocarbons, BETEXN, PAH)	Situation Unit Lead to validate surveillance and modelling data; Planning Section for use in IAP	Confirm spatial extent of spill; extent of spill can in turn influence location of other OMP and SMP monitoring components and sites
Marine fauna assessment	Rapid assessment of presence and distribution of marine fauna; evaluate impact of spill and response activities on fauna	Planning Section for use in IAP; Oiled Wildlife Unit/Division to help in developing Wildlife Response Sub-plan	Understanding of species, populations and geographical locations at greatest risk from spill impacts. IMT can use this information to help qualify locations with highest level of protection priority (e.g. dugong nursery area is at risk of high contact therefore dispersant use closest to spill source may be a preferred option); understanding the impacts of spill response activities can help IMT to modify or terminate activities if they are assessed as creating more harm than the oil alone (e.g. large shoreline clean-up teams and staging areas may disturb shorebird nesting resulting in adults abandoning chicks)
Air quality modelling (responder health and safety)	Modelled outputs of VOCs	Operations Section to help determine safe zones in close vicinity of spill; Planning Section for use in IAP	Determine safe distances from spill source for response personnel; determine the presence and persistence of volatile organic compounds to know if response areas are safe for personnel

18.2 Impacts from response activities

Table 10-4 of the Joint Industry OSM Framework outlines the potential impacts from response activities and the relevant OMP/SMP for monitoring impacts. For example, if shoreline clean-up was being considered as a response option, then possible impacts resulting from that activity could include physical presence, ground disturbance, water/sediment quality decline and lighting/noise impacts to fauna.

When finalising monitoring designs, the OSM Implementation Lead shall review Table 10-4 of the Joint Industry OSM Framework and the relevant activity EP to ensure potential impacts from response activities are considered and incorporated into relevant OMP/SMP designs.

18.3 Operational monitoring of effectiveness of control measures and to ensure EPS are met

As stated in Table 15-1, when finalising monitoring designs, the OSM Implementation Lead and Santos Environment Unit Lead (or delegate) shall review the Environmental Performance Standards (EPSs) listed in the activity specific OPEP and integrate checks into the monitoring design that will help determine if relevant EPSs are being met.

Table 18-3 provides relevant EPSs listed in Santos' activity-specific OPEPs and how operational monitoring may be able to confirm it is being met.

Table 18-3: Relevant OPEP Environmental Performance Standards related to operational monitoring

Environmental Performance Standard	Confirmation that EPS is being met
[EPS-SCU-018] Access plans for shoreline operations will be developed. Unless directed otherwise by the Control Agency, Access plans will prioritise use of existing roads and tracks, establish demarcation zones to protect sensitive areas and select vehicles appropriate to conditions	Implementation of OMP: Shoreline Clean-up Assessment will involve assessment teams determining suitable access routes, including utilisation of existing roads and tracks and establish demarcation zones to protect sensitive areas
[EPS-SCU-020] Unless directed otherwise by the designated Control Agency, a soil profile assessment is conducted prior to earthworks	Implementation of OMP: Shoreline Clean-up Assessment and OMP: Sediment Quality Assessment will involve a soil profile assessment being conducted prior to earthworks taking place
[EPS-SCU-024] Unless directed otherwise by the Control Agency, demarcation zones are mapped out in sensitive habitat areas for vehicle and personnel movement, considering sensitive vegetation, bird nesting/ roosting areas and turtle nesting habitat.	Implementation of OMP: Shoreline Clean-up Assessment will involve assessment teams mapping any demarcation zones in sensitive habitat areas
[EPS-SCU-019] Unless directed otherwise by the designated Control Agency, operational restrictions on movement of personnel and vehicles, including vehicle types and traffic volumes, are established to minimise impacts from erosion and compaction	Implementation of OMP: Shoreline Clean-up Assessment will involve assessment teams determining any operational restrictions for vehicle and personnel movement

19. Data management

Minimum standards for data management are provided in Section 10.11 of the Joint Industry OSM Framework and will be adopted by Santos and the OSM Services Provider.

20. Quality assurance and quality control

Refer to Section 10.11 of the Joint Industry OSM Framework for QA/QC minimum standards which will be adopted by Santos and the OSM Services Provider.

21. Communication protocols

21.1 OSM Services Provider

Communication protocols between Santos and its OSM Services Provider with respect to delivery of the OMPs and SMPs (during both preparedness and implementation) are intentionally defined to ensure clear and consistent information is provided in both directions.

The following communication protocols must be observed:

- Communication between Santos and its OSM Services Provider during the preparedness phase (pre-spill) will be between the nominated Industry Member Technical Advisory Group representative and the OSM Services Provider.
- Communication between Santos and its OSM Services Provider during activation (prior to deployment) will be between the Environment Unit Lead (or delegate) and the OSM Services Provider representative.
- During implementation (post deployment), primary communication occurs via two pathways:
  - Environment Unit Lead and the OSM Services Provider Duty Manager for contractual, management, scientific and general direction matters; and
  - Santos Division Commander / On-Scene Commander and the OSM Services Provider's Group Manager/s / Field Team Leaders for on-site matters.
- All key OSM decisions should be logged in an ICS 214 Log maintained by the OSM Implementation Lead.
- All key OSM tasks, actions and requirements should be documented in an IAP during the response phase of the spill.
- The Santos Environment Unit Lead will keep the Operations Section Chief, Logistics Section Chief and Planning Section Chief briefed of the OSM status as required.
- All correspondence (copies of emails and records of phone calls) between Santos and the OSM Services Provider during a response should be recorded and kept on file.
- All communication received by OSM Services Provider not in line with these protocols should be reported to the Environment Unit Lead who will seek guidance on the accuracy of the information received.
- Unless related to safety (e.g. evacuation), any direction or instruction received by the OSM Services Provider outside of these protocols should be confirmed via the Santos Environment Unit Lead or On-Scene Commander prior to implementation.

During the post-response phase all communications shall be between the Santos Environment Advisor and the OSM Services Provider.

21.2 External stakeholders

Results of OMPs and SMPs will be discussed with relevant stakeholders. Information will be shared with regulatory agencies/authorities as required and inputs received from stakeholders will be evaluated and where practicable, will be used to refine the ongoing spill response and/or ongoing operational and/or scientific monitoring.

The Santos IMT Public Information Officer will be the focal point for external engagement during the response operation.

Stakeholder communications post-response will be managed by the Santos Government and Public Affairs Team.

22. Stand down process

Monitoring for each component will continue until termination criteria for individual components are reached. Typically, OMPs will terminate when agreement has been reached with the Jurisdictional Authorities relevant to the spill to terminate the response or a relevant SMP has been activated. SMPs will continue after the spill response has been terminated and until such time as their termination criteria are also reached. A list of criteria is provided in the OSM Framework.

After OMPs are terminated, the OMP monitoring teams will be advised to stand down. Following this stage, Santos is responsible for coordinating a lessons-learnt meeting between the OSM Services Provider, sub-contracted

Monitoring Service Providers and other relevant stakeholders. It is the responsibility of Santos to ensure that lessons learnt are communicated to the relevant stakeholder groups. The lessons discussed should include both positive actions to be reinforced and lessons for actions that could be improved in future standby or response campaigns. Table 22-1 provides a checklist to assist in terminating the OMPs and SMPs and the monitoring effort.

Table 22-1: Checklist for terminating monitoring components

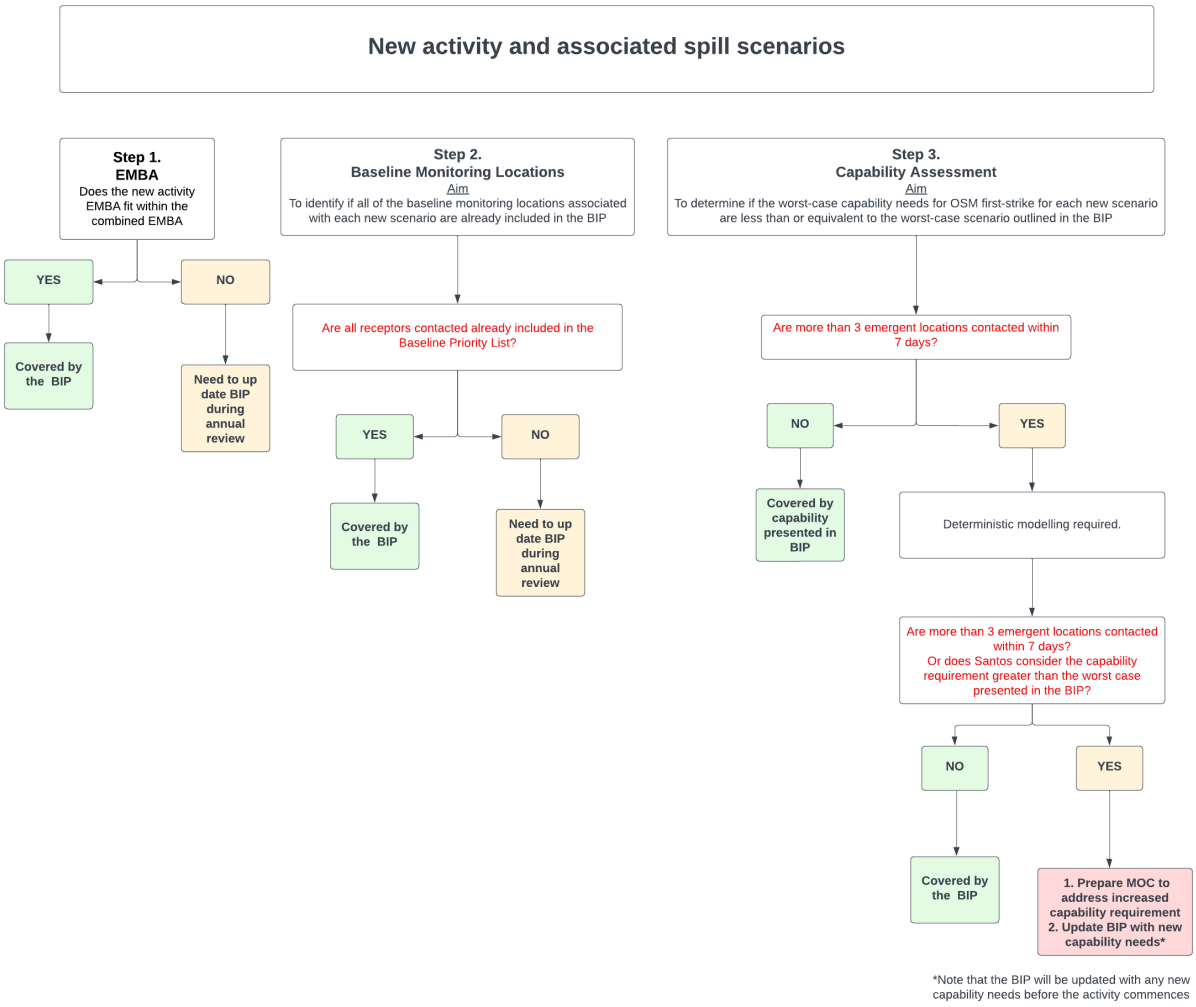
Responsibility	Task	Complete
Santos Environment Unit Lead / Environment Advisor with input from OSM Services Provider	Review termination criteria of OMPs and SMPs (provided in Table 9-1 (OMPs) and Table 9-2 (SMPs) of the Joint Industry Operational and Scientific Monitoring Framework) to ensure OMPs and SMPs are terminated in accordance with these criteria	☐
	Ensure all SMP monitoring reports are peer reviewed by an expert panel (refer to Section 10.10 of the Joint Industry OSM Framework)	☐
	Conduct lessons-learnt meeting	☐

23. References

APPEA (2021) Joint Industry Operational and Scientific Monitoring Plan Framework. Rev D. Report prepared by BlueSands Environmental for APPEA Marine and Environmental Science Working Group.

Kirby MF, Brant J, Moore J, Lincoln S (eds) (2018) PREMIAM – Pollution Response in Emergencies – Marine Impact Assessment and Monitoring: Post-incident monitoring guidelines. Second Edition. Science Series Technical Report. Cefas, Lowestoft.

Appendix A Process for assessing new activities against OSM-BIP first-strike capability



Appendix B Background information for key sensitivities

Table B-1: Background information for key sensitivities for locations predicted to be contacted within 7 days, at a probability >5%, and requiring a baseline review

Location	Receptor	Background	Key locations	Seasonality
Barrow Island	Birds	Important feeding and resting area for migratory shorebirds. Under the Ramsar Convention, an area is recognised as an internationally-significant littoral avifauna site if it supports > 1% of a species' population. Barrow Island meets this Ramsar criterion for six trans-equatorial migratory species: grey-tailed tattler (*Tringa brevipes*), ruddy turnstone (*Arenaria interpres*), red-necked stint (*Caladrius ruficollis*), sanderling (*Calidris alba*), greater sand plover (*Charadrius leschenaultia*) and lesser sand plover (*Charadrius mongolus*). It is also significant for two non-migratory birds: fairy tern (*Sterna nereis*) and the northern race of the sooty oystercatcher (*Haematopus fuliginosus opthalmicus*) (DEC 2006). Nesting area for seabirds.	The highest abundances of shorebirds are associated with the extensive tidal mudflats of the south-eastern and southern coasts, such as Bandicoot Bay.	Migratory shorebird abundances increase on the island as the birds arrive from the north during September to December. The abundances of some migratory shorebirds continue to increase in January and February, suggesting local movements of birds from the mainland to Barrow Island. Abundances decrease as the migratory species leave the region to return north at the end of summer.
	Turtles	Green (*Chelonia mydas*), flatback (*Natator depressus*), hawksbill (*Eretmochelys imbricata*), loggerhead (*Caretta caretta*) and leatherback (*Dermochelys coriacea*) turtles (DEC 2006).	Flatbacks nest on sandy beaches on the mid-eastern coast (DEC 2006). Green turtles predominantly use exposed sandy beaches on the west coast (DEC 2006). Substantial mating populations of green turtles are found in the waters of north-western Barrow Island (DEC 2006). Green turtle can be found year-round feeding on algae-covered rocky intertidal and subtidal platforms off the west coast (DEC 2006). Feeding grounds for hawksbill turtles have been identified to the south of the Barrow Shoals (DEC 2006).	Flatback: breeding/nesting season October – January. Hatching season: February – March. Green turtle: mating aggregations may commence from October with peak nesting from December to January, however, nesting does occur year round (Moro and MacAulay 2010). Hawksbill: The peak season for nesting is between October and November, with less frequent nesting during December and January round (Moro and MacAulay 2010).
	Cetaceans	Whale species that may occasionally visit include the humpback whale (*Megaptera novaeangliae*), short-finned pilot whale (*Globicephala macrorhynchus*), false killer whale (*Pseudorca crassidens*), killer whale (*Orcinus orca*), minke whale (*Balaenoptera acutorostrata*), Bryde's whale	Spinner dolphins, common dolphins, and striped dolphins are generally oceanic species and are likely to be most abundant on the west coast of the island (DEC 2006).	-

Location	Receptor	Background	Key locations	Seasonality
		(*Balaenoptera edeni*), sei whale (*Balaenoptera borealis*), pygmy blue whale (*Balaenoptera musculus brevicauda*), fin whale (*Balaenoptera physalus*), melon-headed whale (*Peponocephala electra*), sperm whale (*Physeter macrocephalus*) and the blue whale (*Balaenoptera musculus musculus*). Of these, only the humpback whale is a regular visitor to the area (DEC 2006). Bottlenose dolphins (*Tursiops truncatus*) and humpback dolphins (*Sousa sahulensis*) have resident populations within the shallow waters of the inner Rowley Shelf, including the Barrow Island area (DEC 2006). Spinner dolphins (*Stenella longirostris*), common dolphins (*Delphinius delphis*), and striped dolphins (*Stenella caeruleoalba*) are abundant in the waters around Barrow Island (DEC 2006).		
	Dugong	Dugong (*Dugong dugon*) significant sightings (Bancroft et al. 2000)	-	-
	Mangroves	Restricted areas of stunted *Avicennia marina* occurring in narrow fringing strips in embayments (DEC 2006).	Mattress Point, south of the Chevron camp, near the airstrip, at Stokes Point and near Pelican Island on the western side of Bandicoot Bay (DEC 2006).	-
Bedout Island	Turtle	Flatback nesting (Fossette et al. 2021)	-	-
	Birds	Listed as an Important Bird and Biodiversity Area (Birdlife International, 2019). Seabird breading including Lesser Frigatebird (*Fregata ariel*), Masked Booby (*Sula dactylatra*) and Brown Boobies (*Sula leucogaster*) (Lavers et al. 2020).	-	-
Broome – Roebuck, Broome North Coast	Cetaceans	Roebuck Bay has the largest known Australian snubfin dolphin (*Orcaella heinsohni*) population in the world, with over 150 individuals recorded (DBCA 2024). Indo-Pacific Humpback Dolphin (*Sousa chinensis*) – nearshore species, regularly observed in Roebuck Bay (DPIRD, date unknown). Indo-Pacific Bottlenose Dolphin (*Tursiops aduncus*) – nearshore species observed in mangrove and seagrass bed habitat in Roebuck Bay (DPIRD, date unknown). Humpback Whales (*Megaptera novaeangilae*) – dry season migratory route in Roebuck Bay to calving grounds along Kimberly Coast (DPIRD, date unknown).	Roebuck Bay	Humpback migration occurring in dry season from April to October.

Location	Receptor	Background	Key locations	Seasonality
	Turtles	Green Turtle (*Chelonia mydas*) – most commonly observed turtle species in Roebuck bay. Found in seagrass bed and reef habitat. Utilises Roebuck Bay as seasonal feeding area and transit area on migration (Roebuck Bay Working Group Inc. 2017a) (Roebuck Bay Working Group Inc. 2017b). Flatback Turtle (*Natator depressus*) nests in small numbers around Cape Villaret during summer months (Roebuck Bay Working Group Inc. 2017a) (Roebuck Bay Working Group Inc. 2017b). Hawksbill Turtle (*Eretmochelys imbricata*) observed in limited numbers within Roebuck Bay. No major nesting sites within Roebuck Bay, but are known to nest along the Broome North Coast, particularly the Cape Leveque area. (Roebuck Bay Working Group Inc. 2017a). Loggerhead Turtle (*Caretta caretta*) commonly observed within Roebuck Bay, although population numbers are not well documented. No major nesting sites within Roebuck Bay, but are known to nest along the Broome North Coast, particularly the Cape Leveque area. Utilises Roebuck Bay as seasonal feeding area and transit area on migration (Roebuck Bay Working Group Inc. 2017a) (Roebuck Bay Working Group Inc. 2017b). Olive Ridley Turtle (*Lepidochelys olivacea*) observed in limited numbers within Roebuck Bay (Roebuck Bay Working Group Inc. 2017a). Closest major nesting point further along Kimberly Coast.	Roebuck Bay Broome North Coast Cape Villaret Cape Leveque	Flatback turtle nesting around Cape Villaret in Summer months.
	Dugong	Dugong (*Dugong dugon*) - Roebuck Marine Park, located 12 km offshore from Broome, is active with dugongs and considered a key area for the species. Broome North Coast provides critical foraging area through seagrass bed habitat. Roebuck houses one of the largest dugong populations in Western Australia, with over 1,000 estimated individuals in the bay and adjacent coastal waters (Seamap Australia, date unknown). Roebuck population is considered to be of national significance (Australian Marine Parks, date unknown).	Roebuck Bay and Roebuck Marine Park	-
	Birds	The extensive tidal flats and beaches of Eighty Mile Beach and Roebuck Bay), are of great importance to migratory shorebirds. No other region in Australia supports such large and diverse nonbreeding populations (Bamford et al. 2008, Hansen et al. 2016).	At Roebuck Bay, different roosts are used on daytime and night-time high tides (Roger et al. 2020). Shorebirds roost at the closest acceptable roost to their preferred foraging grounds; in species in which	Migratory shorebirds arrive at Roebuck Bay from late August onwards. Mid March to mid May is the peak departure period.

Location	Receptor	Background	Key locations	Seasonality
		Between them Eighty Mile Beach and Roebuck Bay support 21 shorebird species in internationally significant numbers (i.e. >1% of the entire population of the East Asian Australasian Flyway), that almost 3.5 million shorebirds in total occur on these sites, and they include ~580,000 shorebirds that forage on tidal flats (Rogers et al. 2011).	the location of preferred feeding areas is not static over time, roost location also varies over time (Roger et al. 2020). Wet season rains and spring create temporary supratidal wetlands which are very difficult for humans to access; many coastal shorebirds roost in these sites when they are available and are therefore overlooked when shorebird surveys are restricted to easily accessed beach roosts (Roger et al. 2020).	
Dampier Region (Northern Pilbara to Karratha) and Dampier Archipelago)	Cetaceans	Humpback whales (*Megaptera novaeangliae*): Biologically Important Area Migration for humpback whales. Females occasionally give birth in the waters of the Dampier Archipelago, although the main calving area is further north (CALM 2005)	Adult humpback whales and their young frequent the Archipelago on their southern migrations in early spring, and the Mermaid Sound (area of water between the western coastline of the Burrup Peninsula to the east of the Dampier Port, and Dampier Archipelago to the west) is a significant resting area for females with calves (MMPATF 2021; CALM 2005; CALM 1990).	Humpback whale northern migration past Pilbara occurs June and July while southern migration occurs in early spring.
		Humpback dolphins (*Sousa sahulensis*): The Australian humpback dolphin exhibit relatively small home ranges (<300 km^2) and high site fidelity (Hanf et al. 2016).	Humpback dolphins inhabit shallow, coastal waters; typically, within 20 km of land and in water depths of less than 20 m (Parra and Jedensjö 2013; Hanf et al. 2015; Hanf et al. 2021; Hunt et al. 2017). In the Pilbara, they have been recorded up to 50 km from the mainland, but possibly associated with offshore islands (Hanf et al. 2015; Hanf et al. 2021).	Humpback dolphins may be present throughout the year.
		Indo-Pacific bottlenose dolphins (*Tursiops aduncus*) have been recorded throughout nearshore waters of the region (Hanf et al 2016; Allen et al. 2012; Hanf et al. 2021).	-	Indo-Pacific bottlenose dolphins may be present throughout the year.
	Dugong	Current knowledge on the size of the population of the Dampier Archipelago/ Cape Preston area for dugongs (*Dugong dugon*) is limited (MMPATF 2021).	Small numbers of dugongs have been sighted in shallow, warm waters in bays and between islands, including at East Lewis Island, Cape Preston, Regnard Bay, Nickol Bay and west of Keast Island (MMPATF 2021; CALM 2005). Dugongs have a strong association with	May be present throughout the year.

Location	Receptor	Background	Key locations	Seasonality
			seagrass habitat. Seagrass beds are found throughout Nickol Bay and around many of the islands (Worley Parsons 2009).	
	Birds	Many of the islands are important seabird nesting sites. The Dampier Archipelago has been recognised to have BIAs based on breeding for the wedge-tailed shearwater (*Ardenna pacifica*), roseate tern (*Sterna dougallii*) and Australian fairy tern (*Sternula nereis*). Important feeding and resting area for migratory shorebirds, utilising many beaches and mud flats (CALM 1990).	Angel Island: shorebird sightings: Bar-tailed godwit (*Limosa lapponica*), Ruddy turnstone (*Arenaria interpres*), Whimbrel (*Numenius phaeopus*). Brigadier Island: Shorebird sightings: Whimbrel (*Numenius phaeopus*). Cohen Island: Shorebird sightings: Ruddy turnstone (*Arenaria interpres*), Grey-tailed tattler (*Tringa brevipes*). Seabird nesting: Wedge-tailed shearwater (*Ardenna pacifica*), Caspian tern .(*Hydroprogne caspia*) Collier Rocks: Seabird nesting: Wedge-tailed shearwater (*Ardenna pacifica*). Conzinc Island: shorebird sightings: Grey-tailed tattler (*Tringa brevipes*) Seabird nesting: Wedge-tailed shearwater (*Ardenna pacifica*), Caspian tern (*Hydroprogne caspia*) Delambre Island: Seabird nesting: Wedge-tailed shearwater (*Ardenna pacifica*) Dolphin Island: shorebird sightings: Red-necked stint (*Calidris ruficollis*), Grey plover (*Pluvialis squatarola*), Grey-tailed tattler (*Tringa brevipes*) Elphick Nob: Seabird nesting: Australian fairy tern (*Sternula nereis*), Wedge-tailed shearwater (*Ardenna pacifica*). Egret Island: Seabird nesting: Caspian tern (*Hydroprogne caspia*) Enderby Island: shorebird sightings: Sharp-tailed sandpiper (*Calidris acuminata*), Oriental plover (*Charadrius veredus*), Whimbrel (*Numenius phaeopus*), Grey-tailed tattler (*Tringa brevipes*).	Australian fairy tern breeding: August-November (CALM 1990) Wedge-tailed shearwater breeding: October – April (CALM 1990; Nicholson 2002) Caspian tern .(breeding: July – October (CALM 1990) Roseate tern breeding: August – December (Higgins and Davies 1996

Location	Receptor	Background	Key locations	Seasonality
			Seabird nesting: Caspian tern. (*Hydroprogne caspia*) Gidley Island: Shorebird sightings: Whimbrel (*Numenius phaeopus*). Goodwyn Island: Shorebird sightings: Grey-tailed tattler (*Tringa brevipes*) Seabird nesting: Australian fairy tern (*Sternula nereis*), Wedge-tailed shearwater (*Ardenna pacifica*), Roseate tern (*Sterna dougallii*). Hauy Island: Seabird nesting: Wedge-tailed shearwater (*Ardenna pacifica*) Keast Island: Seabird nesting: Caspian tern .(*Hydroprogne caspia*), Australian Peican (*Pelecanus conspicillatus*) Kendrew Island: Seabird nesting: Australian fairy tern (*Sternula nereis*), Wedge-tailed shearwater (*Ardenna pacifica*) Lady Nora Island: Shorebird sightings: Oriental plover (*Charadrius veredus*), Whimbrel (*Numenius phaeopus*) Seabird nesting: Wedge-tailed shearwater (*Ardenna pacifica*), Caspian tern (*Hydroprogne caspia*) Legendre Island: Whimbrel (*Numenius phaeopus*), Grey-tailed tattler (*Tringa brevipes*) Seabird nesting: Wedge-tailed shearwater (*Ardenna pacifica*) Malus Island: Shorebird sightings: Grey-tailed tattler (*Tringa brevipes*) Seabird nesting: Wedge-tailed shearwater (*Ardenna pacifica*) Nelson Rocks: Shorebird sightings: Whimbrel (*Numenius phaeopus*) Roly Rocks: Seabird nesting: Wedge-tailed shearwater (*Ardenna pacifica*) Rosemary Island: Shorebird sightings: Red necked stint (*Calidris ruficollis*)	

Location	Receptor	Background	Key locations	Seasonality
			Seabird nesting: Caspian tern (*Hydroprogne caspia*) (CALM 2005; Higgins and Davies 1996)	
	Turtles	The waters of the Dampier Archipelago are used for breeding while the sandy beaches are regularly used for nesting by green (*Chelonia mydas*), hawksbill (*Eretmochelys imbricata*) and flatback turtles (*Natator depressus*), and occasionally by loggerhead turtles (*Caretta caretta*) (CALM 2005). Leather back turtles have been recorded in waters of the Dampier Archipelago, however, do not nest in this area.	Flatback turtle: There are significant rookeries centred on Dampier Archipelago (DoEE 2017; Limpus 2007). Delambre Island, Enderby Island, Hauy Island, Keast Island and Legendre Island have records of moderate nesting (Pendoley 2019). Delmbre Island has been recognised as the largest flatback turtle rookery in Australia with an estimated 3500 nesting females per year (Pendoley 2019). Green turtle: some the nesting sites have been identified as principal near-coastal rookeries for the species (DoEE 2017; Waayers et al. 2014). Angel Island, Cohen Island, Delambre Island, Dolphin Island, Eaglehawk Island, Enderby Island, Goodwyn Island, Hauy Island, Keast Island, Lady Nora Island, Legendre Island, Malus Island, Rosemary Island, and West Lewis Island have records nesting for this species (Pendoley 2019). Hawksbill nesting in WA is centred on the Pilbara (Dampier Archipelago) (Whiting et al. 2018; Waayers et al. 2014; Limpus 2002). Rosemary Island is considered a significant breeding area, supporting the most significant hawksbill turtle rookery in the Western Australian region and one of the largest in the Indian Ocean; tens to hundreds of animals nest on the island annually, more than any other Western Australian rookery, with approximately 1000 nesting females nesting per year (Pendoley Environmental 2019; DoEE 2017; DSWEPC 2012d). Angel Island, Delambre Island, Dolphin Island, Eaglehawk Island, Enderby Island,	The flatback turtle nesting during the summer months (October to March) with peak nesting in November to January (DoEE 2017; CALM 2005; CALM 1990). The green turtle nesting during the summer months (November – March) with peak nesting between December to February (DoEE 2017; CALM 2005; CALM 1990). The hawksbill turtle nesting during the summer months (October – February) with peak nesting in October to January, however, are known to nest all year round in the region (DoEE 2017; DSEWPC 2012b; CALM 2005; Prince 1993; CALM 1990).

Location	Receptor	Background	Key locations	Seasonality
			Goodwyn Island, Malus Island and Rosemary Island have records of moderate nesting (Pendoley 2019).	
	Coral	Live coral cover can vary greatly from reef to reef, as indicated by contrasting covers of 10 to 60% on Sailfish Reef and Hamersley Shoal, respectively (CALM 2005).	High coral diversity is found on the seaward slopes of Delambre Island, Hamersley Shoal, Sailfish Reef, Kendrew Island and north-west Enderby Island (CALM 2005).	-
	Mangroves	Six species of mangrove are found within the Dampier Archipelago/Cape Preston region: the white mangrove (*Avicennia marina*), red mangrove (Rhizophora stylosa), club mangrove (*Aegialitis annulata*), ribbed-fruit orange mangrove (*Brugiera exaristrata*), yellow- leaf spurred mangrove (*Ceriops tagal*) and river mangrove (*Aegiceras cornculatum*) (CALM 2005).	Most mangals occur along the mainland coast on the tidal flats at Regnard Bay, the Maitland River mouth, King Bay and Nickol Bay. Well-developed communities also occur in some of the sheltered bays on the islands, for example at West Intercourse Island, in Searipple Passage and the southern shores of West Lewis and East Lewis islands (CALM 2005). The mangrove communities at the Fortescue River delta, Cape Preston area, West Intercourse Island, Enderby Island, Searipple Passage/Conzinc Bay and Dixon Island have been assessed by Semeniuk (1997) as having international significance from a biodiversity and ecological basis (CALM 2005).	-
	Seagrass	Seagrasses occur sparsely, in low diversity and low abundance, on shallow, unconsolidated sediments of sand and muddy sand (Jones 2004).	The most significant areas of seagrass are found between Keast and Legendre islands and between West Intercourse Island and Cape Preston (CALM 2005).	-
Eighty Mile Beach	Mangroves	The Eighty Mile Beach is almost devoid of mangroves. The exceptions are two small tidal creeks on Mandora Station (Johnstone et al. 2013).	Two small tidal creeks on Mandora Station (Johnstone et al. 2013).	-
	Birds	The extensive tidal flats and beaches of Eighty Mile Beach and Roebuck Bay), are of great importance to migratory shorebirds. No other region in Australia, or indeed anywhere else in the East Asian Flyway, supports such large and diverse nonbreeding populations (Bamford et al. 2008, Hansen et al. 2016). Between them Eighty Mile Beach and Roebuck Bay support 21 shorebird species in internationally significant	Shorebird roosting distribution in north-western Australia is limited by their intolerance of hot microclimates; by day most species need to roost on wet substrates to avoid heat stress (Roger et al. 2020). Shorebirds prefer open roost settings and avoid sites where the tide pushes	Around September the first migratory shorebirds arrive and by October many disperse further across Australia, using Eighty Mile Beach as an important staging area (Commonwealth of Australia, 2016).

Location	Receptor	Background	Key locations	Seasonality
		numbers (i.e. >1% of the entire population of the East Asian Australasian Flyway), that almost 3.5 million shorebirds in total occur on these sites, and they include ~580,000 shorebirds that forage on tidal flats (Rogers et al. 2011).	them close to tall features (e.g. mangroves, sand dunes) that can be used as cover by hunting birds of prey (Roger et al. 2020). At Eighty Mile Beach density of shorebirds on tidal flats at low tide is strongly correlated with high tide counts on the adjacent beaches, suggesting shorebirds there typically roost on beaches close to their preferred foraging sites (Roger et al. 2020).	
Exmouth Gulf	Salt flats- extensive and significant	-	Flats extend ~1,026km2 from Locker Point to Sandalwood Peninsula, and range from the 4.5-13km wide (Brunskill et al. 2001; D.C. Blandford and Associates Pty Ltd and Oceanica Consulting Pty Ltd 2005).	-
	Blue-green algal. Mats	-	Extensive blue-green algal mats (cyanobacterial mats) occupy the high intertidal zone along the eastern (~85km2) and southern margins (~20km2) of Exmouth Gulf (Sutton and Shaw, 2021).	-
	Salt marshes	-	Saltmarshes (namely samphire) occur extensively along the eastern intertidal margin of Exmouth Gulf, and also along the southern and western margins (Fitzpatrick et al. 2019). They also often line tidal creeks along with mangroves (Oceanica 2006).	-
	Mangroves	-	Mangroves are extensive from Bay of Rest and Gales Bay to all along the eastern margin of Exmouth Gulf (Humphreys et al. 2005; Lyne et al. 2006; Oceanica 2006; EPA 2008; Fitzpatrick et al. 2019).	-
	Reef flats and oyster beds	-	Low relief subtidal reef is extensive around Bundegi and North West Cape across to Muiron Islands (Bancroft and Sheridan 2000; Beckley and Lombard 2012; van Keulen and Langdon 2011). It is likely that subtidal reef flats are found	-

Location	Receptor	Background	Key locations	Seasonality
			around many of the islands, such as Eva and Fly Islands, which have shallow reef flats off the northern edges (Dee et al. 2020). Oyster beds are present on intertidal pavements around Heron Point (Fitzpatrick et al. 2019).	
	Macroalgae and turf algae	-	Macroalgae beds are a common vegetated habitat across Exmouth Gulf, occurring along the central, eastern, southern, and western margins, as well as around many of the islands to the north of Exmouth Gulf (Cassata and Collins 2004; Lyne et al. 2006; Cassata and Collins 2008; van Keulen and Langdon 2011; McLean et al. 2016; BMT 2020).	-
	Seagrass	-	Seagrass meadows have been known to occur along the eastern, southern and western margins of Exmouth Gulf, and around islands such as Muiron Islands, Burnside Island and Tent Island (Hutchins et al. 1996; RPS Bowman Bishaw Gorham 2004; Lyne et al. 2006; Oceanica 2006; Vanderklift et al. 2016). Coverage estimates for seagrasses are variable across Exmouth Gulf, noting that the extent and abundance of seagrass meadows across the whole Gulf has not been comprehensively mapped (Sutton and Shaw, 2021).	-
	Corals	-	Soft and hard coral communities are spread around the coastal margins of Exmouth Gulf, as well as around islands inside and outside Exmouth Gulf (Lyne et al. 2006; Babcock et al. 2008b; Twiggs and Collins 2010; 360 Environmental 2017). Mainly distributed along the southern and eastern margins of Exmouth Gulf (Irvine and Salgado Kent 2019).	-

Location	Receptor	Background	Key locations	Seasonality
	Turtles	-	Mainly distributed along the southern and eastern margins of Exmouth Gulf (Irvine and Salgado Kent 2019).	Observed within the gulf year-round
	Marine mammals	Exmouth Gulf is included in the Ningaloo Reef to Montebello Islands Important Marine Mammal Area, assigned by the IUCN Marine Mammal Protected Areas Task Force (IUCN-MMPATF 2021). The qualifying species include the dugong (*Dugong dugon*), Australian humpback dolphin (*Sousa sahulensis*) and humpback whale (*Megaptera novaeangliae*). Humpback whale (*Megaptera novaeangliae*) resting and nursing area	-	Humpback whale: June through to the end of October
	Dugong	Strong evidence of population connectivity between Shark Bay and Exmouth Gulf (Gales et al. 2004).	Mainly observed in shallow waters (<100m) in Exmouth Gulf and around the North West Cape (Jenner and Jenner 2005, Sleeman et al. 2007; RPS 2010)	Dugongs were reported to be more frequent in Exmouth Gulf in August (RPS 2010).
	Birds	Identified as an internationally important shorebird area (Weller et al. 2020).	Exmouth Gulf Mangroves is an Important Bird Area (IBA) and a Key Biodiversity Area (Dutson et al. 2009; Key Biodiversity Areas Partnership 2020). It extends 70 km from Giralia Bay to Turbridgi Point. The three bird species triggering the KBA criteria include the dusky gerygone (Gerygone tenebrosa), pied oystercatcher (Haematopus longirostris) and grey-tailed tattler (Tringa brevipes) (Key Biodiversity Areas Partnership 2020). The entire Exmouth Gulf coastline, islands (in particular Sunday Island and Muiron Islands), and the coastline from North West Cape to Point Billie are identified as an internationally important shorebird area (Weller et al. 2020). Exmouth Gulf and islands meet the 'species criteria' for International Significance (supporting >1% of the flyway population) for grey-tailed tattler, eastern curlew (*Numenius madagascariensis*) and ruddy turnstone (*Arenaria interpres*) (Onton et al. 2013; Weller et al. 2020).	Juvenile shorebirds can be found year-round. Adults usually between August and April.

Location	Receptor	Background	Key locations	Seasonality
Karratha to Port Hedland	Birds		The Port Hedland Saltworks is a regular non-breeding destination for both northern hemisphere and a limited range of local Australian shorebirds (Johnstone et al. 2013).	Migrating shorebirds arrive in northern Australia between late August and early November.
	Turtle	Flatback turtles (*Natator depressus*) found at Cemetery Beach and Mundabullangana are a part of the same genetic management unit as flatbacks found at Thevenard Island and Barrow Island (Whittock et al. 2014)	Flatback (*Natator depressus*) rookeries at Mundabullangana and Cemetery beach (Whittock et al. 2014)	Flatback turtle nesting season for this area is from November to January and hatchling season is from December to March. Migratory shorebird numbers on northern Australian beaches peak in November and again in March as the majority of birds begin their return to the northern hemisphere (Bennelongia Pty Ltd, 2011).
	Cetaceans	This area is within the know distribution of humpback dolphins (*Sousa chinensis*) (Parra et al. 2017) and Indo-Pacific bottlenose dolphin (*Tursiops aduncus*) (Braulik et al 2019).	-	-
Lowendal Islands	Birds	Nesting area for seabirds.	Abutilon, Beacon, Bridled, Parakeelya, and Varanus islands	Seabird nesting all year, peak Oct – Jan. Pied cormorant (*Phalacrocorax varius*) nests in winter (Nicholson 2002). Wedge-tailed shearwater (*Ardenna pacifica*) and Bridled tern (*Onychoprion anaethetus*) nest in Summer (Nicholson 2002). Silver gull (*Larus novaehollandiae*) nests in summer and Autumn (Nicholson 2002). Crested tern (*Thalasseus bergii*), Lesser crested tern (*Thalasseus bengalensis*) and Roseate tern (*Sterna dougallii*) nest in Autumn (Nicholson 2002).
	Turtles	Green (*Chelonia mydas*), flatback (*Natator depressus*), hawksbill (*Eretmochelys imbricata*), loggerhead (*Caretta caretta*) and leatherback (*Dermochelys coriacea*) turtles (DEC 2006).	All beaches on Beacon, Bridled, Varanus, Abutilon, Parakeelya Islands Significant hawksbill nesting on Varanus Island (DSEWPC 2012a). Hawksbill foraging around the Lowendal Island group (DSEWPC 2012a).	Hawksbill nesting in spring and early summer (peak October) with a 20 km internesting buffer. Flatback nesting peak late December – early January with a 20 km internesting buffer (DSEWPC 2012a).
	Cetaceans	Whale species that may occasionally visit include the humpback whale (*Megaptera novaeangliae*), short-finned	-	-

Location	Receptor	Background	Key locations	Seasonality
		pilot whale (*Globicephala macrorhynchus*), false killer whale (*Pseudorca crassidens*), killer whale (*Orcinus orca*), minke whale (*Balaenoptera acutorostrata*), Bryde's whale (Balaenoptera edeni), sei whale (*Balaenoptera borealis*), pygmy blue whale (*Balaenoptera musculus brevicauda*), fin whale (*Balaenoptera physalus*), melon-headed whale (*Peponocephala electra*), sperm whale (*Physeter macrocephalus*) and the blue whale (*Balaenoptera musculus musculus*). Of these, only the humpback whale is a regular visitor to the area (DEC 2006).		
	Dugong	The seagrass beds around the Lowendal Islands are thought to provide a valuable food source for dugong (*Dugong dugon*) (DEC 2006).	-	-
	Mangroves	Mangroves occupy less than 0.1% of the coastline (DEC 2006).	-	-
Montebello Islands	Birds	Twenty-six species of seabirds and waders, including migratory waders, are known in the Montebello Islands Marine Area. Migratory and threatened seabirds – Significant nesting, foraging and resting areas (Burbidge et al. 2000). At least 61 islands in the Montebello group are used by nesting seabirds (DEC 2006). Waterbirds- Historically moderately common: pied cormorant (*Phalacrocarax varius*), Australian pelican (*Pelecanus conspicillatus*), Historically common: eastern reef egret (*Egretta sacra*), osprey (*Pandion haliaetus*) Shorebirds- Historically moderately common: whimbrel (*Numenius phaeopus*), greenshank (*Tringa nebularia*), common sandpiper (*Actitis hypoleucos*), ruddy turnstone (*Arenaria interpres*), red-necked stint (*Calidris ruficollis*) Historically common: bar-tailed godwit (*Limosa lappanica*), grey-tailed tattler (*Heteroscelus brevipes*), beach stone-curlew (*Esacus neglectus*), pied oystercatcher (*Haematopus ostralegus*), sooty oystercatcher (*Haematos fuliginosus*) Burbidge et al. 2000).	Wedge-tailed shearwater (*Puffinus pacificus*) significant breeding historically reported on Ah Chong, Gossypium, Brooke, Flag, Gardenia and South East Islands. Silver gull (*Larus novaehollandiae*) breeding historically reported on Brooke and South East. Caspian tern (*Sterna caspia*) common breeding resident historically on Ah Chong, Alpha, Bluebell, Dandelion, Flag, Foxglove, Islet to south of Hermite, Ivy, Kunzea, Marri Islands, Primrose, Renewal and Trimouille. Roseate tern (*Sterna dougallii*) significant historical breeding historically reported on Dahlia, Dandelion, Pimelia, Myoporum, Gannet, Fig Islands and Bloodwood. Fairy tern (*Sterna nereis*) historical breeding on Fairy Tern Island and Hibbertia. Crested tern (*Sterna bergii*) significant historical breeding on Daisy, Epsilon and Flag Burbidge et al. 2000)..	Wedge-tailed shearwater and bridled tern nest in summer (Nicholson 2002). Silver gull nest in summer and Autumn (Nicholson 2002). Caspian tern nest in autumn and winter (Nicholson 2002). Crested tern, lesser crested tern, roseate tern and sooty tern nest in Autumn (Nicholson 2002). Fairy tern nest in winter and spring (Nicholson 2002).

Location	Receptor	Background	Key locations	Seasonality
	Turtle	Loggerhead (*Caretta caretta*) and green (*Chelonia mydas*) (*significant rookeries*); hawksbill (*Eretmochelys imbracata*), flatback (*Natator depressus*) turtles (Burbidge et al. 2000) Flatback are common in the waters surrounding the Montebello Islands (Burbidge et al. 2000) and nesting occurs for the following species (Commonwealth of Australia, 2017): • Green turtle • Flatback • Hawksbill	Hawksbill- Ah Chong Island, South East Island, Trimouille and elsewhere.	Green turtle- major nesting Nov – Mar (peak: Dec-May) on locations with sandy beaches (recovery plan) Flatback- minor nesting occurs Oct-Mar (peak: Nov-Jan) Hawksbill- major nesting occurs all year (peak Oct-Jan)
	Cetaceans	Whale species that may occasionally visit include the humpback whale (*Megaptera novaeangliae*), short-finned pilot whale (*Globicephala macrorhynchus*), false killer whale (*Pseudorca crassidens*), killer whale (*Orcinus orca*), minke whale (*Balaenoptera acutorostrata*), Bryde's whale (*Balaenoptera edeni*), sei whale (*Balaenoptera borealis*), pygmy blue whale (*Balaenoptera musculus brevicauda*), fin whale (*Balaenoptera physalus*), melon-headed whale (*Peponocephala electra*), sperm whale (*Physeter macrocephalus*) and the blue whale (*Balaenoptera musculus musculus*). (DEC 2006). Pygmy blue whale (*Balaenoptera musculus brevicauda*) and humpback whale (*Megaptera novaeangliae*) migration area Humpback dolphins (*Sousa sahulensis*) thought to be present year round in the area (Raudino et al. 2018)	An area of sheltered water to the west of Trimouille Island is used as a resting area for female humpback whales and their young calves during their southerly migration (DEC 2006).	-
	Dugong	Dugong (*Dugong dugon*) significant sightings (Bancroft et al. 2000)	-	-
Muiron Islands	Birds	Nesting area for seabirds Wedge-tailed shearwater (*Ardenna pacifica*) nesting colony, birds forage at sea in large aggregations. Crested tern (*Thalasseus bergii*) nesting colony (Department of Parks and Wildlife, 2014) Identified as an internationally important shorebird area (Weller et al. 2020).	-	Wedge-tailed shearwater are believed to stay in the area year-round, but undertake significant flights away from the islands around May.Returning around June, they nest in burrows on both islands spending several months preparing and re-excavating the burrows. At about 1m long and not very deep, the burrows are subject to collapse by foot traffic. A single egg is laid around October and the chicks hatch in January (DPaW 2015).

Location	Receptor	Background	Key locations	Seasonality
	Turtle	Major loggerhead turtle (*Caretta caretta*) nesting site, significant green turtle (*Chelonia mydas*) nesting site, low density hawksbill turtle (*Eretmochelys imbricata*) nesting site, occasional flatback turtle (*Natator depressus*) presence	-	Loggerhead turtle peak nesting: November to January (Waayers 2010). Green turtle peak nesting December to January (Waayers 2010).
Ningaloo Coast World Heritage Area	Mangroves	Mangroves are not extensive.	On the east side of the Cape Range peninsula, a fringing mangal of Avicennia marina occurs to the south of Cape Murat, between Bundegi Reef and Exmouth. On the west side of the Peninsula, mangals occur at Mangrove Bay (*A. marina, Rhizophora stylosa and Bruguiera exaristata*), Low Point (*Avicennia marina*) and Yardie Creek (*A. marina and R. stylosa*)	-
	Manta rays	-	-	Ningaloo Reef is considered an important area for Manta Rays in autumn and winter (Preen et al. 1997).
	Whale sharks	Whale Sharks aggregate in the waters of the Ningaloo Marine Park, frequently close to the Ningaloo Reef front. The aggregations coincides with the period when the Leeuwin Current is strongest. (Sleeman et al. 2010). The whale sharks that visit Ningaloo are mostly immature males (Sequerira et al. 2016).	-	Peak visibility April to July (noting that whale sharks may be present throughout the year)
	Turtle	Four species of turtle nest in Ningaloo: Green turtle (*Chelonia mydas*), Flatback turtle (*Natator depressus*), Hawksbill turtle (*Eretmochelys imbricata*), Loggerhead turtle (*Caretta caretta*)	The most concentrated area of green turtle nesting is along the northern beaches and Muiron Islands, while loggerhead nesting is concentrated along beaches further south (Bungelup, Jane's Bay, Gnaraloo) and on South Muiron Island (Whiting 2016)	Main nesting: Hawksbill July-Mar Green Sept-Mar Flatback Sept-Mar Loggerhead Sept-Mar
	Marine mammals	Two species of dolphins are resident at Ningaloo, the Indo-Pacific bottlenose dolphin (*Tursiops aduncus*) and the Australian humpback dolphin (*Sousa sahulensis*) (Allen et al. 2012, Jefferson & Rosenbaum 2014). Humpback whales (*Megaptera novaeangliae*) and pygmy blue whales (*Balaenoptera musculus brevicauda*) migrate past Ningaloo each year on their way to breeding grounds further north, and back again (Jenner et al. 2001; Double et al. 2014). (Note: an increasing number of humpback calves	Indo-Pacific bottlenose dolphins have been found to be primarily associated with the 20m contour and the Muiron Islands (Hanf, 2015). A relatively dense population of have been observed around the North West Cape, suggesting that this region is of high importance to this species (Haughey et al. 2020) Humpback dolphins tend to be associated with intertidal and shallow	Humpback whales: June through to the end of October Pygmy blue whales: April to June

Location	Receptor	Background	Key locations	Seasonality
		are being born at or near Ningaloo each year (Irvine et al. 2018). The waters off Ningaloo are a possible foraging BIA for pygmy blue whales (Thums et al. 2022). Killer whales (*Orcinus orca*) prey on humpback whale calves and are regularly present during the southern migration of humpback whales each year (Pitman et al. 2014).	coastal waters, as well as offshore islands (Hanf, 2015). Dugong mostly inhabit the shallow 90-5 m) waters fringing the coast and offshore islands, occurring in close conjunction with the seagrass and algae beds on which they feed.	
	Birds	Identified as an internationally important shorebird area (Weller et al. 2020). Approximately 30 bird species listed under (JAMBA), China–Australia Migratory Bird Agreement (CAMBA) and/or Republic of Korea- Australia Migratory Bird Agreement (ROKAMBA) have been recorded in the Cape Range National Park (DEC 2010). Habitats including the shallow sandy intertidal beaches and rocky shorelines of the Ningaloo coast are important for seabirds and waders to breed, rest and feed (Shire of Exmouth et al. 1999).	Significant seabird rookeries include Cape Farquhar, Pelican Point, Point Maud and Winderabandi Point (Shore of Exmouth et al. 1999).	Juvenile shorebirds can be found year-round. Adults shorebirds usually between August and April.
Southern Islands Coast (Southern Pilbara shoreline, Onslow area coastline)	Sediment	The Department of Environment and Conservation (DEC) investigated background contaminants in Sediments of the Pilbara in 2005 (DEC 2006). Sediment samples were collected from coastal waters at Port Hedland, Dampier Archipelago, Onslow, Ashburton River Mouth and Exmouth Gulf. Samples were analysed for TBT, PAHs, TPH, BTEXN, organochlorin pesticides, PCBs, total metals and metalloids. Background sediment quality was found to be high. Total arsenic were found in high concentrations in one site off Onslow (considered natural and likely to be related to geology of the region.	-	-
	Mangroves	Mangroves in the area form small but sometimes complex communities in embayments and on the sheltered shores of many offshore islands.	Juvenile green turtles are known to forage on mangroves and have been recorded in both Urala Creek North and Urala Creek South (AECOM 2022).	-
	Turtle	Recovery Plan for Marine Turtles in Australia 2017-2027 (Commonwealth of Australia 2017) has listed critical nesting habitat in this area for Green turtle (*Chelonia mydas*), Flatback turtle (*Natator depressus*), Hawksbill turtle (*Eretmochelys imbricata*) and Loggerhead turtle (*Caretta caretta*).	Thevenard Island is an important nesting area (Commonwealth of Australia 2017).	Nesting and hatching takes place between October and April. Flatback turtle nesting in the Ashburton area occurs between October and February, with peak nesting activity in December (Imbricata 2013).

Location	Receptor	Background	Key locations	Seasonality
		Flatback BIA for nesting and internesting (DCCEEW 2023). Internesting BIA for green and loggerhead turtle (DCCEEW 2023).		
	Marine mammals	Key species (O2 Marine, 2021) : humpback whale (*Megaptera novaeangliae*), dugong (*Dugong dugon*), Australian humpback dolphin (*Sousa sahulensis*), Indo-Pacific bottlenose dolphin (*Tursiops aduncus*). Dugongs are resident in coastal waters of the Pilbara coast and are sighted year-round, having a strong association with seagrass habitat. BIAs (DCCEEW 2023): Humpback whale: migration and resting. Pygmy blue whale: distribution.	-	-
	Birds	Key species (O2 Marine, 2021): Australian fairy tern (*Sternula nereis*), bar-tailed godwit- critically endangered (*Limosa lapponica menzbieri*), curlew sandpiper - critically endangered (*Calidris ferruginea*), eastern curlew- critically endangered (*Numenius madagascariensis*) Breeding and foraging BIA of Wedge-tailed shearwater (DCCEEW 2023).	-	Juvenile shorebirds can be found year-round. Adults shorebirds usually between August and April.

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Appendix C OSM baseline data sources

Table C-1: Baseline data sources

Receptor	Existing baseline monitoring	Source / Data Custodian	Spatial extent
Water quality	Chevron (2019) Wheatstone Effluent Quality Validation Report, Rev 0- 20200909 (ABU200900381)	Chevron	Onslow area
	Chevron (2022) MEQMP Compliance report and data (ABU221200858)	Chevron	Barrow Island
	Chevron (2022) Wheatstone Platform Environmental Monitoring Program – draft report. 60672341 Wheatstone 5 Yearly Monitoring Technical Report- Rev A	Chevron	Wheatstone Platform
	Chevron (2018) Wheatstone Platform Waste Water Discharges Model Verification Report (ABU190601699)	Chevron	Wheatstone Platform
	Chevron (2022) Gorgon Backfill Fields Benthic Survey 2022 (ABU230100068)	Chevron	Gorgon Backfill Fields
	Pilbara Ports Authority (2019) Marine Environmental Quality Program	Pilbara Ports Authority	Dampier Dampier Archipelago Port Hedland
	O2 Marine (2020) Mardie Project- Marine Water Quality. Prepared for Mardie Minerals Pty Ltd. Report Number R190056	O2 Marine	Mardie
	Port of Broome- Ongoing Marine Monitoring Program. By O2 Marine for Kimberley Ports Authority	Kimberley Ports Authority	Broome Kimberley
	Proposed Browse to North West Shelf Project, Appendix D.1: Browse to NWS Project Trunkline Route Surveys (2019) Environmental Survey Report. Neptune Document J11200-1-RR-006	Advisian/Neptune	Kimberley Marine Park Continental Slope Demersal Fish KEF Agro-Rowley Terrace Marine Park Ancient Coastline at 125 m Depth Contour KEF
Sediment quality	Chevron (2019) Wheatstone LNG Project Mangrove Monitoring Program 2019 (ABU200800053)	Chevron	Onslow
	Chevron (2022) MEQMP 2022 Compliance report and data (ABU221200858)	Chevron	Barrow Island
	Chevron (2022) Wheatstone Platform Environmental Monitoring Program - DRAFT REPORT 60672341, Wheatstone Platform 5 Yearly Monitoring Technical Report-Rev A	Chevron	Wheatstone Platform
	Chevron (2022) Gorgon Backfill Fields Benthic Survey 2022 (ABU230100068)	Chevron	Gorgon Backfill Fields
	Pilbara Ports Authority (2019) Marine Environmental Quality Program	Pilbara Ports Authority	Dampier

Receptor	Existing baseline monitoring	Source / Data Custodian	Spatial extent
			Dampier Archipelago Port Hedland
	O2 Marine (2019). Mardie project- Sediment Sampling and Analysis Plan Results. Prepared for Mardie Minerals Pty Ltd. Report Number R190033	O2 Marine	Mardie
	O2 Marine and Teal Solutions (2019). Port Hedland Spoilbank Marina Sediment Sampling and Analysis Plan Implementation Report. Prepared for the Department of Transport. Report Number R190209	O2 Marine	Port Hedland
	Jones R, Wakeford M, Currey-Randall L, Miller K, Tonin H (2021) Drill cuttings and drilling fluids (muds) transport, fate and effects near a coral reef mesophotic zone. Marine Pollution Bulletin 172, 112717	AIMS	Glomar Shoal Rankin Bank
	O2 Marine (2021) Ashburton Infrastructure Project Sediment Sampling and Analysis Plan, Fremantle, WA. Prepared for Mineral Resource Limited	O2 Marine	Ashburton Onslow area
	Advisian (2019) Scarborough Sediment Sampling and Analysis Plan Implementation Report. Prepared for Woodside	Woodside	Dampier
	Woodside (ongoing unpublished data) Chemical and Ecological Monitoring of Mermaid Sound	Woodside	Burrup Peninsula Dampier
	Port of Broome- Ongoing Marine Monitoring Program. By O2 Marine for Kimberley Ports Authority	Kimberley Ports Authority	Broome Kimberley
	Proposed Browse to North West Shelf Project, Appendix D.1: Browse to NWS Project Trunkline Route Surveys (2019) Environmental Survey Report. Neptune Document J11200-1-RR-006	Advisian/Neptune	Kimberley Marine Park Continental Slope Demersal Fish KEF Agro-Rowley Terrace Marine Park Ancient Coastline at 125 m Depth Contour KEF
Intertidal and coastal habitats	Chevron (2019) Wheatstone LNG Project Mangrove Monitoring Program 2019 (ABU200800053)	Chevron	Onslow
	DBCA (long term-monitoring) Ningaloo Reef Program	DBCA	Ningaloo
	360 Environmental (2017) Learmonth Habitat Surveys. Prepared for Subsea 7	Subsea 7	Exmouth Gulf
	Woodside (ongoing unpublished data) Chemical and Ecological Monitoring of Mermaid Sound	Woodside	Burrup Peninsula Dampier
	AECOM (2022) Assessment of Benthic Communities and Habitats Ashburton Salt Project. Prepared for K + S Australian Pty Ltd. Doc No. 60692048_4.	K + S Australian Pty Ltd	Ashburton Onslow area

Receptor	Existing baseline monitoring	Source / Data Custodian	Spatial extent
	Reef R and Lovelock C (2019). Characteristics of landward expansion of mangrove forests with sea level rise. Geophysical Research Abstracts 21(1), 1.	Monash University	Exmouth Gulf
	DBCA (2019) Ecological monitoring in the Shark Bay marine reserves, DBCA, Perth.	DBCA	Shark Bay
	Sutton AL and Shaw LL (2020) A snapshot of Marine Research in Shark Bay (Gathaagudu): Literature Review and Metadata Collection (1949-2020). West Australian Marine Science Institution, 180.	WAMSI	Shark Bay
	Sutton AL and Shaw JL (2021) Cumulative Pressures on the Distinctive Values of Exmouth Gulf. First draft report to the Department of Water and Environmental Regulation by the Western Australian Marine Science Institution, Perth, Western Australia. 272 pages.	WAMSI	Exmouth Gulf
	DBCA (2023) DBCA Annual Report 2022–23, Department of Biodiversity, Conservation and Attractions, Perth. Primary productivity and energy transfer between marine ecosystems (SP 2020-002)	DBCA	Dampier Archipelago
	Lincoln G, Mathews D, Oades D with the Balanggarra, Bardi Jawi, Dambimangari, Karajarri, Mayala, Nyangumarta, Nyul Nyul, Wunambal Gaambera & Yawuru ISWAG members (2021) The Kimberley Indigenous Turtle & Dugong Initiative 2021-2031. Prepared by Mosaic Environmental for the Kimberley Indigenous Saltwater Advisory Group (ISWAG) Broome 2021	Coordinated by the Kimberley Indigenous Saltwater Advisory Group, implemented by Kimberley Saltwater Communities, supported by Western Science Partners	Kimberley
	Astron Environmental Services (2021) Varanus and Bridled Islands Mangrove Monitoring – Annual Report 2020, unpublished report to Santos WA Energy Limited	Santos	Varanus Island Bridled Island
	Ground-truthing satellite imagery that is utilised to monitor mangrove extent/density at Montebello Islands	DBCA	Montebello Islands
	Port of Broome- Ongoing Marine Monitoring Program. By O2 Marine for Kimberley Ports Authority	Kimberley Ports Authority	Broome Kimberley
	WAMSI- Mardie Off Set Plan	WAMSI	Pilbara Coast Gnoorea Yammadery Onslow Giralia Bay
Benthic habitat	Chevron (2019) Jansz-Io Subsea Compression Benthic Video Footage Review (G7-NT-REPX0000239)	Chevron	Jansz-Io Field
	Chevron (2022) WHS Platform Environmental Monitoring Program - DRAFT REPORT 60672341, Wheatstone Platform 5 Yearly Monitoring Technical Report-Rev A	Chevron	Wheatstone Platform
	Chevron (2022) Gorgon Backfill Fields Benthic Survey (ABU230100068)	Chevron	Gorgon Backfill Fields
	Chevron (2023) Thevenard Island Retirement Project Heavy Lift Vessel Anchor Spread Benthic Habitat Mapping- Survey Report	Chevron	Thevenard Island

Receptor	Existing baseline monitoring	Source / Data Custodian	Spatial extent
	DBCA (long term-monitoring) Ningaloo Reef Program	DBCA	Ningaloo
	Wahab MA, Radford B, Cappo M, Colquhoun J, Stowar M, Depczynski M, Miller K, Heyward A (2018) Biodiversity and spatial patterns of benthic habitat and associated demersal fish communities at two tropical submerged reef ecosystems. Coral Reefs, 37, 327-343, 10.1007/s00338-017-1655-9	AIMS	Glomar Shoal Rankin Bank
	O2 Marine (2019). Mardie project- Sediment Sampling and Analysis Plan Results. Prepared for Mardie Minerals Pty Ltd. Report Number R190033	O_2 Marine	Mardie
	O2 Marine (2019). Mardie Project - Subtidal Benthic Communities and Habitat Baseline Assessment. Prepared for Mardie Minerals Pty Ltd. Report Number R190045.	O_2 Marine	Mardie
	Jones R, Wakeford M, Currey-Randall L, Miller K, Tonin H (2021) Drill cuttings and drilling fluids (muds) transport, fate and effects near a coral reef mesophotic zone. Marine Pollution Bulletin 172, 112717	AIMS	Glomar Shoal Rankin Bank
	O2 Marine (2021) Benthic Communities and Habitat Ashburton Infrastructure Project, Fremantle, WA. Prepared for Mineral Resources Limited	O_2 Marine	Ashburton Onslow area
	O2 Marine (2021). Onslow Seawater Desalination Plant. Benthic Communities and Habitat. Report No. R200065. Prepared for the Water Corporation.	O_2 Marine	Onslow area
	360 Environmental (2017) Learmonth Habitat Surveys. Prepared for Subsea 7	Subsea 7	Exmouth Gulf
	Advisian (2019) Dampier Archipelago Commonwealth Waters Marine Benthic Habitat Survey. Prepared for Woodside Energy Ltd	Woodside	Dampier Archipelago
	MScience (2019) Scarborough Trunkline Marine Environmental Studies- Pre-dredging Coral Habitat Assessment. Report to Advisian	Advisian	Dampier Archipelago Dampier Angle Island Burrup Peninsula Conzinc Island Gidley Island Intercourse Island Malus Island Middle Island
	Woodside (ongoing unpublished data) Chemical and Ecological Monitoring of Mermaid Sound	Woodside	Burrup Peninsula Dampier
	AECOM (2022) Assessment of Benthic Communities and Habitats Ashburton Salt Project. Prepared for K + S Australian Pty Ltd. Doc No. 60692048_4.	K + S Australian Pty Ltd	Ashburton Onslow area
	O2 Marine and Teal Solutions (2019) Port Hedland Spoilbank Marina Sediment Sampling and Analysis Plan Implementation Report. Prepared for the Department of Transport. Report Number R190209	O_2 Marine	Port Hedland

Receptor	Existing baseline monitoring	Source / Data Custodian	Spatial extent
	BMT (2020) Technical Note. Learmonth Benthic Habitat Survey. Prepared for MBS Environmental	BMT	Exmouth Gulf
	Advisian (2019) Scarborough Offshore Benthic Marine Habitat Assessment. Prepared for Woodside	Woodside	Scarborough permit area WA-1-R
	Advisian (2019) Montebello Marine Park Benthic Habitat Survey ROV Analysis of the Scarborough Pipeline Route. Prepared for Woodside	Woodside	Montebello Australian Marine Park
	Moustaka M, Mohring M, Holmes T, Evans R , Thomson D, Nutt C, Stoddart J, Wilson S (2019) Cross-shelf Heterogeneity of Coral Assemblages in Northwest Australia, Diversity, vol. 11, 15pp.	DBCA Marine Science	Dampier Archipelago Regnard Island Eaglehawk Island Dockrell Reef Enderby Island Goodwyn Island Malus Island Conzinc Island Gidley Island Hammersley Shoal Legendre Island Delambre Island
	Thompson DP, Babcock RC, Evans RD, Feng M, Moustaka M, Orr M, Slawinski D, Wilson S, Hoey A (2021) Coral larval recruitment in north-western Australia predicted by regional and local conditions. Marine Environmental Research 168: 105318	CSIRO	Dampier Archipelago Regnard Island Eaglehawk Island Dockrell Reef Enderby Island Goodwyn Island Malus Island Conzinc Island Gidley Island Hammersley Shoal Legendre Island Delambre Island
	Adam A., Thomas L, Underwood J, Gilmour J, Richards Z (2022) Population connectivity and genetic offset in the spawning coral *Acropora digitifera* in Western Australia. Molecular Ecology.	Curtin University	Ashmore Reef Lalang-garram Marine Park Reefs Beagle Reef Adele Island

Receptor	Existing baseline monitoring	Source / Data Custodian	Spatial extent
			Clerke Reef Mermaid Reef Imperieuse Reef Ningaloo Station Gnaraloo Quobba
	Doropoulos C, Gomez-Lemos LA, Salee K, McLaughlin MJ, Tebben J, Van Koningsveld M, Feng M, Babock R (2021). Limitations to coral recovery along an environmental stress gradient. Ecological Applications. 2022;32:e2558.	CSIRO	Exmouth Gulf Exmouth Ningaloo Coral Bay
	Edgeloe JM, Severn-Ellis AA, Bayer PE, Mehravi S, Breed MF, Krauss SL, Batley J, Kendrick GA, Sinclair EA. 2022. Extensive polyploid clonality was a successful strategy for seagrass to expand into a newly submerged environment. Proc. R. Soc. B20220538.https://doi.org/10.1098/rspb.2022.0538	UWA	Shark Bay
	McLean D and Birt M. (2021) Enhanced ROV survey of tropical fish and benthic communities associated with shallow oil and gas platforms. Research Square	AIMS	Varanus Island
	Sutton AL and Shaw LL (2020) A snapshot of Marine Research in Shark Bay (Gathaagudu): Literature Review and Metadata Collection (1949-2020). West Australian Marine Science Institution, 180.	WAMSI	Shark Bay
	Sutton AL and Shaw JL (2021) Cumulative Pressures on the Distinctive Values of Exmouth Gulf. First draft report to the Department of Water and Environmental Regulation by the Western Australian Marine Science Institution, Perth, Western Australia. 272 pages.	WAMSI	Exmouth Gulf
	DBCA (2023), Biodiversity and Conservation Science Annual Report 2022–23, DBCA, Perth. Primary productivity and energy transfer between marine ecosystems (SP 2020-002)	DBCA	Dampier Archipelago
	DBCA (2023), Biodiversity and Conservation Science Annual Report 2022–23, DBCA, Perth. Understanding the key ecosystem services provided by the seagrass meadows of Western Australia (SP 2018-136)	DBCA	Shark Bay
	National Reef Monitoring Network	The IMOS National Reef Monitoring Network sub-Facility	Houtman Abrolhos Islands Ningaloo Coast World Heritage Area Exmouth Gulf Dampier Archipelago Island Group Barrow Island Montebello Islands Group Ashmore Reef

Receptor	Existing baseline monitoring	Source / Data Custodian	Spatial extent
			Cartier Island Darwin Harbour Arafura Arnhem Marmion Rottnest Island Geographe Bay
	Ningaloo Outlook	CSIRO	Ningaloo Coast World Heritage Area
	Gilmour JP, Cook KL, Ryan NM, Puotinen ML, Green, RH, Shedrawi G, Hobbs J-P A, Thompson, DP, Badcock, R, Buckee J, Foster T, Richards ZT, Wilson SK, Barnes PB, Coutts TB, Radford BT, Piggott CH, Depczynski M, Evans SN, Schoepf V, Evans RD, Halford AR, Nutt CD, Bancroft KP, Heyward AJ, Oades D (2019) The state of Western Australia's coral reefs. Coral Reefs https://doi.org/10.1007/s00338-019-01795-8	AIMS	Western Australia Cocos Keeling Islands Ashmore Reef Scott Reef Rowley Shoals Montebello Islands Group Barrow Island Ningaloo Reef Shark Bay
	Lincoln G, Mathews D, Oades D with the Balanggarra, Bardi Jawi, Dambimangari, Karajarri, Mayala, Nyangumarta, Nyul Nyul, Wunambal Gaambera & Yawuru ISWAG members (2021) The Kimberley Indigenous Turtle & Dugong Initiative 2021-2031. Prepared by Mosaic Environmental for the Kimberley Indigenous Saltwater Advisory Group (ISWAG) Broome 2021	Coordinated by the Kimberley Indigenous Saltwater Advisory Group, implemented by Kimberley Saltwater Communities, supported by Western Science Partners	Kimberley
	Heyward A, Miller K, Fromont J, Keesing J, Parnum I (EDS.) (2018). Kimberley Benthic Biodiversity Synthesis Report of Project 1.1.1 prepared for the Kimberley Marine Research Program, Western Australian Marine Science Institution, Perth, Western Australia, 57pp.	WAMSI AIMS	Kimberley Camden Sound Bonaparte Archipelago Eclipse Archipelago Lalang-garram Marine Park Reefs
	Port of Broome- Ongoing Marine Monitoring Program. By O2 Marine for Kimberley Ports Authority	Kimberley Ports Authority	Broome Kimberley

Receptor	Existing baseline monitoring	Source / Data Custodian	Spatial extent
	Biota Environmental Sciences (2019) Asian Renewable Energy Hub Environmental Review Document, Assessment Number 2140, Appendix 2 Benthic Communities and Habitat Survey. Prepared by BMT	BMT for Asian Renewable Hub (NW Interconnected Power)	Eighty Mile Beach
	Proposed Browse to North West Shelf Project, Appendix D.1: Browse to NWS Project Trunkline Route Surveys (2019) Environmental Survey Report. Neptune Document J11200-1-RR-006	Advisian/Neptune	Kimberley Marine Park Continental Slope Demersal Fish KEF Agro-Rowley Terrace Marine Park Ancient Coastline at 125 m Depth Contour KEF
	O2 Marine (2020). Kimberley Marine Offloading Facility - Benthic Infauna Survey. O2 Marine Report Number T200073. Perth, Western Australia	O2 Marine	Broome Roebuck Bay
	Evans RD, Wilson SK, Fisher R, Ryan NM, Babcock R, Blakeway D, Bond T, Dorji P, Dufois F, Fearns P, Lowe RJ, Stoddart J, Thomson DP (2020) Early recovery dynamics of turbid coral reefs after recurring bleeching events. Journal of Environmental Management 268 110666	DBCA	West pilbara
	Helmholz P, Bassett T, Boyle L, Browne N, Parnum I, Moustaka M, Evans R (2024) Evaluating Linear Coral Growth Estimation Using Photogrammetry and Alternative Point Cloud Comparison Method. The International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences, Volume XLVIII-2-2024 ISPRS TC II Mid-term Symposium “The Role of Photogrammetry for a Sustainable World”, 11–14 June 2024, Las Vegas, Nevada, USA	Curtin University	Enderby Island, Dampier Archipelago
	Moustaka M, Evans RD, Kendrick GA, Hyndes GA, Cuttler MVW, Bassett TJ, O’Leary MJ, Wilson SK (2024) Local habitat composition and complexity outweigh seascape effects on fish distribution across a tropical seascape. Landsc Ecol 39:28 https://doi.org/10.1007/s10980-024-01814-2	DBCA	Dampier Archipelago
	Travaglione N, Evans R, Moustaka M, Cuttler M, Thompson DP, Tweedy J, Wilson (2023) Scleractininan corals rely on heterotrophy in highly turbid environments. Coral Reefs https://doi.org/10.1007/s00338-023-02407-2	AIMS	Dampier Archipelago
Marine fish and elasmobranchs	Chevron (2019) Jansz-Io Subsea Compression Benthic Video Footage Review (G7-NT-REPX0000239)	Chevron	Jansz-Io field
	Chevron (2021) Wheatstone Sawfish Progress Report	Chevron	Onslow area
	Chevron (2022) Gorgon Backfill Fields Benthic Survey 2022 (ABU230100068)	Chevron	Gorgon Backfill Fields
	DBCA (long term-monitoring) Ningaloo Reef Program	DBCA	Ningaloo
	Wahab MAA, Radford B, Cappo M, Colquhoun J, Stowar M, Depczynski M, Miller K, Heyward A (2018) Biodiversity and spatial patterns of benthic habitat and associated demersal fish communities at two tropical submerged reef ecosystems Coral Reefs, 37, 327-343, 10.1007/s00338-017-1655-9	AIMS	Glomar Shoal Rankin Bank

Receptor	Existing baseline monitoring	Source / Data Custodian	Spatial extent
	Jones R, Wakeford M, Currey-Randall L, Miller K, Tonin H (2021) Drill cuttings and drilling fluids (muds) transport, fate and effects near a coral reef mesophotic zone. Marine Pollution Bulletin 172, 112717	AIMS	Glomar Shoal Rankin Bank
	Morgan D, Lear K, Norman B (2020) Sawfish surveys Urala Creek, Exmouth Gulf, February 2019. Report to AECOM. Centre for Sustainable Aquatic Ecosystems, Harry Butler Institute, Murdoch University, Perth, Western Australia	Murdoch University	Ashburton Exmouth Gulf
	Schramm KD, Marnane MJ, Elsdon TS, Jones CM, Saunders BJ, Newman SJ, Harvey ES (2021) Fish associations with shallow water subsea pipelines compared to surrounding reef and soft sediment habitats. Sci Rep 11, 6238 . https://doi.org/10.1038/s41598-021-85396-y	Curtin University	Thevenard Island
	Galaiduk R, Radford B, Case M, Bond T, Taylor M, Cooper T, Smith L and McLean D (2022) Regional patterns in demersal fish assemblages among subsea pipelines and natural habitats across north-west Australia. Front. Mar. Sci. 9:979987. doi: 10.3389/fmars.2022.979987	AIMS	Rankin Bank Glomar Shoal Thevenard Island
	Currey-Randall LM, Galaiduk R, Stowar M, Vaughan BI, Miller KJ (2021) Mesophotic fish communities of the ancient coastline in Western Australia. PLoS ONE 16(4): e0250427. https://doi. org/10.1371/journal.pone.0250427	AIMS	Locations associated with the ancient coastline KEF at depths greater than 125 m
	McLean D and Birt M. (2021) Enhanced ROV survey of tropical fish and benthic communities associated with shallow oil and gas platforms. Research Square	AIMS	Varanus Island
	McLean DL, Vaughan BI, Malseed BE, Taylor MD (2020) Fish-habitat associations on a subsea pipeline within an Australian Marine Park, Marine Environmental Research 123, 104813	AIMS	Montebello Australian Marine Park
	Sutton AL and Shaw LL (2020) A snapshot of Marine Research in Shark Bay (Gathaagudu): Literature Review and Metadata Collection (1949-2020). West Australian Marine Science Institution, 180.	WAMSI	Shark Bay
	Sutton AL and Shaw JL (2021) Cumulative Pressures on the Distinctive Values of Exmouth Gulf. First draft report to the Department of Water and Environmental Regulation by the Western Australian Marine Science Institution, Perth, Western Australia. 272 pages.	WAMSI	Exmouth Gulf
	DBCA (2023), Biodiversity and Conservation Science Annual Report 2022–23, Department of Biodiversity, Conservation and Attractions, Perth. Benefits of marine parks for marine fishes in a changing climate (SP 2021-040)	DBCA	WA State Marine Parks
	DBCA (2023), Biodiversity and Conservation Science Annual Report 2022–23, Department of Biodiversity, Conservation and Attractions, Perth. Do marine reserves adequately represent high diversity cryptobenthic fish assemblages in a changing climate? (SP 2019-031)	DBCA	Ningaloo
	National Reef Monitoring Network	The IMOS National Reef Monitoring Network sub-Facility	Houtman Abrolhos Islands Ningaloo Coast World Heritage Area Exmouth Gulf

Receptor	Existing baseline monitoring	Source / Data Custodian	Spatial extent
			Dampier Archipelago Island Group Barrow Island Montebello Islands Group Ashmore Reef Cartier Island Darwin Harbour Arafura Arnhem Marmion Rottnest Island Geographe Bay
	Lear KO, Ebner BC, Fazeldean T, Bateman RL, Morgan DL (2024) Effects of coastal development on sawfish movements and the need for marine animal crossing solutions. Conservation Biology, e14263. https://doi.org/10.1111/cobi.14263	Murdoch University	Onslow area
	Feutry P, Laird A, Davies CL, Devloo-Delva F, Fry G, Johnson G, Gunasekara RM, Marthick J, Kyne PM (2021) Population structure of Narrow Sawfish *Anoxypristis cuspidata* across northern Australia. Report to the National Environmental Science Program Marine Biodiversity Hub. CSIRO, Charles Darwin University, and NPF Industry Pty Ltd.	CSIRO	Kimberley Northern Territory coastline
	Heupel M, Simpfendorfer C, Chin A, Appleyard S, Barton D, Green M, Johnson G, McAuley R and White W (2020) Examination of connectivity of hammerhead sharks in northern Australia. Report to the National Environmental Science Program, Marine Biodiversity Hub. Australian Institute of Marine Science.	AIMS	Exmouth Gulf Broome
	Morgan DL, Lear KO, Dobinson E, Gleiss AC, Fazeldean T, Pillans RD, Beatty SJ and Whitty JM (2021) Seasonal use of a macrotidal estuary by the endangered dwarf sawfish, *Pristis clavata*. Aquatic Conservation Marine and Freshwater Ecosystems 31(8):2164–2177. doi: 10.1002/aqc.3578	CSIRO	Kimberley Fitzroy River King Sound
	Port of Broome- Ongoing Marine Monitoring Program. By O2 Marine for Kimberley Ports Authority	Kimberley Ports Authority	Broome Kimberley
	West K, Travers MJ, Stat M, Harvey ES, Richards ZT, DiBattista JD, Newman SJ, Harry A, Skepper CL, Heydenrych M, Bunce M (2021) Large-scale eDNA metabarcoding survey reveals marine biogeographic break and transitions over tropical north-western Australia. Divers Distrib. 27: 1942–1957. https://doi.org/10.1111/ddi.13228	Trace and Environmental DNA (TrDNA) Laboratory, Curtin University	Kimberley
	Moustaka M, Evans RD, Kendrick GA, Hyndes GA, Cuttler MVW, Bassett TJ, O'Leary MJ, Wilson SK (2024) Local habitat composition and complexity outweigh seascape effects on fish distribution across a tropical seascape. Landsc Ecol 39:28 https://doi.org/10.1007/s10980-024-01814-2	DBCA	Dampier Archipelago

Receptor	Existing baseline monitoring	Source / Data Custodian	Spatial extent
	Tebbett SB, Bellwood DR, Bassett T, Cuttler MVW, Moustaka M, Wilson SK, Yan HF, Evans RD (2023) The limited role of herbivorous fishes and turf-based trophic pathways in the functioning of turbid coral reefs. Rev Fish Biol Fisheries https://doi.org/10.1007/s11160-023-09823-1	Curtin University	Dampier Archipelago
Fisheries	Sutton AL and Shaw JL (2021) Cumulative Pressures on the Distinctive Values of Exmouth Gulf. First draft report to the Department of Water and Environmental Regulation by the Western Australian Marine Science Institution, Perth, Western Australia. 272 pages.	WAMSI	Exmouth Gulf
	DBCA (2023), Biodiversity and Conservation Science Annual Report 2022–23, Department of Biodiversity, Conservation and Attractions, Perth. Benefits of marine parks for marine fishes in a changing climate (SP 2021-040)	DBCA	WA State Marine Parks
	DBCA (2023), Biodiversity and Conservation Science Annual Report 2022–23, Department of Biodiversity, Conservation and Attractions, Perth. Do marine reserves adequately represent high diversity cryptobenthic fish assemblages in a changing climate? (SP 2019-031)	DBCA	Ningaloo
	National Reef Monitoring Network	The IMOS National Reef Monitoring Network sub-Facility	Houtman Abrolhos Islands Ningaloo Coast World Heritage Area Exmouth Gulf Dampier Archipelago Island Group Barrow Island Montebello Islands Group Ashmore Reef Cartier Island Darwin Harbour Arafura Arnhem Marmion Rottnest Island Geographe Bay
	State of the Fisheries Report (Western Australia)	DPIRD	WA's major commercial and recreational fisheries
	DPIRD (2020). Western Australian Marine Stewardship Council Report Series No. 16: Ecological Risk Assessment of the Shark Bay Invertebrate Fisheries. DPIRD, Western Australia.	DPIRD	Shark Bay

Receptor	Existing baseline monitoring	Source / Data Custodian	Spatial extent
	Bartes S and Braccini JM (2021) Potential expansion in the spatial distribution of subtropical and temperate west Australian sharks. Journal of Fish Biology. doi:10.1111/jfb.14822	DPIRD	Fisheries included: Bigeye sixgill (*Hexanchus nakamurai*) Tiger shark (*Galeocerdo cuvier*) Spinner shark (*Carcarhinus brevipinna*) Scalloped hammerhead (*Sphyrna lewini*) Broadnose sevengill sharks (*Notorhyncus cepedianus*) Southern sawsharks (*Pristiophorus nudipinnis*)
	Langlois TJ, Wakefield CB, Harvey ES, Boddington DK and Newman SJ (2021). Does the benthic biota or fish assemblage within a large targeted fisheries closure differ to surrounding areas after 12 years of protection in tropical north-western Australia? Marine Environmental Research 170: 105403.	DPIRD	Fishery: Pilbara demersal scalefish fisheries
	Yeoh D, Johnston D and Harris D (2021) Squid and cuttlefish resources of Western Australia. Fisheries Research Report No. 314 Department of Primary Industries and Regional Development, Western Australia. 101pp	DPIRD	Squid and cuttlefish
	DPIRD (2020) Western Australian Marine Stewardship Council Report Series No. 17: Ecological Risk Assessment of the Exmouth Gulf Prawn Managed Fishery. DPIRD, Western Australia.	DPIRD	Exmouth Gulf
	Ryan KL, Lai EKM, Smallwood CB (2022) Boat-based recreational fishing in Western Australia 2020/21. Fisheries Research Report No. 327 Department of Primary Industries and Regional Development, Western Australia. 221pp.	DPIRD	
	Sutton AL and Shaw LL (2020) A snapshot of Marine Research in Shark Bay (Gathaagudu): Literature Review and Metadata Collection (1949-2020). West Australian Marine Science Institution, 180.	WAMSI	Shark Bay
	Meteyard, B (2024) Northern Prawn Fishery Data Summary 2023. NPF Industry Pty Ltd, Australia	Northern Prawn Fishery PTY Ltd	Kimberley Northern Territory
	Lynch TP, Smallwood CB, Ochwada-Doyle FA, Lyle J, Williams J, Ryan KL, Devine C, Gibson B, Jordan A (2020) A cross continental scale comparison of Australian offshore recreational fisheries research and its applications to Marine Park and fisheries management. – ICES Journal of Marine Science, 77 (3): 1190–1205.	CSIRO	Australia wide
Reptiles	Chevron (2022) Gorgon Gas Development - Marine Turtle Monitoring Program 2021/22: Barrow Island and Mundabullangana ABU220800133	Chevron	Barrow Island Mundabullangana

Receptor	Existing baseline monitoring	Source / Data Custodian	Spatial extent
	Wilson P, Thums M, Pattiaratchi C, Whiting S, Pendoley K, Ferreira L, Meekan M (2019) High predation of marine turtle hatchlings near a coastal jetty. Biological Conservation, 236	UWA/DBCA	Thevenard Island
	Rob D, Barnes P, Whiting S, Fossette S, Tucker T and Mongan T (2019) Turtle activity and nesting on the Muiron Islands and Ningaloo Coast: Final Report 2018, Ningaloo Turtle Program. Report prepared for Woodside Energy Limited. Department of Biodiversity, Conservation and Attractions, Exmouth, pp.51.	DBCA	Cape Range National Park North West Cape Muiron Islands North Muiron Island South Muiron Island Sunday Island Bungelup
	Tucker T, Whiting S, Fossette S, Rob D, Barnes P (2020). Inter-nesting and migrations by marine turtles of the Muiron Islands and Ningaloo Coast. Final Report. Prepared for Woodside Energy Limited. Department of Biodiversity, Conservation and Attractions, Perth. pp. 1-93	DBCA	Muiron Islands North Muiron Island South Muiron Island North West Cape Cape Range National Park Bungelup
	Ferreira LC, Thums M, Fossette S, Wilson P, Shimada T, Tucker A, Pendoley K, Waayers D. Guinea ML, Loewenthal G, King J, Speirs M, Rob D, Whiting SD (2020) Multiple satellite tracking datasets inform green turtle conservation at a regional scale. Diversity and Distribution 27: 249-266	AIMS	Rosemary Island Legendre Island Middle Passage Island Barrow Island Muiron Islands Ningaloo Coast World Heritage Area Montebello Islands Group Lacepede Islands Maret Island Scott Reef
	Fossette S, Loewenthal G, Peel LR, Vitenbergs A, Hamel MA, Douglas C, Tucker AD, Mayer F, Whiting SD (2021) Using Aerial Photogrammetry to Assess Stock-Wide Marine Turtle Nesting Distribution, Abundance and Cumulative Exposure to Industrial Activity. Remote Sens, 13, 1116.	DBCA	Y Island Locker Island Onslow Area Mainland Coast Ashburton Island Thevenard Island

Receptor	Existing baseline monitoring	Source / Data Custodian	Spatial extent
			Barrow Island Long Island Dampier Mainland Coast Rosemary Island West Mid Intercourse Island East Lewis Island Legendre Island Hauy Island Delambre Island Karratha Downes Island Bedout Island Port Hedland Mainland Coast Mundabullangana Cape Lambert Exmouth Gulf
	Pendoley Environmental (2018). Marine turtle survey of Mardie Salt Project Area - December 2017. January 2018. Prepared for Phoenix Environmental	Pendoley Environmental	Mardie
	Pendoley Environmental (2019). Mardie Salt Project: Marine turtle monitoring program 2018/2019. April 2019. Prepared for BCI Minerals Ltd.	Pendoley Environmental	Mardie Angle Island Long Island Middle Island Round Island Sholl Island
	Ningaloo Turtle Program	DBCA	North West Cape Cape Range National Park Bungelup
	Rosemary Island Turtle Monitoring Program	DBCA	Rosemary Island
	West Pilbara Turtle Program	DBCA	Karratha Cleaverville

Receptor	Existing baseline monitoring	Source / Data Custodian	Spatial extent
			Wickham
	North West Shelf Flatback Turtle Monitoring Program	DBCA	Thevenard Island Delambre Island Karratha Port Hedland Mainland Coast Eighty Mile Beach Echo Beach Cable Beach Cape Domett
	Care for Headland Turtle Program	Care for Hedland	Port Hedland area
	Dirk Hartog Island Loggerhead Monitoring	DBCA	Dirk Hartog Island
	AECOM (2022) Marine Fauna Impact Assessment Ashburton Salt Project. Doc No. 60597242_3	AECOM	Ashburton Locker Island
	Keesing, J.K. (Ed.) (2019). Benthic habitats and biodiversity of the Dampier and Montebello Australian Marine Parks. Report for the Director of National Parks. CSIRO, Australia	CSIRO	Dampier Marine Park Montebello Australian Marine Park
	Gammon M, Whiting S, Fossette S (2023) Vulnerability of sea turtle nesting sites to erosion and inundation: A decision support framework to maximize conservation. Ecosphere, 14(6), e4529. https://doi.org/10.1002/ecs2.4529	UWA/DBCA	Y Island Locker Island Onslow Area Mainland Coast Ashburton Island Thevenard Island Barrow Island Long Island Dampier Mainland Coast Rosemary Island West Mid Intercourse Island East Lewis Island Legendre Island Hauy Island Delambre Island

Receptor	Existing baseline monitoring	Source / Data Custodian	Spatial extent
			Karratha Downes Island Bedout Island Port Hedland Mainland Coast Mundabullangana Cape Lambert
	FitzSimmons N N, Pittard SD, McIntyre N, Jensen MP, Guinea M, Hamann M, Kennett R, et al. (2020). Phylogeography, Genetic Stocks, and Conservation Implications for an Australian Endemic Marine Turtle. Aquatic Conservation 30 (3): 440–60. https://doi.org/10.1002/aqc.3270.	Griffith University/DBCA	Barrow Island Delambre Island Mundabullangana Port Hedland Mainland Coast Eighty Mile Beach Echo Beach Cape Domett
	Thums M, Udyawer V, Galaiduk R, Ferreira L, Streten C, Radford B (2021) Using Marine Turtles to Identify Habitat and Assess Connectivity of the North and North-West Marine Park Networks and Sea Country: Exploration Study of Data and Partnerships. Report prepared for Parks Australia. Australian Institute of Marine Science, Perth. 48pp.	AIMS	Miaboolya Beach Quobba Shark Bay Ningaloo Coast World Heritage Area Muiron Islands Barrow Island Great Sandy Island Eighty Mile Beach Scott Reef Kimberley Roebuck Bay Joseph Bonaparte Gulf Lalang-garram Marine Park Reefs Oceanic Shoals Thevenard Island Echo Beach Montebello Islands Group

Receptor	Existing baseline monitoring	Source / Data Custodian	Spatial extent
			Camden Sound Horizontal Falls
	Sutton AL and Shaw LL (2020) A snapshot of Marine Research in Shark Bay (Gathaagudu): Literature Review and Metadata Collection (1949-2020). West Australian Marine Science Institution, 180.	WAMSI	Shark Bay
	Sutton AL and Shaw JL (2021) Cumulative Pressures on the Distinctive Values of Exmouth Gulf. First draft report to the Department of Water and Environmental Regulation by the Western Australian Marine Science Institution, Perth, Western Australia. 272 pages.	WAMSI	Exmouth Gulf
	Fossette S, Ferreira L C, Whiting SD, King J, Pendoley K, Shimada T, Speirs M, Tucker A D, Wilson P, Thums M (2021) Movements and distribution of hawksbill turtles in the Eastern Indian Ocean. Global Ecology and Conservation, 29, e01713. https://doi.org/10.1016/j.gecco.2021.e01713	DBCA	Beacon Island Delambre Island Rosemary Island Varanus Island Montebello Islands Group
	Pillans RD, Whiting S, Tucker T, Vanderklift MA (2022) Fine-scale movement and habitat use of juvenile, subadult, and adult green turtles (*Chelonia mydas*) in a foraging ground at Ningaloo Reef, Australia. Aquatic Conservation: Marine and Freshwater Ecosystems 32 1323-1340	CSIRO	Ningaloo
	Gammon M, Whiting S, Fossette S (2023) Vulnerability of sea turtle nesting sites to erosion and inundation: a decision support framework to maximize conservation. Ecosphere 14: e4529	UWA/DBCA	Pilbara southern islands Pilbara northern islands Onslow area Thevenard Island Barrow Island Montebello Islands Dampier Archipelago Karratha Mundabullangana Cemetery Beach
	Ferreira LC, Thums M, Whiting S, Meekan M, Andrews-Goff V, Attard CRM, Bilgmann K, Davenport A, Double M, Falchi F, Guinea M, Hickey SM, Jenner C, Jenner M, Loewenthal G, McFarlane G, Möller LM, Norman B, Peel L, Pendoley K, Radford B, Reynolds S, Rossendell J, Tucker A, Waayers D, Whittock P, Wilson P and Fossette S (2023) Exposure of marine megafauna to cumulative anthropogenic threats in north-west Australia. Front. Ecol. Evol. 11:1229803. doi: 10.3389/fevo.2023.1229803	AIMS	Pilbara coast Kimberley Northern Territory coastline
	Ningaloo Outlook	CSIRO	Ningaloo Coast World Heritage Area

Receptor	Existing baseline monitoring	Source / Data Custodian	Spatial extent
	Lambourne RN (2019) Classifying the diving behaviour of flatback turtles (*Natator depressus*) from multi-sensor tags. Honours thesis, Murdoch University	Murdoch University	Thevenard Island
	Udyawer V, D'Anastasi B, McAuley R, Heupel M (2016) Exploring the status of Western Australia's sea snakes. National Environmental Science Programme	AIMS	Shark Bay Ningaloo Coast World Heritage Area Port Hedland Rowley Shoals Oceanic Shoals
	Lincoln G, Mathews D, Oades D with the Balanggarra, Bardi Jawi, Dambimangari, Karajarri, Mayala, Nyangumarta, Nyul Nyul, Wunambal Gaambera & Yawuru ISWAG members (2021) The Kimberley Indigenous Turtle & Dugong Initiative 2021-2031. Prepared by Mosaic Environmental for the Kimberley Indigenous Saltwater Advisory Group (ISWAG) Broome 2021	Coordinated by the Kimberley Indigenous Saltwater Advisory Group, implemented by Kimberley Saltwater Communities, supported by Western Science Partners	Kimberley
	Tucker AD, Pendoley KL, Murray K, Loewenthal G, Barber C, Denda J, Lincoln G, Mathews D, Oades D, Whiting SD, et al. (2021) Regional Ranking of Marine Turtle Nesting in Remote Western Australia by Integrating Traditional Ecological Knowledge and Remote Sensing. Remote Sensing. 13(22):4696. https://doi.org/10.3390/rs13224696	DBCA WAMSI	Kimberley
	Santos Varanus Island Turtle Monitoring Program	Santos	Varanus Island
	Bayliss P, Raudino H, Hutton M, Murray K, Waples K and Strydom S (2019) Modelling the spatial relationship between dugon (Dugong dugon) and their seagrass habitat in Shark Bay Marine Park before and after the marine heatwave of 2010/11. Department of Agriculture, Water and the Environment Final Report 2.	CSIRO DBCA	Shark Bay Ningaloo Reef Exmouth Gulf
	Hounslow JL, Fossette S, Chong W, Bali R, Tucker AD, Whiting SD and Gleiss AC (2023) Behaviour-specific spatiotemporal patterns of habitat use by sea turtles revealed using biologging and supervised machine learning, Journal of Applied Ecology, 60(9):1828-1840. doi: 10.1111/1365-2664.14438	Murdoch University	Roebuck Bay
	West KM, Heydenrych M, Lines R, Tucker T, Fossette S, Whiting S and Bunce M (2023) Development of a 16S metabarcoding assay for the environmental DNA (eDNA) detection of aquatic reptiles across northern Australia, Marine and Freshwater Research 74(5):432-440. doi: 10.1071/MF20288	Curtin University	Roebuck Bay
	Whiting S, Tucker T, Pendoley K, Mitchell N, Bentley B, Berry O and FitzSimmons N (2018) Final Report of Proposal 1.2.2 prepared for the Kimberley Marine Research Program, Western Australian Marine Science Institution, Perth, Western Australia, 146 pp	DBCA WAMSI	Kimberley
	Thums Michele, Rossendell Jason, Fisher Rebecca, Guinea Michael L. (2020) Nesting ecology of flatback sea turtles *Natator depressus* from Delambre Island, Western Australia. Marine and Freshwater Research 71, 443-451.	AIMS	Delambre Island

Receptor	Existing baseline monitoring	Source / Data Custodian	Spatial extent
	Schneider L, Tucker AD, Vincent K, Fossette S, Young EJ and Whiting SD (2022) First Assessment of Mercury (Hg) Concentrations in Skin and Carapace of Flatback Turtles (*Natator depressus*) (Garman) From Western Australia. Front. Environ. Sci. 10:843855. doi: 10.3389/fenvs.2022.843855	DBCA	Thevenard Island Eighty Mile Beach
	Gammon M, Whiting S, Fossette S (2023) Vulnerability of sea turtle nesting sites to erosion and inundation: a decision support framework to maximize conservation. Ecosphere 14: e4529	UWA DBCA	Pilbara southern islands Pilbara northern islands Onslow area Thevenard Island Barrow Island Montebello Islands Dampier Archipelago Karratha Mundabullangana Cemetery Beach
Marine megafauna (whale shark, dugong and cetaceans)	Chevron (2019) Soundscape monitoring at JIC site (G1-NT-REPX0000361)	Chevron	Barrow Island
	Chevron (2023) Soundscape Monitoring at the JIC Site 2021-2023	Chevron	Barrow Island
	Raudino HC, Hunt TN, Waples KA (2018) Records of Australian humpback dolphins (*Sousa sahulensis*) from an offshore island group in Western Australia. Marine Biodiversity Records 11:14	DBCA	Montebello Islands
	Raudino HC, Douglas CR, Waples KA (2018) How many dolphins live near a coastal development? Regional Studies in Marine Science 19: 25-32	DBCA	Onslow Area Thevenard Island
	Sprogis K and Parra G (2022) Coastal dolphin and marine megafauna in Exmouth Gulf, Western Australia: informing conservation management actions in an area under increasing human pressure. Wildlife Research, 50(6): 435-450	UWA	Exmouth Gulf
	Wild S, Krutzen M, Rankin M, Hoppitt W, Gerber L, Allen S (2019) Long-term decline in survival and reproduction of dolphins following a marine heatwave. Current Biology 29, R225-R240	University of Leeds	Shark Bay
	Thums M, Ferreira LC, Jenner C, Jenner M, Harris D, Davenport A, Andrews-Goff V, Double M, Moller L, Attard CRM, Bilgmann K, Thomson PG, McCauley R (2022) Pygmy blue whale movement, distribution and important areas in the Eastern Indian Ocean. Global Ecology and Conservation 35 e02054	AIMS	Western Australia
	ECOCEAN Whale Shark Photo-Identification Library	Ecocean	Ningaloo
	AIMS (2021) Individual haplotyping of whale sharks from seawater environmental DNA.	AIMS	Ningaloo

Receptor	Existing baseline monitoring	Source / Data Custodian	Spatial extent
	Lester E, Meekan MG, Barnes P, Raudino H, Rob D, Waples K, Speed CW (2020) Multi-year patterns in scarring, survival and residency of whale sharks in Ningaloo Marine Park, Western Australia. Mar Ecol Prog Ser 634:115-125.	UWA	Ningaloo
	Irvine L and Salgado Kent C (2018) The distribution and relative abundance of marine mega-fauna, with a focus on humpback whales (*Megaptera novaeangliae*), in Exmouth Gulf, Western Australia.	Oceans Blueprint	Exmouth Gulf
	NESP MaC Project 3.10 - A partnership approach to filling key knowledge gaps on dugongs in northern Australia using novel technologies, 2023 -2026 (JCU, CDU, DBCA)	AIMS	Exmouth Gulf Ningaloo Shark Bay
	AIMS research on whale sharks	AIMS	Ningaloo
	Sprogis KR, Sutton AL, Jenner MN, McCauley RD, Jenner KCS (2022) Occurrence of cetaceans and seabirds along the Indian Ocean 110 E meridian from temperate to tropical waters. Deep-Sea Research II 205. 105184	Centre for Whale Research/UWA	Indian Ocean 110 E meridian from temperate to tropcial waters
	Haughey R, Hunt TN, Hanf D, Passadore C, Baring R and Parra GJ (2021) Distribution and Habitat Preferences of Indo-Pacific Bottlenose Dolphins (*Tursiops aduncus*) Inhabiting Coastal Waters With Mixed Levels of Protection. Front. Mar. Sci. 8:617518. doi: 10.3389/fmars.2021.617518	Flinders University	North West Cape Exmouth Gulf Ningaloo
	Cleguer C, Kelly N, Tyne J, Wieser M, Peel D and Hodgson A (2021) A Novel Method for Using Small Unoccupied Aerial Vehicles to Survey Wildlife Species and Model Their Density Distribution. Front. Mar. Sci. 8:640338. doi: 10.3389/fmars.2021.640338	Murdoch University	Exmouth Gulf
	Sutton AL and Shaw LL (2020) A snapshot of Marine Research in Shark Bay (Gathaagudu): Literature Review and Metadata Collection (1949-2020). West Australian Marine Science Institution, 180.	WAMSI	Shark Bay
	Sutton AL and Shaw JL (2021) Cumulative Pressures on the Distinctive Values of Exmouth Gulf. First draft report to the Department of Water and Environmental Regulation by the Western Australian Marine Science Institution, Perth, Western Australia. 272 pages.	WAMSI	Exmouth Gulf
	Raudino HC, Bouchet PJ, Douglas C, Douglas R, Waples K (2023) Aerial abundance estimates for two sympatric dolphin species at a regional scale using distance sampling and density surface modelling. Front. Ecol. Evol. 10:1086686. doi: 10.3389/fevo.2022.1086686	DBCA	Exmouth Gulf Onslow Area Ashburton Dampier Area Dampier Archipelago Karratha Porth Hedland Area Eighty Mile Beach Southern Pilbara Islands

Receptor	Existing baseline monitoring	Source / Data Custodian	Spatial extent
			Northern Pilbara Islands Great Sandy Island
	D'Cruz A, Salgado Kent C, Waples K, Brown AM, Marley SA, Thiele D, Yawuru PBC and Raudino HC (2022) Ranging Patterns and Site Fidelity of Snubfin Dolphins in Yawuru Nagulagun/Roebuck Bay, Western Australia. Front. Mar. Sci. 8:758435. doi: 10.3389/fmars.2021.758435	Edith Cowan University	Broome Roebuck Bay
	DBCA (2023), Biodiversity and Conservation Science Annual Report 2022–23, Department of Biodiversity, Conservation and Attractions, Perth.	DBCA	Roebuck Bay
	Lester E, Canon T, Arujo G (2023) Whale sharks (*Rhincodon typus*) feed on baitfish with other predators at Ningaloo Reef. Pacific Conservation Biology 29 86-87	DBCA	Coral Bay Ningaloo
	Palmer C, Martien KK, Raudino H, Robertson KM, Withers A, Withers E, Risk R, Cooper D, D'Cruz E, Jungine E, Barrow D, Cuff N, Lane A, Keynes D, Waples K, Malpartida A and Banks S (2023) Evidence of resident coastal population(s) of false killer whales (*Pseudorca crassidens*) in northern Australian waters. Front. Mar. Sci. 9:1067660. doi: 10.3389/fmars.2022.1067660	Charles Darwin University	Exmouth Gulf Pilbara Coast Islands Southern Pilbara Islands and Coast Eighty Mile Beach Broome Lalang-garram Marine Park Reefs Darwin Harbour Tiwi Islands Groote Archipelago
	Ferreira LC, Thums M, Whiting S, Meekan M, Andrews-Goff V, Attard CRM, Bilgmann K, Davenport A, Double M, Falchi F, Guinea M, Hickey SM, Jenner C, Jenner M, Loewenthal G, McFarlane G, Möller LM, Norman B, Peel L, Pendoley K, Radford B, Reynolds S, Rossendell J, Tucker A, Waayers D, Whittock P, Wilson P and Fossette S (2023) Exposure of marine megafauna to cumulative anthropogenic threats in north-west Australia. Front. Ecol. Evol. 11:1229803. doi: 10.3389/fevo.2023.1229803	AIMS	Shark Bay Ningaloo Coast World Heritage Area Kimberley
	Ningaloo Outlook	CSIRO	Ningaloo Coast World Heritage Area
	Bouchet PJ, Thiele D, Marley SA, Waples K, Weisenberger F, Balanggarra Rangers, Bardi Jawi Rangers, Dambimangari Rangers, Nyamba Buru Yawuru Rangers, Nyul Nyul Rangers, Uunguu rangers, Raudino H (2021) Regional Assessment of the Conservation Status of Snubfin Dolphins (*Orcaella heinsohni*) in the Kimberley Region , Western Australia, Frontiers in Marine Science, 7(January), pp. 1–20.	Universtiy of St Andrews DBCA	Kimberley Roebuck Bay Cygnet Bay Prince Regent River Cambridge Gulf
	Brown AM, Bejder L, Pollock KH, Allen SJ (2016) Site-specific assessments of the abundance of three inshore dolphin species to inform conservation and management, Frontiers in Marine Science, 3(FEB), pp. 1–18.	Murdoch University	Kimberley Roebuck Bay

Receptor	Existing baseline monitoring	Source / Data Custodian	Spatial extent
			Beagle Bay Cygnet Bay Cone Bay Cambridge Gulf Buccaneer Archipelago
	Brown AM, Smith J, Salgado Kent C, Marley S, Allen SJ, Thiele D, Bejder L, Erbe C, Chabanne D (2017) Relative abundance, population genetic structure and acoustic monitoring of Australian snubfin and humpback dolphins in regions within the Kimberley, Report of Project 1.2.4 for the Kimberley Marine Research Program. Western Australian Marine Science Institute, Perth.	Murdoch University	Kimberley Roebuck Bay Cygnet Bay Yampi Sound Prince Regent River Cambridge Gulf Buccaneer Archipelago
	Jarolimek CV, King J J, Apte SC., Hall J, Gautam A, Gillmore M, Doyle C (2023) A review of inorganic contaminants in Australian marine mammals, birds and turtles. Environmental Chemistry 20, 147-170. https://doi.org/10.1071/EN23057	CSIRO	Australia wide
	Lincoln G, Mathews D, Oades D with the Balanggarra, Bardi Jawi, Dambimangari, Karajarri, Mayala, Nyangumarta, Nyul Nyul, Wunambal Gaambera & Yawuru ISWAG members (2021) The Kimberley Indigenous Turtle & Dugong Initiative 2021-2031. Prepared by Mosaic Environmental for the Kimberley Indigenous Saltwater Advisory Group (ISWAG) Broome 2021	Coordinated by the Kimberley Indigenous Saltwater Advisory Group, implemented by Kimberley Saltwater Communities, supported by Western Science Partners	Kimberley
	Bayliss P, Hutton M (2017). Integrating Indigenous knowledge and survey techniques to develop a baseline for dugong (*Dugong dugon*) management in the Kimberley: Final Report of project 1.2.5 of the Kimberley Marine Research Program Node of the Western Australian Marine Science Institution, WAMSI, Perth, Western Australia, 98 pp.	CSIRO	Kimberley
	Bayliss P, Raudino H, Hutton M, Murray K, Waples K and Strydom S (2019) Modelling the spatial relationship between dugong (*Dugong dugon*) and their seagrass habitat in Shark Bay Marine Park before and after the marine heatwave of 2010/11. Department of Agriculture, Water and the Environment Final Report 2.	CSIRO DBCA	Shark Bay Ningaloo Reef Exmouth Gulf
	Raudino H, D'Cruz E, Waples K, Menzies J, Murdoch J, Quartermaine T and Mathews D (2020) Dry season dreaming Snubfin census on Yawuru sea country. Landscope 36, 41-44	DBCA	Roebuck Bay
	Thums M, Jenner C, Waples K, Salgado Kent C and Meekan M (2018) Humpback whale use of the Kimberley; understanding and monitoring spatial distribution. Report of Proposal 1.2.1 prepared for the Kimberley Marine Research Program, Western Australian Marine Science Institution, Perth, Western Australia, 78pp. Tourism WA. Shire of Broome visitor factsheet. Three-year average 2015/2016/2017. Produced by Tourism WA – Strategy and Research.	AIMS WAMSI	Kimberley

Receptor	Existing baseline monitoring	Source / Data Custodian	Spatial extent
	Brown AM, Allen SJ, Kelly N, Hodgson A (2022) Using Unoccupied Aerial Vehicles to estimate availability and group size error for aerial surveys of coastal dolphins. Remote Sensing in Ecology and Conservation. doi: 10.1002/rse2.313	Murdoch University	Ningaloo Reef Exmouth Gulf
Seabirds and shorebirds	Chevron Env-Gor-Seabird Monitoring Report 2021/22 J01209 (ABU220500068)	Chevron	Ah Chong Island (Montebello group) Double Island North Double Island South Parakeelya Island Barrow Island Group
	Dunlop JN. and Greenwell C (2021) Seasonal movements and metapopulation structure of the Australian fairy tern in Western Australia. Pacific Conservation Biology, 27, 47-60	Conservation Council of Western Australia	Stewart Island Fortescue Island Mardie Island Regnard Island Scholl Island Shark Bay Exmouth Gulf Somerville Island Tent Island Hope Point Houtman Abrolhos Islands Ningaloo Coast
	Weller D, Kidd L, Lee C, Klose S, Jaensch R, Driessen J (2020) Directory of Important Habitat for Migratory Shorebirds in Australia. Prepared for Australian Government Department of Agriculture, Water and the Environment by BirdLife Australia, Melbourne	Birdlife Australia	Barrow Island Carnarvon Coral Bay Exmouth Gulf Houtman Abrolhos Islands Karratha Ningaloo Onslow Area Port Hedland Adele Island Lacepede Islands Dampier Peninsula

Receptor	Existing baseline monitoring	Source / Data Custodian	Spatial extent
	Australia's National Shorebird Monitoring Program https://awsg.org.au/about-us/shorebirds-2020/	Birdlife Australia	Dampier Port Hedland Shark Bay Eighty Mile Beach Barrow Island Exmouth Gulf Ningaloo Reef Ningaloo Roebuck Bay
	Birdata: https://birdata.birdlife.org.au/	Birdlife Australia	Western Australia
	eBird: https://ebird.org/hotspots?hs=L5713406&yr=all&m=	eBird	Western Australia
	Astron (2020) Thevenard Island Retirement Project Terrestrial Ecological Monitoring Report June 2020. Prepared for Chevron	Chevron	Thevenard Island
	Biota (2022) Ashburton Salt Project Migratory Shorebird Assessment. Prepared for K + S Salt Australia	for K + S Salt Australia	Ashburton Exmouth Gulf
	Cannell B, Hamilton S, Driessen J (2019) Wedge- tailed shearwater foraging behaviour in the Exmouth region. Report for Woodside Energy Ltd. University of Western Australia and Birdlife Australia.	UWA	Muiron Islands
	Sutton AL and Shaw LL (2020) A snapshot of Marine Research in Shark Bay (Gathaagudu): Literature Review and Metadata Collection (1949-2020). West Australian Marine Science Institution, 180.	WAMSI	Shark Bay
	Sutton AL and Shaw JL (2021) Cumulative Pressures on the Distinctive Values of Exmouth Gulf. First draft report to the Department of Water and Environmental Regulation by the Western Australian Marine Science Institution, Perth, Western Australia. 272 pages.	WAMSI	Exmouth Gulf
	Woodside Case Study: Ningaloo Region Migratory Shorebirds of Exmouth Gulf (Birdlife)	Woodside Birdlife Australia	Exmouth Gulf Giralia Station
	DBCA shorebird surveys of Montebello Islands and Bedout Island in 2017 and 2018 mentioned in: Australian National Report to the 19th JAMBA, 13th CAMBA and 6th ROKAMBA Consultative Meetings, Commonwealth of Australia 2018	DBCA	Bedout Island Montebello Islands
	Roger DI, Scroggie MP, Hassell CJ (2020) Review of long-term shorebird monitoring in north Western Australia. Arthur Rylah Institute for Environmental Research. Technical Report Series No. 313. Prepared for DBCA	Arthur Rylah Institute DBCA	Roebuck Bay Eighty Mile Beach Bush Point
	Pendoley Environmental (2021) Varanus and Airlie Islands Shearwater Monitoring Annual Report 2020	Santos	Lowendal Islands Group Airlie Island

Receptor	Existing baseline monitoring	Source / Data Custodian	Spatial extent
			Serrurier Island
	Bancroft W and Bamford M (2018) ANSIA Stage 2 Fauna Assessment	MJ and AR Bamford Consulting Ecologists	Pilbara
	Phoenix Environmental Sciences (2023) Long-term migratory shorebird monitoring program for the Optimised Mardie Project. Prepared for Mardie Minerals Pty Ltd	Phoenix Consultants	Mardie
	Lavers JL, Humphreys-Williams E, Crameri NJ, Bond AL (2020) Trace element concentrations feathers from three seabird species breeding in the Timor Sea. Marine Pollution Bulletin 151. 110876	University of Tasmania	Bedout Island
	Biota Environmental Sciences (2019) Asian Renewable Energy Hub Environmental Review Document, Assessment Number 2140, Appendix 8, Asian Renewable Energy Hub Migratory Shorebirds and Waterbirds Survey. Prepared by Biotat Environmental Sciences, Nov 2018	Biota Environmental Sciences for Asian Renewable Hub (NW Interconnected Power)	Eighty Mile Beach
	Chan YC, Chan DTC, Tibbitts TL, Hassell CJ, Piersma T (2023) Site fidelity of migratory shorebirds facing habitat deterioration: insights from satellite tracking and mark-resighting. Mov Ecol 11, 79 https://doi.org/10.1186/s40462-023-00443-9	Department of Coastal Systems, NIOZ Royal Netherlands Institute for Sea Research Global Flyway Network Australasian Wader Studies Group	Roebuck Bay Eighty Mile Beach
	Lavers JL, Humphreys-Williams E, Crameri NJ, Bond AL (2020) Trace ekement concentrations feathers from three seabird species breeding in the Timor Sea. Marine Pollution Bulletin 151. 110876	University of Tasmania	Bedout Island

Appendix D Initial oil characterisation sampling

Oil sampling and analysis

Oil sampling kits are held by Santos for the purposes of taking initial spilled oil/ oily water samples. Santos also maintains procedures to guide untrained personnel in the collection of these initial samples, which may be taken by vessel crew. Trained personnel may be deployed to the field via the OSM Services Provider to continue sampling as required as part of ongoing operational monitoring.

Sampling kits are positioned at Santos strategic locations (refer to Table 9-2) and will be mobilised to the required locations when needed. The kits contain all necessary equipment and sampling containers for shipping to a laboratory for analysis.

The Santos Oil and Water Sampling Procedures (7710-650-PRO-0008) defines the sampling protocol and procedures, and broad implementation guidance is provided in Table D-1.

Using on-site Vessel of Opportunity (VOOs), oil samples are to be taken daily where possible from fresh oil, and from the weathered oil locations.

Laboratory analysis

Laboratory analysis of the chemical and physical properties of the recovered oil, including gas chromatography/mass spectrometry for the purpose of fingerprinting the oil constituents, is to be undertaken. Fingerprinting of the released hydrocarbon potentially allows contamination to be traced back to the source where this is otherwise unclear or in dispute. The Santos Oil and Water Sampling Procedures (7710-650-PRO-0008) outlines the suite of available oil testing and fingerprinting analyses that can be performed by the preferred laboratories. Details of the testing laboratories can also be found within the document.

Ecotoxicology assessment of the oil is to be conducted at an ecotoxicology capable laboratory following the revised Australian and New Zealand Water Quality Guidelines, if the hydrocarbon is from Santos fields/reservoirs and ecotoxicology testing has not already been done (i.e. pre-spill). The quantity of sample required for analysis will be confirmed by the laboratory but is expected to be in the order of 6 to 10 L. Testing results will provide the concentrations at which toxicity endpoints consistent with revised Australian and New Zealand Water Quality Guidelines are met for each test. Overall species protection concentrations, including 90%, 95% and 99% species protection trigger levels are then to be generated using a species sensitivity distribution fitted to the data (e.g. by using the Burrlioz software program).

Table D-1: Implementation guidance – initial oil characterisation

Action		Consideration	Responsibility	Complete
Initial actions	Source available vessels (on hire or VOO) for oil sampling.	Can be multi-tasked – e.g. for vessel surveillance or tracking buoy deployment.	Operations Section Chief Logistics Section Chief	☐
	Source sampling equipment. Confirm sampling methodology. Confirm laboratory for sample analysis. Develop health and safety requirements/controls.	Refer Table 9-2 for resource availability. The Santos Oil and Water Sampling Procedures (7110-650-PRO-0008) provide the procedures for sampling.	Environment Unit Lead Safety Officer	☐
	Vessel directed to sampling location.	Sampling of oil at thickest part of slick – typically leading edge.	Operations Section Chief	☐
	Vessel crew to undertake sampling and delivery of samples to nearest Port for dispatch to laboratory. Environment Unit Lead to confirm analysis of oil with lab.	Darwin Logistics personnel to assist with logistics of sending oil samples to laboratory for analysis.	Operations Section Chief Environment Unit Lead Logistics Section Chief	☐
Ongoing actions	Continue sample collection post release where oil is available.	Initial monitoring by crew of available vessels – Once mobilised to site OSM Services Provider to continue sampling of oil in conjunction with operational water quality monitoring.	Operations Section Chief Environment Unit Lead Logistics Section Chief	☐

Appendix E OSM Services Provider Call Off Order Form

Operational and Scientific Monitoring (OSM) Services Call-Out Order Form

Please do not hesitate in contacting the Duty Manager at the earliest opportunity in the event of an incident or potential incident. Please ensure you telephone the Duty Manager before e-mailing or faxing this completed form

Oil Spill Response Limited's safety policy requires us to work closely with the mobilising party to ensure all aspects of safety and security are addressed for our personnel.

To	Duty Manager
OSRL Base	Southampton, UK Loyang, Singapore Fort Lauderdale, USA
Telephone	+65 6266 1566
Emergency Fax	+65 6266 2312
Email	dutymanagers@oilspillresponse.com, osm@oilspillresponse.com

Details of Authorised Contact				
Mobilising Company				
Name of Person Authorising OSRL				
Position of Authorising Representative				
Direct Phone Number	Country Code	+	Number	
Email Address				

Operational Monitoring service to be activated (X)		**Scientific Monitoring service to be activated (X)**	
OM1 Hydrocarbon Properties and Weathering Behaviour at Sea		**SM1** Water Quality Impact Assessment	
OM2 Water Quality Assessment		**SM2** Sediment Quality Impact Assessment	
OM3 Sediment Quality Assessment		**SM3** Intertidal and Coastal Habitat Assessment	
OM4a Surface Chemical Dispersant Effectiveness and Fate Assessment		**SM4** Seabirds and Shorebirds	
OM4b Subsea Dispersant Injection Monitoring		**SM5** Marine Mega-fauna Assessment	
OM5 Marine Fauna Surveillance		**SM6** Benthic Habitat Assessment	
OM6 Shoreline Clean-up Assessment		**SM7** Marine Fish and Elasmobranch Assemblages Assessment	
		SM8 Fisheries Impact Assessment	
		SM9 Heritage Features Assessment	
		SM10 Social Impact Assessment	

Location of Port of Staging/ Departure – Port (X)		Additional Information
Ashburton		
Barrow Island		
Broome		
Cape Preston		
Dampier		
Darwin		
Derby		
Exmouth		
Onslow		
Port Hedland		
Port Walcott		
Varanus Island		
Wyndham		
Yampi Sound		

Location of Port of Staging/ Departure – Airport (X)		Additional Information
Barrow Island		
Broome		
Cape Preston		
Darwin		
Derby		
Karratha		
Learmonth		
Lombardina		
Onslow		
Pardoo		
Perth		
Port Hedland		
Roebourne		
Wallal Downs		

Request for OSM position to IMT/EMT (X)		IMT/EMT Address
OSM Implementation Lead		
OSM Field Operations Manager		
SM Coordinator		
OM Coordinator		

Invoice Address if available	
Purchase Order Number	

I, the above-named Authorising Representative for the Mobilising Company, approve activation of Oil Spill Response Limited and its resources for OSM Services under the terms of the SUPPLEMENTARY SERVICE AGREEMENT FOR OPERATIONAL AND SCIENTIFIC MONITORING (OSM) SERVICES Agreement in place between the above stated Company and Oil Spill Response PTY Limited.

Signature:		Date / Time (UTC+8):		

Please telephone the Duty Manager to confirm receipt the completed form after sending this completed form.