VERMILION
Oil & Gas
Australia Pty. Ltd.

VERMILION OIL & GAS AUSTRALIA

EXPLORATION AND SURVEY OPERATIONS OIL POLLUTION EMERGENCY PLAN

AUPD24001-VOG-1100-YH-0016

Revision	Date	Originator	Checker	Approver
2	2 September 2026	Social Resources	Environmental Advisor HSE Manager	Managing Director

Revision History

Revision	Date	Description	Originator	Checker	Approver
0	24 March 2025	For Use	MW	MJ	RC
1	30 March 2026	Updated to address NOPSEMA comments	MW	NJ	RC
2	2 September 2026	Updated to address NOPSEMA comments	MW	NJ	RC

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15	VOGA Well Construction QHSE Advisor
16	VOGA Environmental Advisor
17	MODU Offshore Installation Manager
18	Manager Assessment and Compliance NOPSEMA – Perth
19	AMOSC
20	DTMI Oil Spill Response Coordinator

Table of Contents

Abbreviations and Acronyms

°C	degrees Celsius
AAC	Aerial Attack Coordinator
ADIOS	Automated Data Inquiry for Oil Spills
AIIMS	Australasian Inter-Service Incident Management System
ALARP	as low as reasonably practicable
AMOSC	Australian Marine Oil Spill Centre
AMOS Plan	Australian Marine Oil Spill Plan
AMSA	Australian Maritime Safety Authority
APASA	Asia Pacific Applied Science Associates Pty Ltd
AEP	Australian Energy Producers
BAOAC	Bonn Agreement Oil Appearance Code
bbl	barrels
BER	boom encounter rate
BoM	Bureau of Meteorology
BOP	blowout preventer
CALM Buoy	Catenary Anchor Leg Mooring Buoy
CAMBA	China-Australia Migratory Bird Agreement
CCT	Corporate Command Team
cm	centimetres
DBCA	Department of Biodiversity, Conservation and Attractions
DCCEEW	Department of Climate Change, Energy, the Environment and Water
DEMIRS	Department of Energy, Mines, Industry Regulation and Safety
DFAT	Department of Foreign Affairs and Trade
DPIRD	Department of Primary Industries and Regional Development
DOR	dispersant-to-oil ratio
DTMI	Department of Transport and Major Infrastructure
DWER	Department of Water and Environmental Regulation
EMBA	environment that may be affected
EP	Environment Plan
EPBC Act	*Environmental Protection and Biodiversity Conservation Act 1999*
ERP	Emergency Response Plan
ESC	Environmental and Scientific Coordinator
FWADC	fixed wing aerial dispersant capability
g/m^2	grams per square metre
GIS	Geographic Information System
GSI	Great Sandy Island

HFO	heavy fuel oil
HMA	Hazard Management Agency
h	hour(s)
HSES	Health, Safety, Environment and Security
HSE MS	Health, Safety and Environment Management System
IAP	Incident Action Plan
IBC	intermediate bulk container
IC	Incident Commander
ICC	Incident Command Centre
ICT	Incident Command Team
IMO	International Maritime Organisation
IMT	Incident Management Team
JAMBA	Japan-Australia Migratory Bird Agreement
JHA	job hazard analysis
JIP	Joint Industry Practice
JSCC	Joint Strategic Coordination Committee
kg	kilograms
kg/m^3	kilograms per cubic metre
km	kilometres
KPI	key performance indicator
m	metres
m^2	square metre(s)
m^3	cubic metre(s)
mm	millimetres
MBI	Montebello Islands
MEE	Maritime Environmental Emergencies
MEER Unit	Maritime Environmental Emergency Response Unit (within WA DTMI)
MODU	Mobile Offshore Drilling Unit
MOU	Memorandum of Understanding
National Plan	National Plan for Maritime Environmental Emergencies
NDVI	Normalised Difference Vegetation Index
NEBA	net environmental benefit analysis
NES	national environmental significance
nm	nautical mile
NOPSEMA	National Offshore Petroleum, Safety and Environmental Management Authority
NRT	National Response Team
NWS	North-West Shelf
OH&S	Occupational Health and Safety
OMP	Operational Monitoring Plan

OPEP	Oil Pollution Emergency Plan
OPGGSA	*Offshore Petroleum and Greenhouse Gas Storage Act 2006*
OPGGS(E)R	Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2009
OPICC	Offshore Petroleum Incident Coordination Committee
OPP	Oil Pollution Plan
OPRC	Oil Pollution Preparedness, Response and Cooperation
OPRC	International Convention on Oil Pollution Preparedness, Response and Cooperation 1990
OSCA	Oil Spill Control Agents (Register)
OSM	Operational and Scientific Monitoring
OSM BIP	Operational and Scientific Monitoring Bridging Implementation Plan
OSR	Oil Spill Response
OSRA	Oil Spill Response Atlas or Agency
OSRL	Oil Spill Response Limited
OSRO	Oil Spill Response Organisation(s)
OSTM	Oil Spill Trajectory Modelling
OWA	Oiled Wildlife Advisor
OWR	Oiled Wildlife Response
OWERP	Oiled Wildlife Emergency Response Plan
OWRP	Oiled Wildlife Response Plan
PEAR	People, Environment, Assets and Reputation
PIC	Person in Charge
POB	persons on-board
POLREP	Pollution Report (Form)
POWRP	Pilbara Region Oiled Wildlife Response Plan
PPE	personal protective equipment
ppb	parts per billion
ppm	parts per million
psi	pounds per square inch = 0.068 atmospheres
P(SL)A	*Petroleum (Submerged Lands) Act 1982*
Ref	reference
ROV	remotely operated vehicle
SCAT	Shoreline Clean-up Assessment Technique
SDS	safety data sheet
SIMOPS	Simultaneous Operations
SITREP	Situation Report (Form)
SMEACS	Situation, Mission, Execution, Administration and Logistics, Command, Control and Communication, Safety
SMEERC	State Marine Environmental Emergency Response Committee
SMOPC	State Marine Oil Pollution Committee
SMP	Scientific Monitoring Plan

SOPEP	Shipboard Oil Pollution Emergency Plan
State Hazard Plan-MEE	Western Australian State Hazard Plan Maritime Environmental Emergencies
T	tonnes
TRP	Tactical Response Plan
US	United States
VFR	Visual Flight Rules
VOGA	Vermillion Oil & Gas Australia Pty Ltd
WA	Western Australia
WAMOPRA	Western Australia Marine Oil Pollution Risk Assessment
WAOWRP	Western Australia Oiled Wildlife Response Plan
WestPlan-HAZMAT	Western Australian Hazardous Materials Emergency Management Plan

In the event of a spill, go to PART 4

The Exploration and Survey Operations OPEP is divided into six parts:

EXPLORATION AND SURVEY OPERATIONS OIL POLUTION EMERGENCY PLAN

PART 1
OSCP OVERVIEW

- Statutory requirements
- Approach to response planning
- Establishing the risk and context

PART 2
INCIDENT MANAGEMENT PROCESS

- Emergency and crisis management response
- Incident response cycle
- Response strategies

PART 3
PERFORMANCE MANAGEMENT

- Assurance and capability management
- Continuous improvement

PART 4
ACTIVATION OF OPEP

- Activation and notification flowcharts

PART 5
OIL POLLUTION PLANS

- OPP 1 – Diesel
- OPP 2 – Wandoo Crude
- Termination and recovery
- ICT arrangements

PART 6
SUPPORT PLANS

- Waste management
- Stakeholder engagement
- Operational and scientific monitoring
- Health and safety
- Logistics management
- Tactical response plans

Appendix A: **SDSs**

Appendix B: **NEBA**

Appendix C: **OSM-BIP**

PART 1: Oil Pollution Emergency Plan Overview

Section 1 – Introduction

1.1 Oil Pollution Emergency Plan Aim and Outcomes

The aim of the Vermilion Oil & Gas Australia Pty Ltd (VOGA) Exploration and Survey Operations Oil Pollution Emergency Plan (OPEP) is to ensure that measures are in place to mitigate the oil spill hazards associated with survey and exploration activities.

To achieve this, the Exploration and Survey Operations OPEP has established the following outcomes based on the following requirements:

- **Outcome 1:** The Exploration and Survey Operations OPEP is established to mitigate the oil spill hazards identified in the respective Environment Plans (EPs).
- **Outcome 2:** Response strategies provided in the Exploration and Survey Operations OPEP are appropriate to:
  - The nature and scale and associated environmental impact of the potential spill hazards
  - The nature and scale and associated environmental impact of the potential spill response strategies
  - The environmental sensitivities and priorities as outlined within the respective EP.
- **Outcome 3:** The Exploration and Survey Operations OPEP describes incident management system and interfaces.
- **Outcome 4:** Decision-making processes support mitigation of environmental impact of spills and assessment of effectiveness of response strategies using:
  - The Incident Action Plan (IAP) which includes a consideration for environmental impact of spill and response
  - Operational and scientific monitoring (OSM).
- **Outcome 5:** The Exploration and Survey Operations OPEP shall contain processes to assess, test and maintain arrangements to meet the outcomes of the OPEP through:
  - Assurance processes
  - Capability assessment
  - Review triggers.

These outcomes align with the VOGA Critical Procedure Performance Standard for Element 8 – Oil Spill Response [WAN-WNAB-CP-ER-02 and WAN-WNAB-CP-ER-03] key requirements.

There are six parts to the OPEP:

- Part 1 – an overview of the Exploration and Survey Operations OPEP
- Part 2 – the VOGA incident management process
- Part 3 – the management arrangements for the Exploration and Survey Operations OPEP
- Part 4 – notification and activation requirements

- Part 5 – Oil Pollution Plans (OPPs) detailing response strategies and arrangements for credible spill scenarios
- Part 6 – spill response support plans.

1.2 Scope

This plan has been established by VOGA to respond to oil pollution associated with survey and exploration drilling activities within Permit Area WA-14-L (Section 1.3).

The Exploration and Survey Operations OPEP includes organisational responsibilities, actions, reporting requirements, and resources available to ensure the effective and timely management of the response to an accidental oil spill resulting from exploration activities. OPEP requirements and corresponding sections where these requirements are addressed are outlined in Table 1-1.

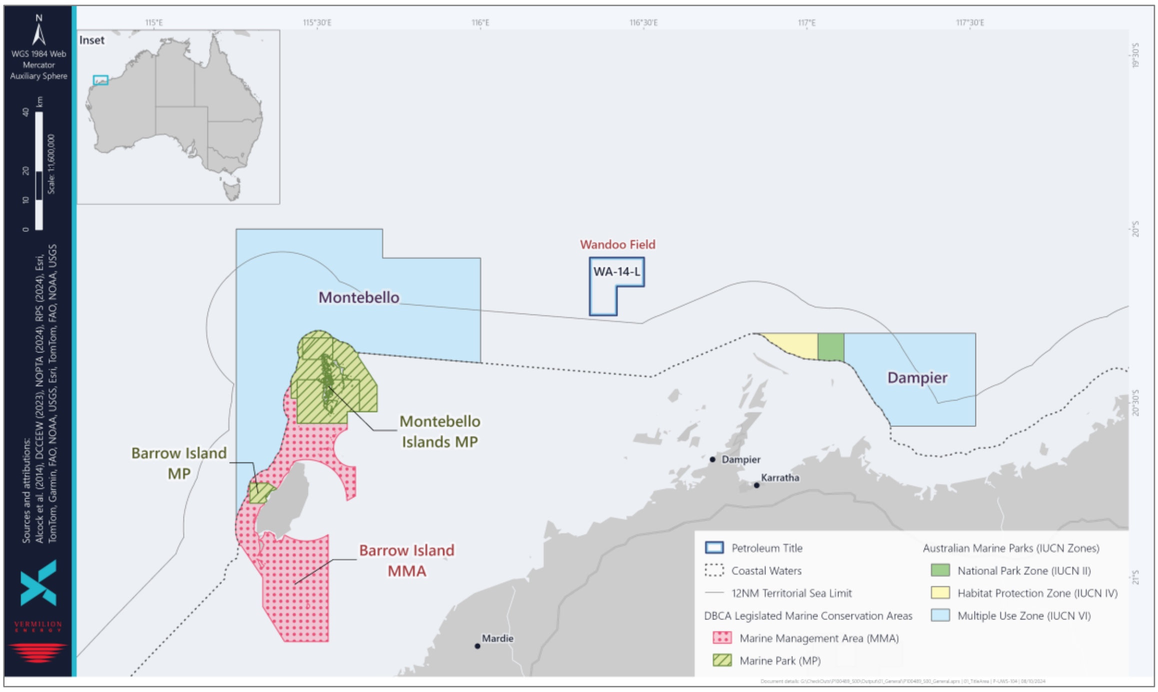
Table 1-1: Scope of OPEP

Description of OPGGS(E)R requirements for OPEP	Part in OPEP
The oil pollution emergency plan must include adequate arrangements for responding to and monitoring oil pollution.	Part 5 and 6
The implementation strategy must include arrangements for testing the response arrangements in the oil pollution emergency plan that are appropriate to the response arrangements and to the nature and scale of the risk of oil pollution for the activity.	Part 3
The arrangements for testing the response arrangements must include: (a) a statement of the objectives of testing (b) a proposed schedule of tests (c) mechanisms to examine the effectiveness of response arrangements against the objectives of testing (d) mechanisms to address recommendations arising from tests.	Part 3
The proposed schedule of tests must provide for testing the response arrangements.	Part 3
The implementation strategy must provide for monitoring of impacts to the environment from oil pollution and response activities.	Part 6 and Appendix B
The implementation strategy must include information demonstrating that the response arrangements in the OPEP are consistent with the national system for oil pollution preparedness and response.	Part 1 and 3

1.3 Location

Permit WA-14-L is situated approximately 80 km northwest of the port of Dampier (Figure 1-1) with water depths ranging from approximately 50–60 m below Lowest Astronomical Tide (LAT).

Figure 1-1: Wandoo Field location

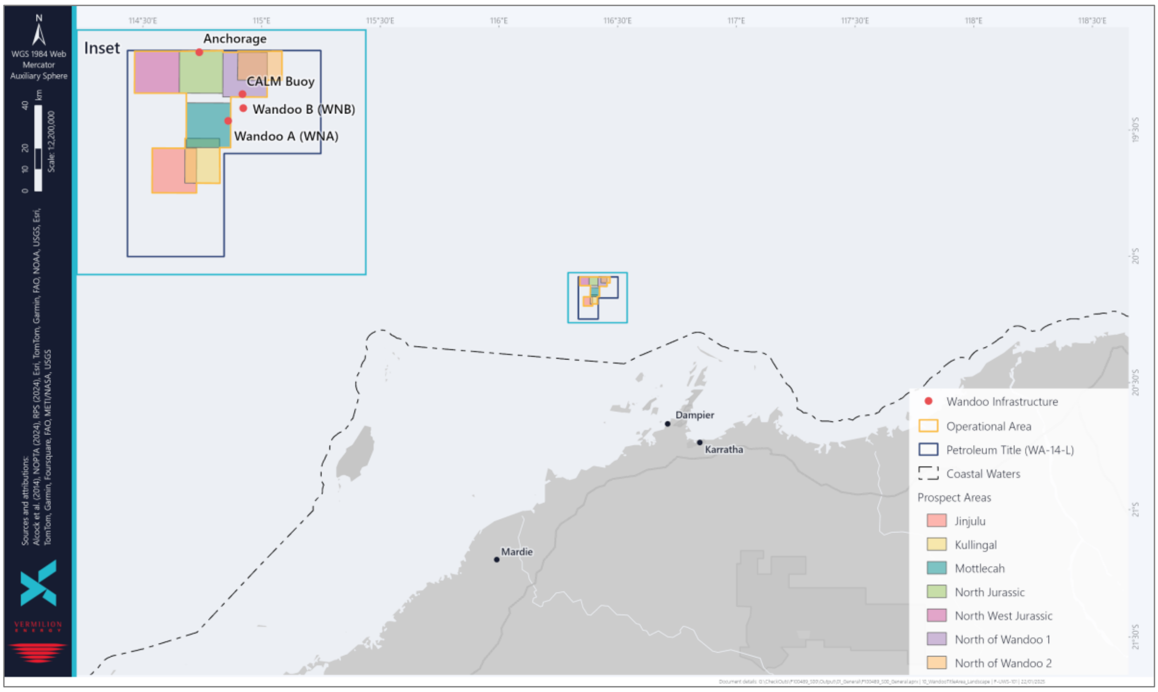


Indicative coordinates for the exploration prospects and survey areas are provided in Table 1-2 and illustrated in Figure 1-2.

Table 1-2: Indicative geographical coordinates of the exploration prospects

Prospects	X (Easting)	Y (Northing)	Latitude	Longitude
Kullingal	437843.0	7769379.0	20.171952275° S	116.405154118° E
Mottlecah	439263.0	7773031.5	20.138993472° S	116.418865226° E
Jinjulu	435158.7	7769128.6	20.174126078° S	116.379457185° E
North of Wandoo 1	441024.0	7777050.0	20.102736571° S	116.435844178° E
North of Wandoo 2	442025.0	7778592.0	20.088833157° S	116.445468311° E
Jurassic North	438556.0	7777506.0	20.098539052° S	116.412251940° E
NW Jurassic	431796.0	7777285.0	20.100308831° S	116.347583269° E

Figure 1-2: Operational Areas



1.4 Activity Description

This OPEP covers oil spill scenarios from survey and exploration drilling activities within the Permit Area WA-14-L, as described in the Wandoo Field Exploration Drilling EP [AUPD24001-VOG-1100-YH-0015] and Wandoo Field Exploration Drilling EP [AUPD24001-VOG-1100-YH-0015].

1.4.1 Geotechnical and Geophysical Survey Activities

The activities covered in the Wandoo Field Geotechnical and Geophysical Survey EP [AUPD24001-VOG-1100-YH-0015] include:

- Geotechnical survey, including seabed grab sampling and borehole/Piezocone Penetration Tests (PCPTs)
- Geophysical survey, including Multibeam Echo Sounder (MBES), Side Scan Sonar (SSS), Sub-bottom Profiling (SBP) and magnetometer.

Activities excluded from the scope of the EP are:

- Seismic surveys
- Vessel operations within Port Boundaries or State waters, given they are managed under the *Shipping and Pilotage Act 1967* (WA) as administered by the relevant Port Authority under the *Port Authorities Act 1999* (WA)
- Vessel operations within Commonwealth waters outside of the Operational Area, given they are managed under the *Navigation Act 2012* (Cth) as administered by the Australian Maritime Safety Authority (AMSA).

1.4.2 Exploration Drilling Activities

The activities covered in the Wandoo Field Exploration Drilling EP [AUPD24001-VOG-1100-YH-0015] include:

- Using an approved transit route specialist anchor handling vessels will manoeuvre the drilling rig into place
- The drilling rig will be positioned at sites determined as suitable by the seabed assessments
- Surface hole section will be drilled and cased, and then a riser and Blowout Preventer (BOP) to prevent release of hydrocarbons installed
- The well would then be drilled to reach the reservoir
- Once the exploration wells have been drilled and evaluated, they will be Plugged and Abandoned (P&A) so hydrocarbons cannot be released, and all equipment removed from the seabed.

1.5 Interface with Other Plans

1.5.1 VOGA Plans

This Exploration and Survey Operations OPEP interfaces with the following VOGA plans:

- **Wandoo Emergency Response Plan [VOG-2000-RD-0017]** – This plan describes the immediate 'actions-on' for an unplanned emergency incident at one of VOGA's facilities. The Wandoo Emergency Response Plan (ERP) is the plan that will be initially put in place to manage the immediate, life-threatening consequences of an emergency (e.g. fire, collision, etc.) and immediately mitigate, as far as possible, the consequences of these actions. The Wandoo ERP will always have primacy over other plans.
- **Source Control Contingency Plan** – The Source Control Contingency Plan provides a response framework to implement a well construction activity to intercept and plug/kill a well bore in the event of a well blowout. The Source Control Response Team is run independently of the VOGA Oil Spill Incident Command Team (ICT). Both teams interface at the crisis management level of the emergency response structure.
- **Wandoo Field Exploration Drilling EP [AUPD24001-VOG-1100-YH-0015]** – The Exploration Drilling EP caters for all exploration drilling activities associated with the Permit Area. The EP is developed by VOGA and accepted by the Jurisdictional Authority under the Offshore Petroleum and Greenhouse Gas Storage (Environmental) Regulations 2009 (OPGGS(E)R). It identifies the environmental risks and impacts associated with the activities covered within the plan. This OPEP addresses all potential oil spill risks identified in the Wandoo Field Exploration Drilling EP.
- **Wandoo Field Geotechnical and Geophysical Survey EP [AUPD24001-VOG-1100-YH-0014] –** The Geotechnical and Geophysical Survey EP caters for all survey activities associated with the Permit Area. The EP is developed by VOGA and accepted by the Jurisdictional Authority under the OPGGS(E)R. It identifies the environmental risks and impacts associated with the activities covered within the plan. This OPEP addresses all potential oil spill risks identified in the Wandoo Field Geotechnical and Geophysical Survey EP.

- **Exploration and Survey Operations Oil Spill Response Capability Review [VOG-1100-YH-0019]** – This report provides a capability review for all oil spill response spill scenarios associated with production and well construction activities within the Wandoo Permit Area WA-14-L. The capability assessment included detailing the specification for each resource requirement (e.g. skills, vessels, equipment) and identifying what contracts and arrangements are in place, or required, to meet the resource requirements. The requirements are ascertained and assessed through workshops, surveys and review of existing contracts.
- **Exploration and Survey Operations Operational and Scientific Monitoring Bridging Implementation Plan [VOG-1100-YH-0018]** – This plan has been designed to interface with the Joint Industry Operational and Scientific Monitoring Framework and associated Oil Spill Response Limited (OSRL) Supplementary Agreement. The Exploration and Survey Operations Operational and Scientific Monitoring Bridging Implementation Plan (OSM-BIP) is informed by the EP through the identification of the sensitive receptors in the Wandoo Field operating environment that could be impacted during an oil spill.

1.5.2 Government and Industry Plans

This OPEP interfaces with the following Australian Government, State Government and Industry plans.

1.5.2.1 Oil Spill Response Organisations (OSRO)

Oil Spill Response Limited (OSRL):

- VOGA has a signed Associate Agreement with OSRL for the Wandoo Production Area
- VOGA is a member of the OSRL Joint Industry Oil Spill Monitoring Supplementary Service
- VOGA has access to the Global Dispersant Stockpile (GDS)
- OSRL has the capacity to provide personnel and equipment to combat Level 3 spills
- Access to international resources is facilitated through the OSRL membership.

Australian Marine Oil Spill Plan (AMOS Plan) (AMOSC, 2021):

- This plan is managed by the Australian Marine Oil Spill Centre (AMOSC), and will be activated by VOGA when the response to an oil spill incident is regarded by VOGA to be requiring resources beyond those of the company
- The plan coordinates the participation of the oil industry in response through the mobilisation of AMOSC personnel and/or equipment, which can be supplemented by personnel and equipment owned directly by other industry companies
- As members of AMOSC, Chevron and Santos will respond with equipment and/or personnel to respond to a VOGA spill impacting on Barrow or Lowendal Islands respectively.

1.5.2.2 Oil Spill Response Agency (OSRA)

National Plan for Maritime Environmental Emergencies

AMSA manages the National Plan for Maritime Environmental Emergencies (National Plan), Australia's key maritime emergency contingency and response plan (AMSA, 2020). AMSA fulfils its obligations under the National Plan for non-ship source pollution incidents on the formal request from the respective Offshore Petroleum Incident Controller/s (AMSA, 2021).

AMSA is notified immediately of all ship-source incidents through the AMSA Rescue Coordination Centre (RCC) Australia. The AMSA National Plan Incident Management System Policy (NP-POL-003) (AMSA, 2022a) describes the incident management system which is applied by AMSA, State Control Agencies and the offshore industry Australia wide for all marine oil spill response incidents and implemented through the National Plan for Maritime Environmental Emergencies.

The Department of Transport and Major Infrastructure (DTMI) is a signatory to the inter-governmental agreement under the National Plan. The State Response Team are members of the National Response Team and are trained and competent in roles ranging from team leader for equipment operations and shoreline response to ICT roles. The MEER Unit has access to AMSA's National Plan equipment to respond to spills in State waters. This equipment is located in Dampier and Fremantle.

WA State Hazard Plan – Maritime Environmental Emergencies (MEE)

The WA State Hazard Plan – Maritime Environmental Emergencies (MEE) provides an overview of arrangements for the management of marine oil pollution and marine transport emergencies in Western Australia. It enables the WA Government through the Department of Transport and Major Infrastructure (DTMI) to prevent, prepare for, respond to and recover from maritime environmental emergencies as listed in the *Emergency Management Act 2005* (WA) and prescribed in the Emergency Management Regulations 2006 (the EM Regulations).

For the purposes of the Exploration and Survey Operations OPEP, State Hazard Plan - MEE describes the response arrangements that the WA State Government will put in place for oil spills from the Wandoo Field, should they enter, or be predicted to enter, State waters and any shorelines or wildlife therein. This includes performing the function of Controlling Agency for response activities in State waters resulting from Level 2/3 incident in Australian Government waters as per the WA DTMI Offshore Petroleum Industry Guidance Note Marine Oil Pollution (MOP): Response and Consultation Arrangements (September 2018).

DTMI Incident Management Plan - Marine Environmental Emergency (MEE)

- This plan describes the activities and actions that the WA DTMI will undertake to mount a credible and proportionate response to oil pollution in State waters. For the purposes of the VOGA Exploration and Survey Operations OPEP, the DTMI Incident Management MEE is complimentary in that it will be used to assist and guide the actions and activities that take place in State waters by the DTMI in response to a spill from exploration drilling in the Wandoo Field.
- The DTMI MEER Unit will work with the VOGA to determine protection priorities and undertake an initial and ongoing environmental impact assessments to determine the

most appropriate response in State waters. These protection priorities determined at the time of a spill may differ from those originally identified in the accepted OPEP.

- The MEER Unit, convenes the State-level maritime environmental emergency coordination committee, which includes representatives from relevant agencies and authorities involved in marine oil spill response. When a spill has the potential to impact State waters, the DTMI coordinates notification of the committee representatives and other key State roles in accordance with the State Hazard Plan for Maritime Environmental Emergencies and the DTMI Oil Spill Incident Management Guideline.

1.5.2.3 *Third Party Vessels*

Shipboard Oil Pollution Emergency Plans (SOPEPs):

- These plans contain details about the ship, roles and responsibilities in the event of a spill, and spill response equipment on board. MARPOL 73/78 requires that every oil tanker of 150 tonnes gross tonnage and above, and every ship other of 400 gross tonnes and above, carry a SOPEP approved by the Administration. It is the same Shipboard Marine Pollution Plan that is required under the Oil Pollution Preparedness, Response and Cooperation (OPRC) Convention.
- Shipboard Marine Pollution Plans also include noxious liquid substances and should more correctly be called “Shipboard Marine Pollution Emergency Plan.” The plans must be prepared in accordance with vessel class and flag State requirements and guidelines as laid down by the International Maritime Organisation (IMO).
- For the purposes of this OPEP, all vessels that are involved in the activity will implement their SOPEP to assist in mitigating any spills from their shipping activities, which contributes to the mitigation of the overall oil spill risk from the petroleum activity.

1.6 Response Priorities

Consistent with the National Plan, the priorities for VOGA in responding to an oil spill will be:

- Human health and safety
- Habitat and cultural resources
- Rare and/or endangered flora and fauna
- Commercial resources (including commercial fisheries, other offshore oil and gas production and exploration facilities in the immediate surrounds)
- Community amenities for social and recreational activities (including recreational fishing, local beaches and culturally sensitive areas).

1.7 Incident Classification

The AMSA National Plan and the WA State Hazard Plan – MEE assign response levels to oil spills according to the criteria listed in Table 1-3.

The Wandoo ERP [VOG-2000-RD-0017] provides details on the response arrangements and responsibilities VOGA has for the management of emergencies which may occur during survey and drilling operations. Consistent with the National Plan, the Wandoo ERP categorises incidents in relation to the response required:

- **Level 1 incidents**: Generally able to be resolved through the application of local or initial resources only (e.g. first strike response).
- **Level 2 incidents**: More complex in size, duration, resource management and risk and may require deployment of jurisdictional resources beyond the initial response.
- **Level 3 incidents**: Characterised by a degree of complexity that requires the Incident Commander to delegate all incident management functions to focus on strategic leadership and response coordination and may be supported by national and international resources.

Table 1-3: Emergency classification levels (AMSA and WA DTMI)

Characteristic	Level 1	Level 2	Level 3
Management			
Jurisdiction	Single jurisdiction	Multiple jurisdictions	Multiple jurisdictions
Delegation	Incident Controller responsible for all functions	Some functions delegated or divisions created	All functions delegated and/or divisions created
Number of agencies	First-response agency	Routine multi-agency response	Agencies from across government and industry
IAP	Simple/outline	Outline	Detailed
Resources	Resourced from within one area	Requires intra-state resources	Requires national or international resources
Type of emergency			
Type of response	First-strike	Escalated	Campaign
Duration	Single shift	Multiple shifts Days to weeks	Extended response Weeks to months
Hazards	Single hazard	Single hazard	Multiple hazards
Resources at risk			
Human	Potential for serious injuries	Potential for loss of life	Potential for multiple loss of life
Environment	Isolated impacts or with natural recovery expected within weeks	Significant impacts and recovery may take months. Remediation required	Significant area and recovery may take months. Remediation required
Wildlife	Individual fauna	Groups of fauna or threatened fauna	Large numbers of fauna
Economy	Business level disruption	Business failure	Disruption to a sector
Social	Reduced services	Ongoing reduced services	Reduced quality of life
Infrastructure	Short-term failure	Medium-term failure	Severe impairment
Public affairs	Local and regional media coverage	National media coverage	International media coverage

Section 2 – Statutory Requirements

2.1 International Conventions

Australia has ratified the following international conventions relating to risk from oil and gas activities:

- International Convention for the Prevention of Pollution from Ships 1973, and modified by the Protocol 1978 (MARPOL 73/78)
- International Convention on Oil Pollution Preparedness, Response and Cooperation 1990 (IMO, 1990).

Both conventions compel the Australian Government (and in turn, State Government) to implement legislation that regulates activities in Australian territorial waters. Of relevance to VOGA, is that MARPOL 73/78 states that parties to the convention *"...shall require that operators of offshore units under its jurisdiction have Oil Pollution Plans, which are coordinated with the national system..."*

OPRC 1990, which entered into force on 13 May 1995, provides a global framework for international cooperation and mutual assistance between states and regions when preparing for and responding to major oil pollution. Contracting states are required to establish a national system for responding to oil spills, including a designated national authority, a national operational contact point, and a national contingency plan. This needs to be supported by a minimum level of response equipment, communications plans, regular training and exercises. Ships, offshore units, sea ports and oil-handling facilities are required to carry OPPs which must be coordinated with national systems for responding to oil pollution incidents.

2.2 Commonwealth, State or Territory Laws

2.2.1 Commonwealth

2.2.1.1 Offshore Petroleum Incident Coordination Framework

The Australian Government has agreed that in responding to offshore petroleum incidents originating in Australian Government waters, a central incident coordination committee be convened and chaired by the Department of Industry, Science and Resources. The committee is known as the Offshore Petroleum Incident Coordination Committee (OPICC).

The purpose of OPICC is to effectively coordinate the Australian Government efforts and resources and communicate to the public and affected stakeholders all matters relevant to a significant offshore petroleum incident that originates in Australian Government waters.

OPICC is not a mechanism to deploy Australian Government resources, exercise incident control or implement operational response arrangements. However, it can provide whole-of-government strategic collaboration to resolve conflicts and identify gaps in support of marine oil pollution emergency response activities.

2.2.1.2 Offshore Petroleum and Greenhouse Gas Storage Act 2006 (OPGGSA) and Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2023

This Act provides the regulatory framework for the activity and is the principal piece of legislation relevant for this OPEP.

The OPGGS(E)R have been made under the OPGGSA and amended in 2014 with the objective of ensuring any petroleum activity is: (1) consistent with the principles of ecologically sustainable development; and (2) undertaken in accordance with an EP that has appropriate environmental performance outcomes and standards as well as measurement criteria for determining whether the outcomes and standards are met. Further amendments were made in 2023 and an updated Oil Pollution Risk Management Guidance Note issued by NOPSEMA in October 2024.

This OPEP meets the explicit requirements set out in the OPGGS(E)R 2023 and described in the NOPSEMA Oil Pollution Risk Management Guidance Note N-04750-GN1488 A382148 (07/10/2024).

NOPSEMA manages the regulatory approval and ongoing compliance oversight of the OPGSSA for the Facility.

2.2.1.3 Environmental Protection and Biodiversity Conservation Act 1999 (EPBC Act)

The EPBC Act provides a legal framework to protect and manage nationally and internationally important flora, fauna, ecological communities and heritage places defined in the EPBC Act as matters of National Environmental Significance (NES).

Through mechanisms established under the EPBC Act, there are significant environmental sensitivities of types noted above, within the oil spill zone of potential impact for some of the credible spill scenarios from the Facility (for further details, refer to the EP). These are considered as a priority for protection should an oil spill occur.

Under the standing Notice of Exemption granted by the Minister for the Environment, persons acting in accordance with the National Plan are exempted from Part Three of the EPBC Act (requirement for approvals for activities). Once this OPEP has been accepted by NOPSEMA, this exemption includes actions undertaken that are consistent with this OPEP.

The Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW) manage any approvals for activities or exemptions under the EPBC Act in relation to the facility and associated activities.

2.2.2 State of Western Australia

Should oil travel inside the 3 nm limit (State waters), a range of WA legislation also affects the response operations that would be undertaken under this OPEP by VOGA. This legislation includes:

- *Pollution of Waters by Oil and Noxious Substances Act 1987*:
  - The purpose of this Act is to protect the sea and other waters from pollution by oil and noxious substances. This Act implements MARPOL 73/78 in the State and details the

liabilities and penalties for discharges from ships (and other sources) and enables WA to take measures to respond to spills.

  - For the purposes of this OPEP, it provides a 'head of power' by which the WA DTMI is able to undertake legal action to clean up marine pollution within State waters, and places an environmental legal obligation on the WA DTMI to respond to oil spills. This has, in effect, the same legal obligation placed upon VOGA for oil spills from survey and drilling activities as per the OPGGSA and the OPGGS(E)R. In practice, it means that two parties have the same legal obligation to respond in the marine environment. VOGA proposes (and the DTMI has agreed) to manage this overlapping legal responsibility through the response arrangement outlined in Section 2.3.2 of this OPEP.
  - In relation to oils spilt that have or are likely to head into State waters, the WA DTMI will be notified as soon as practicable.

- *Emergency Management Act 2005* and regulations (WA):
  - The DTMI is the Hazard Management Agency (*Emergency Management Act 2005*) for all Marine Oil Pollution, regardless of the source, in State waters. The MEER Unit within DTMI undertakes work to prevent, prepare, respond and recover from marine oil pollution in State waters. The MEER Unit coordinates the State Response Team, personnel trained and competent at the team leader level for equipment operations, shoreline cleanup and assessment.
  - The purpose of this Act is to outline the manner in which the State of WA will implement emergency management, command, control, response and recovery arrangements during significant emergency incidents that affect the community.
- *Biodiversity Conservation Act 2016 (WA)* and Biodiversity Conservation Regulations 2018 (WA):
  - This legislation provides coverage for flora and fauna as well as important matters including habitats, communities, threatening processes and weeds. It provides protection for threatened ecological communities and strengthens protection for whales and dolphins. The responsible agency with jurisdictional authority for this Act is the Department of Biodiversity, Conservation and Attractions (DBCA).
  - The two objects of the Act are to conserve and protect biodiversity and biodiversity components in the State; and to promote the ecologically sustainable use of biodiversity components in the State.
  - For the purposes of this OPEP, this legislation clearly sets out the legislative roles of DBCA and their primacy in dealing with oiled wildlife. VOGA will manage this legislative mandate during a spill by inviting DBCA to participate in ICT activities to ensure the response is reasonable and that proportionate resources that may assist DBCA are provided.

2.3 Jurisdictional Authority and Control Agency Responsibilities

2.3.1 Jurisdictional Authority

The jurisdictional authority is the State, Territory or Commonwealth agency with jurisdictional authority for marine pollution in its area of jurisdiction. NOPSEMA is the jurisdictional authority for offshore oil and gas exploration and production activities in Commonwealth waters, while AMSA is the jurisdictional authority for vessel-based activities in Commonwealth waters.

The Department of Energy, Mines, Industry Regulation and Safety (DEMIRS) is the jurisdictional authority for offshore oil and gas exploration and production activities in State waters, while the DTMI is the jurisdictional authority for vessel-based activities in State waters and is also the Hazard Management Authority (HMA) for Marine Oil Pollution. In the event of marine pollution in State waters, the HMA (DTMI) is the designated jurisdictional authority, regardless of the source.

2.3.2 Control Agency

The National Plan describes the Control Agency as the agency or company assigned by legislation, administrative arrangements or within the relevant contingency plan, to control response activities to a maritime environmental emergency. The Control Agency will have responsibility for appointing the Incident Controller (VOGA uses the term ‘Incident Commander’).

VOGA is the Control Agency for oil spills confined to Commonwealth waters from activities in the Wandoo Field, meaning VOGA is responsible for assuming Incident Control and providing an Incident Controller (Commander). In the event that a spill has any potential to enter State waters, the WA DTMI will be notified as soon as reasonably practicable. For spills arising from ships and vessels within Commonwealth waters, VOGA may undertake initial response actions and will hand over Incident Control to AMSA.

In accordance with State Hazard Plan – Maritime Environmental Emergencies (MEE), the Control Agency for a Level 1 MEE emergency in State waters resulting from an offshore petroleum activity is VOGA. The Control Agency for a Level 2/3 MEE emergency in State waters resulting from an offshore petroleum activity is the DTMI.

Cross-jurisdictional response activities are those activities that arise as a result of an incident originating in Commonwealth waters and requiring DTMI to exercise its HMA obligations in State waters. A partnership between VOGA and DTMI is required to ensure response activities across the entire incident are carried out.

Where State waters are impacted by a Level 2/3 MEE emergency resulting from an offshore petroleum activity in Commonwealth waters, DTMI will only assume the role of Control Agency for that portion of the response activity that occurs within State waters.

Table 2-1: Control agency by location

Spill response/ impact location	Spill source	Control agency	Relevant OPEP
Commonwealth waters	VOGA facilities	VOGA	Exploration and Survey Operations OPEP [AUPD24001-VOG-1100-YH-0016]
	Ships and vessels	VOGA/AMSA	Exploration and Survey Operations OPEP/National Plan
State waters	VOGA facilities	VOGA	Exploration and Survey Operations OPEP [AUPD24001-VOG-1100-YH-0016] WA DTMI Incident Management Plan
		DTMI	

Spill response/ impact location	Spill source	Control agency	Relevant OPEP
	Vessels not connected to the facility	DTMI	WA DTMI Incident Management Plan

Dispersant use in and around State waters must be approved by either DTMI or the DEMIRS (see DTMI's Dispersant Consent Use Guidance Note for further information).

2.3.3 Cross-Jurisdictional Arrangements

In all cross-jurisdictional MEE emergencies beyond Level 1, DTMI will establish an Incident Management Team (IMT), and VOGA will be required to provide an appropriate number of appropriately qualified personnel for the DTMI IMT. This is an initial 11 personnel in accordance with the DTMI Offshore Petroleum Industry Guidance Note Marine Oil Pollution: Response and Consultation Arrangements (Version 5, July 2020). Figure 2-1 displays how the VOGA ICT Representatives will be integrated within the DTMI IMT.

VOGA will conduct initial response actions in State waters as necessary in accordance with their OPEP and continue to manage those operations until incident control can be established by DTMI.

Upon establishment of incident control by DTMI, VOGA will continue to provide planning and resources in accordance with the OPEP. This will include response assets and contracts specified in their OPEP, such as those pertaining to waste management, transport and personnel as well as response arrangements with the AMOSC and other third-party responders.

In fulfilling its obligations as the Control Agency, the DTMI will require VOGA to work in partnership with DTMI to ensure an adequate response is provided across the entire incident. DTMI and VOGA will determine the most appropriate response in State waters by working together on the IAP, protection priorities and Net Environmental Benefit Analysis (NEBA)of response activities.

VOGA utilises an Initial NEBA Spreadsheet Tool that provides information on sensitivities at risk, and feasibility and impact of response strategies based on the spill category and season. This and the Initial IAP prepared by VOGA can be provided to DTMI at the time of initial notification of a spill potentially entering state waters.

To facilitate this overarching coordination between the two Control Agencies and their respective IMTs, a Joint Strategic Coordination Committee (JSCC) will be established. The JSCC will be jointly chaired by the WA DTMI State Maritime Environmental Emergency Coordinator and a VOGA nominated senior representative and comprise of individuals deemed necessary by the chairs to ensure an effective coordinated response across both jurisdictions. The control coordination arrangements for a cross-jurisdictional MEE are outlined in Figure 2-1 and Figure 2-2.

Figure 2-1: VOGA integration into DTMI IMT

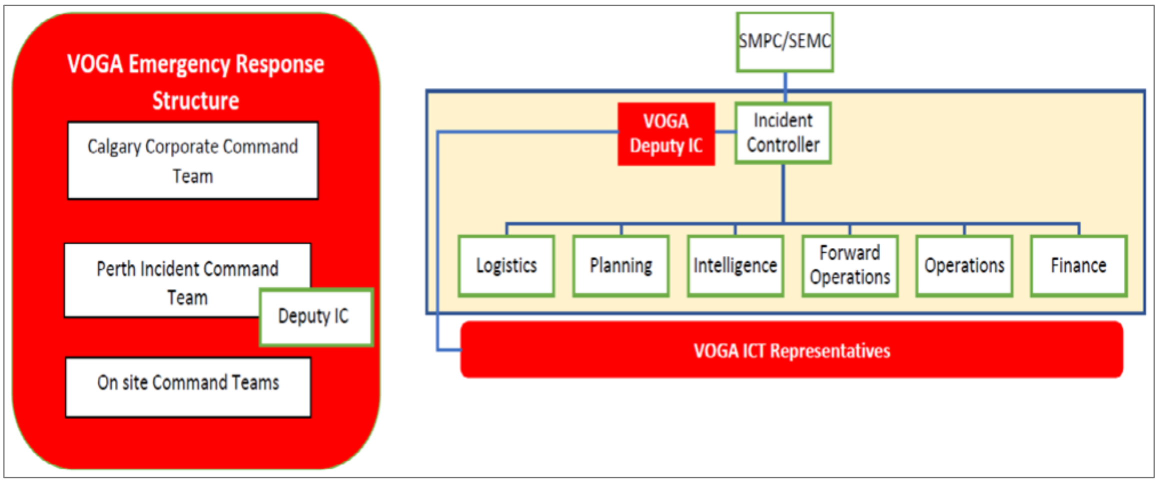
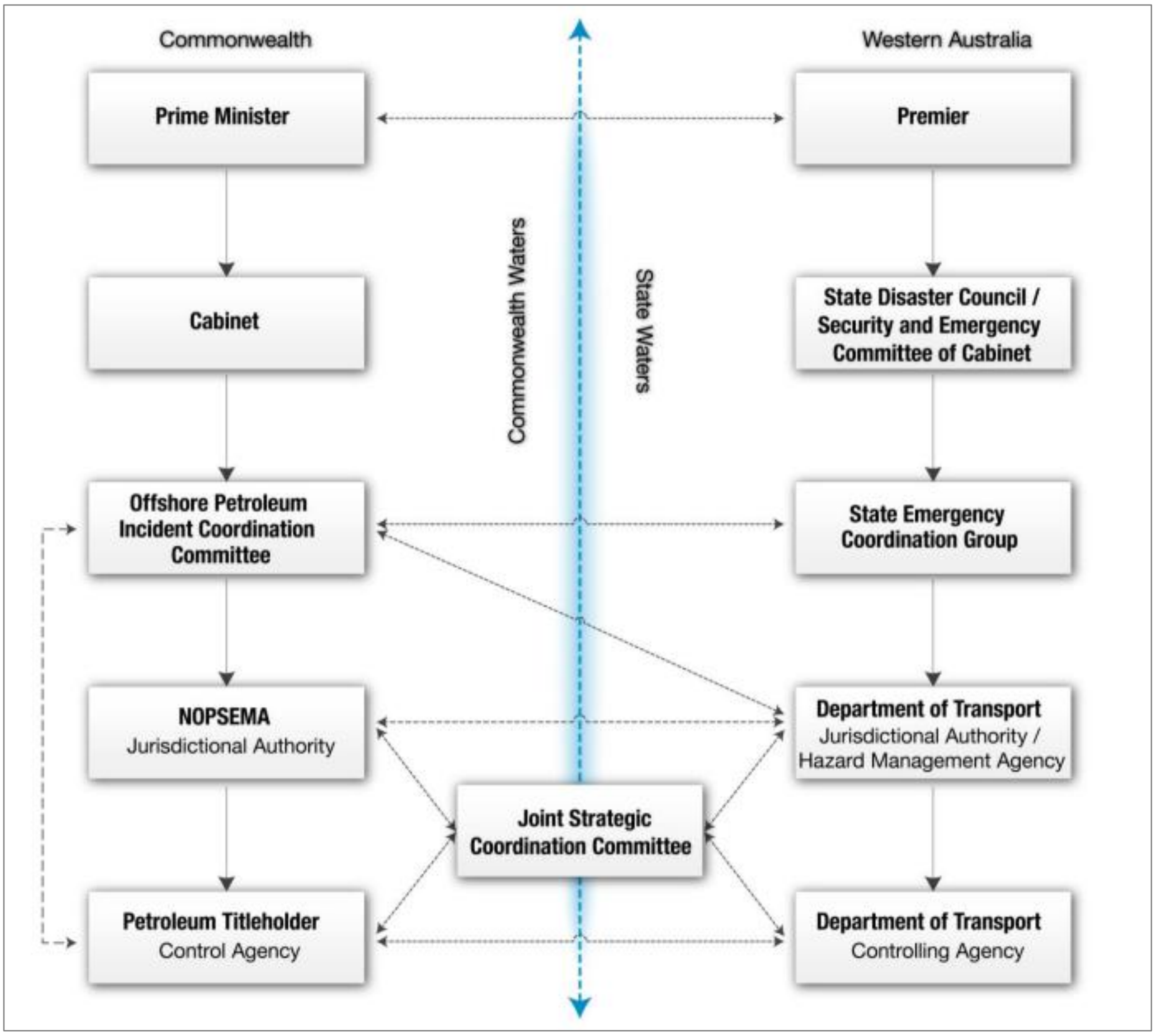


Figure 2-2: Coordination arrangements for a cross-jurisdictional MEE



2.4 Relevant Person Engagement for Planning

Relevant Person consultation during OPEP preparation was primarily focused on:

- **Legislative roles:** Ensuring that parties with a legislative role in oil spill response agree with the processes and descriptions of activities described herein, and that these response processes and procedures are consistent with the range of Commonwealth and State legislation. In particular, consultation focused on the provision of equipment and resources that can be shared between governments and industry, the 'shared' obligation to respond to oil spills within WA State waters and obligations on the WA State Government and VOGA on wildlife response.
- **Third parties:** Ensuring that other parties with an interest or role in the implementation of the plan have an opportunity to comment and agree to the processes and procedures in the plan. This includes regional oil and gas operators whose operations could be affected; or whose resources may be called upon to assist VOGA implement OSR strategies; and other parties in the Karratha area who could also assist VOGA.
- **Development of call-out contracts for key service providers:** Ensuring that commercial providers for the individual services necessary to implement the spill response strategies had the capacity and capability to do so. A number of Scopes of Work were developed and negotiated with these parties, leading to standby contracts for critical service delivery. This gives assurance that these can be called in within the required response timeframes.

Key relevant persons engaged during the development of the Wandoo Field Geotechnical and Geophysical and Exploration Drilling EPs included, but are not limited to:

- Commonwealth and State government departments and agencies
- Commonwealth and State commercial fishing
- Recreational fishers and marine users and peak representative bodies
- Traditional Custodians and First Nations nominated representative corporations
- Research institutes
- Local government and recognised local business and community reference/liaison groups or organisations
- Local environment and conservation groups or organisations
- Energy industry titleholders and operators.

The Wandoo Field Geotechnical and Geophysical Survey and Wandoo Field Exploration Drilling EPs present the responses from all relevant persons and responses by VOGA. A full copy of VOGA briefing packages, correspondence and full text of the stakeholder replies are held in the VOGA's Document Control System and provided to NOPSEMA.

During a response to a spill incident, the functions of Stakeholder Liaison Officer and Public Information Officer are responsible for ensuring all relevant persons are informed and involved where appropriate.

NOPSEMA and WA DTMI are key regulatory stakeholders that are kept informed of incidents via the notification processes identified in Part 4. WA DTMI in their role as HMA takes on the role of ensuring notification and situation reports are provided to the State Marine Oil Pollution Committee (SMOPC) and relevant government agencies. In this way, they act as a single point of contact.

Section 3 – Approach to Response Planning

3.1 Overview

VOGA's oil spill response planning process is based on impact and consequence scenario planning which involves establishing the context and risk; evaluating, demonstrating and defining response strategies and resources; implementation; and first response, as described in Table 3-1 and illustrated in Figure 3-1.

The process is divided into two phases: planning (refer Table 3-1) and spill response. The spill response is supported by the incident action planning process (refer Section 6); Part 5 – Oil Pollution Plans (OPPs) are initial IAPs based on existing impact assessments for the spill and response activities within the Wandoo Field Geotechnical and Geophysical Survey and Exploration Drilling EPs.

3.2 The Planning Phase

As outlined in Table 3-1, preparing for spills involves the following steps to achieve the Exploration and Survey Operations OPEP outcomes (Section 1.1):

- Step 1: Understanding the hazard profile – Outcome 1 of the Exploration and Survey Operations OPEP.
- Step 2: Identifying parameters to assess applicable response strategies and scale of the event – Outcome 2 of the Exploration and Survey Operations OPEP.
- Step 3: Identifying suitable response strategies – Outcome 2 of the Exploration and Survey Operations OPEP.
- Step 4: Understanding the impacts associated with response strategies – Outcome 2 and 3 of the Exploration and Survey Operations OPEP.
- Step 5: Ensuring capability and plan supports management of risks to ALARP – Outcome 4 and 5 of the Exploration and Survey Operations OPEP.
- Step 6: Define the Environmental Performance Outcomes (EPOs) and Environmental Performance Standards (EPSs).

The outcome of this approach is that:

- Oil spill hazards associated with VOGA's activities are addressed and risks are managed to as low as reasonable practicable (ALARP).
- Response strategies (Table 7-1) and resources are based on the nature and scale of the incident.
- Oil Spill Trajectory Modelling (OSTM) outputs for the loss of well control and vessel collision was undertaken to identify response parameters, including:
  - minimum time to impact defined environmental sensitivities
  - probability of shoreline impact to defined environmental sensitivities

  - maximum quantity of oil impact to defined environmental sensitivities
  - maximum length of oil impact to defined shoreline environmental sensitivities.

- Response strategies are risk assessed and management controls outlined in the Wandoo Field Geotechnical and Geophysical Survey and Exploration Drilling EPs are considered in this OPEP.

Table 3-1: Description of steps in oil spill response assessment (planning process)

Response planning steps
Step 1: Oil spill hazard is identified and context for each spill category and season described. This requires understanding the potential events (scenarios) which requires knowledge of: • API type, composition of reservoir/fluids assay. • Reservoir modelling of oil type or another geotechnical analysis. • Release rate, quantity, duration. • Location of activity and potential spill sources. • Metocean data matching the location and timing of activity. • Location of environmental receptors and method of impact from oil. • Toxicity of oil. • Timing of spill (season). • Thresholds. • Environment that may be affected (EMBA).
Step 2: Evaluation of response parameters is also about consideration of the hazard, as response preparation requires understanding the potential consequence, including: • Probability of oiling defined environmental sensitivities. • Minimum time to impact defined environmental sensitivities. • Quantity of oil to impact defined environmental sensitivities. • Length of shoreline impacted. • Response operating area.
Step 3: Definition of response strategies for spill categories involves designing the most appropriate response plan, such that the impacts, in the event of a spill, are reduced to ALARP. VOGA uses an assessment process for oil spill planning and response (Figure 3-1), and in doing so consider: • The oil spill hazard. • The context for each spill category and season. • Operational constraints. • Assess the impacts of the hazard and the response activities. • Assess whether impacts from the hazard and the response activities are ALARP, by considering all alternatives and their relative benefits and costs. • Where not determined to be ALARP, the response strategies are adjusted as part of an iterative process. • This iterative process considers capability and in doing so looks at the potential benefits and costs of doing more sooner.

Response planning steps
As a part of the planning the response, in **Step 4: Assess impacts of spill scenario,** VOGA also assesses the impacts of the spill response. This not only contributes to making choices about the response strategies, but also informs how the response should be undertaken to ensure that the risks and impacts of the response are managed to ALARP. This step involves: • Environmental risk and impact assessment. • OSTM of surface, entrained and subsurface oil with and without response strategies. • Identification of the controls (including environmental performance outcomes, standards and measurement criteria) to be implemented as a part of the spill.
To ensure that VOGA has a level of preparedness to implement the response strategy **Step 5: Define the response resources** is undertaken next. In this step, VOGA considers: • Operational limitations (equipment functional capacity/coverage, safety of response personnel). • Constraints of equipment effectiveness. • Scale of the spill event. • Skill-sets required for specific roles.
Step 6: Define the Environmental Performance Outcomes (EPOs) and Environmental Performance Standards (EPSs).

3.2.1 Response Thresholds

Response thresholds have been developed for response planning to determine the conditions that response strategies would be effective. These thresholds are provided as a guide for response planning based on case studies that have demonstrated some response strategies (e.g. chemical dispersant application) require certain oil spill thicknesses and conditions to be effective.

The thresholds assist with understanding response strategy capability requirements when used in conjunction with oil spill trajectory modelling results. Modelling informs the predicted spatial extent of the spill at certain response thresholds, which in turn can inform response strategy selection.

VOGA has applied recommended exposure values to response activities relating to floating and shoreline oil exposure as described in the NOPSEMA Information Paper number A1289237 Application of oil spill modelling in Environment Plans (2025) which are described in Table 3-2.

Table 3-2: Oil spill response planning thresholds

Hydrocarbon (g/m^2)	Description
≥1	Estimated minimum threshold for commencing some monitoring components (e.g. water quality monitoring) and MES tactics (e.g. aerial surveillance). At this concentration, hydrocarbons may appear as a silver to rainbow sheen under calm conditions (Bonn Agreement, 2004). At this concentration, available response control measures may have limited effectiveness, depending on the environment and hydrocarbon characteristics. Natural degradation may be the response option with the highest net environmental benefit. (NOPSEMA, 2025).
≥10	Estimated minimum threshold for commencing all triggered monitoring components.

Hydrocarbon (g/m^2)	Description
	At this concentration, hydrocarbons may appear as a silver to rainbow sheen under calm conditions (Bonn Agreement, 2004). This approximates the lower limit for harmful exposures to birds and marine mammals (NOPSEMA, 2025) so assists with planning for related scientific monitoring components.
≥50	Estimated minimum floating hydrocarbon threshold for on water response strategies. At this concentration, hydrocarbons transition from appearing as metallic sheen to continuous or discontinuous 'true oil' on the surface of the ocean (Bonn Agreement, 2004). It represents the concentration of floating oil at or above which there is in increased likelihood of consequences on ecological, social, economic and cultural features of the environment. (NOPSEMA, 2025). Surface chemical dispersants are most effective on hydrocarbons that are at a thickness of 50-100 g/m^2 on the sea surface. Testing of effectiveness of various skimmers at different oil thickness have found that oil recovery rate of skimmers drops significantly when oil thickness is less than 50 g/m^2.
≥100	It represents a lower concentration for identifying ecological features of the environment that may be affected by shoreline oil, and for assessing the estimated minimum shoreline accumulation threshold for shoreline cleanup. This threshold is often used as the minimum thickness for effective shoreline cleanup (Owens and Sergy, 2000). It represents the concentration of shoreline oil that is of priority for operational and scientific monitoring. (NOPSEMA, 2025).

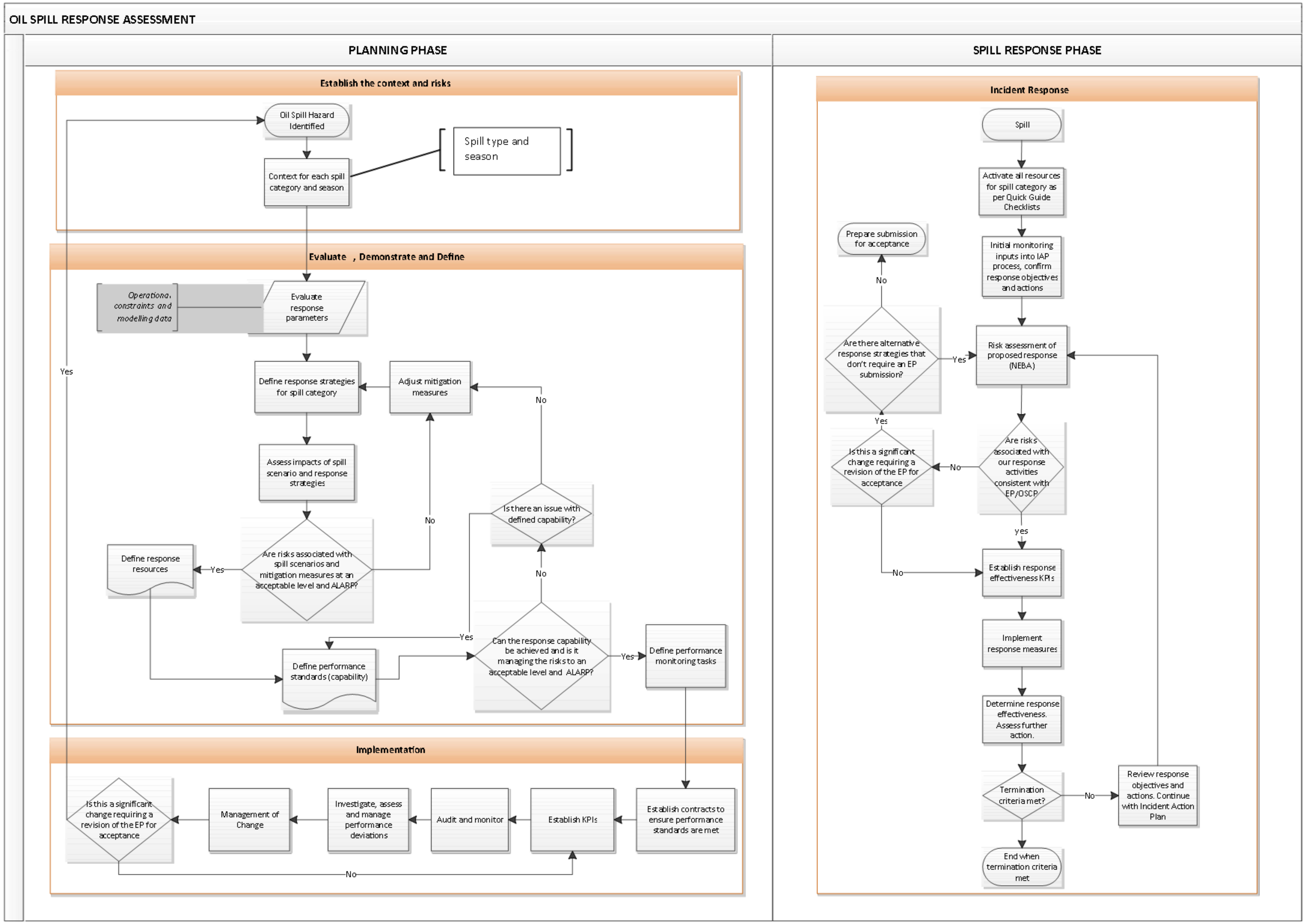
3.3 Spill Response Phase

Initial response actions are described in the Oil Pollution Plans (OPPs). These actions are based on the strategies, resources and capability identified in the planning process. Resources are activated and the outputs from monitoring and evaluation are used to conduct an impact assessment of spill impact mitigation assessment, NEBA to confirm that the risks associated with response activities are consistent within the EP and this OPEP. If they are, then response effectiveness Key Performance Indicators (KPIs) are developed and response measures implemented. The incident action planning process provides for the opportunity to determine if response operations are effective and if termination criteria are met.

The incident action planning process used by the ICT allows for the effectiveness of each strategy to be reviewed, adjusted or halted if the objectives of the response are not being met or the environmental impacts were not addressed in the NEBA thus fulfilling Outcome 3 of the OPEP. If the impact of a response strategy is significantly higher than what is considered in the EP, then this means either impact of the strategy is unacceptable or an EP revision is required for acceptance. An example of where a revision to an EP may be required is where new technology such as that for in-situ burning or bioremediation becomes available to VOGA.

To support this approach and provide a timely response, OPPs detail an initial IAP (OPEP; Part 5) enabling response resources to be activated whilst event-specific assessments are conducted.

Figure 3-1: Assessment process for oil spill planning and response



Section 4 – Establishing the Risk and Context

4.1 Oil Characterisation

4.1.1 Oil Types

Details of the oil type expected during exploration drilling (Wandoo Crude) and used for vessel activities (diesel fuel oil) are presented in Table 4-1 and Table 4-2.

Table 4-1: Details of oil types

Oil type	Oil group	API gravity	Density @ 15°C	Pour point (°C)	Flash point (°C)	Viscosity @ 40°C	Predicted evaporation	Wax content	Asphalt-ene content
Diesel fuel oil	II	38.8	0.83	-36	40	1.0	High	<1%	<1%
Wandoo crude (fresh)	IV	19.5	0.9368	-24	144	~48	15%	Low	Low

Table 4-2: Boiling ranges and chemical characteristics of Wandoo crude

Characteristic	Volatiles (%)	Semi-volatiles (%)	Low volatiles (%)	Residual (%)	Density (kg/m^3)	Aromatic content (%)
Boiling point (°C)	<180	180 – 265	265 – 380	>380		
Wandoo crude	0.0	13	40.7	46.3	936.9 @ 15°C	2.87

4.1.2 Diesel Fuel Oil

Diesel is used by support vessels, plant and equipment associated with daily operations. Diesel is expected to undergo rapid evaporative loss and natural breakdown in the high energy environmental conditions experienced around the Permit Area.

4.1.3 Wandoo Crude Oil

Wandoo crude, having lost the majority of its lighter fractions due to microbial biodegradation in the reservoir, is heavier than most light crude oils typically produced on the North-West Shelf (NWS), and has a low pour point, virtually no paraffin wax, and low asphaltene content. Oils with asphaltene content less than 0.5% are less likely to form stable emulsions are more likely to disperse (ITOPF, 2014a). Laboratory data indicates that 52% of the Wandoo crude is likely to be persistent hydrocarbons (boiling point >375 °C).

Weathering data for the two extreme seasonal conditions are provided in Table 4-3. The results in indicated that over half of the crude spilled on the water is likely to evaporate after 10 days of weathering in summer conditions, while 10 days of winter weathering results in over a third of the oil evaporating.

Table 4-3: Summer and winter weathering trial results, ChemCentre (2015)

Time	Summer conditions – loss (w/w%)	Winter conditions – loss (w/w%)
1 day weathered	19%	20%
2 days weathered	29%	23%
3 days weathered	36%	23%
4 days weathered	43%	28%
5 days weathered	48%	29%
10 days weathered	53%	34%
21 days weathered	55%	38%

Results of detailed testing of the efficacy of dispersants using a Mackay-Nadeau-Steelman apparatus indicate that Wandoo crude is amendable to being dispersed by five dispersants: Ardrox, Corexit 9500A, Dasic Slickgone EW, Dasic Slickgone NS, and Finasol OSR 52. The dispersant trials showed good results for all dispersants if used in the first three days, with Slickgone NA and EW both providing 100% dispersant efficacy.

The spill scenarios and associated volumes identified for the survey and drilling activities are drawn from the risks identified and described in the Wandoo Field Geotechnical and Geophysical Survey and Exploration Drilling EPs.

For the purposes of oil pollution emergency planning, credible scenarios presented in Table 4-4 are based on oil spill hazards identified in the Wandoo Field Geotechnical and Geophysical Survey and Exploration Drilling EPs, according to the following criterion:

- Type of hydrocarbon
- Instantaneous or ongoing spill
- Volume
- Amenability to similar spill response strategies.

Table 4-4: Summary of credible spill scenarios

Spill type	Possible cause	Credible upper spill volume	VOGA ERP incident level	National Plan incident level
Marine Diesel Oil	Vessel collision	300 m^3	Level 1	1
Wandoo Crude	Loss of well control over 35 days	762 m^3/day (26,678 m^3)	Level 3	3

4.1.4 Oil Spill Trajectory Modelling

4.1.4.1 Scope

Two oil spill modelling studies and reports have been undertaken in the area of operation for the vessel and drilling activities. The two reports generated are:

- RPS (2024a) Vermilion Wandoo Exploration OSM (GOC367176)
- RPS (2024b) Vermilion Wandoo B16 OSM (MAQ08852J).

For the scenario outlined in Table 4-4, stochastic and deterministic modelling was undertaken to:

- Identify sensitivities at risk from an oil spill, including sensitivities within the zone of potential contact identified by the modelling
- Determine the areas over where OSR strategies may be required or implemented.

The Wandoo Exploration and B16 wells are within 7 km of each other. Both have similar credible spill volumes through Loss of Well Control modelled (26,678 m^3 for exploration activities) and (25,555 m^3 for operational well B16). Metocean, wind and regional current data used for both modelling reports are from the same dataset. Dispersant application was modelled in the B16 report with application of dispersant indicating an environmental benefit by reducing floating surface oil exposure and shoreline contact of oil across all seasons. At the end of the simulation for the deterministic trajectory that resulted in the largest volume of oil ashore and longest length of shoreline contacted above 100 g/m^2 (summer conditions), dispersant application indicated a reduction in volume of oil ashore from 5,326 m^3 (unmitigated) to 2,707 m^3 (mitigated), demonstrating the potential net environmental benefit of applying dispersant.

Key conclusions drawn from both oil spill modelling studies are used as the basis for planning of response strategies to the loss of well control and diesel spills. Although OSTM has inherent limitations, this information has been used in the response planning phase and will be used in an actual incident to assist in the NEBA of response strategies as a basis from which to begin the IAP process.

Outputs of the Exploration OSTM are provided in the Wandoo Field Exploration Drilling EP and a summary of key findings over all seasons is presented in Table 4-5.

Table 4-5: Summary of key results for floating oil exposure and shoreline oil accumulation (RPS, 2024a)

Scenario description		Loss of well control	Vessel collision
Spill volume		26,678 m^3	300 m^3
Oil type		Wandoo crude	Diesel
Release depth		0 m (surface)	0 m (surface)
Release duration		35 days	6 hours
Simulation length		56 days	30 days
Floating oil exposure	Maximum distances from the release location to floating oil exposure thresholds	Floating oil concentrations ≥1 g/m^2 could extend up to 998 km from the release location. The maximum distances reduced to 473 km and 25 km as the threshold increases to ≥10 g/m^2 and ≥50 g/m^2 respectively.	Floating oil concentrations ≥1 g/m^2 could extend up to 31 km from the release location. The maximum distances reduced to 18 km and 6 km as the threshold increases to ≥10 g/m^2 and ≥50 g/m^2 respectively.
	Highest probability of floating oil exposure to a receptor at or above 1 g/m^2	Montebello AMP, 97% during winter conditions.	NC.
	Quickest time before exposure to a receptor at or above 1 g/m^2	Montebello AMP, 37 hours during transitional conditions.	NC.

Scenario description		Loss of well control	Vessel collision
Shoreline oil accumulation	Probability of oil accumulation on any shoreline at or above 10 g/m^2	100% during winter conditions.	24% during winter conditions.
	Absolute minimum time for oil to accumulate on shoreline cells at or above 10 g/m^2	WA11.West (318) – Barrow Island and Montebello Islands (A), 2 days 21 hours during winter conditions.	WA11.West (318) – Barrow Island and Montebello Islands (A), 3 days 19 hours during winter conditions.
	Maximum volume of oil ashore from a single spill simulation at or above 10 g/m^2	4,550 m^3 during summer conditions.	23 m^3 during winter conditions.
	Highest probability of oil accumulation for a specific shoreline cell at or above 10 g/m^2	WA.11 West (318) – Barrow Island and Montebello Islands (A), 92% during winter conditions.	WA11.West (318) – Barrow Island and Montebello Islands(A), 15% during winter conditions.
	Maximum volume of oil ashore from a single spill simulation for a specific shoreline cell at or above 10 g/m^2	2,570 m^2 WA11.West (318) Barrow Island and Montebello Islands (A), during transitional conditions.	23 m^3 WA11.West (318) – Barrow Island and Montebello Islands (A), during winter conditions.

The thickness of floating oil influences the type of response strategy implemented. For dispersant application, a thickness of 100 g/m^2 is generally used as a minimum for effectiveness. Table 4-6 summarises the maximum distance and direction from the exploration well location of three threshold levels. The thickest areas of floating oil are predicted to be within 25 km of the well location. This provides an indication as to where dispersant application should be prioritised. As the modelling is unable to allocate dispersant to the most effective zone, i.e. in terms of slick thickness and continuity, the trajectory modelling results conservatively estimate the benefit that dispersant application will have on reducing oil contact to environmental sensitivities. However, dispersant application should be a priority response activity considered in the event of a Loss of Well Control event.

Floating oil thickness also influences containment and recovery activities at sea. Containment and recovery efforts become inefficient in thinly spread oil, the area closest to the well site and of thickest coverage will be prioritised for at-sea containment and recovery. Thresholds of 1% are not practical to respond to with containment and recovery, dispersant or shoreline cleanup interventions.

In the exploration drilling modelling (RPS, 2024a), oil is predicted to impact shorelines across all seasons with a high probability and short timeframe (Table 4-7). Winter is the worst season for shoreline accumulation at and above the actionable cleanup threshold of 100 g/m^2. There is a 100% probability of impact with an average shoreline length of 105 km being impacted at 100 g/m^2 and a minimum timeframe of 3 days 6 hours. The average volume of oil ashore for this season at 100 g/m^2 is 1,170 m^3 and the worst-case single spill is estimated to be 3,579 m^3.

Table 4-6: Comparison of OSTM results floating oil exposure for summer, transitional and winter seasons without dispersant application (RPS, 2024a)

Oil	Amount	Floating oil exposure threshold	Summer maximum distance (km) and direction from release location	Transitional maximum distance (km) and direction from release location	Winter maximum distance (km) and direction from release location
Marine diesel oil	300 m^3	1 g/m^2	21 km NE	31 km E	29 km S
		10 g/m^2	14 km NE	17 km NW	18 km S
		50 g/m^2	5 km W	6 km NW	3 km E
Wandoo crude	26,678 m^3	1 g/m^2	647 km NE	998 km SW	741 km NE
		10 g/m^2	55 km W	473 km W	311 km SW
		50 g/m^2	15 km E	25 km NE	13 km W

Table 4-7: Comparison OSTM results shoreline accumulation Wandoo Crude without dispersant application (RPS, 2024a)

Shoreline statistics	Summer			Transitional			Winter		
	Shoreline accumulation thresholds			Shoreline accumulation thresholds			Shoreline accumulation thresholds		
	10 g/m^2	100 g/m^2	1,000 g/m^2	10 g/m^2	100 g/m^2	1,000 g/m^2	10 g/m^2	100 g/m^2	1,000 g/m^2
Probability of contact to any shoreline (%)	93	79	56	87	75	57	100	99	82
Absolute minimum time to shore (hours)	78	93	158	85	108	167	69	78	111
Maximum accumulated volume (m^3) from a single spill simulation	4,550	4,431	3,474	3,670	3,589	3,179	3,637	3,579	2,972
Average accumulated volume (m^3) across all spill simulations	719	668	400	719	688	516	1,208	1,170	901
Maximum length of shoreline (km) from a single spill simulation	1,320	588	122	524	268	102	518	248	85
Average length of shoreline (km) across all spill simulations	248	97	17	166	65	17	224	105	30

Table 4-8: Comparison of OSTM results shoreline accumulation diesel (RPS, 2024a)

Shoreline statistics	Summer			Transitional			Winter		
	Shoreline accumulation thresholds			Shoreline accumulation thresholds			Shoreline accumulation thresholds		
	10 g/m²	100 g/m²	1,000 g/m²	10 g/m²	100 g/m²	1,000 g/m²	10 g/m²	100 g/m²	1,000 g/m²
Probability of contact to any shoreline (%)	2	NC	NC	9	1	NC	24	6	NC
Absolute minimum time to shore (hours)	152	NC	NC	136	366	NC	91	110	NC
Maximum accumulated volume (m^3) from a single spill simulation	1.2	NC	NC	5.3	1.6	NC	23.2	20.3	NC
Average accumulated volume (m^3) across all spill simulations	<1	NC	NC	<1	<1	NC	1	<1	NC
Maximum length of shoreline (km) from a single spill simulation	5	NC	NC	19	1	NC	14	6	NC
Average length of shoreline (km) across all spill simulations	0.08	NC	NC	0.51	0.01	NC	1.55	0.23	NC

4.2 Key Sensitivities

Barrow Island, Montebello Islands and the Dampier Archipelago are identified in the OSTM as key sensitivities contacted by oil. Environmental, sociological and economic sensitivities within the Permit Area WA-14-L and the identified EMBA have been assessed. Key sensitivities within the EMBA are detailed in the EPs, which describe key marine habitats, associated flora and fauna, social and economic values, and areas of environmental significance as outlined below.

The area of coastline that could be affected contains a wide range of environmentally significant sensitivities, including:

- **Key marine habitats** (corals, seagrasses, macro-algae, subtidal soft sediment, mangroves, intertidal beaches/mudflats).
- **Key marine fauna** (birds, marine mammals, marine reptiles, sharks).
- **Social and economic** (National Heritage and Shipwrecks, fisheries and aquaculture, commercial shipping, Defence, other users, World Heritage Areas, Commonwealth Marine Protected Areas, State Marine Protected Areas).

Additional detail is available through the DTMI Oil Spill Response Atlas (OSRA) as described in OPP1 and OPP2 task guidance notes.

Determination of environmental sensitivity requires both the identification of resources present and an assessment of the consequence to the resources should they be affected by oil. The 'Hazard Assessment' within the Wandoo Field Geotechnical and Geophysical Survey and Exploration Drilling EPs detail the potential impact of hydrocarbon on key environmentally sensitive habitats and associated flora and fauna from various spill scenarios.

PART 2: Incident Management Process

Section 5 – Emergency and Crisis Management Response

5.1 Overview

Arrangements for managing emergencies are detailed in the VOGA Wandoo ERP [VOG-2000-RD-0017]. For consistency and alignment with corporate practice, the management of oil spill emergencies described in this OPEP are based on the framework and arrangements in the ERP.

5.2 Response Structure

VOGA has an emergency management response structure that is based around three levels of organisational control: tactical, operational and strategic. The premise behind these levels of control is that those parties within VOGA with the greatest expertise to manage that aspect of the emergency are empowered to do so, with operational or strategic levels stood up to provide support in terms of planning, resources and the management of extraneous issues that while important, are managed at the lower levels of control.

There are three teams within the emergency management response structure including the:

1. Corporate Command Team (CCT).
2. Incident Command Team (ICT).
3. On-site ICT.

Figure 5-1 represents the VOGA emergency management response structure and depicts the three levels of the Calgary CCT, the Perth ICT, and the On-site ICT, including the links between teams.

The goal of the three teams within the VOGA emergency management response structure is to implement reasonable and proportionate OSR strategies until such time as the OSR may be terminated.

The teams will do this by implementing a six-step incident response cycle as described in Section 6. Prudent over-caution is used by VOGA in responding to oil spills, i.e. CCTs and ICTs will be notified with a view to being stood up for oil spills, then stood down after size and scale have been assessed and verified.

5.3 Command and Control

VOGA's ICT runs an incident control system analogous to the Australasian Inter-Service Incident Management System (AIIMS) to which the National Plan is also aligned (AFESACL, 2013).

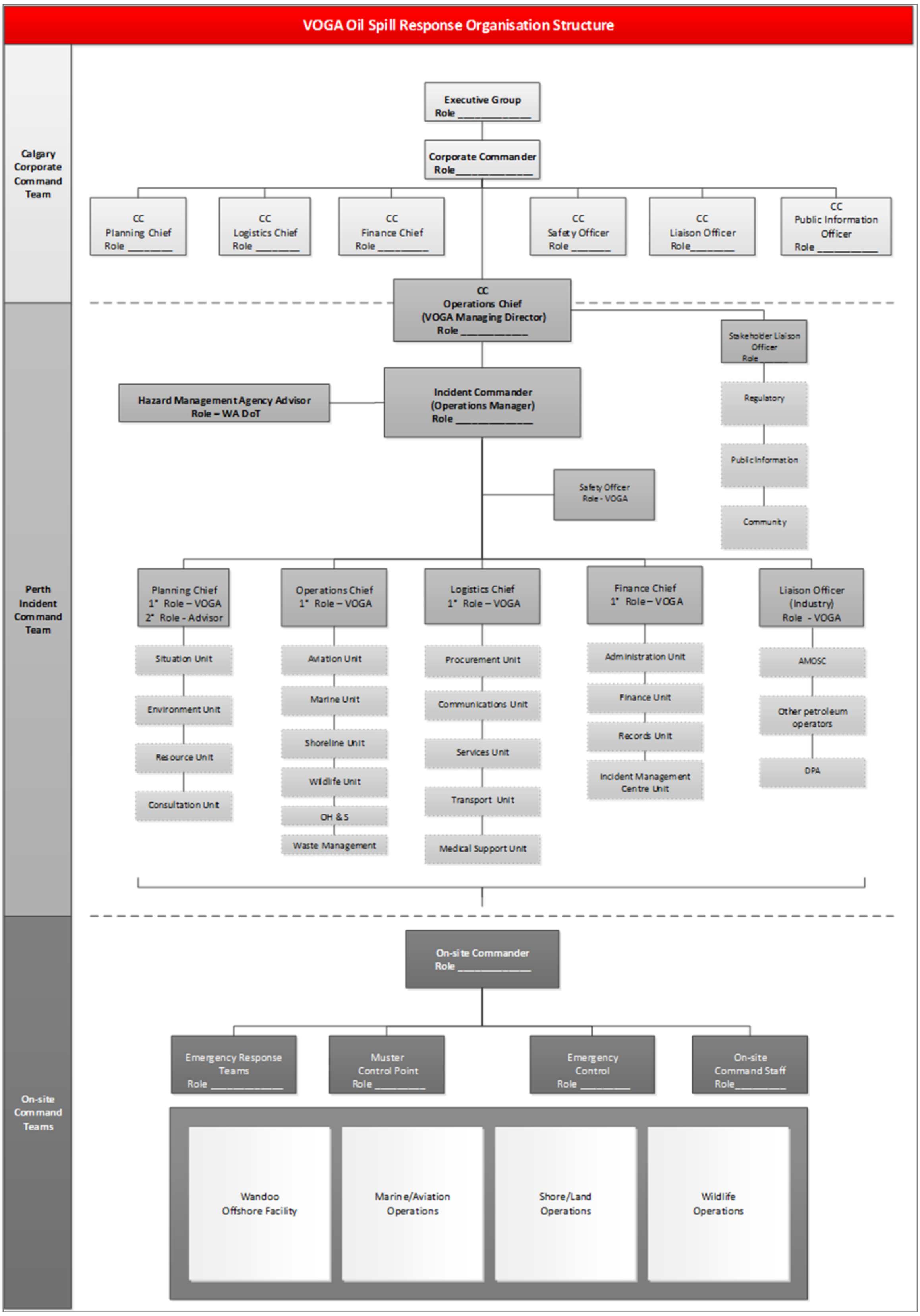
The chain of command for incident response is depicted within the VOGA emergency management response structure. Personnel appointed to these functions are selected from within VOGA or, for protracted incidents that run for weeks or months, using trained National Response Team members, AMOSC and the AMOSC Core Group, international OSR support organisations, and from within the international resources of VOGA. Where required, the DTMI Incident Controller has input into the team composition and structure.

Table 5-1: Key ICT functions for OSR

Role	Functional responsibilities
VOGA Incident Commander/ICT Leader	First point of contact for Person in Charge (PIC) offshore. Assists PIC to manage the response and calls out the ICT if required. Responsible for ensuring that an effective response is mounted by the On-site Command Team, and the onshore ICT. Approve IAP and where required engage State Maritime Environmental Emergency Coordinator/DTMI Incident Controller for agreement/endorsement of plan for activities within, or potentially impact, WA waters.
DTMI Incident Controller (Hazard Management Agency) and State Maritime Environmental Emergency Coordinator	DTMI Incident Controller (Hazard Management Agency) is the State appointed incident controller for oil spill response activities within, or potentially impact, WA waters. The State Maritime Environmental Emergency Coordinator provides overall strategic management of the response and executive level support and guidance to the DTMI Incident Controller.
Planning Chief Situation Resources Environment	Supervises the VOGA ICT and leads the IAP process. Records and displays data for information, planning and programming, allocation and justification. Documents and maintain records of all Wandoo Offshore Installation and VOGA ICT actions. Manages critical information requirements.
	Interfaces with State Maritime Environmental Emergency Coordinator or State Environmental and Scientific Coordinator (ESC) for input into IAP for activities impacting state waters.
	The collection, processing and organisation of operational monitoring information, e.g. OSTM, weather, sea state.
	Tracking of the deployment of resources.
	Responsible for the collection and collation of environment data/advice, e.g. obtains environmental data from OSRA and scientific monitoring (DTMI ESC and local sources) with support from an Environment Unit Lead role.
Logistics Chief Procurement Services Transport Communications Medical	Develops logistics plan to support operations and provides overall resource support to emergency incident sites. Establishes and maintains lists of personnel, supplies and materials which might be required to support the emergency/disaster. Responsible for establishing any SIMOPS Plan to manage the risk generated by multiple activities.
	Acquisition of personnel and equipment.
	Acquisition of services and facilities, including waste management resources.
	Provision of air, land and sea transport services.
	Communications Sub-Plan and for ensuring the provision of communications services/support.
	Provision of medical services where needed.
Operations Chief Marine Aviation Shoreline Wildlife	Assumes responsibility for executing approved Action Plans. Responsible for all tactical command and coordination of in-country incident response assets in the assistance and support of the On-site Commander. Ensures that operational objectives and assignments identified in Action Plans are carried out effectively. Monitors operations; ensures necessary operational support is provided when and where required; allocates resources.
	Coordination and direction of all activities undertaken by waterborne craft and equipment.

Role	Functional responsibilities
Occupational Health & Safety (OH&S)	Coordination and direction of all activities undertaken utilising aircraft, e.g. aerial dispersant spraying, aerial surveillance and transport.
Waste management	Planning and coordination of shoreline assessment and cleanup activities (in consultation with the DTMI, planning, specifically the environmental specialists). Implementation of shoreline cleanup activities.
	Implementation of the WA Oiled Wildlife Plan, i.e. the collection, treatment and rehabilitation of oiled wildlife in consultation with DBCA via the DTMI ESC.
	Development and implementation of the OH&S Plan.
	Coordination of the containment, storage, transport and disposal of recovered oil and oily waste. Also, instruction in on-site handling, storage and/or separation and treatment.
Finance Chief	Provides monetary, insurance, legal, risk and human resources, related administrative functions to support emergency operations and to preserve vital records documenting work performed and associated costs in the event of disaster or major emergency.
Safety Officer	Assesses unsafe situations and develops measures for assuring personnel safety. Confirms safety regulatory authorities and applicable departments have been notified. Ensures implementation of safety measures and monitoring and recording of personnel exposures to hazardous products. Supports accident investigations, recommends corrective action, and prepares accident report.
CCT	Focus of the CCT is on ensuring ICT are responding in accordance with corporate requirements, liability/insurance, business continuity, media/investor relations, and financial management/support of response.
Corporate Command Operations Chief	Provides the interface between the ICT and CCT. Provides updates to the CCT regarding IAPs and communicates any needs for support if required. Responsible for ensuring VOGA's corporate objectives are communicated to the ICT and are also reflected in the IAP.
Stakeholder Liaison Officer	Responsible for managing regulatory engagement and coordinating any regulatory approvals required to implement response strategies. Coordinates engagement of stakeholders who are impacted from the spill or response activities. Coordinates investigation of reportable events. Acts as the functional interface between these various parties. Implements VOGA Communications Plan, providing media information support and serving as the dissemination point for all VOGA media releases.
Liaison Officer (Industry)	Identifies the assisting and cooperating companies and agencies, including communications link and location; provides list to the CCT. Functions as "point of contact" for assisting and cooperating agency representatives. Responsible for ensuring that parties who have agreed to undertake specific functions under the OPEP are undertaking the functions consistent with the OSR strategies, EPOs and EPSs of the Exploration and Survey Operations OPEP [AUPD24001-VOG-1100-YH-0016].

Figure 5-1: VOGA OSR organisation structure



5.4 Response Facilities

VOGA's ICT utilise VOGA's Perth office as the primary Incident Command Centre (ICC) for OSR monitoring or incident management activities.

This facility contains information communication technology infrastructure to communicate effectively with the range of parties required in a significant response, private and nearby breakout areas, along with sufficient access controls and logistical support for the ICT to operate over a number of weeks or months. In the event a unified command ICT is established with the DTMI, a co-located ICC will be established at mutually agreed location.

VOGA also has access to an alternate ICC should a business continuity event, civil unrest, security or capacity issue impede VOGA's capability to fully exercise incident control from the primary facility.

For spills requiring significant field logistical support, a forward operating command area may be established. Assistance from the City of Karratha Local Emergency Management Committee and Pilbara Ports will be sought at the time of an incident to identify the most appropriate, secure location for a forward operating command location that meets the needs of the ICT in accordance with the nature and scale of the spill incident.

In addition, depending on spill size a forward operating post may be established. The most likely location will be at the VOGA warehouse and laydown area at the TOLL supply base near the Port of Dampier.

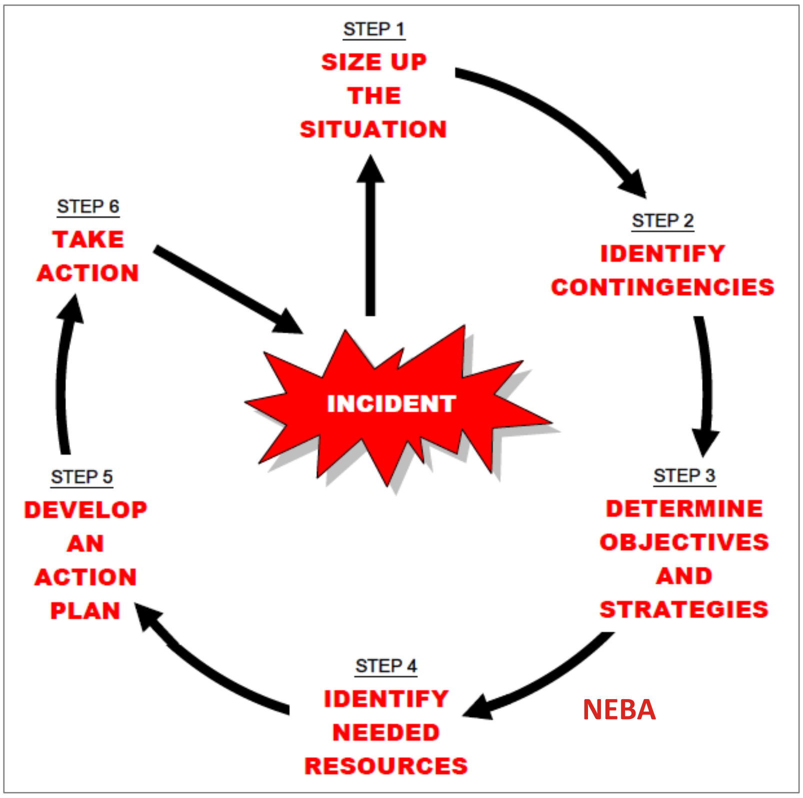
An airbase (with manager) will be established at the airport to manage the aerial operations, specifically application of dispersant. Aircraft deployed for aerial surveillance will be managed by the contract holder.

Section 6 – Incident Response Cycle

6.1 Overview

The successful management of an incident relies on the completion of a number of coordinated activities. The VOGA Emergency Response framework for incident management is based on conducting operations within a six-step incident response cycle (Figure 6-1). Initial objectives (tasks to be done), IAP and priorities will be determined through the incident response cycle.

Figure 6-1: VOGA ERP six-step incident response cycle



6.2 Size-up the Situation

The first step of the process is about gathering intelligence and gaining an appreciation of the situation. Using this information, outcomes are predicted and plans put in place to respond to the event. Information collected during this stage includes:

- Up-to-date situational awareness, some of which is collected through the tasks associated with monitoring and evaluation and includes:
    - The oil type, volume, location
    - Where it is going (modelling and weather conditions)
    - When will it get there (modelling and weather conditions)
    - What environmental sensitivities are at risk (priorities for protection)

  - What is happening to it (weathering etc.)
  - What is the worst-case credible scenario.
- The adjustments required to the current incident objectives and/or response strategies.
- NEBA for proposed response strategies.

6.3 Identify Contingencies

Predictions of what the situation will be at stages during the incident, and at the final stage, will influence the activities of Operations and Logistics. It is critical that the Planning Chief can explain the basis of the predictions, the probabilities of the outcomes, and the consequences of events unfolding in a different manner.

The Logistics Chief must interpret the predictions and determine the likely future demands on the Logistics Team. This will take place in the ICT meetings, but details are likely to be resolved only through interaction between individuals in the Planning and Logistics teams.

The Incident Commander will use predictions to set priorities, perhaps between competing operational areas, and will advise senior personnel on appropriate control actions.

6.4 Determine Objectives and Strategies

Objectives are statements of the desired outcome or goal for the incident. VOGA's objectives for initial spill response activities as described in the OPPs are to:

- Ascertain extent of spill
- Prevent impact to sensitive resources.

A strategy defines what is going to be done – a broad plan, developed in support of the incident objectives, that is used to combat the incident. Strategies follow on from the objectives and are achieved through successful implementation of tactical plans. For ongoing incidents, strategies are regularly reviewed and new ones developed when necessary, particularly if the control objective is amended.

Strategies for spill scenarios in this OPEP have been identified and risk assessed according to net environmental benefit; and prepared for in terms of resources required to implement the strategy. The NEBA is used to identify and compare the potential effectiveness and impacts of response options, enabling a qualitative determination of the most appropriate response strategy. This process should guide the decision on which strategy is most appropriate to the particular spill each time the plan is reviewed.

6.5 Net Environmental Benefit Analysis

NEBA is a tool that has been developed to help facilitate the selection of the most appropriate response options to effectively combat an oil spill. VOGA has adopted the use of this tool in a strategic sense in this OPEP to select response options and will use the tool in an operational sense in the response planning cycle during by the Planning Chief or Environment Unit Team Leader within the Planning Team.

NEBA takes into account the advantages, limitations and added risks associated with individual OSR techniques and strategies, however, it has a broader perspective than environmental considerations and incorporates ecological, socio-economic and cultural aspects. It is a process that provides a means to balancing the trade-offs and selecting the best response option(s). The four stages of a NEBA are set out in Table 6-1.

Table 6-1: Four stages of a NEBA

Stage	Description
1	Compile and evaluate the data for relevant oil spill scenarios including fate and trajectory modelling, identification of resources at risk and determination of feasible response options.
2	Predict outcomes/impacts for the 'no intervention' (or natural attenuation) option as well as the effectiveness (i.e. relative mitigation potential) of the feasible response options for each scenario.
3	Balance trade-offs by weighing and comparing the range of benefits and drawbacks associated with each feasible response option, including no intervention, for each scenario.
4	Select the best response option(s) to form the strategy for each scenario based on the combination of techniques that will minimise the overall ecological, socio-economic and cultural impacts and promote rapid recovery.

Information requirements for the NEBA process:

- A copy of the OPP for the spill category – refer to Sections 11.2 and **Error! Reference source not found.**
- Current situation report (SITREP form) that includes details about the spill, weather, currents and tides, action taken to date, forecast situation
- OSTM outputs from the OPEP; and/or forecast OSTM outputs utilising real-time spill and metocean conditions
- Preferred response option/s from Section 7
- Priority protection areas/resources identified in the OPP
- Sensitive receptors at risk from oiling
- Outputs from monitoring and evaluation operations (e.g. aerial surveillance)
- Knowledge of response strategy impacts, advantages, constraints and limitations.

Once oil type, quantity, real-time weather information, and a trajectory pathway are known, the sensitivities within the EMBA need to be identified. The Planning Chief will review the protection priority ranking that has been provided in the OPPs and consider outputs from OSTM analysis, including:

- The probability of impact – will the response strategy reduce the probability of impact of to the sensitive receptor?
- Minimum time to impact (days) – will the response strategy increase the number of days before impact to the sensitive receptor?
- Severity of impact (quantity of oil) – will the response strategy reduce the average and/or total amount of oil to impact the sensitive receptor?

- Impacts associated with the proposed response strategy – will the response operation have more of a negative impact than untreated oil?
- What controls will be put in place to mitigate impacts associated with the proposed response strategy?
- The recovery time of the receptor after exposure to hydrocarbons – is recovery time likely to be short or long term?

A decision must be made as to which sensitive receptors have the highest protection and/or cleanup priority and which response strategy/strategies will minimise the overall ecological, socio-economic and cultural impacts and promote rapid recovery. The VOGA NEBA template (Appendix B) provides guidance as to the prioritisation of receptors. If there are conflicting outcomes for a particular response option, then the receptor with the higher priority becomes the preferred response option.

In the initial phase of a spill, VOGA has prepared an assessment tool to complement the OPPs and assist in identifying sensitive receptors, assessing environmental benefits and impact of response strategies in line with the Survey and Exploration EPs.

VOGA's spill response planning process (Figure 3-1) then requires that the response strategy decision needs to be reviewed to ensure that the risks and impacts associated with the response options are consistent with those identified in the EP. If the risks and impacts are not consistent with those identified in the EP, then the following will occur (as per Figure 3-1):

- Response strategy controls are identified and assessed,
- An alternative response strategy is assessed, or
- An application for approval to implement the response strategy will be made.

During the final stages of an OSR, cleanup activities will take into account five broad questions as suggested in IPIECA (2015):

- Is the remaining oil a potential source of harm to environmentally sensitive receptors?
- Would further cleaning do more harm than good?
- Does the oil interfere with the aesthetic appeal or recreational use of the shoreline?
- Does the residual level of contamination adversely affect economic resources or disrupt economic activities?
- Does the effort involved in further cleaning outweigh environmental or economic benefits that could be achieved?

The NEBA will be completed on the following timeline:

- Within 24 hours of the spill as part of the OPP
- Every 24 hours as part of the IAP cycle
- As required if the situation changes beyond what is planned for and response strategies require evaluation
- Until termination criteria are met for response strategies and ultimately the incident.

6.6 Identify Required Resources

Resources required to implement response strategies have been identified in OPP 1, OPP 2 and the source of these resources detailed in the VOGA Emergency Response Logistics Management Plan [VOG-7000-RH-0008]. Contracts have been established to support the activation and deployment of these resources within the timeframes identified. The Logistics Chief maintains a record of contracts in place to provide spill response resources and will activate these as required. The contracts agreement and rates that provide minimum resources are reviewed annually to ensure currency.

Current resource allocations and availability is provided through liaison with the Logistics Chief and includes information such as:

- Service providers currently engaged by VOGA being redirected to OSR activities
- Activation of specific OSR/emergency response contracts
- Identification of resources of opportunity.

The ability to meet the resource demand during a spill has been assessed in the Exploration and Survey Operations Oil Spill Response Capability Review [VOG-1100-YH-0019].

6.7 Develop an Incident Action Plan

A tactical plan describes how a job will be done – the deployment of resources at an incident to execute all or part of a strategy. Tactics are implemented by team leaders who are responsible for the deployment of resources at an incident or in an incident division or sector. Tactics specify jobs that must be completed within stated parameters (time, size, equipment to be used, standards etc.) in order for the strategy to be carried through.

Tactical plans will include the controls that should be used to ensure the impacts associated with response activities are reduced to ALARP.

Once tactics are in place, the actual work can be allocated to those who will perform it. This is called ‘tasking’. Tasks are the smallest components of the IAP and are generated by team leaders for specific jobs that are required. The achievement of any objective is through the completion of many individual tasks.

6.7.1 Briefings

Briefings are used to communicate the IAP to responders and ICT support personnel. A briefing (verbal and written) should take the form of Situation, Mission, Execution, Administration and Logistics, Command, Control and Communication, and Safety (SMEACS):

- **S**ituation – what has happened, response effort so far
- **M**ission – the overall aim of the response
- **E**xecution – who, how and what will be done in the response
- **A**dministration and logistics – arrangements to support the ICT and responders

- **C**ommand, control and communication – who to report to, who has responsibility for the incident, and how responders and the ICT communicate
- **S**afety – hazards and controls.

6.8 Take Action

The operational phase involves implementing the strategies and executing the tasks identified in the IAP. Throughout this phase, situational awareness should be regularly updated and include a briefing of the IAP.

The Planning Chief goes through a cycle of preparing for meetings, conducting meetings, preparation and modification of the IAP, and addressing issues emanating from the meetings. Information provided to the Logistics Team is to support that team in their work and the development of their components of the IAP.

This cycle may repeat a number of times during the shift. Towards the end of the shift, however, the process changes in that the focus of the IAP becomes one for the incoming shift rather than for the existing incident staff. The planning cycle repeats with extra components such as briefings and handovers. At the end of the shift, the incoming Planning Chief repeats the process.

To assist in the maintenance of situational awareness, the Operations Chief should also be collating information from the response teams to allow the assessment of the effectiveness of the response strategies. This feedback assists in determining effectiveness of response strategies.

Logistics ensures the implementation of response strategies by operations can be achieved through the provision of personnel and equipment.

6.9 Review Phase

Incident parameters evolve and as such, action plans must be revised on a regular basis (at least once per operational period) to maintain consistent, up-to-date guidance across the system. The purpose of the review phase is to ensure that:

- Incident objectives are reviewed to address change in circumstances
- Response strategies are achieving the incident objective
- Performance measures identified are being met
- Resources are effectively allocated.

The review phase involves assessing the effectiveness of the strategies identified in the IAP to assess whether there are any improvements required to the incident strategies. This is done by:

- Considering the information provided via feedback from the Operations Team on the situational awareness
- Reviewing the environmental priorities

- Assessing whether the incident objectives are being met, and if changes are required to address potential changes in the above items.

The Planning Team must also be able to analyse the performance of the response effort as a whole. This should be done during the incident to ensure that the objectives, strategies, tactics are working, and to find out the causes where they are not. To achieve this, each response strategy must have a section on measuring effectiveness.

Particular effort should be made to debrief personnel as they come off shift. Mechanisms to capture information from the field must be put in place prior to the shift change, and personnel made aware of the expectation put on them. Debriefs should not be overly formal and should not delay for avoidably long periods those going off duty to rest. Information gathered at debriefs is recorded and distributed to those who may be affected by it. The Planning Chief is responsible for coordinating this work and providing the assessment and proposed changes to the Incident Commander.

6.10 Adjust Phase

The adjustment phase involves determining the new or revised incident objectives and strategies for the next IAP and assessing if progress towards termination criteria is being made. The Incident Commander’s decision making is based on understanding:

- Situational awareness and the potential worst-case credible scenario
- The available response strategies, their benefits and operating limitations
- The environmental priorities utilising
- NEBA to guide the decision-making process (as advised by the Planning Chief in the ICT).

There will be occasions where the resources available to the Incident Commander and the ICT as a whole are not sufficient to carry out all preferred response options. It is the responsibility of the Incident Commander to make the decision about which strategies and tactics receive the resources; they need to prioritise the response to ensure the maximum benefit of the response effort. Managing competing demands for resources and also protection priorities is a key part of the role of Incident Commander, and to do this effectively they require a high level of situational awareness which is obtained from the activities within the Planning Team. The Liaison Officer (Regulatory) needs to be engaged on the proposed changes to ensure the appropriate regulatory approvals are obtained as necessary prior to implementation.

Section 7 – Response Strategies

7.1 Overview

Response strategies which may be appropriate for each spill category have been identified using the systematic approach to planning and the anticipated net environmental benefit of each using a NEBA. These response options are described in Sections 7.2 to 7.8 and are summarised in Table 7-1. An outcome of this process is the creation of two OPPs to assist the ICT and on-site responders in the initial response to an oil spill as a precursor to a formal IAP.

The ongoing response in an incident (IAP) will use the latest available spill information and the following to decide on the most appropriate ongoing response strategies:

- Potential impact of spill and the response strategy
- Operational constraints of the day – primarily safety, sea state and weather, but can also include logistical factors
- First response activities undertaken to combat the incident such as those undertaken in the OPP 1 and OPP 2 (Part 5).

It is important to note that the description of these strategies and application to each scenario does not mean that they will definitely be implemented during a response. They are not certain to occur except for monitoring and evaluation, which applies to all spill incidents.

Table 7-1: Summary of likely response options and environmental impact considerations for each spill scenario

Response consideration	Marine diesel spill	Loss of well control
Upper credible scenario	Single release 300 m^3.	Continuous release over 35 days 26,678 m^3.
Predicted outcomes based on Exploration OSM Report (GOC367176)	Is expected to evaporate rapidly with a low probability of shoreline impact, under 10% except for in winter where there is an estimated probability of 15% for shoreline accumulation at or above 10 g/m^2. The earliest shoreline impact is at 91 hours and the greatest volume ashore is 23 m^3.	Modelling suggests 92% contact to shorelines in winter at 10 g/m^2 threshold 51% in summer and 61% in transitional season. The earliest shoreline impact is at 2 days 21 hours.
Source control		
Identified as suitable?	Yes.	Yes.
NEBA considerations	Source control activities include, shutting off pumps and transferring fuel to another fuel tank. All strategies would be effective in minimising the amount of hydrocarbons lost to the environment and would reduce the area of potential exposure.	Regaining control of a well may require a relief well to achieve the desired result.

Response consideration	Marine diesel spill	Loss of well control
Monitor and evaluate		
Identified as suitable?	Yes.	Yes.
NEBA considerations	All spills will be monitored and evaluated to assess the natural biodegradation of the hydrocarbons and ensure situational awareness of the spill is maintained by VOGA emergency response teams.	All spills will be monitored and evaluated to assess the natural biodegradation of the hydrocarbons and ensure situational awareness of the spill is maintained by VOGA emergency response teams.
Chemical dispersion		
Identified as suitable?	No.	Yes.
NEBA considerations	Marine diesel is not a persistent hydrocarbon; it has a high natural dispersion and evaporation rate due to the high percentage of volatile components within the oil. A small increase in sea state (wave and wind action) can assist natural biodegradation through entraining diesel in the water column. Shoreline impact is not anticipated.	Dispersants will be assessed as a response option to increase the rate of biodegradation and minimise and the impacts of oil on the environmental sensitivities in the EMBA. Dispersant use could potentially result in an increase in environmental benefit for mangroves, mudflats, marshland, sandy beaches and rocky shores; as well as turtle nesting sites, migratory birds, seabirds and shorebirds. A dispersant test spray run will be undertaken prior to moving to full dispersant application operations to verify its effectiveness. Dispersant application was modelled in the B16 OSM Report (RPS 2024b). For all seasonal conditions assessed, the modelling demonstrated a reduction in the length of shoreline contact (above 10 g/m^2), when the surface dispersant was applied. For the unmitigated case, the greatest length of shoreline contact at, or above, the low threshold (10 g/m^2) during the summer, transitional and winter seasons was 898 km, 227 km and 233 km, respectively, compared to 691 km, 160 km, 190 km for the mitigated case, or a reduction of 30%, 42% and 22%, respectively. The greatest volume of oil on shore from a single spill trajectory was predicted to reduce from 5,606 m^3, to 2,737 m^3 when the mitigation option was considered. This represented a reduction of oil ashore of 45%.

Response consideration	Marine diesel spill	Loss of well control
Mechanical dispersion		
Identified as suitable?	No.	Yes.
NEBA considerations	Diesel spreads and evaporates rapidly. Mechanical dispersion may inhibit the rate of evaporation and could cause the oil to emulsify.	Mechanical dispersion will be assessed as a response option to enhance dispersion and dilution of oil into the water column which then leads to biodegradation of the oil. Mechanical dispersion can result in an increase in environmental benefit for all ecological sensitivities and for mangroves, marshlands, mudflats, sandy beaches, rocky shores and open waters.
Containment and recovery		
Identified as suitable?	No.	Yes.
NEBA considerations	An instantaneous spill of diesel will spread and evaporate rapidly due to the high proportion of volatile components within the oil and will not be of a sufficient thickness to provide for effective containment and recovery operations.	Containment and recovery can be used to recover oil to prevent it impacting on environmental, social and cultural sensitivities. Containment and recovery may be effective on Wandoo Crude as it is a persistent crude oil with a high specific gravity and viscosity. Depending on metocean conditions, containment and recovery is expected to have a removal rate of up to 10% (ITOPF, 2014b). Containment and recovery will be used if metocean conditions are suitable and if oil is of suitable thickness.
Protection and deflection		
Identified as suitable?	No.	Yes.
NEBA considerations	Diesel spreads and evaporates rapidly; it is unlikely that a spill in this category will be of a sufficient thickness to be effectively corralled or deflected by booms. OSTM for this scenario show that there is a probability sensitive marine resources will be impacted by oil at a thickness greater than 10 g/m^2, hence protection and deflection may result in an environmental benefit for turtle nesting sites, migratory birds, shorebirds, mangroves, marshland, mudflats, sandy beaches and rocky shores.	Where the EMBA indicates impact to shoreline sensitivities, protection and deflection will be assessed as a response strategy. OSTM for this scenario show that there is a probability sensitive marine resources will be impacted by oil at a thickness greater than 10 g/m^2, hence protection and deflection may result in an environmental benefit for turtle nesting sites, migratory birds, shorebirds, mangroves, marshland, mudflats, sandy beaches and rocky shores.

Response consideration	Marine diesel spill	Loss of well control
Shoreline cleanup		
Identified as suitable?	No.	Yes.
NEBA considerations	OSTM suggests the maximum volume of oil ashore from a single spill simulation is 23 m^3, however, the average across all spill scenarios is 1 m^3. Shoreline cleanup activities have the potential to cause more harm than good and as such require careful planning and execution. An increase in environmental benefit can generally be achieved when cleanup activities are undertaken on sandy beaches and areas where there are turtle nesting sites, migratory birds and shorebirds.	Shoreline cleanup activities will be assessed as a response where impact is predicted to occur in areas of highest sensitivity. The exploration drilling OSTM suggests a minimum time to shore of approximately 78 hours for a accumulation threshold of 100 g/m^2 (the actionable cleanup threshold). Dispersant application modelled in the B16 well OSTM suggests a reduction of shoreline accumulation of approximately 45%. Shoreline cleanup activities have the potential to cause more harm than good and as such require careful planning and execution. An increase in environmental benefit can generally be achieved when cleanup activities are undertaken on sandy beaches and areas where there are turtle nesting sites, migratory birds and shorebirds.
Oiled wildlife response		
Identified as suitable?	Yes.	Yes.
NEBA considerations	Surveillance for oiled wildlife will be conducted as per the Exploration and Survey Operations OSM-BIP [VOG-1100-YH-0018]. Oiled Wildlife Response (OWR) will be undertaken for all categories if required.	
In-situ burning		
Identified as suitable?	No.	No.
NEBA considerations	Diesel evaporates rapidly and is not suitable for in-situ burning.	Wandoo crude is not amenable to in-situ burning (flash point of 144°C), and the required equipment, technology, approved accelerant, and training is not readily available in Australia.

7.2 Source Control

Where practical and safe to do so, the emergency response plans to isolate and control the source of spills are implemented as a parallel activity alongside response activities. The aim of source control is to control or stop the flow of oil so that the amount of oil escaping in the environment is minimised. Control of the spill source is considered to be a primary spill response and only undertaken when safe to do so.

Source control actions for all spill categories will be instructed by the responsible PIC of either the vessel, MODU or facility where the incident occurs. Control actions will be undertaken in compliance with the spill response plans listed in Section 1.5 and will be appropriate to size of the spill. Source control activities proposed for each spill category is summarised in Table 7-2.

Table 7-2: Source control options

Spill category	Spill type	Credible upper spill volume	Product type	Source control activities
A	Vessel collision	300 m^3	Marine Diesel Oil	Contain diesel onboard or transfer fuel to another tank if possible. Isolating affected tank or tank lightening. Vessel separation.
B	Loss of well control	26,678 m^3	Wandoo Crude	Close Blowout Preventer (BOP), drill relief well as per Source Control Contingency Plan.

7.2.1 Loss of Well Control

A Source Control Contingency Plan details options available to regain control of a well after a well blowout. It provides campaign-specific details relating to reservoir conditions, blowout taskforce team structure, and logistics. The objective of the document is to have as much planning as possible conducted upfront to minimise the response time of remedial measures. The Source Control Contingency Plan is managed by the VOGA Well Construction Manager.

Real-time phases associated with responding to an uncontrolled hydrocarbon release include:

- Phase 1: Initial response, convene well construction ICT and gather information
- Phase 2: Determine most efficient well kill method
- Phase 3: Detailed planning of the well kill operation
- Phase 4: Execute well kill operation
- Phase 5: Cleanup operation
- Phase 6: Incident investigation.

If a loss of well control cannot be controlled via secondary well control procedures (e.g. closing a BOP), well fluids may continue to be released until a relief well is drilled or the well is capped and the flow intersected.

VOGA will mobilise an appropriate Mobile Offshore Drilling Unit (MODU) from local or international sources that has the required specifications to drill a relief well and regain control over the well that is blowing out. Plans for drilling a relief well will begin in parallel to progressing other well intervention options (to stop the flow of hydrocarbon or to permanently secure the primary well) (Phase 1).

The relief well will intersect the uncontrolled zones from the primary well and specialised plugging fluids will be pumped into the well to overcome the reservoir pressure. Well kill modelling will be conducted to confirm the fluid rates, pump rates and volumes that will be required to maintain integrity of the primary bore.

VOGA has a contract in place with Wild Well Control who will assist in providing these engineered solutions to regain control after a well blowout.

The process associated with planning and drilling of a relief well, if required, is estimated to take 78 days.

7.3 Monitoring, Evaluation and Surveillance (MES)

7.3.1 Description of MES Response Strategy

MES is a response strategy that can take on two functions:

- To monitor natural recovery (no intervention with physical or chemical response strategies)
- Monitoring which involves maintaining situational awareness and an assessment of response effectiveness.

Specific items to be monitored are trajectory of spill, oil characteristics, extent of slick, resources that may be impacted, and effectiveness of other response strategies.

Operational monitoring (OM) to evaluate hydrocarbon weathering and behaviour and impact on water quality, sediment, fauna, habitats and shorelines are contained in the OSM-BIP [VOG-1100-YH-0018]. Opportunities may arise to co-mobilise resources for the purposes of both MES and OM and this will be assessed in the IAP.

The ongoing monitoring and evaluation of the oil spill is a key strategy that allows managers of the response to maintain situational awareness, an up-to-date understanding of the success of other response options, and to monitor the natural weathering of the oil. It is by ongoing monitoring and evaluation of the situation that the response may be tailored day-to-day, adjusting and pre-empting the consequences of the oil spill and mitigating the worst of these consequences.

MES is undertaken in order to obtain information which will assist in the planning and execution of oil spill response strategies. The nature of the monitoring program implemented will depend on the needs of the incident, and may involve:

- Aerial surveillance
- Remote (satellite) sensing
- Satellite tracking buoys
- Drone imagery
- Vessel based observation
- Oil spill trajectory modelling.

7.3.2 Spill Scenarios for which MES May be Implemented

All spills will be have some MES activities conducted to assess the natural biodegradation of the hydrocarbons, effectiveness of response strategies, and ensure situational awareness of the spill is maintained by VOGA emergency response teams. Tasks and resources are detailed in Table 11-4 and Table 12-4.

7.3.3 Operational Constraints for MES

Operational constraints for MES include, but are not limited to:

- Remote location of vessel and drilling activities and potentially affected surrounding areas
- Ability for aircraft to undertaken aerial surveillance (limitations relating to suitable aircraft being available, night-time operations, distance from mainland)
- Availability of trained aerial observers
- Availability of drones, flight restrictions for drones and availability of drone pilots
- Timeframe for satellites to be within range of spill location
- Timeframe to mobilise personnel for surveillance activities
- Communication of data collected back to the ICT and clarity around units in which information is recorded (e.g. nm/km; datum in which coordinates have been recorded etc.)
- Verification of information being collected.

7.4 Chemical Dispersant

7.4.1 Description of Chemical Dispersant Application

The purpose of dispersant use is to decrease the amount of oil that may strand on shorelines or reduce its presence on the sea surface to prevent wildlife and habitat impacts. Oil that is dispersed into the water column reduces the volume of oil on the ocean surface and reduces the potential for impact on emergent receptors. This is achieved by breaking the oil down into small droplets, which are rapidly dispersed into the water column and away from the ocean surface. Through dispersant use, the process of natural dispersion and biodegradation is accelerated as more oil droplets are formed, increasing the surface area of the oil which increases the reaction rate of the biodegradation.

As some of the oil will not be able to be effectively sprayed using aerial operations, VOGA will also implement marine dispersant application operations. These operations will be directed (as part of the IAP) to operate in areas likely to result in the greatest effectiveness of the dispersant; and in such a manner as to allow for other oil spill marine operations.

Dispersant application will only be carried out while the spill response impact assessment, NEBA, demonstrates that the application is providing a net environmental benefit and that the application will minimise the overall ecological, socio-economic and cultural impacts and promote rapid recovery.

This will be determined through the assessment of dispersant efficacy testing results, daily NEBA, metocean forecast modelling and operational monitoring outcomes. Laboratory based efficacy testing of the dispersants available to VOGA on Wandoo crude has been assessed and described in Section 4.1.3. Tactics and resources for dispersant application are detailed in Table 12-6 and Table 12-7.

7.4.2 Dispersant Application

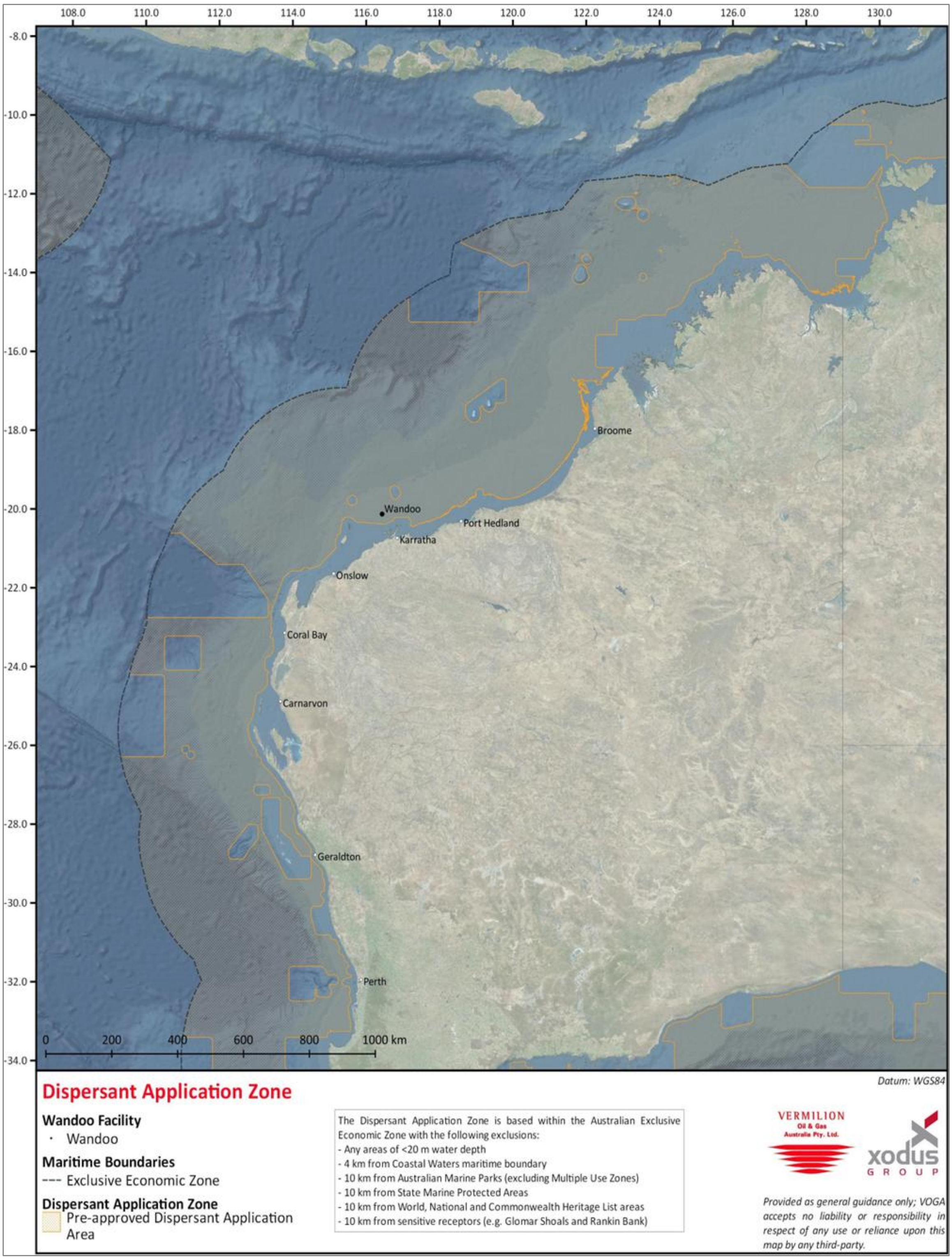
7.4.2.1 Dispersant Application Zone

Dispersant application may occur within the Australian Exclusive Economic Zone shown in Figure 7-1 and with the following exclusions:

- Waters shallower than 20 m
- 4 km from Coastal Waters maritime boundary
- 10 km from Australian Marine Parks (excluding multiple use zones)
- 10 km from State Marine Protected Areas
- 10 km from World National and Commonwealth Heritage List areas
- 10 km from sensitive receptors (e.g. Glomar Shoals and Rankin Bank).

Initial application of dispersant will be focused on the area surrounding source of the continuous spill to target the freshest crude oil and maximise the potential benefits of dispersant application. Additional application will be based on the trajectory of the oil, the NEBA and location within the dispersant application zone.

Figure 7-1: Dispersant application zone



7.4.2.2 Decision Making Process

During a spill response, the decision to apply dispersant to oil will be made via the IAP process. The IAP is supported by a NEBA utilising real-time operational information, such as metocean conditions, spill location and dispersant application, combined with trajectory modelling. This decision will be based on the potential impact of dispersant application, considering quantity, exposure and sensitivity, against potential reduction in the environmental impact. This will be done by assessing the effectiveness of dispersant, including the following parameters:

- **Effectiveness Monitoring**: For this operational activity, the effectiveness of the dispersant will be continuously monitored during application, using the Joint Industry Operational Monitoring Plan (OM4a): Surface Chemical Dispersant Fate and Effectiveness Assessment (refer OSM-BIP). This assessment is largely based on the Special Monitoring of Applied Response Technologies (SMART) protocol (NOAA, 2006). The SMART protocol assists in characterising the nature and extent of surface dispersed oil, aids in the validation and accuracy of plume trajectory models and allows for rapid quantification of data to enable the IMT to make decisions about continuation of dispersant application. The IMT will assess the effectiveness of continued dispersant use against an operational NEBA assessment.
- **Sensitive receptors**: the following will be considered when undertaking the decision-making process:
  - Minimum time to oil contact on sensitive receptors: If dispersant application can increase the contact time this would potentially allow for protection or shoreline strategies to be implemented to further reduce the impact.
  - Average and maximum volume of oil on sensitive receptors: If dispersant application reduces the scale of impact, this not only reduces the immediate impact but may also reduce the size of response activities within that area – potentially resulting in reduced disturbance of environmental sensitivities in shoreline or shallow water.
  - Average and maximum length of shoreline contacted by oil: If dispersant application reduces the scale of impact, this not only reduces the immediate impact but may also reduce the size of response activities within that area – potentially resulting in reduced disturbance of environmental sensitivities in shoreline or shallow water.
  - Probability of oil contact on sensitive receptors: A reduction in the probability of oil contact to sensitive receptors reduces the potential risk level of the event.
  - Change in proportion of surface and entrained oil: The application of dispersant may result in an increase in the extent of potential zones of entrained hydrocarbons. This is compared to the potential reduction in volume of oil to shoreline and maximum length of shoreline contacted by the oil, to see if there is a net benefit to the application of dispersant.
- **NEBA**: This will assist in assessing the exchange of one impact for another. This process will be continually re-evaluated and updated during an incident and will balance the trade-offs between benefits and impacts. Chemical dispersants will only be applied if there is net benefit to the priority sensitive receptors from its application.
- **Forecast modelling**: This will be completed every day during the oil spill incident to ascertain if the movement of oil as a result of current, weather and sea conditions will result in a net benefit to priority sensitive receptors. If the modelling indicates that the application of

dispersant under current environmental conditions will lead to increased deposition of hydrocarbons on priority sensitive receptors, dispersant will not be applied.

- **Marine water quality monitoring**: As part of operational monitoring activities, water quality monitoring will be conducted in conjunction with dispersant operations and samples will be analysed for dispersant and hydrocarbons (dissolved and entrained). Real-time results from these operational monitoring studies will inform the NEBA.
- **Response performance objectives**: These will be evaluated for compliance of measurement criteria. Any non-compliance will be identified as part of the IAP process and could result in the termination of chemical dispersant application.

7.4.2.3 Quantity of Dispersant

ITOPF (2014c) Technical Information Paper 4 (TIP 4) Dispersant use provides a method for determining the volume and application rate of dispersant. The two parts to the calculation are:

- Determining the volume of oil to be treated
- Determining the volume of dispersant required for that volume of oil.

Calculating the Volume of Oil to be Treated

ITOPF suggests that although there are variations in the thickness of oil within a slick, most fresh crude oil spills spread within a few hours so that the average thickness is 0.1 mm (also referred to as 10^{-4} m) and says *"this thickness is often used as the basis upon which to plan operations"* which means that the volume of oil in one hectare (10^4 m^2; 10,000 m^2) is calculated as:

Step 1. Calculating the volume of oil in one hectare

- For planning purposes we will use 1 m^3/hectare for spills with an average thickness of 100 g/m^2 (0.1 mm). This is based on the following:
  - Thickness of oil x area = volume of oil
  - Assuming density 1 kg/m^3 and even spreading 100 g/m^2 has thickness of 10^{-4} m.
  - 10^{-4}m (thickness of oil) x 10^4m^2 (area of oil) = 1 m^3 or 1,000 litre of oil.

Calculating the Volume of Dispersant Required

The dispersant-to-oil ratio (DOR) can range from 1:10 through to 1:50 or even less depending on the oil, dispersant types and the method of dispersant (aerial or vessel). For aerial planning purposes, a DOR of 1:20 is used because it is an accepted ratio to start with and may be adjusted depending on effectiveness. A DOR of 1:20 is also used in OSTM studies that have been used in this OPEP for evaluating the impact of dispersant use. ITOPF TIP 4 says the calculation to determine dispersant quantity is using a DOR of 1 part dispersant to 20 parts oil (1:20) (ITOPF, 2014c).

Step 2. Calculate the volume of dispersant required

The dispersant quantity required per hectare is 50 litres. This is based on:

- Dispersant quantity = litres of oil/20

- Using the calculation in Step 1, dispersant quantity per hectare = 1,000 litres of oil in 1 hectare/ 20 = 50 litres per hectare.

VOGA has assumed that FWADC is capable of delivering 1.8 m^3 of dispersant per sortie (although some aircraft like the Hercules are capable of more) (Table 7-3). Four Fixed Wing Aerial Dispersant Capability (FWADC) aircraft flying five sorties each and delivering 36 m^3 of dispersant in total will cover approximately 720 hectares per day. VOGA has assumed that the OSRL aircraft is capable of 8.2 m^3 per sortie, with a possible five sorties per day.

Table 7-3: Potential area covered and volume of dispersant that could be applied per day via aerial dispersion

No. of aircraft	Potential area (hectares) that could be covered at a rate of 50 litres per hectare				Potential volume that could be applied (m^3)			
	No. of sorties				No. of sorties			
	1	5	10	20	1	5	10	20
1	36	180	360	720	1.8	9	18	36
2	72	360	720	1,440	3.6	18	36	72
3	108	540	1,080	2,160	5.4	27	54	108
4	144	720	1,440	2,880	7.2	36	72	144

Calculating the Volume of Dispersant Required

The significant variation in oil thickness within a slick means that in practice it is impossible to evaluate the optimum dosage precisely. ITOPF (2014c) recommends that the practical and most efficient solution is to target the thickest parts of the oil. Therefore, to accommodate for the uncertainty in the total area to be treated with dispersant (i.e. due to wind rows, dispersant evaporation, and variability in slick thickness), the maximum distance from the release location to floating oil exposure threshold of 50 g/m^2 has been used. In this case that is 25 km to the Northeast (RPS, 2024a).

For the purposes of this OPEP, a continuous spill due to loss of well control during well exploration was evaluated with a scenario of a 26,678 m^3 surface release of Wandoo crude over 35 days following a loss of well control from the exploration wells which is approximately 762 m^3/day of oil released, assuming a consistent flow rate. A DOR of 1:20 would require approximately 38 m^3/day of dispersant to be applied, equating to 1,330 m^3 over the entire campaign if it was possible to apply dispersant for 35 days commencing 48 hrs after the incident of the incident.

These continuous spill scenarios assume the oil to be located in the dispersant application zone and for the oil to be an appropriate thickness for dispersant efficacy (50-100 g/m^2). An area 18 km x 18 km (32,400 hectares) closest to the surface release point will be prioritised for dispersant application activities and application areas outside of this zone will be determined based on the trajectory of the oil. This priority zone is within the pre-approved zone of dispersant application (Figure 7-1).

Four aircraft conducting five sorties each per day, with an additional sortie for one aircraft, could achieve the required daily dispersant application target of 38 m^3 covering an area of 720 hectares (highlighted yellow in Table 7-3).

A dispersant budget analysis was undertaken considering dispersant stockpile volumes, locations, mobilisation and transport times and methods, customs and consumption rates. In the event of an OSR, the 'live' Dispersant Spreadsheet can be utilised to update stockpile status and optimise the logistics arrangements in real time. VOGA is a member of AMOSC and the OSRL Global Dispersant Stockpile (GDS). Australian dispersant stockpiles will be accessed first followed by the GDS which has 5,000 m^3 of dispersant pre-positioned across the world, members of the GDS can access 100% of this stockpile. This information has been included in the VOGA Emergency Response Logistics Plan [VOG-7000-RH-0008].

Marine Vessel Application Rates

The ICT Planning Chief will work with the Logistics Chief to ensure that the optimum combination of aerial and vessel based dispersant application is used to achieve efficient dispersant stockpile use.

Calculating the volume of oil to be treated for marine vessel operations is the same as for aerial dispersion. However, a DOR of 50:1 is used for vessel dispersant planning as the dispersant droplets do not need to be as a higher concentration as aerial application. In addition, dispersant applied using the Afedo spray system is diluted before application, thus reducing the volume of dispersant required.

VOGA determined that a vessel travelling at 4 knots for 10 hours a day continuous spraying, can cover approximately 75 hectares.

7.4.3 Operational Constraints for Dispersant Application

In addition to 'no go' zones, constraints may also include:

- Metocean conditions
- Availability of suitable vessels, aircraft and personnel for dispersant activities
- Mobilisation times
- Thickness of the slick
- Weather conditions and available daylight.

Seasonal environmental conditions and sensitivities will dictate spray runs and areas. An analysis to determine these specific sectors will be undertaken at the time by the Planning Team and implemented by the Aviation and Marine Units.

7.5 Mechanical Dispersion

7.5.1 Description of Mechanical Dispersion Operations

Mechanical dispersion is the use of fire monitors, engine wash, or other means to mechanically/ physically disperse oils into the water column, thereby increasing the speed with which weathering and biodegradation occurs. This strategy is a secondary strategy that may be considered for Wandoo crude spills that result from activities within the Wandoo Field.

Mechanical dispersion has the benefits of:

- Assisting natural dispersion and biodegradation of oil
- Requiring less response personnel as it does not require booms or skimmers like in the containment and recovery strategy
- Eliminating waste storage and disposal issue
- Being able to treat areas that aerial and vessel dispersant operations may not be able to access or are lower priority areas for chemical dispersant application.

Mechanical dispersion operations may be activated for the loss of well control scenario described in this OPEP, but not for diesel spills, if the information collected through monitoring and evaluation suggests:

- The slick is moving toward a sensitive receptor
- The weathered oil is amenable to mechanical dispersion
- A safe operating environment for responders
- Tactics and resources for mechanical dispersion are detailed in Table 12-9.

7.5.2 Operational Constraints for Mechanical Dispersion

A sea state that is not suitable for containment and recovery operations assists the mechanical dispersion response strategy. Vessels deployed to undertake this operation must be capable of working in the sea-state conditions that are current and forecast.

Mechanical dispersion will not be undertaken in areas of less than 20 m depth water.

7.6 Containment and Recovery

7.6.1 Description of Containment and Recovery

Booms and skimming equipment can be used to create physical barriers on the water surface to contain and recover the oil spill where information and predictive spill fate modelling indicate a likely threat to environmental, social and cultural sensitivities. This strategy is often used in the offshore environment in close proximity to the hydrocarbon source. Once contained, an attempt to recover the hydrocarbons from the surface waters can be undertaken.

Containment and recovery, subject to amenable weather conditions and equipment limitations, will be one of the strategies in an oil spill, to corral and physically remove spilt oil from the ocean, using different types of vessels and booming configurations.

Priority of the implementation of tasks to support this strategy will be focused on containing and recovering oil that has not been successfully chemically dispersed, and to remove as much oil as feasible from the marine environment to prevent it from potentially impacting the shorelines of the Dampier Archipelago and the Barrow, Montebello, Great Sandy and Lowendal Islands as well as the mainland of the WA coastline.

The aim of this strategy will be to have on-water 'containment and recovery' strike teams. This will require regional and state resources, and will be directed (as part of the IAP) to operate in areas where oiling of environmental sensitivities will result in most harm to those sensitivities. This analysis will be undertaken at the time by the Planning Chief and implemented by the Marine Unit within Operations.

If this option is considered suitable through assessments and situation awareness (NEBA, trajectory to sensitivities, weather, seas state, oil type), significant logistical support will be required that will include suitable vessels, experienced crew, booms and skimmers, pumps, on-board storage for recovered oil and aircraft to direct the vessel to the areas with the thickest surface oils.

7.6.1.1 The Boom Encounter Rate

The Boom Encounter Rate (BER) is a planning tool to assess the effectiveness of booming strategies. It provides planners with an indication of the amount of oil that could potentially be contained in booming activities, which leads to an understanding of recovery and waste requirements.

The BER can be calculated from the AMSA contingency planning guidelines (AMSA, 2015):

- The length of boom employed (referred to as LB) and the consequent "swathe" of the boom array, i.e. the opening of boom array. For planning purposes, the swathe is 30% of the total boom length being deployed.
- The speed (velocity, V) at which the boom array can be effectively operated. For planning purposes, this is assumed to be 1 knot (1,852 m/h).
- The average thickness (T) of the oil.
- The "percentage cover" of the oil or chemical on the sea surface. For planning purposes, this is considered to be 100% during the initial stages of the response operation.

The BER is therefore calculated as follows: BER = (LB x 0.3) x V x T.

The AMSA guideline recommends that oil thickness be determined through modelling. Table 7-4 provides indicative slick thickness and estimate BER and assumes a standard boom length of 300 m. This indicates that the BER appears to reduce by an order of magnitude over 24 hours, and so is likely to be 10% as effective on day two of a response as day one. At-sea containment and recovery of oil may not be efficient or effective depending on the sea state and how far the slick has spread. These activities will depend on the conditions of the day.

Table 7-4: Indicative BER (planning targets) (Table 14 of AMSA OPEP guidelines)

	Time (h)	1	2	3	4	6	12	24
Group II Oil	Thickness (mm)	0.217	0.128	0.094	0.076	0.056	0.034	0.020
	BER (m^3/h)	36.2	21.3	15.7	12.7	9.3	5.7	3.3
Group II or III Oil	Thickness (mm)	0.474	0.283	0.207	0.167	0.123	0.074	0.044
	BER (m^3/h)	79.0	47.2	34.5	27.8	20.5	12.3	7.3

The BER information in Table 7-4 is based on the spreading coefficient and assumes no wind or current; once these are factored into the calculation, the BER will change and it also assumes the spill is instantaneous (i.e. not loss of well control). They are used as a basis from which to begin planning, continuous flow of oil to the surface from loss of well control may present a situation where the BER is greater than what is planned for.

Wandoo crude is described by APASA as a Group IV oil, however, that is based on the residual component at a boiling point of >380 °C. Wandoo crude for response planning purposes can be considered a Group III oil because it floats, the pour point is not less than -30 °C, and the viscosity is less than 1,500 cP (pers comm 6 September 2013, Paul Irving, Scientific Officer, AMSA). Therefore, for the purposes of estimating the BER, a thickness of 0.044 mm is used.

The following assumptions were used:

- Large weir skimmers such as the GT185 and the Walosep weir skimmer have recovery capacities up to about 65 t/h (~65 m^3/h).
- Assuming an operational rate of recovery of one-third of that capacity (due to sea-state and oil type), then skimming could potentially yield approximately 20 m^3/h.
- Using an operational rate of recovery over 4 hours of operation per day, a potential volume of 80 m^3/day could be recovered.
- At sea recovery is heavily dependent on the viscosity of the oil, wind speed and wave height.
- An offshore work vessel team deployed with a large weir skimmer and booming system to contain and recovering oil from the thickest part of the leading edge of the slick could potentially recover 20 m^3/h over a 4 hour operational period. This would result in a total of 80 m^3/day of oily water could be recovered by skimmers. However, this would be limited on the amount of oil that could actually be corralled by the booms (as calculated above in the BER assumptions) and the efficacy of the skimmer.
- The percentage of oil (from the oil and water mix) that is able to be recovered by large weir skimmers ranges from 50% to 90%.
- Assume in these scenarios that the skimmers achieve an efficiency of 50%, then for every 10 m^3 of liquid recovered, 5 m^3 would be oil.

Containment and recovery can be used to recover oil to prevent it impacting on environmental, social and cultural sensitivities. Containment and recovery may be effective on Wandoo crude as it is a persistent crude oil with a high specific gravity and viscosity. Depending on metocean conditions, containment and recovery is expected to have a removal rate of 10% to 15% (ITOPF, 2014b). Containment and recovery will be used if metocean conditions are suitable and if oil is of suitable thickness.

Containment and recovery operations are likely to be activated if the information collected through monitoring and evaluation suggests:

- The slick is moving toward a sensitive receptor
- Sea-state and weather conditions allow effective boom and skimmer deployment
- The weathered oil is able to be recovered with skimmers
- A safe operating environment for responders.

At-sea containment and recovery is planned for an initial 20 days with further planning of marine operations evolving as the response to the incident progresses. A 20-day containment and recovery campaign with 6 teams over 10 operational days that contains 80 m^3/day/team of oily water per day could potentially reduce the volume of surface oil by 2,400 m^3 (assuming 50% skimmer efficacy) and possibly prevent shoreline oiling. Consideration of the recovery rate of available skimmers and the likely percentage of oil recovered would be made as part of the NEBA and risk assessment process.

Tactics and resources for containment and recovery operations are detailed in Table 12-11.

7.6.2 Operational Constraints for Containment and Recovery

Containment of fresh, volatile oil should not be attempted due to its low flash point. No attempt should be made until the safety of the area has been established. Containment of lighter oils such as marine diesels is often not viable because it evaporates and dissipates quickly.

The limiting factor for the effectiveness of at-sea containment and recovery is the BER and the efficiency of skimmers, all of which are heavily dependent on sea-state and weather conditions.

The efficiency of skimmers offshore and in near-shore environments are limited primarily by the encounter rate (amount of oil that can be corralled and skimmed); sea state; viscosity of the oil and weather conditions. Minimum thickness of oil considered viable to contain and recovery is 50 g/m^2. The BER, skimmer recovery rate and percentage of oil recovered have all been considered in planning for this strategy.

Booms fail (release oil) due to entrainment, drainage failure, splash over, critical accumulation, submergence, planning or equipment failure (breakage) (Fingas, 2013). The OSRL field guide for containment and recovery describes deployment techniques and strategies to minimise boom failure. Thickness of the slick is one of the main limiting factors for containment and recovery operations.

In addition to the oil properties, sea-state and wind conditions directly affect how effective containment and recovery techniques will be. Suitable metocean conditions are detailed in OPP 2.

7.7 Protection and Deflection

7.7.1 Description of Protection and Deflection Operations

Protection and deflection, subject to amenable weather and sea conditions as well as equipment operational limits, is the use of physical barriers to separate oil from environmental sensitivities, or to deflect to other areas where it may be naturally collected or deflect it to other areas where the oil will do less harm.

Near-shore resources can be protected by the impact of oil through the use of booming configurations that either redirect oil or prevent impact by exclusion. Oil may be directed onto a shoreline to be recovered and in that case a shoreline cleanup operation is undertaken.

Booms can be used to create physical barriers on the water surface to protect sensitive receptors. This strategy involves a combination of near-shore booming using vessel-based operations (‘near-shore operations’) while the spill remains on a predicted shoreline impact trajectory, and the placement of shoreline boom around areas to:

- Protect sensitive shorelines
- Deflect the oil back to ocean or to easier locations for shoreline cleanup
- Reduce the volume of oil impacting sensitive shoreline habitats to ALARP
- Align the response strategy with NEBA.

Protection and deflection operations are likely to be activated if the information collected through monitoring and evaluation suggests:

- Sensitive receptors are predicted to be impacted by oil
- The slick is greater than 10 g/m^2 thick
- Sea state and weather permit boom deployment
- A safe operating environment for responders.

The EMBA includes a number of coastal and island shorelines, with a probability of between 78% and 90% impact on the Montebello Islands and Barrow Island at a threshold of >10 g/m^2 over a shoreline length of 13–49 km. On these islands, there are a number of priority sensitivities that could be protected through the use of protection and deflection strategies, including mangrove areas, turtle nesting beaches and significant bird habitats (seasonal dependant).

This OPEP provides for an initial deployment of 5 protection and deflection teams for the Montebello and Barrow Islands with real time operational monitoring to inform the expansion of this response strategy to 10 teams. Tactics and resources are detailed in Table 12-13. It may be the case that protection and deflection activities form part of shoreline clean-up operations as a tactic within that strategy.

Shoreline impacts may occur about 69 hours (RPS, 2024a). During this time the protection and deflection sites will be identified and prioritised. The implementation of this strategy in these areas may result in a better outcome than allowing the oil to strand.

7.7.2 Operational Constraints for Protection and Deflection

Booms require suitable sea state and weather as per the containment and recovery strategy. Metocean limitations for boom deployment are generally:

- Maximum sea state (Beaufort Scale) of 3–4
- Maximum current (knots) of 1–2
- Maximum wind speed (knots) of 14–22.

7.8 Shoreline Cleanup

7.8.1 Description of Shoreline Cleanup

Shoreline cleanup involves removing or monitoring oil with the objectives to:

- Minimise exposure hazards to human health
- Speed recovery of impacted areas, if possible
- Reduce the threat of additional or prolonged natural resource impacts.

Generally, oil that is stain, film or sheen is less than 1 mm thick and is extremely difficult to remove from substrate and is usually left to recover naturally with wave action, or if it is a man-made structure that is oiled, response options such as pressure cleaning may be utilised. A NEBA will need to be carried out before shoreline cleanup operations commence, to ensure that attempts to remove weathered oil do not result in more of a negative impact than leaving the oil there.

Shoreline cleanup will implement a three-stage methodology using strategies identified in Table 7-5:

- Emergency phase – collection of oil floating close to the shore and pooled bulk oil removal
- Project phase – removal of stranded oil and oiled shoreline material that cannot be cleaned in-situ
- Polishing phase – final cleanup of light oil contamination and removal of oil stains, where the incident NEBA demonstrates this is necessary.

Personnel requirements for these response strategies will vary. Worst case estimates for manual cleanup have been provided in OPP 2 based on OSTM outputs for the worst replicate simulation for a loss of well control scenario.

Table 7-5: Shoreline cleanup methods

Method	Description
Natural recovery	Natural recovery allows the shoreline to recover without intervention; this minimises environmental impact caused by cleanup activities by allowing nature to degrade and remove oil from the shoreline.
Physical cleaning – removal/disposal	
Manual cleanup	Manual cleanup and recovery using shovels, rakes, hand scrapers and sieves. This is the preferred option for cleaning inaccessible shorelines of those where mechanical cleanup is undesirable.
Mechanical cleanup	Mechanical cleanup is undertaken using bobcats, front-end loaders, graders, scrapers, beach sieving machines and beach cleaning machines. These can be used to rework beach sediment or to push such sediment into the shoreline for cleaning by the waves.
Vacuum systems	Vacuum systems may be portable hand-operated systems or vacuum trucks. Vacuum systems tend to pick up large volumes of water with the oil and so it is preferable to use them on oil pooled on the sediment surface or to remove oil from containers or dams in which the water has been decanted. One method to minimise the amount of water removed from the beach is to use light, portable vacuum systems to deposit

Method	Description
	oil-water into temporary storage containers on the beach, allow settling time and to decant the water. Large units can then be used to collect the oil from these containers and transport oil to storage sites. Vacuum systems can also be used in association with deflection booms to recover oil from the sea surface. It is advisable in this case to fit the hose with a broad Manta Ray head.
Use of sorbents	Two types of sorbent materials can be used: (1) loose, powdered or granular sorbents, or (2) solid, pads, rolls or sheets. Each of these may be either of synthetic or natural fibre. As a general rule, loose sorbent materials are not used because they are difficult to recover. However, there are occasions when this is not considered to be a problem, such as in high-energy areas where oily sorbent materials can be expected to be washed off of surfaces and dissipated to sea. Of course, oil too is likely to be washed off such shorelines, to dissipate. Solid sorbents may be used in the form of sorbent booms to recover light oil films or as pads or rolls to absorb free oil from the surface of sediments in cases where vacuum systems cannot gain access or where oil is too fluid for manual recovery.
Physical cleaning – washing	
Low-pressure flushing	Low pressure flushing can be used, with care, to remove surface oils from most beach-type surfaces. The water can be applied at ambient temperature or heated depending on the oil's viscosity and/or degree of weathering and on ecological constraints. It is important that re-floated oil is collected in booms or other containment devices and recovered using skimmers or sorbents.
High-pressure flushing	High-pressure washing is to be used only on solid man-made surfaces such as wharves, jetties, etc. This method tends to emulsify oil and consequently the use of sorbents to collect re-floated oil is not recommended. Oil, which is removed from surfaces, can be collected within light in-shore booms or onshore using Shore Guardian or a similar boom. Oil can be recovered using vacuum systems or skimmers.
Steam cleaning	Steam cleaning uses a moderate jet of steam that will remove oil from almost any surface. In addition to the physical forces of the steam jet, it raises the temperature of the adhered oil, thereby lowering its viscosity and allowing it to flow off a surface. This is not recommended for surfaces that support living plants or animals.
Sand blasting	Sand is applied to the structure at high velocity using sand blasting equipment. The oil is removed from the substrate by the abrasive action of the sand. It is used to remove thin accumulations of weathered oil residues from rock surfaces, man-made structures, or other impermeable surfaces with relatively few or no living organisms attached where the other techniques are not applicable or feasible.
Physical cleaning – in situ	
Surf washing/ sediment reworking	Sediments are relocated to the surf zone to permit the natural cleansing action of waves to remove oil which has penetrated into beach sediments (mostly fine gravel and cobble) and which is not removed by normal wave action from the surface. The sediments are returned to the upper portions of the beach within a relatively short period through natural wave and tidal action.
Treatment	
Bioremediation	Bioremediation is the term to describe a range of processes that can be used to accelerate the natural biodegradation of oil into simple compounds such as carbon dioxide, water and biomass. Bio-stimulation is the application of nutrients and bio-augmentation or seeding is the addition of microbes specially selected to degrade the oil.

Shoreline waste generation can be reduced by identifying shorelines likely to be impacted and pre-cleaning the shore of debris and vegetation before oil strands, thus reducing the total amount of oily waste to dispose of. Shoreline waste generation can range from three to over 10 times the amount of oil stranded. In-situ cleanup techniques are ideal for minimising the generation of waste and are particularly suited to remote area response where the logistical requirement associated with waste management and transfer can be a limiting factor.

The Guidelines and Strategies for Oil Spill Waste Management in Arctic Regions (Polaris, 2009) reported that *"the key factor in waste generation is neither the amount of oil spilled nor the amount of shoreline that is oiled. The volume of waste generated during a response operation is a function of the nature of the spill (type and volume of oil, natural weathering processes) and location and length of oiled shoreline, combined with the decisions made by spill managers who select the treatment and cleanup methods and the level of effort (treatment end points)."*

This information, although from a different geographical region, is considered relevant to shoreline response teams working in remote locations in northwest WA because of the same logistical constraints posed by working in remote locations. Consideration will be made in the VOGA IAP process to ensure that response techniques and waste management as described in Section 15 are aligned so that the overall generation of waste is minimised.

Shoreline cleanup operations are likely to be activated if the information collected through monitoring and evaluation suggests:

- Shorelines are predicted to be impacted by oil at a thickness greater than 100 g/m^2
- A safe operating environment for responders.

7.8.2 Determining Worst Case Shoreline Cleanup Scenarios

For the Kullingal OSTM scenario (RPS, 2024a) of 26,678 m^3 over 35 days, the greatest volume of oil predicted to come ashore from an unmitigated spill presents a worst case scenario of 4,550 m^3 during summer conditions. Dispersant application is assumed to be implemented as a response strategy and is predicted to reduce the volume ashore by approximately 45% as per the B16 well OSTM outputs (RPS, 2024b) presenting a scenario of at least 2,047 m^3 ashore.

The minimum time to shoreline contact for unmitigated spills is less than three days. This timeframe is significant for the mobilisation and implementation of operational and scientific monitoring plans particularly shoreline assessment as well as protection and deflection and shoreline cleanup activities.

The shoreline oiling analysis of OSTM results encompass all segments that are contacted by oil. Ongoing identification of shoreline segments using real time data will inform ongoing shoreline cleanup response efforts during a response to an incident.

Not all shorelines presented in the OSTM output will be contacted by oil at the same time. The stochastic model ran 100 simulations for each season (summer, transition and winter) using the same spill information (release location, spill volume, duration and oil type) but varied the start time. Once the simulations were complete, the results were overlaid. This approach ensures that the predicted transport and weathering of an oil slick is subjected to a range of current and wind conditions. The stochastic model output does not represent the extent of any one spill trajectory (which would be significantly smaller) but rather provides a summary of all trajectories run for each scenario.

7.8.2.1 Priority Coastline Sections

Coastline sections for the OSTM assessment were defined by dividing the coastline into polygons aligned with the shoreline cells from the WA Marine Oil Pollution Risk Assessment Protection Priorities and Western Australia Marine Oil Pollution Risk Assessment (Advisian, 2017).

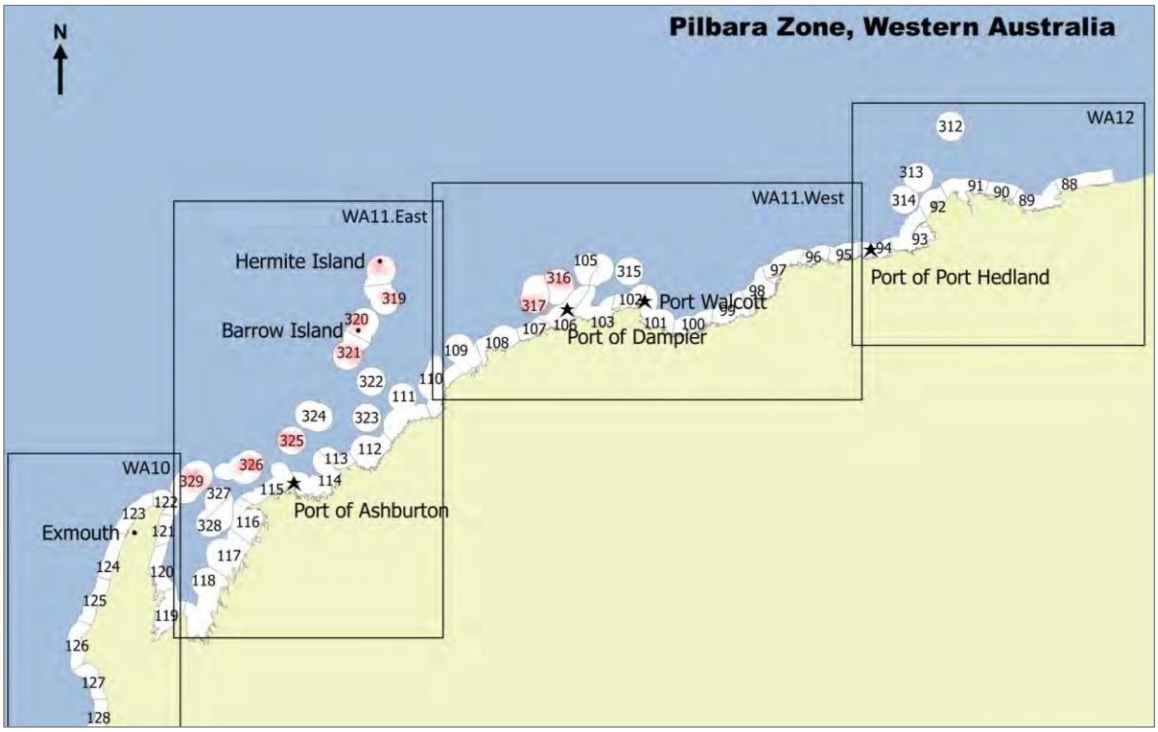
OSTM shoreline contact data was sorted and arranged according to the parameters:

- Minimum time to contact
- Probability of shoreline contact
- Maximum volume of oil ashore.

The result from this process was the identification of nine priority coastline sections (highlighted red in Figure 7-2) covering:

- WA11.East (105) - West Intercourse Island - Dolphin Island N point (C) - Dampier Archipelago
- WA11.East(316) – West Intercourse Island – Dolphin Island N point (F) – Dampier Archipelago
- WA11.East(317) – West Intercourse Island – Dolphin Island N point (G) – Dampier Archipelago
- WA11.West(318) – Barrow Island and Montebello Islands (A) – Montebello Islands
- WA11.West(319) – Barrow Island and Montebello Islands (B) – Montebello Islands
- WA11.West(320) – Barrow Island and Montebello Islands (C) – Barrow Island
- WA11.West(321) – Barrow Island and Montebello Islands (D) – Barrow Island
- WA11.West(325) – Coolgra Point W – Yardie Landing (C) – Thevenard Island
- WA11.West(326) – Baresand Point – Entrance Point E – Surrurier Island, Bessieres Island, Round Island
- WA11.West(329) – Locker Point – Baresand Point – Muiron Islands

Figure 7-2 Pilbara shoreline cells and sub-zones (DTMI, 2018)



7.8.2.2 *Priority Coastline Sections within Marine Reserves or Marine Parks*

Within the ten priority coastline sections identified, there are Dampier, Gascoyne and Montebello AMPs; and the Montebello and Barrow Island State Marine Parks, as well as Barrow Island Class A Nature Reserve.

Refer to the Wandoo Field Exploration Drilling EP for a description of these areas. VOGA identified this worst-case scenario to recognise the environmental values associated with these reserves and parks. It is also important to note that the Barrow Island Marine Management Area is adjacent to the Montebello Island Marine Park.

7.8.3 Shoreline Cleanup Personnel and Equipment

7.8.3.1 *Shoreline Cleanup Personnel Capability and Productivity*

When determining shoreline team numbers, VOGA will take into account guidance from shipping and oil and gas industry references including IPIECA (2015) and ITOPF (2014d):

"The potential performance of the workforce is difficult to judge until work has commenced and has been underway for some time. For this reason, deciding on how many workers are required on a shoreline is best achieved by establishing a small-scale operation on a representative section of the shoreline and then replicating this approach with the appropriate level of manpower in other areas of the shoreline, once working practices have been optimised. The number of people required will be determined by the demands of the cleanup technique employed and the amount of material that can be reasonably handled within a day" (ITOPF, 2014d).

"In general it is more efficient to start with a smaller number of teams, properly set up worksite with logistics support in place, and monitor the progress of the deployed teams. A reassessment of what further work is required can then be made and a decision taken on whether changes in the number of personnel are merited, either up or down" (IPIECA, 2015).

VOGA plans to deploy shoreline cleanup teams made up of 10 workers supervised by one team leader. This provides a span of control of 10:1 as per IPIECA (2015) guidance:

"As shoreline operations progress and the tasks become more routine, the number of workers each team leader can manage effectively may increase to a worker: team leader ratio higher than the initial planning levels of 10:1" (IPIECA, 2015).

Not all sections of the coastline will be accessible or amenable to manual shoreline cleanup activities, for example, cleanup teams would not be able to access mudflats or mangroves. A re-assessment of the number of personnel required and productivity of cleanup teams will be made once shoreline cleanup activities have taken place and real-time data regarding shoreline oiling has been obtained by SCAT teams undertaking OM6 surveys.

Shoreline cleanup personnel capability required and estimated time to complete bulk removal of oily waste is presented in Table 7-6. Twenty five shoreline teams are planned for the first 20 days primarily driven by the need to safely manage 275 people in remote areas, including transport, accommodation and catering.

These teams will be deployed across four distinct tactical sectors, based on the OSTM used in planning (RPS, 2024a). The operation necessitates a multi-hub approach, with 8 teams for the Dampier Archipelago, 6 for the remote Barrow/Montebello Islands, 5 for Thevenard and outer islands, and 6 for the Muiron Islands.

Biosecurity requirements for Barrow Island will need to be met in accordance with DBCA and Chevron processes and procedures.

Bulk oil removal refers to oil collected during the emergency phase (collection of oil floating close to the shore and pooled bulk oil removal) and the project phase (removal of stranded oil and oiled shoreline material that cannot be cleaned in-situ). During cleanup, a mix of oil and oily waste is collected. For planning purposes, potential waste generation is based on a bulking factor of 10 as per IPIECA (2015).

VOGA is using the guidance provided by IPIECA (2015) that one person can collect 1 m^3 of oily waste per day. Based on this guidance, one team of 10 workers can collect 10 m^3 of oily waste per day. Waste volumes would be altered if mechanical removal or in-situ cleaning activities such as surf washing or flushing were applied. The assumption that only half of the oil stranded ashore can be accessed or is amenable to bulk collection is also used.

Table 7-6: Shoreline cleanup potential waste and personnel requirements

Scenario	Potential waste generated in bulk oil removal [1]	No. of people required for bulk oil removal [2]	Estimated time to complete bulk removal of oily waste [3]
A. Maximum accumulated volume (m^3) from a single spill simulation >100 g/m^2 assuming no access or response technique constraints.	4,431 m^3 Bulking factor of 10 Potential bulk oil waste removal 44,310 m^3	25 teams = 250 people plus 20 team leaders Total 275 people scaled up from 5 teams by day 3 to 25 teams by day 20	Collecting 250 m^3 per day = 178 days cleanup
1. Bulking factor of 10 is used to estimate waste volumes within the bulk oil removal stage (emergency and project phases) of shoreline cleanup activities. 2. Ten people per team, each estimated to collect 1 m^3 of oily waste per day. Team leaders are not factored into the productivity estimates. 3. Based on 10 m^3 collected per team per day.			
B. Maximum accumulated volume (m^3) from a single spill simulation assuming only 50 % of the oil ashore is collected due to access constraints or manual bulk removal not the most appropriate response technique.	2,215 m^3 Bulking factor of 10 Potential bulk oil waste removal of 22,150 m^3	25 teams = 250 people plus 20 team leaders Total 275 people scaled up from 5 teams by day 3 to 25 teams by day 20	Collecting 250 m^3 per day = 89 days bulk removal and cleanup
4. Planning based on 25 teams undertaking 2 week rosters and being changed out after 14 days. 5. Team numbers and composition to be verified by OM6 SCAT surveys and feedback from the field operations. 6. An optimum number of teams will be determined based on the ability to safely and effectively manage approximately 275 people in the field at one time.			

Time to complete bulk oil removal (emergency and project phase) is based on the ability of each team collecting 10 m^3 of oily waste per day. The estimated time to complete bulk oil removal is described as:

$$\# \, days = \frac{volume \ (m3)}{\text{productivity (m3)}} \text{ where } productivity = \# \, teams \ x \ 10 \ m3.$$

The polishing phase of shoreline cleanup will be under the guidance of a NEBA and OM6 SCAT survey recommendations. VOGA recognised that although effective manual cleanup activities are generally limited to oil with a minimum thickness of 100 g/m^2, there may be instances depending on the location and vulnerability of sensitivities within that location which necessitate additional cleaning activities be undertaken. An example of this is if a turtle nesting beach has been contacted by oil during turtle nesting season. Additional cleanup activities in the form of a polishing phase may be recommended through the NEBA process to minimise oil contact with nesting turtles or hatchlings. Alternatively, high value recreational or commercial areas may need additional cleaning through high-pressure cleaning of seawalls or jetty structures so that amenity can be restored.

VOGA's NEBA of polishing phase cleanup activities will take into account five broad questions, as suggested in IPIECA (2015):

- Is the remaining oil a potential source of harm to environmentally sensitive receptors?
- Would further cleaning do more harm than good?

- Does the oil interfere with the aesthetic appeal or recreational use of the shoreline?
- Does the residual level of contamination adversely affect economic resources or disrupt economic activities?
- Does the effort involved in further cleaning outweigh environmental or economic benefits that could be achieved?

Resources to support the polishing phase would be sourced through the same arrangements in place for the emergency and project phase of shoreline cleanup.

7.8.3.2 Shoreline Cleanup Team Leaders

Trained team leaders will lead the cleanup teams to ensure activities are carried out according to instructions provided by the ICT and aligned with the EPOs and EPSs. Shoreline cleanup team leaders will have completed shoreline cleanup training and will be responsible for supervising the activities within their team. Within Australia, these team leaders can be sourced from the AMOSC core group, AMOSC mutual aid, AMSA National Response Team, or the WA DTMI State Response Team. Internationally, team leaders can be sourced from OSRL.

7.8.3.3 Key Arrangements in Place to Support Shoreline Cleanup Activities

VOGA is planning to initially equip and maintain 55 people over the first 5 days (based on shoreline contact at day 3) scaling up to 275 people by day 10.

Details of the shoreline cleanup kits and personnel protective equipment (PPE) available for immediate use in Dampier are contained in the VOGA Emergency Response Logistics Plan [VOG-RH-7000-0008]. Additional kits and PPE can be sourced through Perth-based suppliers.

VOGA has contracts in place for supply base and logistical services in the event of an oil spill. These arrangements include the provision of transport and drivers, supply base areas and equipment, waste disposal equipment and laydown areas, mechanical equipment, and emergency accommodation camps. Where camping on islands is not possible, vessels may be used to accommodate teams working offshore. Accommodation can be sourced onshore through camp providers that supply accommodation and catering; and transport of personnel to offshore and onshore locations can be provided by local bus and vessel operators as listed in the VOGA Emergency Response Logistics Plan [VOG-RH-7000-0008].

VOGA, in consultation with DTMI as HMA for MEE, has access to local emergency management personnel through the City of Karratha Local Emergency Management Committee and the wider Pilbara District Emergency Management Committee who can undertake or facilitate support roles as per the WA emergency management arrangements.

Shoreline cleanup workers can be sourced from labour hire providers identified in the VOGA Emergency Response Logistics Plan [VOG-7000-0008]. The Dampier Port Marine Oil Pollution Group can support response efforts and provide local knowledge to facilitate access to islands for shoreline cleanup. Access and operations on islands will be guided by the findings of the OM6 SCAT surveys in relation to suitable landing locations within the vicinity of the operations area to be set up. These locations can be pre-empted in the Tactical Response Plans for shoreline cleanup and activated, if required.

Hire or event management providers will be used to provide amenities such as toilets, shade, tables and chairs. This equipment can be transported via shallow draft vessels and barges operated by AMS and other vessel providers. Cleanup equipment such as sorbents, near shore booms and skimmers can also be sourced from the AMOSC, AMSA and AMS stockpiles and transported by vessel.

VOGA has arrangements in place for temporary waste storage including skips, intermediate bulk containers (IBCs) and containers as well as long term waste disposal solutions. These will be deployed via barges to islands and via truck on the mainland for remote waste collection. Refer to Section 15.1 for further details on oil spill waste management.

Mechanical equipment, such as all-terrain vehicles, four-wheel drives and buses, may be hired or purchased through local providers or transported from Perth. Earthmoving equipment may be suitable for specific shoreline types, such as front-end loaders, graders, bobcats and skid-steers. This equipment can be hired locally through local providers or ex Perth.

Minimum resources for establishing shoreline cleanup operations have been listed in Table 12-15. Mechanical support has been estimated based on the number of work zones to be set up, some may support a number of shoreline teams in each zone by providing bulk removal of waste. This is a minimum requirement for planning purposes that will be re-assessed in an actual spill response.

7.8.4 Operational Constraints for Shoreline Cleanup

The major constraint for shoreline cleanup is the thickness of the oil on the shore. Oil needs to be at least 100 g/m^2 thick to enable effective manual cleanup. The National Plan Environment and Scientific Working Group developed Foreshore Assessment and Termination Guidelines (2007) that suggest shoreline oiling of a thickness of <0.01 cm (100 g/m^2) which can be seen as a stain, should be left to self-clean through wave action only.

Other constraints include:

- Amenability of shoreline habitats to manual cleanup activities
- Access to remote islands and mainland beaches
- Biosecurity issues associated with moving people and equipment between remote islands and the mainland
- Access to sites (habitat, terrain, distance from the mainland, landing/mooring sites for vessels)
- Transport of equipment to remote sites
- Weather and sea state
- Hazardous wildlife.

7.9 Oiled Wildlife Response

7.9.1 Description of Oiled Wildlife Response

VOGA Oiled Wildlife Response (OWR) efforts are guided by the WA Oiled Wildlife Response Manual 2023 (WAOWRM) and the WA Oiled Wildlife Response Plan 2023 (WAOWRP) developed and maintained by DBCA. First strike response tactics and resources are detailed in Table 11-6 and Table 12-17.

OWR encompasses the combination of activities that minimise the impacts of an oil spill on wildlife by a) prevention of oiling and b) mitigation of effects when oiling has taken place. The success of an OWR goes beyond the count of rehabilitated and released animals, and includes consideration of factors such as:

- The ability to protect animals from oiling
- The capacity to minimise suffering of wildlife and optimise welfare
- The ability to mobilise a response quickly and to perform basic activities promptly
- The effectiveness of integration of OWR into the overall response
- The ability to harness local resources, capacity and communities into ongoing response efforts
- The ability to respond while preserving the safety of responders
- The capacity to transport affected animals to resource hubs for more effective treatment and provide the best achievable care
- The ability to derive learning from response events which drives improved future responses and improved understanding of the impact of oil on wildlife.

VOGAs role in OSR will be to facilitate response actions that will provide coordinated, immediate and effective protection, rescue and rehabilitation of wildlife during marine pollution incidents.

VOGAs primary objectives in relation to oiled wildlife are to:

- Maximise the best achievable and practicable protection measures to wildlife and their habitats during marine pollution incidents
- Minimise the risk of impacts to oiled wildlife and wildlife threatened by oil
- Minimise injuries to wildlife threatened or impacted by other operational activities associated with the response (e.g. containment and cleanup, dispersant application, aviation etc.)
- Provide achievable care for wildlife in line with best practices
- Return as many rescued wildlife back to the wild
- Document any impacts observed from the marine pollution incident or associated operational activities
- Prevent injuries to responders and the general public from wildlife associated with the incident and OWR actions search and rescue of oiled wildlife.

7.9.2 Spill Scenarios for Which Oiled Wildlife Response May be Implemented

OWR may be implemented for any spill event and is dependent on the surveillance conducted as part of MES and Operational Monitoring. If wildlife are present within the spill area or have the potential to be oiled as a result of oil stranding on shorelines, then OWR will be activated.

7.9.3 Operational Constraints for Oiled Wildlife Response

Operational constraints that may arise during OWR include:

- Access to remote islands and mainland beaches
- Biosecurity issues associated with moving people and equipment between remote islands and the mainland
- Access to sites (habitat, terrain, distance from the mainland, landing/mooring sites for vessels)
- Weather and sea state
- Available daylight
- Hazardous wildlife.

7.9.4 Response Structure

7.9.4.1 Oiled Wildlife Response in Commonwealth Waters

For oil spills emanating from offshore oil and gas operations within Commonwealth waters, the designated control agency is VOGA, and NOPSEMA is the jurisdictional authority. In the event that wildlife is affected, the jurisdictional authority for wildlife is DBCA, whilst the DTMI is the designated control agency.

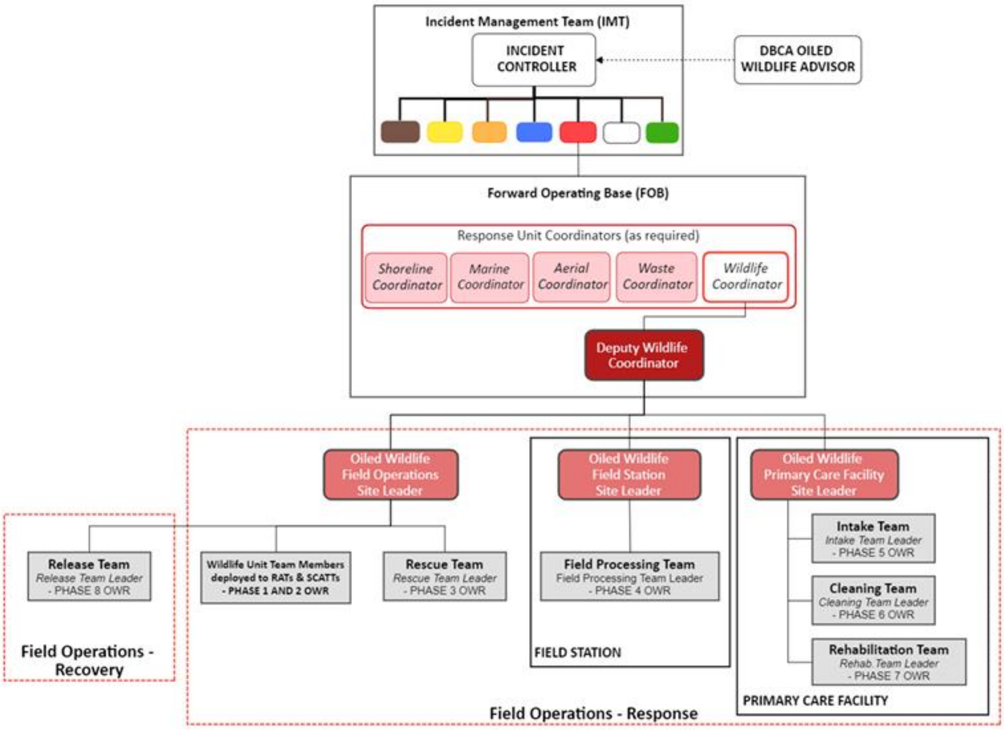
7.9.4.2 Oiled Wildlife Response in WA State Waters

DBCA is the jurisdictional authority responsible for ensuring a minimum standard of treatment, protection and destruction of oil-affected wildlife. In this instance, DBCA, the DTMI and VOGA will work together to coordinate the OWR.

In any event where DBCA is not leading the response, an Oiled Wildlife Advisor (OWA) from DBCA will be placed in the VOGA ICT to ensure standards are being adhered to and licenses for pre-emptive capture and deterrence activities can be granted and administered promptly, when deemed necessary.

Figure 7-3 presents the WAOWRP (2023) expanded structure for an OWR. An industry Oiled Wildlife Adviser and Wildlife Division Coordinator is appointed in consultation with DBCA.

Figure 7-3: Notional OWR structure for a spill with high wildlife impact (WAOWRP, 2023)



7.9.5 Approach to Response Planning

OWR planning was conducted according to the response planning process outlined in Section 3. This process aligns with the concepts presented in the IPIECA Good Practice Guide 516 Wildlife Response Preparedness (IPIECA, 2104).

Analysis of OSTM data for a loss of well control with no dispersant applied and across all seasons was undertaken to identify the initial protection priorities for wildlife (RPS, 2024a). Shoreline cells identified in the DTMI WAOPMRA were used in the OSTM and the following parameters were analysed to determine the priority receptors for OWR:

- Probability of oiling at a threshold of 10 g/m^2
- Minimum time to contact at a threshold of 10 g/m^2
- Maximum length of shoreline impacted (km).

The shoreline cells were filtered further to identify those that are known to be turtle nesting sites and China-Australia Migratory Bird Agreement (CAMBA) and Japan-Australia Migratory Bird Agreement (JAMBA) sites. By applying these response planning parameters to the OSTM analysis, VOGA has an understanding of the scale and extent of the operational area including a timeframe for scaling up oiled wildlife capabilities. First strike priority areas, subsequent operational areas and the timeframe in which to deliver oiled wildlife capabilities required to these areas has been identified from this sensitivity analysis. OWR planning has been framed around the first strike priority shoreline segments identified for:

- Montebello Islands
- Dampier Archipelago
- Barrow Island
- Legendre Island
- Delambre Island.

These shoreline sectors are the focus for VOGA response activities in the first 10 days of response activities. In addition to the on-ground work during this time, scaling up and activation of resources for staging areas and additional oiled wildlife facilities to be available beyond day 15 will take place.

7.9.6 Response Actions

VOGA will coordinate the initiation of OWR activities and assist ongoing OWR operations through facilitating access to assets such as aircraft and marine vessels, staging areas, transport, waste management and personnel as identified in the VOGA Emergency Response Logistics Plan [VOG-RH-7000-0008].

Once activated, the WAOWRM has eight stages, which require alignment to the IAP process for the incident. OWR activities will follow the procedures and guidelines set out in the WAOWRP for the eight phases of response and utilise the templates and forms specifically designed to support these procedures. All response strategies will be developed by the Wildlife Planning Officer in collaboration with the Wildlife Operations Officer with advice from the Wildlife Division Coordinator and the industry Oiled Wildlife Advisor. These form the basis of the IAP oiled wildlife sub-plan which includes:

- Wildlife priorities for protection
- Exposure modification measures
- Recovery and treatment of oiled wildlife
- Resourcing of equipment
- Personnel requirements.

The IC approves the oiled wildlife sub-plan as part of the IAP process managed by the Planning Chief. The WAOWRM contains standardised operating procedures, protocols and processes for the wildlife response to a marine oil pollution event in WA. All oiled wildlife management activities must follow this manual and the accompanying WA OWRP.

A 35-day loss of well control event would result in wildlife being impacted either directly by contact, ingestion of oiled food source or habitat contamination. OWR resources required will depend on the nature and scale of the incident however VOGA will use the WAOWRP guidance for wildlife impact rating of high to prepare for the resources required in an oiled wildlife event as per Figure 7-4. Project personnel resources require are outlined in Figure 7-5.

Oiled wildlife response personnel numbers in WA, Australia and internationally are tracked by the AMOSC Industry Oiled Wildlife Working Group (IOWWG) on the OWR State board. This document is updated annual by AMOSC and copy is attached as an appendix to the VOGA Emergency Response Logistics Plan [VOG-7000-RH-0008].

Figure 7-4: Wildlife impact rating chart (WAOWRP, 2024)

Wildlife Impact Rating (circle rating for each criterion)	LOW	MEDIUM	HIGH
What is the likely duration of the wildlife response?	< 3 days	3-10 days	> 10 days
What is the likely total intake of animals?	< 10	11-25	>25
What is the likely daily intake of animals?	0-2	2 to 5	>5
Are threatened species, or species protected by treaty, likely to be impacted, either directly or by pollution of habitat or breeding areas?	No	Yes - possible	Yes - likely
Is there likely to be a requirement for building primary care facility for treatment, cleaning and rehabilitation?	No	Yes - possible	Yes - likely

Figure 7-5: Personnel resource requirements (WAOWRP, 2024)

Role	Wildlife impact: Low	Wildlife impact: Medium	Wildlife impact: High
IMT and Operational Management			
DBCA Oiled Wildlife Advisor	1	1	1
Wildlife Coordinator	0	1	1
Deputy Wildlife Coordinator	0	0-1	2
Site Leaders, Team Leaders and specialist staff:			
OW Field Operations Site Leader		1	1
OW Field Station Site Leader		1	1
OW Primary Care Facility Site Leader		1	1
Rescue Team Leader		1	1
Field Processing Team Leader	0-1	1	1
Intake Team Leader		1	1
Cleaning Team Leader		0-1	1
Rehabilitation Team Leader		0-1	1
Release Team Leader		0-1	1
Veterinarian	0-1	1	2
Veterinary nurse	0	1	4
Licensed DBCA wildlife rehabilitator	0-1	2	4
Team members:			
WU Team Member - RATs and SCATTs	0-2	4	8
Rescue Team		8	16
Field Processing Team		3	6
Intake Team		6	12
Cleaning Team	0	6	10
Rehabilitation Team		6	12
Release Team		6	6
	6	**55**	**93**

7.10 In-situ Burning

VOGA does not consider in-situ burning as a suitable response option because the flash point of Wandoo crude (144°C) means that the oil is not amenable to being ignited in-situ.

PART 3: Performance Management

Section 8 – Assurance and Capability Management

8.1 Overview

VOGA manages oil pollution response capability and assurance requirements through:

- Training and competency of key response personnel and contractors
- Assessing capability against response requirements
- Assurance tasks such as exercises and third-party inspections.

8.2 Training and Competency

Element 5 of VOGA's Health, Safety and Environment Management System (HSE MS) is training and competency and within that element, the Personnel Selection, Placement and Competency Assurance Manual [VOG-1000-MN-0004] outlines how VOGA manages the training of personnel. On-site Emergency Response personnel are trained in emergency control and leadership to ensure they are suitability prepared for decision making in an emergency situation.

Training requirements are identified for On-site Command and Incident Command teams to ensure rotate testing of scenarios and equipment. Records are kept to track the completed training of personnel.

Each member of VOGA's ICT will have completed incident management training as outlined in Table 8-1, giving them basic competencies and therefore requisite skills to undertake their required incident response roles. At a minimum, this means a course in ICT management for ICT members, with planning, operations, logistics, finance chief roles, and Incident Commanders having completed a training course in ICT command and control.

Table 8-1: VOGA ICT OSR training

	Incident Commander	Planning Chief	Operations Chief	Logistics Chief	Finance Chief	ICT support roles	WNB Field Superintendent
Introduction to oil spills – familiarisation session	✓	✓	✓	✓	✓	✓	✓
Manage Emergency Incidents (PMAOHS511A)	-	-	-	-	-	-	✓
PMAOMIR320 or IMO Level 2 in OSR	-	✓	✓	✓	✓	✓	-
IMO Level 3 in OSR or PMAOMIR418	✓	-	-	-	-	-	-

The Planning Chief is supported by an Environmental unit, with the minimum competency requirement for the Environment Unit Team Leader role being a tertiary qualification in marine or environmental science (or equivalent) and a minimum three years in an environmental role in the oil and gas and/or marine industry. Specialised skill-sets such as those required for monitoring (e.g. fluorometry, shoreline surveys), aerial observation, OWR and specialised equipment operations will be sourced from the resources available within the AMOSC Core Group, AMSA National Response Team and ESC Network, the DTMI State Response Team or service providers.

8.3 Capability

8.3.1 Determining Requirements

VOGA's capability for OSR are the arrangements, contracts, MOUs, directories and agreements in place with service providers who may be involved in response efforts for an oil spill incident, assessed against worst-case scenario and documented under the Exploration and Survey Operations Oil Spill Response Capability Review [VOG-1100-YH-0019].

Determining capability for OSR requires an understanding of the strategies to be implemented and the associated resources. Resources required to support the implementation of each response strategy are identified in this OPEP and assessed in the capability review against ALARP criteria.

8.3.2 Assessment of Capability

Capability assessment is a step in the response planning process described in Figure 3-1. Once a capability is defined, arrangements are then tested to ensure it can be achieved and that risks are being managed to ALARP. If testing suggests the capability cannot be achieved, then an assessment of the response strategy and specified capability is undertaken.

The following questions are considered to determine capability requirements to support management of risk to ALARP:

- Are there additional tasks that can be undertaken for this strategy?
- When and where the resource would be required, based on the results of consequence modelling (e.g., time to impact, thresholds and probability)?
- How long would the resources be required for use?
- Where and what are the size of stockpiles available to VOGA?
- What are the mobilisation times for equipment from these stockpiles and contractor resources?
- What are the logistical requirements for safe deployment of materials and equipment?
- Is there any benefit of either increasing resource and/or reducing mobilisation times?
- What are the costs of either increasing resource and/or reducing mobilisation times?
- Is there any benefit in increasing the amount of resources?
- Is there a better way to undertake activities associated with this strategy?

8.3.3 Worst Case Requirements

The loss of well control scenario based on a 26,678 m^3 surface release assumes a 35-day uncontrolled release of hydrocarbons which by the nature and scale of the spill event would require resources for the duration of the spill event and post-source control. This scenario can be considered the worst case in terms of the quantity and duration resources are required for this activity.

8.3.4 Maintaining Capability for the Duration of a Response

Capability for resources are maintained for the duration of a response through the IAP process. The IAP process provides the ICT with the ability to forecast resource requirements based on real time incident data. Capability assurance will be monitored and adjusted if required to suit to the particular situation with resources for response operations beyond day 20 being identified and provided for.

The Resources Unit within the Planning Section of the ICT monitors response capability by:

- Completing a daily stocktake of resources available, enroute, deployed and no longer serviceable
- Requesting capability statements from service providers in an incident
- Comparing resource requirements of the strategies to be undertaken in the IAP with resources available.

If the capability cannot be achieved then response strategies will be reviewed as part of the IAP process to identify alternative response strategies that reduce risks to ALARP.

Resource requirements for response operations beyond 20 days are difficult to quantify, however, the scale of resources required for loss of well control incidents can be estimated by using the OSTM outputs as a guide to the geographic extent to which a response may evolve. Additional staging areas may need to be established to accommodate the geographical range of operations such as for OWR activities or shoreline cleanup. This will require access to wharf space, laydown areas for equipment, decontamination areas, waste storage and logistical support for additional personnel.

Dispersant stocks required beyond 20 days will require the support of the OSRL Global Dispersant Stockpile or just in time manufacture. The logistical planning required for activating manufacturing will require an analysis of ongoing requirements as soon as the scale of the incident is known. Time allowance will need to be made for sourcing seed ingredients, manufacture, packing and transport. As such, it is essential that if dispersant is an ongoing strategy that a member of the ICT is tasked with determining required volumes. The IPIECA Oil Spill Response Joint Industry Project (JIP3) Dispersants Logistics and Supply Planning document, updated in 2016 will assist in this task. Supporting studies for dispersant volumes are provided in the Exploration and Survey Operations Oil Spill Response Capability Review [VOG-1100-YH-0019].

8.3.5 Monitoring of Capability

Capability can be demonstrated by the creation and testing of mechanisms to access and activate resources during a spill response. These include the testing of contracts, agreements, MOUs, and directories to demonstrate VOGA's capability to implement the response strategies.

Audits and monitoring are a key aspect of this OPEP. Table 8-3 provides VOGA with the opportunity to ensure that the capability put in place in place during the planning phase is maintained over the duration of activities within the Wandoo Field and are heightened during times of higher risk activities (e.g. well construction).

8.4 Assurance Activities

8.4.1 Overview

The two key performance and assurance activities are:

- Exercises
- Inspections and audits.

These activities can either be conducted internally or by a third party, including another titleholder, equipment/resource provider or OSR agency.

Exercises enable the IAP processes, team interfaces and equipment deployment to be tested to enable continuous improvement of response planning or third-party expertise. Exercises can either be desktop, simulated events or full-scale equipment deployment.

Inspections and audits are conducted to test and provide assurance to assumptions and commitments made within this plan and capability assessment.

8.4.2 Exercises

The VOGA Wandoo ERP [VOG-2000-RD-0017] ensures that strategies are in place in to manage emergencies. The VOGA Emergency Response Schedule [VOG-1100-YH-0001] addresses the scope and requirements for conducting exercises for the on-site and incident command teams.

Exercises are part of the training standards identified in the VOGA Emergency Response Schedule include:

- Onsite command exercises (Level 1): An exercise that involves the on-site command team scenario of any severity (may be conducted as a desktop exercise).
- ICT exercises (Level 2): Exercise of any severity, must involve exercising the ICT with an IAP being generated (may be conducted as a desktop exercise) and may involve one or more organisations or external agencies.
- Crisis Management (Level 3): An exercise of any severity that involves Corporate Command Team whose focus is on business continuity and media/investor relations. For these exercises, corporate communications and business continuity plans may be prepared.

VOGA uses exercises to demonstrate the ability to fulfil its roles and responsibilities in terms of emergency response to all incidents, including oil spill incidents. The overall aim of exercises is to drive continual improvement through:

- Providing situational experience for ICT personnel and enabling them to be aware of their assigned roles and responsibilities during a response
- Assessing the effectiveness, achievability and timeliness of incident action planning for the duration of expected response
- Testing interfaces between teams and deployment of equipment and resources.

The Australian Disaster Resilience Handbook Managing Exercises (AIDR, 2023) and the accompanying exercise templates are used to assist in the planning, preparation, delivery and evaluation of internally run exercises.

The VOGA Emergency Response Schedule [VOG-1100-YH-0001] provides details regarding the reporting of recommendations arising out of exercises including changes of procedure, corrective actions and new guidelines. Table 8-2 presents the exercise schedule.

Table 8-2: Testing schedule for well exploration activities

Objectives that VOGA will test	Evidence and supporting documentation required	Within 3 months before well exploration activity starts	Within 3 months after a significant change to spill profile
Aim 1: Provide situational experience for command team personnel and enabling them to be aware of their assigned roles and responsibilities during a response			
To provide an oil spill event to test the on-site or incident command team roles specifically listed in Table 8-1.	VOGA ICT exercise scenario description and attendance list.	✓	-
Aim 2: Assess the effectiveness, achievability and timeliness of incident action planning for the duration of expected response			
Test the incident response cycle.	VOGA ICT exercise scenario description, IAP and decision/event log and post scenario lessons learned.	✓	✓
Aim 3: Testing interfaces and deployment of equipment and resources			
To assess that the ICT are aware of notification protocols in place to contact other agencies, regulatory authorities and OSRAs and OSROs.	VOGA ICT exercise scenario description, IAPs, decision/event log and stakeholder/notification contact list.	✓	✓
Test the mobilisation ability and logistic assumptions around equipment and personnel movement, timings and capability.	Updates to Exploration and Survey Operations Oil Spill Response Capability Review [VOG-1100-YH-0019] as per Table 9-1, based on lessons learned provided to or sourced by VOGA.	✓	✓

8.4.3 Inspections and Audits

8.4.3.1 Overview

VOGA's auditing schedule includes all elements of VOGA's HSE MS, including environment performance. The auditing schedule includes three types of auditing processes:

- Internal inspections of VOGA's response capabilities and commitments
- External inspections of VOGA's response capabilities and commitments
- Inspections of third-party providers.

8.4.3.2 Inspections of VOGA Commitments

HSE MS compliance audits are conducted regularly to review management standards relating to Management, Leadership and Policy, Risk Assessments and Case to Operate, Management of Change, Training and Competency, Emergency Preparedness (including OPEPs), Management and Response, and Incident Management.

VOGA's auditing schedule includes all elements of VOGA's HSE MS, including environment performance. The auditing schedule includes three types of auditing processes:

- Internal audits are conducted by relevant VOGA stakeholders such as the Managing Director, Operations Manager and/or HSES Advisor and are focused on VOGA systems, processes and resources
- External audits are conducted by a third-party provider and are considered a "deep dive" auditing process that reviews the system design completeness and adequacy, implementation adequacy and effectiveness
- Contractor audits are focused on the activities managed by the contracting party.

8.4.3.3 Inspections of Third-Party Providers

The inspection of third-party providers is focused on confirming that systems and processes are in place to meet response expectations within some or all of the following areas:

- Equipment: maintenance management, logistics, training, readiness for activation/deployment.
- People: training and competency management, quantity and availability.
- Activation process: notification processes, activation and mobilisation of people and equipment, exercises and testing.
- Documentation: contracts, agreements, specialist services, authorisation lists, capturing of learning and input into training materials.
- Management and organisation: organisational management of change process, lessons learnt, contracts and liability.

The frequency of the inspection is dependent on VOGA's activity, requirements of mutual aid partners and size/capability of the organisation and is provided in Table 8-3.

Actions for third parties are provided in a report and progress followed at a liaison meeting or the next inspection.

Table 8-3: Inspection frequency and scope

Item	Third Party oil spill response providers		
	OWR agency	Local/Regional Oil Spill Equipment Provider	Global dispersant
Frequency	3-yearly	2-yearly	3-yearly
Equipment: Maintenance management, logistics, training, readiness for activation/deployment.	Included	Included	Included
People: training and competency management, quantity and availability.	Included	Included	-
Activation Process: Notification processes, activation and mobilisation of people and equipment, exercises and testing.	Included	Included	Included
Documentation: Contracts, agreements, specialist services, authorisation lists, capturing of learning and input into training materials.	Included	-	Included
Management and organisation: Organisational management of change process, lessons learnt, contracts and liability.	-	-	-

8.5 Action Management

Recommendations arising out of OPEP reviews, capability reviews, inspections and audits are reviewed and divided into the following categories:

- Those that need to be addressed immediately
- Those that can be actioned and addressed in the cycle of document review and amendment, or
- Those that are not considered appropriate to be incorporated or not relevant to the Exploration and Survey Operations OPEP and are not actioned.

Where recommendations are to address an increase spill response, risk exposure identifies interim measures to manage the risk to ALARP, whilst any agreed action is being completed.

Section 9 – Continuous Improvement

The OPEP may require reviews:

- Following a significant change to a spill risk profile
- Following significant changes to OSR capability or EPSs
- Post-significant event (i.e. incident, change to risk profile, change to activities, change to preparedness/capability both within VOGA and external service providers).

Reviews will take into account any issues arising from events or exercises, any changes in legislation, and also incorporate findings and recommendations from industry incidents locally and globally (if and when information is made public).

Recommendations arising out of OPEP reviews, capability reviews, inspections, audits are reviewed, assessed and considered for implementation if it is consistent with the ALARP principles outlined in the VOGA EPs. A schedule of reviews is provided in Table 9-1.

Table 9-1: Review schedule for exploration activities

Objective	Activity type	Within 3 months before activity starts	During activity	Annually
To ensure that all contacts in the OPEP are regularly checked and updated	Contacts list check	✓	-	✓
To ensure that all service providers retain capability	Review Exploration and Survey Operations Oil Spill Response Capability Review [VOG-1100-YH-0019]	✓	-	✓
	Contractor readiness reports	-	✓	-
To ensure that response strategies are consistent with oil spill mitigation requirements	OPEP review	-	-	✓

Section 10 PART 4: Activation of Oil Pollution Emergency Plan – what to do if an oil spill occurs

WHAT TO DO IF AN OIL SPILL OCCURS

OIL SPILL RESPONSE ACTIONS

INITIAL ACTIONS FLOWCHART 1 → REPORT THE SPILL FLOWCHART 2 → Determine spill type and commence tasks in Oil Pollution Plan

OIL SPILL RESPONSE PRIORITIES

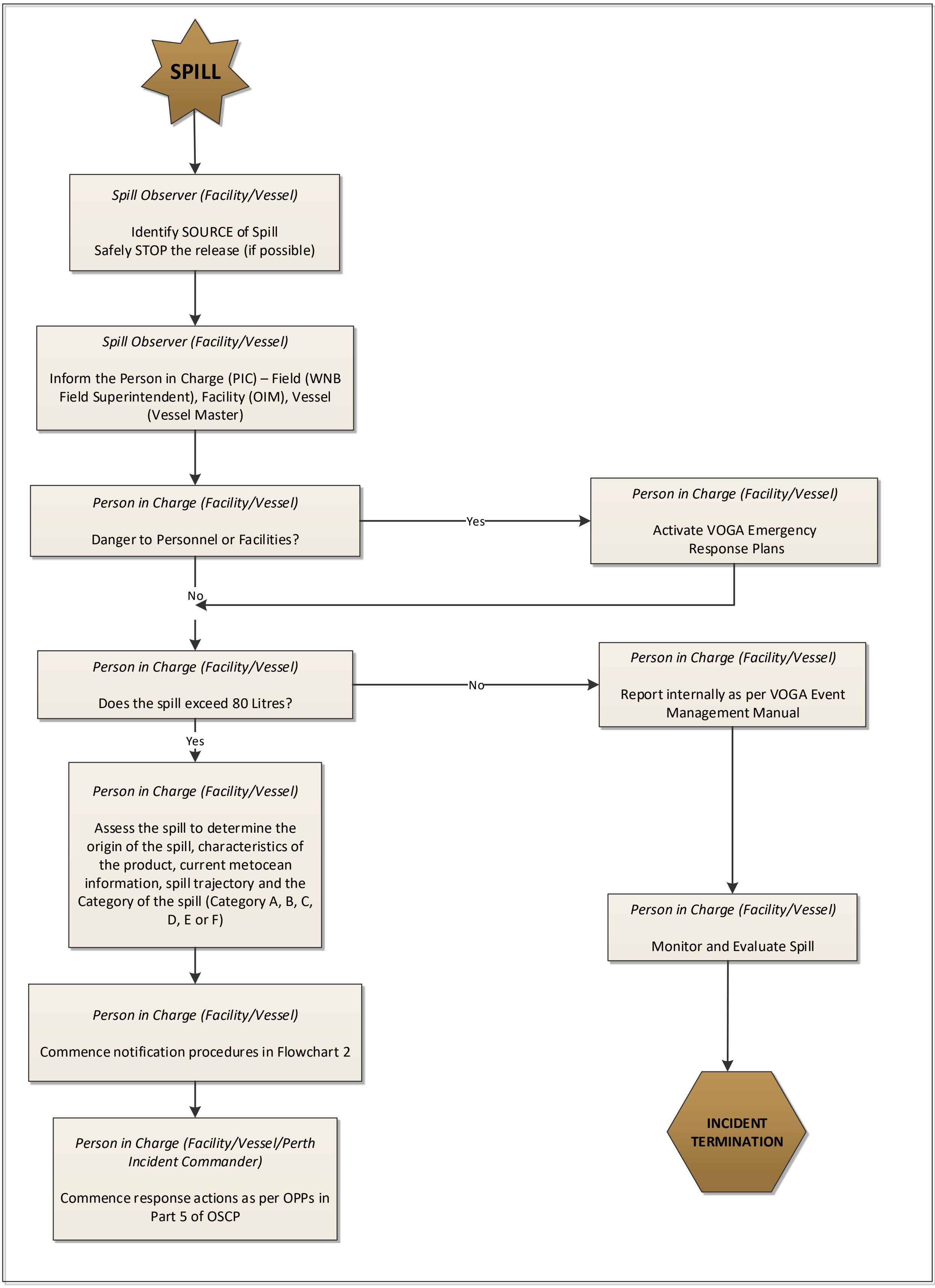
Consistent with the NatPlan, the priorities for VOGA in responding to an oil spill will be:

- Human health and safety
- Habitat and cultural resources
- Rate and/or endangered flora and fauna
- Commercial resources
- Amenities.

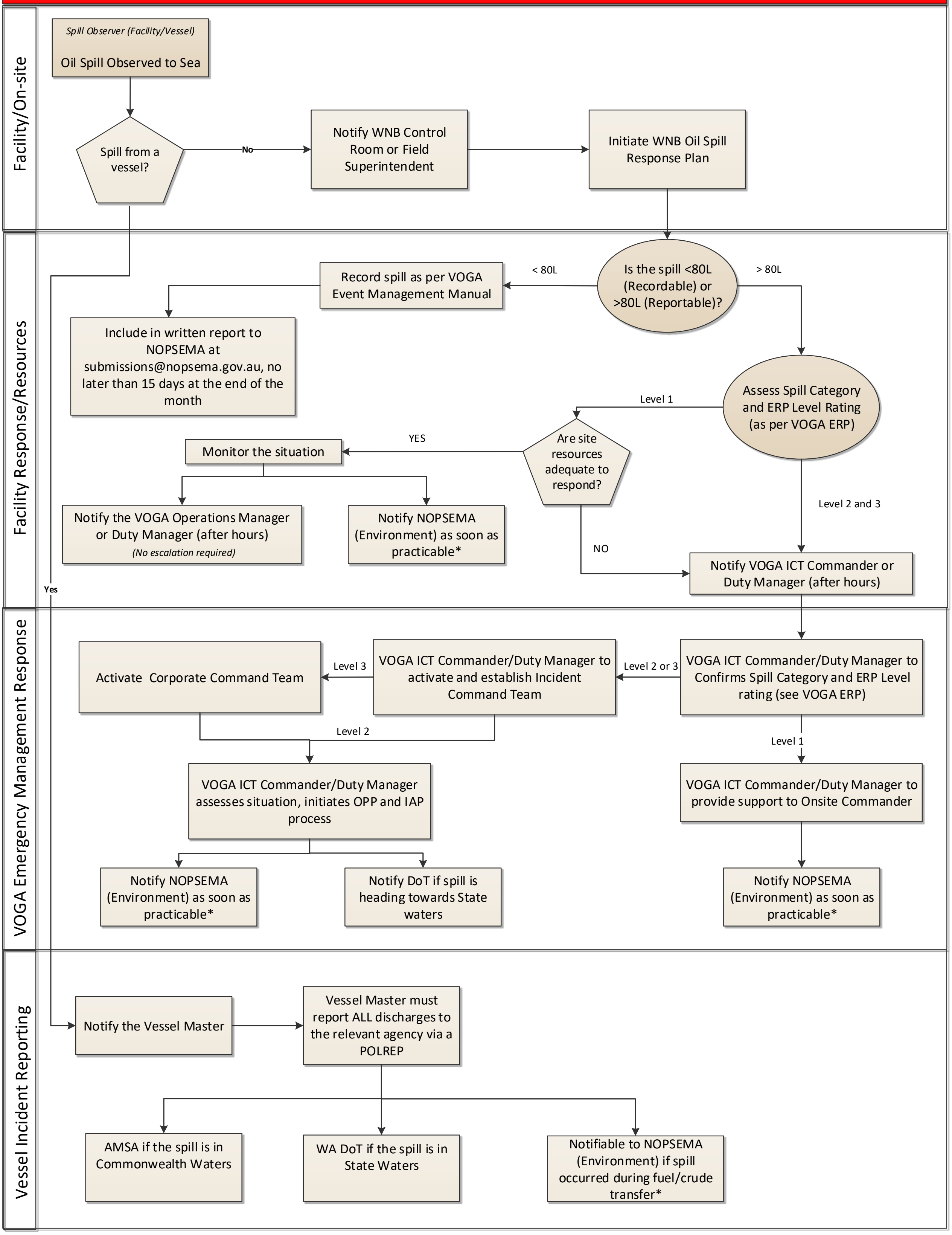
SPILL TYPE, OIL POLLUTION PLAN NUMBER AND CORRESPONDING QUICK GUIDE

Spill type	Oil Pollution Plan #	Credible upper spill volume	Product type	VOGA ERP incident level	National Plan incident level
Vessel collision	OPP 1	300 m^3	Diesel	Level 1	Level 1
Loss of well control	OPP 2	762 m^3/day (26,678 m^3)	Wandoo crude	Level 3	Level 3

FLOWCHART 1: OIL SPILL RESPONSE INITIAL ACTIONS AND ASSESSMENT



FLOWCHART 2: OIL SPILL RESPONSE REPORTING



* WNB Field Superintendent responsible for NOPSEMA Environment notifications for all petroleum activities within Permit Area WA-14L.
MODU Operator is responsible for all safety notifications to NOPSEMA for incidents resulting from activities under the control of the MODU operator.

PART 5: Oil Pollution Plans

Section 11 – Oil Pollution Plan 1 (Marine Diesel Oil Spill)

11.1 Instructions

- Complete the initial actions and notifications in Part 4 for activating the OPEP.
- Work through the initial incident action plan Table 11-1 using the guidance and resources described in Table 11-3 to Table 11-6. Check off tasks that have been undertaken using Table 11-2.
- Transition into incident IAP process using the implementation guidance, termination criteria and environmental performance standards provided in this OPP.

Table 11-1: OPP Initial IAP

Incident Action Plan objectives:	Ascertain extent of spill
	Prevent impact to sensitive resources
Protection priorities	**Oil spill response strategies** (Means of accomplishing objectives)
A 300 m^3 spill from a vessel collision is expected to evaporate rapidly with a low probably of shoreline accumulation.	1. Monitoring, evaluation and surveillance (MES)
	2. Wildlife response
	3. Operational and Scientific Monitoring

Table 11-2: OPP1 Task checklist

OPP 1 DIESEL SPILL – TASK CHECKLIST (first 48 hours)			
	Timeframe	**Who**	**Completed**
Tasking checklist vessel and facility			
Start and maintain personal log.	Immediately on spill detection	Vessel Master	
Initiate vessel SOPEP for diesel spills.	Immediately on spill detection	Vessel Master	
Verify that relevant notifications have been made (i.e. NOPSEMA, DTMI if the potential for a State response).	Within 2 hours of spill detection	Vessel Master and PIC Wandoo B	
Activate and deploy satellite tracking buoy from Wandoo B.	Within 3 hours of spill detection	PIC Wandoo B	
Deploy drone from Wandoo B if there is one available, a pilot available and safe airspace to operate.	Opportunistic surveillance	PIC Wandoo B	
Tasking checklist VOGA Emergency Management Response – Perth ICT (timeframe is on notification of spill)			
Visual observation from aircraft (in daylight hours only) has been arranged.	Within 3 hours	Logistics Chief Perth ICT	

OPP 1 DIESEL SPILL – TASK CHECKLIST (first 48 hours)			
	Timeframe	**Who**	**Completed**
Convene planning meeting to confirm and document: • Incident response aim • Priorities and objectives • Strategies • Priority resources required to be requested.	Within 3 hours	Planning Chief Perth ICT	
Commission RPS to undertake real-time modelling to determine trajectory and fate of oil.	Within 3 hours	Planning Chief Perth ICT	
Obtain available data re: • Weather • Tides/currents • Topography and shoreline • Environmental sensitivity data • Spill trajectory (observed or by modelling) • Oil data (character and behaviour) • Community issues • Action taken to date.	Within 3 hours	Planning Chief Perth ICT	
Activate Joint Industry Operational and Scientific Monitoring Service Providers using instructions in Section 13 of the Operational and Scientific Monitoring Bridging Implementation Plan (Appendix C).	Within 4 hours of initiation criteria being met	IC in conjunction with Planning Chief and Environment Unit Leader (EUL)	
Complete Preliminary NEBA to identify indicative response options and protection priorities (based on Strategic NEBA).	Within 6 hours	EUL and Planning Chief Perth ICT	
Activate priority resources (labour, equipment, transport and other support) based on outcomes of planning meeting and the initial IAP.	Within 24 hours	Logistics Chief in consultation with Planning Chief Perth ICT	
Monitor the response by scheduling and undertaking regular briefings/debriefings of ICT using the SMEACS format.	Every 6 hours or as necessary	IC in conjunction with Planning Chief ICT	
Issue regular Situation Reports (SITREPS) include DTMI if the spill has potential to enter State waters.	Prior to each ICT meeting	Planning Chief Perth ICT	
Activate Oiled Wildlife Response Emergency Response Plan and Procedures (WAOWRP).	Within 48 hours	Planning Chief	
Monitor OH&S performance through Section 18 of Part 6.	Ongoing	Safety Officer	
Use information from MES and Operational Monitoring to transition to IAP cycle as per Section 6.	Within 48 hours	IC Perth ICT	

Strategies	**Tactics** (What is planned to be done?)	**Tasks** (refer Table 11-5 and 11-6 for guidance)
Monitoring, evaluation and surveillance (MES)	Visual observation from vessel	Provide initial situational awareness to the PIC
		Ongoing situational awareness
	Deploy satellite tracking buoy	Deploy unit - PIC
		Access real time data
		Interpret data
	Oil spill trajectory modelling	Activate RPS modelling contract
	Aerial observation	Activate assets to fly as soon as possible in daylight hours only
		Deploy drone from Wandoo B if a drone, pilot and airspace is available
		Analysis of aerial observation
	Situational awareness	Collection and analysis of real-time data – weather, tides, oil characteristics, presence of wildlife etc.
Oiled wildlife response	Wildlife first strike response and reconnaissance Mobilisation of wildlife resources	Aerial reconnaissance
		Marine reconnaissance
		Shoreline reconnaissance – SCAT surveys
Operational and scientific monitoring	Operational monitoring	Review initiation criteria for Operation and Scientific Monitoring Plans (refer to Section 9 of the Joint Industry OSM Framework) and activate OSM Service Providers via instructions in Part B of the Exploration and Survey Operations OSM-BIP [VOG-1100-YH-0018].

11.2 Monitoring, Evaluation and Surveillance (MES) Strategy

Table 11-3: MES strategy summary

Purpose of strategy	• To monitor natural recovery (no intervention with physical or chemical response strategies) • To maintain situational awarenss and assessment of response strategy effectiveness.
Initiation criteria	Activation of oil spill response
Termination criteria	• The spill is no longer visible to human observers. Specifically, a 'silvery/grey' sheen, as defined by the Bonn Agreement Oil Appearance Code (BAOAC), is no longer observable. • Modelling will continue until response modelling predicts oil concentrations in the environment due to the spill are below contact threshold concentrations of 10 g/m^2 surface oil, 100 ppb entrained oil and 50 ppb dissolved aromatic hydrocarbons. • When MES undertaken to evaluate effectiveness of response strategies is no longer required.
Tactics	• Visual observation from vessel or facility • Satellite tracking buoy deployment • Oil spill trajectory modelling • Aerial observation • Sitiuational awareness • Operational and scientific monitoring.
Effectiveness guidance	Information available for the ICT is: • Of sufficient quality • Consistent in reporting • Regular • Required to inform other response strategies.

Table 11-4: MES implementation guide

<table>
<tr><th>Tasks</th><th colspan="6">MES implementation guide</th></tr>
<tr><td rowspan="3">Visual observation from vessel or facility

Observers provide initial situational awareness to the PIC</td><td colspan="6">To initiate this strategy, the PIC of a vessel or the Wandoo facility where the spill has occurred will (if safe to do so) organise for an observer to monitor the spill and communicate information regarding the appearance of the oil, area covered and if the spill has ceased. This process is depicted in Flowchart 1.
Observer on scene to record and report to PIC on facility (who then provides information to Planning Chief) the following.
• Estimate the percentage cover by colour: silver; rainbow; black/dark brown; or brown/orange.
• Is there wildlife in or near the spill?
• Are there other vessels or activities occurring within or near the spill?
• Is it possible to confirm if the spill is continuous?</td></tr>
<tr><td>Outcomes</td><td>Resources and source</td><td>48 hours</td><td>5 days</td><td>10 days</td><td>20 days</td></tr>
<tr><td>Incident notifications.
Identify extent and direction of oil, visual characteristics.</td><td>1 x observer from platform and/or
1 x observer from vessels working in the field</td><td>1 x observer</td><td></td><td></td><td></td></tr>
<tr><td rowspan="3">Ongoing situational awareness by observers from the platform and/or vessel/s</td><td colspan="6">As directed by Planning Chief, provide updates on what the spill looks like, area covered, presence of wildlife or other activities.</td></tr>
<tr><td>Outcomes</td><td>Resources and source</td><td>48 hours</td><td>5 days</td><td>10 days</td><td>20 days</td></tr>
<tr><td>Identify extent and direction of oil, visual characteristics.
Ground truth OSTM.</td><td>1 x observer from platform and/or
1 x observer from vessels working in the field</td><td>1 x observer from platform and/or
1 x observer from vessels working in the field</td><td>1 x observer from platform and/or
1 x observer from vessels working in the field</td><td>1 x observer from platform and/or
1 x observer from vessels working in the field</td><td>1 x observer from platform and/or
1 x observer from vessels working in the field</td></tr>
<tr><td>Deploy satellite tracking buoy, access</td><td colspan="6">It is important to deploy a satellite tracking buoy from the Facility as soon as possible after the spill has occurred, so that real-time data can be collected to verify pre-spill trajectory modelling and also be inputted into real-time modelling. PIC on Wandoo B (or</td></tr>
</table>

Tasks	MES implementation guide					
real time data and interpret data	delegate) deploys tracking buoy by removing from storage on Wandoo B, turning it on and releasing as close to the spill as possible.Planning Chief to check that this has been done. Additional units deployed every three days.					
	Outcomes	**Resources and source**	**48 hours**	**5 days**	**10 days**	**20 days**
	1 x satellite tracking buoy deployed each day for 4 days.	Contract with technical provider Fastwave for satellite tracking buoys	2 x satellite tracking buoys	2 x satellite tracking buoys		
	Planning Chief accesses data from the Fastwave dashboard: url: https://dashboard.fastview.com.au/ user: vermilion1 password: cali6AF7662FK Instructions on how to use the portal are in the ICT Toolbox.					
	Outcomes	**Resources and source**	**48 hours**	**5 days**	**10 days**	**20 days**
	Real time satellite tracking of spill.	Contract with technical provider Fastwave for access to portal	Access to Fastwave portal	Access to Fastwave portal		
	Planning Chief uses real-time data and knowledge of sensitivities to estimate spill trajectory and resources that could be impacted. Real time data is also provided to RPS to validate OSTM.					
	Outcomes	**Resources and source**	**48 hours**	**5 days**	**10 days**	**20 days**
	Data utilised in validation of OSTM and NEBA.	Contract with technical provider	Access to Fastwave portal	Access to Fastwave portal		

Tasks	MES implementation guide					
		Fastwave for access to portal				
Activate oil spill trajectory modelling contract	OSTM is an essential tool used by the Environment Unit in the Planning Team to determine resources at risk and protection priorities. Planning Chief or their delegate activates the RPS contract for real time trajectory modelling: (1) Complete the modelling request form provided. Complete as much detail as possible to allow for generation of modelling results and outputs. (2) Call the RPS Duty Officers on +61 408 477 196 to advise the RPS Duty Officers that they are now activated and a trajectory modelling request will be sent to them via email. Note that the call to the RPS Duty Officers must be made as the email account is not monitored 24/7. (3) Send completed request form to RPS Duty Officers via email at RPSresponse@rpsgroup.com (4) Follow up the email with a phone call to the RPS Duty Officers to confirm email receipt and contents of the email (i.e. the modelling request form) are correct. (5) The RPS Duty Officers will undertake the modelling as per the modelling request form provided. Should any of the incident details change, as further information becomes available, call the RPS Duty Officers to inform them of the change. Follow this call up with an email confirming the change in details for the modelling. (6) Model outputs will be forwarded from the RPS Duty Officers to the requesting client officer as quickly as possible. The results will be transmitted by email to the requesting client officer and copied to the designated parties as identified by the client officer. The results may be passed on via a number of means including email attachment and/or FTP site. Access to the FTP site is via the ICT toolbox. (7) Once the modelling results have been received from RPS, call or email the RPS Duty Officer to inform them that the results have been received. (8) If extra advice is sought in regards to interpreting the trajectory modelling output, please follow up with a call to the RPS Duty Officers for further clarification. RPS will require details collected through the situational awareness task such as real time weather, sea state, and oil type spilled.					
	Outcomes	**Resources and source**	**48 hours**	**5 days**	**10 days**	**20 days**
	Identify the predicted trajectory and fate of the spill	VOGA – 1 x ICT member with oil spill assessment training.	Multiple OSTM runs over first 2 days.	Subsequent OSTM runs as required.	Subsequent OSTM runs as required.	

Tasks	MES implementation guide					
	and dispersed oil, timeframes for contact of oil with environmental sensitivities	OSTM contract with technical provider RPS.				
Aerial observation - activate assets to fly as soon as possible in daylight hours only	Fixed wing aircraft (preferably over wing configuration) or helicopters to provide personnel with the means to observe and record details of oil on water. Logistics Chief secure appropriate aircraft to undertaken aerial observation activities twice a day – morning and afternoon until advised otherwise by Planning Chief. Pilots or observers be provided with information on the anticipated location of the slick (e.g. from OSTM output). If possible use aircraft already in the area to provide situational awareness. Flight time to the Wandoo B platform is 20 minutes (48 nm) based on S76 helicopter (@140 knots).					
	Outcomes	**Resources and source**	**48 hours**	**5 days**	**10 days**	**20 days**
	Aviation assets stood up	Aviation contracts in Emergency Response Logistics Plan	1 x aircraft 1 x airbase	1 x aircraft 1 x airbase	1 x aircraft as required 1 x airbase	1 x aircraft as required 1 x airbase
Secure observers	Activate AMOSC to undertake aerial surveillance activities. If trained observers are not available within the timeframe for initial reconnaissance flight, use untrained aerial observers for initial situational awareness.					
	Outcomes	**Resources and source**	**48 hours**	**5 days**	**10 days**	**20 days**
	Observation records of volume estiimates and trajectory of spill.	AMOSC staff or Core Group members	2 x observers	2 x observers	Observers as required	Observers as required
Data to be collected – conduct flight as soon	Aerial observation template forms are to be provided to observers along with a digital camera for video and photos. Observer is to obtain location details (coordinates) from pilot and note these for images and extent of slick.					

<table>
<tr><th>Tasks</th><th colspan="6">MES implementation guide</th></tr>
<tr><td rowspan="3">as possible in daylight hours only</td><td colspan="6">Information is to be provided back to the Planning Chief as soon as possible after the flight has landed. This could be done initially via verbal briefing from the observer and followed up by email or fax of completed observation template.</td></tr>
<tr><td>Outcomes</td><td>Resources and source</td><td>48 hours</td><td>5 days</td><td>10 days</td><td>20 days</td></tr>
<tr><td>ICT has reliable up to date observations.</td><td>AMOSC staff or Core Group members</td><td>2 x observers</td><td>2 x observers</td><td>Observers as required</td><td>Observers as required</td></tr>
<tr><td rowspan="3">Drone photos and videos</td><td colspan="6">This is an opportunistic task. Determine if there is a drone and drone pilot available on Wandoo B and if there is safe airspact to conduct a flight.
Fly transects from the platform along the slick, directly overhead to assist in determining spill volume and direction.</td></tr>
<tr><td>Outcomes</td><td>Resources and source</td><td>48 hours</td><td>5 days</td><td>10 days</td><td>20 days</td></tr>
<tr><td>Visual confirmation of oil for estimation of volume and extent.</td><td>Drone equipped with video recording.</td><td>1 x drone
3 x flights per day</td><td>1 x drone
3 x flights per day</td><td>1 x drone
3 x flights per day</td><td></td></tr>
<tr><td rowspan="3">Obtain satellite imagery</td><td colspan="6">Satellite imagery may be useful to assist in ascertaining the extent of the spill. If sourced this imagery will be used within the Planning Section to assist in determining resources at risk and protection priorities.
High fidelity photographs using different spectrums to identify the trajectory of the oil and ground truth the OSTM. Time to acquire images depends on availability of satellites over the spill site.</td></tr>
<tr><td>Outcomes</td><td>Resources and source</td><td>48 hours</td><td>5 days</td><td>10 days</td><td>20 days</td></tr>
<tr><td>High fidelity photographs using different spectrums to identify the trajectory of the</td><td>KSAT third party satellite provider sourced through AMOSC</td><td>1 x image acquisition</td><td>2 x image acquisitions</td><td>As required according to spill trajectory</td><td>As required according to spill trajectory</td></tr>
</table>

Tasks	MES implementation guide					
	oil, ground truth the OSTM.					
Collect real-time and predicted data to enter on SITREP boards in ICT and undertake a NEBA	Status boards in ICT require the following information (sourced and entered by situation unit leader): • Real-time and predicted weather and sea-state conditions – source from BoM • Real-time and predicted tidal and current movements – source from BoM • Oil characteristics – properties of the oil spilled and predicted behaviour after weathering – source from RPS • Predicted trajectory of oil based on modelling conducted for planning and verified by real time modelling • Resources at risk of being oiled sourced from OPEP • NEBA of response strategies.					
	Outcomes	**Resources and source**	**48 hours**	**5 days**	**10 days**	**20 days**
	Confirmation of suitable response strategies based on real time and predicted data.	VOGA resources including: Access to internet Diesel specifications OSTM outputs GIS/Google Map output of protection priorities	Updated daily			
Activate Operational and Scientific Monitoring Plan	Refer to Exploration and Survey Operations OSM-BIP [VOG-1100-YH-0018] and inititation criteria for OMPs.					
	Outcomes	**Resources and source**	**48 hours**	**5 days**	**10 days**	**20 days**
	Initiation and termination of operational and scientific monitoring	Exploration and Survey Operations OSM-BIP [VOG-1100-YH-0018] Joint Industry Operational and	Exploration and Survey Operations OSM-BIP [VOG-1100-YH-0018]			

Tasks	MES implementation guide		
		Scientific Monitoring Service	

11.3 Oiled Wildlife First Strike Response Strategy

Table 11-5: Oiled wildlife first strike response strategy summary

Purpose of strategy	To minimise the impacts of an oil spill on wildlife by prevention of oiling and mitigation of effects when oiling has taken place.
Initiation criteria	All spill events that are visible to human observers Confirmation from OM5: Rapid Marine Fauna Assessment of confirmed or imment wildlife contact.
Termination criteria	Termination criteria for oiled wildlfie response is dependent on the incident and will be based on the termination criteria described in the WAOWRP.
Tactics	• First strike • Reconnaissance • Rescue, rehabilitation, release as per WAOWRP.
Effectiveness guidance	In liaison with DBCA, initiate a wildlife first strike response within a minimum of 24 hours (if required) of a confirmed or imminent wildlife contact as reported by OM5: Rapid Marine Fauna Assessment.

Table 11-6: Oiled wildlife first strike response summary

Task	Oiled wildlife first strike response implementation guide
Activate WAOWRP	Call the DBCA State Duty Officer on telephone **(08) 9219 9108.** The DBCA State Duty Officer will notify an Oiled Wildlife Advisor. Appoint a Wildlife Division Coordinator. First strike response activities may be undertaken within the Environment Unit of the Planning section until a Wildlife Division Coordinator is actually in the ICC.
Rapidly assess the situation	Review OSTM – both the model used in response planning and the real time when available. SITREP – reports of wildlife both oiled and active within the response area.
Provide advice to the IMT in relation	Wildlife Division Coordinator to undertake. Use WAOWRP to identify wildlife assets at risk, cross reference with wildlife information contained in NEBA.
	Wildlife Division Coordinator to liaise with DBCA appointed OWA.

Task	Oiled wildlife first strike response implementation guide					
to the wildlife assets at risk	**Outcomes**	**Resources and source**	**48 hours**	**5 days**	**10 days**	**20 days**
	WAOWRP is activated	VOGA activate WAOWRP and source support from AMOSC.				
Liaise with OWA	OWA and Wildlife Division Coordinator are activated and assigned to the ICT	VOGA OWA and WDC	1 x OWA 1 x OWR Division Coordinator	1 x OWA	1 x OWA	1 x OWA
Activate first strike response kits	Wildlife Division Coordinator and OWA discuss and get approval from IC to deploy. First strike kits are portable and contain equipment to allow stabilisation of wildlife before triage and possible treatment at an oiled wildlife facility.					
	Outcomes	**Resources and source**	**48 hours**	**5 days**	**10 days**	**20 days**
	First strike response kits are mobilised to staging areas	AMOSC first strike response kits	Vehicles/small trucks to deliver 6 x first strike response kits to operational sectors. Vessels/aircraft to take kits to islands 1 x OWA 1 x OWR Division Coordinator	1 x OWA 1 x OWR Division Coordinator	1 x OWA 1 x OWR Division Coordinator	1 x OWA 1 x OWR Division Coordinator
	Two OWR containers are mobilised to an OWR facility location in Dampier	1 x OWR container from Dampier (AMSA)	1 x OWR container from Dampier (AMSA)	1 x OWR containers	Review need for additional OWR from the AMOSC Jandakot stockpile	
Reconnaissance	Reconnaissance across priority shorelines with specific locations determined by OSTM and the NEBA at the time of the spill. Resources are required to identify and record location of oiled wildlife as well as determining the presence of wildlife in areas predicted to be impacted by oil. Real time wildlife reconnaissance is necessary to ground truth information due to seasonal and inter-annual variation in abundance and distribution of wildlife.					

<table>
<tr><th>Task</th><th colspan="6">Oiled wildife first strike response implementation guide</th></tr>
<tr><td rowspan="3"></td><td colspan="6">Depending on Exploration and Survey Operations OSM-BIP [VOG-1100-YH-0018] activations this task could be undertaken by teams implementing OM5 – Marine Fauna Surveillance.</td></tr>
<tr><th>Outcomes</th><th>Resources and source</th><th>48 hours</th><th>5 days</th><th>10 days</th><th>20 days</th></tr>
<tr><td>Situational awareness regarding wildlife that has been oiled and wildlife present within the path of the spill trajectory is gained</td><td>OM5 Marine Fuana Surveillance teams from the Joint Industry OSM service.</td><td>1 x aerial observation over extent of predicted trajectory requires 1 x aircraft</td><td colspan="3">Aerial based survey: 1 x aerial observation over extent of predicted trajectory requires 1 x aircraft
Boat based survey: 1 x small vessel (<12 m length) 1 x boat driver; 2 x crew
Shoreline survey: 2 x Quad motorbike or 4WD vehicle; 4 x survey crew</td></tr>
<tr><td rowspan="3">Develop wildlife sub-plan for the IAP based on WAOWRP procedures.</td><td colspan="6">Transition to response cycle and procedures in WAOWRP for OWR activities based on the spill scenario.</td></tr>
<tr><th>Outcomes</th><th>Resources and source</th><th>48 hours</th><th>5 days</th><th>10 days</th><th>20 days</th></tr>
<tr><td>Future OWR activities arrangement developed based on the spill scenario</td><td>To be determined according to WAOWRP procedures</td><td>1 x OWR Advisor; 1 x OWR Planning officer; 1 x OWR Division Coordinator</td><td colspan="3">To be determined according to WAOWRP procedures</td></tr>
</table>

Section 12 – Oil Pollution Plan 2 (Loss of Well Control)

12.1 Instructions

- Complete the initial actions and notifications in Part 4 for activating the OPEP.
- Work through the initial incident action plan Table 12-1 using the guidance and resources described in Table 12-3 to Table 12-17**Error! Reference source not found.**.
- Check off tasks that have been undertaken using Table 12-2.
- Transition into incident IAP process using the implementation guidance, termination criteria and environmental performance standards provided in this OPP.

Table 12-1: OPP2 Wandoo Crude loss of well control initial IAP

Incident Action Plan objectives:	Ascertain extent of spill Prevent impact to sensitive resources
Protection priorities	**Oil spill response strategies** (Means of accomplishing objectives)
The focus for VOGA pre-planning of response activities for first strike response and initial resource mobilisation is the Pilbara coast and offshore islands between Ashburton River Mouth and De Grey River Mouth. This area is the most likely to be impacted first, most significantly and contains several sensitive locations. Dampier is the site most likely to be required for a forward base. For indicative planning, OSTM analysis indicates that several sensitive locations along the coast from North West Cape to Broome may be impacted to varying levels and require a response between Days 9 and 20. Priorities will be verified in a response with real time trajectory data and analysis of seasonal vulnerabilities through the NEBA process.	1. Monitoring, evaluation and surveillance (MES) 2. Chemical dispersion 3. Mechanical dispersion 4. Containment and recovery 5. Protection and deflection 6. Shoreline cleanup 7. Wildlife response 8. Operational and scientific monitoring

Table 12-2: Task checklist for loss of well control Wandoo Crude

OPP 2 WANDOO CRUDE SPILL – TASK CHECKLIST (first 48 hours)			
	Timeframe	**Who**	**Completed**
Tasking checklist facility/on site			
Start and maintain personal log.	Immediately on spill detection	Vessel Master/ PIC MODU	
Undertake visual observation from off-take vessel, platform and/or vessels of opportunity immediately.	Immediately on spill detection	Observer on site	
Activate and deploy satellite tracking buoy.	Within 3 hours of spill detection	PIC MODU	
Deploy drone from Wandoo B if there is one available, a pilot available, and safe airspace top operate.	Opportunistic surveillance	PIC Wandoo B	
Verify that relevant notifications have been made (i.e. NOPSEMA, DTMI if the potential for a State response).	Within 2 hours of spill detection	PIC MODU	
Tasking checklist VOGA Emergency Management Response – Perth ICT (Timeframe is on notification of spill)			
Satellite imagery of the spill to be initiated.	Within 3 hours	Planning Chief Perth ICT	
Visual observation from aircraft (in daylight hours only) has been arranged.	Within 3 hours	Logistics Chief Perth ICT	
Convene planning meeting to confirm and document: • Incident response aim • Priorities and objectives • Strategies • Priority resources required to be requested.	Within 3 hours	Planning Chief Perth ICT	
Commission RPS to undertake real-time modelling to determine trajectory and fate of oil.	Within 3 hours	Planning Chief Perth ICT	
Obtain available data re: • Weather • Tides/currents • Topography and shoreline • Environmental sensitivity data • Spill trajectory (observed or by modelling) • Oil data (character and behaviour) • Community issues • Action taken to date.	Within 3 hours	Planning Chief Perth ICT	
Activate Joint Industry Operational and Scientific Monitoring Service Providers using instructions in Section 13 of the Operational and Scientific Monitoring Bridging Implementation Plan (Appendix C).	Within 4 hours of any OM initiation criteria being met	IC in conjunction with Planning Chief ICT and Environment Unit Leader (EUL)	
Complete Preliminary NEBA to identify indicative response options and protection priorities (based on Strategic NEBA).	Within 6 hours	EUL and Planning Chief Perth ICT	

OPP 2 WANDOO CRUDE SPILL – TASK CHECKLIST (first 48 hours)			
	Timeframe	**Who**	**Completed**
Activate vessel-based dispersant operations to conduct test spray run and ongoing dispersant operations	Within 6 hours	IC in consultation with Planning Chief Perth ICT	
Activate FWADC via AMSA to conduct test spray run.	Within 6 hours	IC in consultation with Planning Chief Perth ICT	
Mobilise dispersant.	Within 6 hours	Logistics Chief in consultation with Planning Chief Perth ICT	
Undertake operational NEBA to determine if dispersant strategy will be implemented.	Within 2 hours of completion of test run	EUL and Planning Chief Perth ICT	
Activate priority resources (labour, equipment, transport and other support) based on outcomes of planning meeting and the initial IAP.	Within 24 hours	Logistics Chief in consultation with Planning Chief Perth ICT	
Identify relevant Tactical Response Plans for protection priorities and request from DTMI and Titleholder (based on Preliminary NEBA).	Within 24 hours	EUL and Planning Chief Perth ICT	
Activate WA Oiled Wildlife Response Plan (WAOWRP) and the VOGA Oiled Wildlife Commander (Wildlife Division Coordinator).	Within 12 hours	Planning Chief	
Monitor the response by scheduling and undertaking regular briefings/debriefings of ICT using the SMEACS format.	Every 6 hours or as necessary	IC in conjunction with Planning Chief ICT	
Issue regular SITREPS (include DTMI if spill has the potential to enter State waters).	Every 6 hours or as necessary	Planning Chief Perth ICT	
Activate OWR first strike response kits to be delivered to the most appropriate staging areas for POWRP operational sectors 6 to 14. Locations will be confirmed based on OSTM at the time of the spill and the initial NEBA.	Within 48 hours	Logistics Chief	
Mobilise OWR personnel	Within 48 hours	WDC through Logistics Chief	
Transition to IAP cycle as per Section 6.	Within 48 hours	IC Perth ICT	

12.2 Monitoring, Evaluation and Surveillance (MES) Strategy

Table 12-3: MES strategy summary

Purpose of strategy	• To monitor natural recovery (no intervention with physical or chemical response strategies) • To maintain situational awarenss and assessment of response strategy effectiveness.
Initiation criteria	Activation of oil spill response.
Termination criteria	• The spill is no longer visible to human observers. Specifically, a 'silvery/grey' sheen, as defined by the Bonn Agreement Oil Appearance Code (BAOAC), is no longer observable. • Modelling will continue until response modelling predicts oil concentrations in the environment due to the spill are below contact threshold concentrations of 10 g/m^2 surface oil, 100 ppb entrained oil and 50 ppb dissolved aromatic hydrocarbons. • When MES undertaken to evaluate effectiveness of response strategies is no longer required.
Tactics	• Visual observation from vessel or facility • Satellite tracking buoy deployment • Oil spill trajectory modelling • Aerial observation • Sitiuational awareness • Operational and scientific monitoring.
Effectiveness guidance	Information available for the ICT is: • Of sufficient quality • Consistent in reporting • Regular • Required to inform other response strategies.

Table 12-4: MES implementation guide

<table>
<tr><th>Tasks</th><th colspan="6">MES implementation guide</th></tr>
<tr><td rowspan="3">Visual observation from vessel or facility. Observers provide initial situational awareness to the PIC</td><td colspan="6">To initiate this strategy, the PIC of a vessel or the Wandoo facility where the spill has occurred will (if safe to do so) organise for an observer to monitor the spill and communicate information regarding the appearance of the oil, area covered and if the spill has ceased. This process is depicted in Flowchart 1.
Observer on scene to record and report to PIC on facility (who then provides information to Planning Chief) the following:
Estimate the percentage cover by colour: silver; rainbow; black/dark brown; or brown/orange.
Is there wildlife in or near the spill?
Are there other vessels or activities occurring within or near the spill?
Is it possible to confirm if the spill is continuous?</td></tr>
<tr><td>Outcomes</td><td>Resources and source</td><td>48 hours</td><td>5 days</td><td>10 days</td><td>20 days</td></tr>
<tr><td>Incident notifications.
Identify extent and direction of oil, visual characteristics</td><td>1 x observer from platform and/or
1 x observer from vessels working in the field</td><td>1 x observer</td><td>1 x observer</td><td>1 x observer</td><td>1 x observer</td></tr>
<tr><td rowspan="3">Ongoing situational awareness by observers from the platform and/or vessel/s</td><td colspan="6">As directed by Planning Chief, provide updates on what the spill looks like, area covered, presence of wildlife or other activities.</td></tr>
<tr><td>Outcomes</td><td>Resources and source</td><td>48 hours</td><td>5 days</td><td>10 days</td><td>20 days</td></tr>
<tr><td>Identify extent and direction of oil, visual characteristics. Ground truth OSTM.</td><td>1 x observer from platform and/or
1 x observer from vessels working in the field</td><td>1 x observer from platform and/or
1 x observer from vessels working in the field</td><td>1 x observer from platform and/or
1 x observer from vessels working in the field</td><td>1 x observer from platform and/or
1 x observer from vessels working in the field</td><td>1 x observer from platform and/or
1 x observer from vessels working in the field</td></tr>
<tr><td>Deploy satellite tracking buoy, access real time data and interpret data</td><td colspan="6">It is important to deploy a satellite tracking buoy from the Facility as soon as possible after the spill has occurred, so that real-time data can be collected to verify pre-spill trajectory modelling and also be inputted into real-time modelling. PIC on Wandoo B (or delegate) deploys tracking buoy by removing from storage on Wandoo B, turning it on and releasing as close to the spill as possible.Planning Chief to check that this has been done.</td></tr>
</table>

<table>
<tr><th>Tasks</th><th colspan="6">MES implementation guide</th></tr>
<tr><td rowspan="10"></td><td colspan="6">Additional units deployed every three days.</td></tr>
<tr><td>Outcomes</td><td>Resources and source</td><td>48 hours</td><td>5 days</td><td>10 days</td><td>20 days</td></tr>
<tr><td>1 x satellite tracking buoy deployed each day for 4 days.</td><td>Contract with technical provider Fastwave for satellite tracking buoys</td><td>2 x satellite tracking buoys</td><td>2 x satellite tracking buoys</td><td>2 x satellite tracking buoys</td><td>2 x satellite tracking buoys</td></tr>
<tr><td colspan="6">Planning Chief accesses data from the Fastwave dashboard:
url: https://dashboard.fastview.com.au/
user: vermilion1
password: cali6AF7662FK
Instructions on how to use the portal are in the ICT Toolbox.</td></tr>
<tr><td>Outcomes</td><td>Resources and source</td><td>48 hours</td><td>5 days</td><td>10 days</td><td>20 days</td></tr>
<tr><td>Real time satellite tracking of spill.</td><td>Contract with technical provider Fastwave for access to portal</td><td>Access to Fastwave portal</td><td>Access to Fastwave portal</td><td></td><td></td></tr>
<tr><td colspan="6">Planning Chief uses real-time data and knowledge of sensitivities to estimate spill trajectory and resources that could be impacted.
Real time data is also provided to RPS to validate OSTM.</td></tr>
<tr><td>Outcomes</td><td>Resources and source</td><td>48 hours</td><td>5 days</td><td>10 days</td><td>20 days</td></tr>
<tr><td>Data utilised in validation of OSTM and NEBA.</td><td>Contract with technical provider Fastwave for access to portal</td><td>Access to Fastwave portal</td><td>Access to Fastwave portal</td><td></td><td></td></tr>
</table>

<table>
<tr><th>Tasks</th><th colspan="6">MES implementation guide</th></tr>
<tr><td rowspan="3">Activate oil spill trajectory modelling contract</td><td colspan="6">OSTM is an essential tool used by the Environment Unit in the Planning Team to determine resources at risk and protection priorities.
Planning Chief or their delegate activates the RPS contract for real time trajectory modelling:
(1) Complete the modelling request form provided. Complete as much detail as possible to allow for generation of modelling results and outputs.
(2) Call the RPS Duty Officers on +61 408 477 196 to advise the RPS Duty Officers that they are now activated and a trajectory modelling request will be sent to them via email. Note that the call to the RPS Duty Officers must be made as the email account is not monitored 24/7.
(3) Send completed request form to RPS Duty Officers via email at RPSresponse@rpsgroup.com
(4) Follow up the email with a phone call to the RPS Duty Officers to confirm email receipt and contents of the email (i.e. the modelling request form) are correct.
(5) The RPS Duty Officers will undertake the modelling as per the modelling request form provided. Should any of the incident details change, as further information becomes available, call the RPS Duty Officers to inform them of the change. Follow this call up with an email confirming the change in details for the modelling.
(6) Model outputs will be forwarded from the RPS Duty Officers to the requesting client officer as quickly as possible. The results will be transmitted by email to the requesting client officer and copied to the designated parties as identified by the client officer. The results may be passed on via a number of means including email attachment and/or FTP site. Access to the FTP site is via the ICT toolbox.
(7) Once the modelling results have been received from RPS, call or email the RPS Duty Officer to inform them that the results have been received.
(8) If extra advice is sought in regards to interpreting the trajectory modelling output, please follow up with a call to the RPS Duty Officers for further clarification.
RPS will require details collected through the situational awareness task such as real time weather, sea state, and oil type spilled.</td></tr>
<tr><td>Outcomes</td><td>Resources and source</td><td>48 hours</td><td>5 days</td><td>10 days</td><td>20 days</td></tr>
<tr><td>Identify the predicted trajectory and fate of the spill and dispersed oil, timeframes for</td><td>VOGA – 1 x ICT member with oil spill assessment training.</td><td>Multiple OSTM runs over first 2 days.</td><td>Subsequent OSTM runs as required.</td><td>Subsequent OSTM runs as required.</td><td></td></tr>
</table>

Tasks	MES implementation guide					
	contact of oil with environmental sensitivities	OSTM contract with technical provider RPS.				
Aerial observation - activate assets to fly as soon as possible in daylight hours only	Fixed wing aircraft (preferably over wing configuration) or helicopters to provide personnel with the means to observe and record details of oil on water. Logistics Chief secure appropriate aircraft to undertaken aerial observation activities twice a day – morning and afternoon until advised otherwise by Planning Chief. Pilots or observers be provided with information on the anticipated location of the slick (e.g. from OSTM output). If possible use aircraft already in the area to provide situational awareness. Flight time to the Wandoo B platform is 20 minutes (48 nm) based on S76 helicopter (@140 knots).					
	Outcomes	**Resources and source**	**48 hours**	**5 days**	**10 days**	**20 days**
	Aviation assets stood up	Aviation contracts in Emergency Response Logistics Plan	1 x aircraft 1 x airbase	1 x aircraft 1 x airbase	1 x aircraft as required 1 x airbase	1 x aircraft as required 1 x airbase
Secure observers	Activate AMOSC to undertake aerial surveillance activities. If trained observers are not available within the timeframe for initial reconnaissance flight, use untrained aerial observers for initial situational awareness.					
	Outcomes	**Resources and source**	**48 hours**	**5 days**	**10 days**	**20 days**
	Observation records of volume estiimates and trajectory of spill.	AMOSC staff or Core Group members	2 x observers	2 x observers	Observers as required	Observers as required
Data to be collected – conduct flight as soon as possible in daylight hours only	Aerial observation template forms are to be provided to observers along with a digital camera for video and photos. Observer is to obtain location details (coordinates) from pilot and note these for images and extent of slick. Information is to be provided back to the Planning Chief as soon as possible after the flight has landed. This could be done initially via verbal briefing from the observer and followed up by email or fax of completed observation template.					

Tasks	MES implementation guide					
	Outcomes	**Resources and source**	**48 hours**	**5 days**	**10 days**	**20 days**
	ICT has reliable up to date observations.	AMOSC staff or Core Group members	2 x AMOSC staff or Core Group members			
Drone photos and videos	This is an opportunistic task. Determine if there is a drone and drone pilot available on Wandoo B and if there is safe airspact to conduct a flight. Fly transects from the platform along the slick, directly overhead to assist in determining spill volume and direction.					
	Outcomes	**Resources and source**	**48 hours**	**5 days**	**10 days**	**20 days**
	Visual confirmation of oil for estimation of volume and extent.	Drone equipped with video recording.	1 x drone 3 x flights per day	1 x drone 3 x flights per day	1 x drone 3 x flights per day	1 x drone 3 x flights per day
Obtain satellite imagery	Satellite imagery may be useful to assist in ascertaining the extent of the spill. If sourced this imagery will be used within the Planning Section to assist in determining resources at risk and protection priorities. High fidelity photographs using different spectrums to identify the trajectory of the oil and ground truth the OSTM. Time to acquire images depends on availability of satellites over the spill site.					
	Outcomes	**Resources and source**	**48 hours**	**5 days**	**10 days**	**20 days**
	High fidelity photographs using different spectrums to identify the trajectory of the oil, ground truth the OSTM	KSAT third party satellite provider sourced through AMOSC	1 x image acquisition	2 x image acquisitions	As required according to spill trajectory	As required according to spill trajectory

<table>
<tr><th>Tasks</th><th colspan="6">MES implementation guide</th></tr>
<tr><td rowspan="3">Collect real-time and predicted data to enter on SITREP boards in ICT and undertake a NEBA</td><td colspan="6">Status boards in ICT require the following information (sourced and entered by situation unit leader):
• Real-time and predicted weather and sea-state conditions – source from BoM
• Real-time and predicted tidal and current movements – source from BoM
• Oil characteristics – properties of the oil spilled and predicted behaviour after weathering – source from RPS
• Predicted trajectory of oil based on modelling conducted for planning and verified by real time modelling
• Resources at risk of being oiled sourced from OPEP
• NEBA of response strategies.</td></tr>
<tr><td>Outcomes</td><td>Resources and source</td><td>48 hours</td><td>5 days</td><td>10 days</td><td>20 days</td></tr>
<tr><td>Confirmation of suitable response strategies based on real time and predicted data</td><td>VOGA resources including:
Access to internet
Wandoo oil specifications
OSTM outputs
GIS/Google Map output of protection priorities</td><td colspan="4">Updated daily</td></tr>
<tr><td rowspan="3">Activate Operational and Scientific Monitoring Plan</td><td colspan="6">Refer to Exploration and Survey Operations OSM-BIP [VOG-1100-YH-0018] and inititation criteria for OMPs.</td></tr>
<tr><td>Outcomes</td><td>Resources and source</td><td>48 hours</td><td>5 days</td><td>10 days</td><td>20 days</td></tr>
<tr><td>Initiation and termination of operational and scientific monitoring</td><td>Exploration and Survey Operations OSM-BIP [VOG-1100-YH-0018]
Joint Industry Operational and Scientific Monitoring Service</td><td colspan="4">Exploration and Survey Operations OSM-BIP [VOG-1100-YH-0018]</td></tr>
</table>

12.3 Chemical Dispersant Application

Table 12-5: Chemical dispersant application summary

Purpose of strategy	• To decrease the amount of oil that may strand on shorelines or reduce its presence on the sea surface to prevent wildlife and habitat impacts.
Initiation criteria	NEBA confirms an environmental benefit of dispersant application according to the trajecory and thickness of a Wandoo Crude spill.
Termination criteria	Chemical dispersant activities will cease if the NEBA output demonstrates that the response strategy: • Does not reduce the probability of oil impacting sensitive receptors • Does not increase the number of days to impact sensitive receptors • Does not decrease the volume of oil to impact sensitive receptors • Has more of a negative impact on sensitive receptors than the untreated oil (e.g. impact of entrained oil) • Hazard controls put in place are not achievable, or • The slick to be treated with dispersant has moved over water less than 20 m deep, or into State Waters.
Tactics	• Aerial dispersant operations • Vessel based dispersant operations.
Effectiveness guidance	• Visual observation of the colour of the dispersed oil plume is a reliable indicator of effective dispersant application via aerial and vessel observers (using guidance in OM4a: Surface Chemical Disperant Fate and Effectiveness Assessment). • Planning Chief will use outputs from operational monitoring to consider if dispersant operations affect the following: • Time to shoreline impact is increased • Average and maximum volume of oil ashore is reduced • Average and maximum length of shoreline contacted is reduced • Probability of oil contact to shorelines is reduced • The impacts and accumulation of entrained oil is compared to the reduction and impacts of surface oil.

12.3.1 Aerial Dispersant Operations

Table 12-6: Aerial dispersant operations implementation guide

<table>
<tr><th>Tasks</th><th colspan="6">Aerial dispersant operations implementation guide</th></tr>
<tr><td rowspan="5">Activate aircraft and support personnel within 6 hours of the spill.

Mobilise dispersant to Karratha Airport within 6 hours of the spill.

Set up operating post at Karratha Airport.</td><td colspan="6">Planning Chief to advise Logistics Chief to advise AMOSC to activate FWADC by calling AMSA RCC on 1800 641 792.
Request two air tractors to be mobilised to Karratha Airport.
Complete the AMSA/AMOSC Joint Standard Operating Procedure document – the FWADC aircraft won't be tasked for operations until this document is completed.
Logistics Chief to secure Aerial Attack Coordinator (AAC) and a helicopter to or alternative aircraft to provide aerial dispersant spotter duties. Aircraft will be required to fly above the air tractor and advise pilot when to turn spray on and off. Requires communication plan between the two aircraft. Depending on the scale of the application area, additional spotter aircraft and AAC may be required to direct air tractors operating in separate areas. If one area of the slick is being treated by the two air tractors, then one spotter helicopter or plane will be used to direct spraying activities.</td></tr>
<tr><td colspan="6">Planning Chief to confirm with Logistics Chief the volume of dispersant to be mobilised to Karratha Airport.
Mobilise initial 38 m^3 from available stockpiles. Plan for a further $38m^3$ per day to be available for use.
Mobilise a dispersant transfer pump to be able to transfer dispersant from Intermediate Bulk Container (IBCs) to aircraft.</td></tr>
<tr><td colspan="6">Logistics Chief to liaise with Karratha Airport to set up a staging area for dispersant stockpile and transferring dispersant to aircraft.
Staging area managed by the Aerotech Liaison Officer (provided by AMOSC).</td></tr>
<tr><th>Outcomes</th><th>Resources and source</th><th>48 hours</th><th>5 days</th><th>10 days</th><th>20 days</th></tr>
<tr><td>Aircraft refuelling and dispersant loading facilities set up and operational.
Briefing facility available for aviation operations teams.</td><td>Karratha Airport. Logistical support to sustain/maintain aerial operations.</td><td>Logistical support to sustain/maintain aerial operations.</td><td>Logistical support to sustain/maintain aerial operations.</td><td>Logistical support to sustain/maintain aerial operations.</td><td>Logistical support to sustain/maintain aerial operations.</td></tr>
</table>

Tasks	Aerial dispersant operations implementation guide					
	Ground crew for refuellilng and loading dispersant available.					
Complete NEBA to justify test run	Planning Chief completes NEBA pro-forma with what is known about the spill at the time to record justification for testing dispersant. See Appendix B.					
Pre-flight briefing	Flight planning forms and manifests to be lodged prior to sorties departure. Communications will be agreed upon during the pre-operational briefings taking into account all aircraft utilised onsite at time for operations. This is most likely to comprise: • Two aircraft VHF channels air to air with local Airfield Common Traffic Advisory Frequency (CTAF) also used/monitored • Aircraft also have to have Marine Radios which can also be utilised. Overall control will be via AMOSC, similarly, OSRL will be in overall control of their aircraft. Daily operations will be directed by the Operations Chief in consultation with AMOSC and OSRL (if involved). The Incident Commander remains in control of all incident response activities. Communications will be in accordance with the agreed communications plan. A Job Hazard Analysis (or comparable analysis) will be completed prior to each activity and will be signed by all personnel involved. All aircraft and aircrew involved with the operation are to be certified fit to conduct the task in accordance with Civil Aviation Safety Authority (CASA) regulations. The Aerotech Liaison Officer is to confirm the serviceability and sign off aircraft sea survival equipment. This will be audited by AMOSC before the first flight. Individuals will supply their own PPE relevant to the task. Fuel and dispersant handling PPE requirements will be specified in relevant Safety Data Sheets (SDS'). As a minimum, all other activities PPE requirement will be full cover, steel caps, high visibility and sun protection. Additional controls will be implemented as necessary. In case of an emergency on the airstrip or field, the muster area will be at the standard Karratha Airport muster location(s).					
Test spray run by air tractor	Loading and fuelling of the aircraft will be under the supervision of the Loading Supervisor, and to the satisfaction of the pilot. Dispersant application rate is to be set at 50 L per hectare with a swath width of 22 m (dependent on aircraft). The spray area will be determined by the movement of oil and as directed by the AAC. When tasked, the spotter platform with the AAC will proceed to the target area and identify the target site. It will then call in and direct the dispersant attack.					

<table>
<tr><th>Tasks</th><th colspan="6">Aerial dispersant operations implementation guide</th></tr>
<tr><td rowspan="3"></td><td colspan="6">Dispersant will be applied within the dispersant application zone.
Seasonal environmental conditions and sensitivities will dictate spray runs and areas. An analysis to determine these specific sectors will be undertaken at the time by the Planning Chief and implemented by the Aviation and Marine Units in Operations.
Test application runs of approximately 100 m in length will be made and several passes may be required to determine dispersant effectiveness. The AAC will direct the air tractor to make another pass if required. The AAC will observe the effectiveness of the dispersant on the oil slick and will report if dispersant is having a mixing effect on the oil and complete the Dispersant Monitoring Application Log (OSRL Handbook). Photographs will be taken by the AAC to provide to the Planning Chief and Environment Unit.
The pilot of the air tractor will complete a Dispersant Application Log and provide this to the Operations Chief upon completion of the mission. The Operations Chief provides this detail to the Planning Chief.
VFR shall be observed at all times, along with standard radio protocols and monitoring. Pilots will maintain separation.</td></tr>
<tr><td>Outcomes</td><td>Resources and source</td><td>48 hours</td><td>5 days</td><td>10 days</td><td>20 days</td></tr>
<tr><td>Dispersant rapidly applied to the thickest part of the slick at the rate of 1:20 (dispersant oil ratio)</td><td>4 x Air tractors
Pilots for the same
Sourced from FWADC
4 x AAC sourced from Core Group
4 x spotter aircraft from VOGA aviation contracts</td><td>2 x Air tractors delivering 2 sorties each (1.8 m^3 per sortie) within 48 hours
Pilots for the same
2 x AAC
2 x spotter aircraft</td><td>4 x Air tractors
Pilots for the same
4 x AAC
4 x spotter aircraft</td><td>4 x Air tractors
Pilots for the same
4 x AAC
4 x spotter aircraft</td><td>4 x Air tractors
Pilots for the same
4 x AAC
4 x spotter aircraft</td></tr>
<tr><td>Ongoing dispersant operations</td><td colspan="6">Aerial dispersant operations will be directed, as part of the IAP, to operate in situations where the greatest effectiveness of the dispersant is likely to result; and operations can be conducted in such a manner as to allow for other oil spill marine operations.
Loading and fuelling of the aircraft will be under the supervision of the Loading Supervisor, and to the satisfaction of the pilot.
Dispersant application rate is to be set at 50 L per hectare with a swath width of 22 m unless otherwise determined by test spray runs. The spray area will be determined by the movement of oil and as directed by the AAC.
When tasked, the spotter platform will proceed to the target area and identify the target site. It will then call in the dispersant application aircraft and direct the dispersant attack. After spray is exhausted or endurance of aircraft is reached , the aircraft will return for resupply.</td></tr>
</table>

<table>
<tr><th>Tasks</th><th colspan="6">Aerial dispersant operations implementation guide</th></tr>
<tr><td rowspan="3"></td><td colspan="6">The AAC will complete the Aerial Dispersant Monitoring Log and provide this information to the Operations Chief who then provides this to the Planning Chief to incorporate into the IAP process. The pilot of the air tractor will complete an Aerial Dispersant Application Log and provide this to the Operations Chief, who then passes this information onto the Planning Chief.
Final number of spray runs shall be determined by consultation between VOGA, AMOSC and Aerotech.
VFR shall be observed at all times, along with standard radio protocols and monitoring. Pilots will maintain separation.
Personnel lists will be finalised at the time of the spill. All personnel will be logged on and off site, and all personnel in aircraft will be noted before departure. Typical functions required in FWADC operations are:
• Air base manager
• Dispersant loading supervisor and crew
• Pilots
• Aerial spotter to direct application of dispersant.
• During the operational phase, only personnel with an operational need will be allowed on the airfield unless authorised by Aerotech Liaison Officer.</td></tr>
<tr><td>Outcomes</td><td>Resources and source</td><td>48 hours</td><td>5 days</td><td>10 days</td><td>20 days</td></tr>
<tr><td>Up to 38m^3 per day delivered by aircraft</td><td>Total of 1,330 m^3 of dispersant from Australian and Global stockpiles</td><td>7m^3 of dispersant from the AMOSC stockpile</td><td>190 m^3 of dispersant from the Australian stockpiles</td><td>190 m^3 of dispersant from Australian and Global stockpiles</td><td>380 m^3 of dispersant from Australian and Global stockpiles</td></tr>
<tr><td rowspan="2">Monitoring dispersant effectiveness (OM4a: Surface dispersant effectiveness monitoring)</td><td colspan="6">Refer to the Exploration and Survey Operations OSM-BIP [VOG-1100-YH-0018]. The Joint Industry OMP (OM4a): Surface Chemical Dispersant Fate and Effectiveness Assessment will be used to guide surface dispersant effectiveness monitoring.
For this operational activity, the effectiveness of the dispersant will be continuously monitored during application, using the Joint Industry Operational Monitoring Plan (OM4a): Surface Chemical Dispersant Fate and Effectiveness Assessment (refer to OSM-BIP). This assessment is largely based on the Special Monitoring of Applied Response Technologies (SMART) protocol (NOAA, 2006). The SMART protocol assists in characterising the nature and extent of surface dispersed oil, aids in the validation and accuracy of plume trajectory models and allows for rapid quantification of data to enable the IMT to make decisions about continuation of dispersant application. The IMT will assess the effectiveness of continued dispersant use against an operational NEBA assessment.</td></tr>
<tr><td colspan="6">Planning Chief completes NEBA pro-forma with what is known about the spill at the time to record justification for ongoing dispersant use based on the results of the test runs.</td></tr>
</table>

<table>
<tr><th>Tasks</th><th colspan="6">Aerial dispersant operations implementation guide</th></tr>
<tr><td rowspan="2">Complete NEBA to justify ongoing dispersant use</td><td>Outcomes</td><td>Resources and source</td><td>48 hours</td><td>5 days</td><td>10 days</td><td>20 days</td></tr>
<tr><td>Assessment of effectiveness of chemical dispersant application</td><td>VOGA - NEBA
AAC visual observation reports
Monitoring Service Providers - OM4a outputs</td><td>VOGA - NEBA
AAC visual observation reports
Monitoring Service Providers - OM4a outputs</td><td>VOGA - NEBA
AAC visual observation reports
Monitoring Service Providers - OM4a outputs</td><td>VOGA - NEBA
AAC visual observation reports
Monitoring Service Providers - OM4a outputs</td><td>VOGA - NEBA
AAC visual observation reports
Monitoring Service Providers - OM4a outputs</td></tr>
<tr><td>Volume of dispersant required</td><td colspan="6">The volume of dispersant required for an operation depends on the application rate which is the ratio of dispersant to oil required for effective dispersion (which is dependent on average slick thickness) and the size of the target area to be sprayed. A trial application of 1:20 is used as a starting point in which to determine the most appropriate application rate.
In recognising that oil spreads at variable rates and thickness is not consistent across the slick, ITOPF (2013) suggest that the most practical and efficient solution is to target the thickest parts of the slick.
For the purposes of this OPEP, a continuous spill due to loss of well control during well exploration was evaluated with a scenario of a 26,678 m^3 surface release of Wandoo crude over 35 days following a loss of well control from the exploration wells which is approximately 762 m^3/day of oil released, assuming a consistent flow rate. A DOR of 1:20 would require approximately 38 m^3/day of dispersant to be applied, equating to 1,330 m^3 over the entire campaign if it was possible to apply dispersant for 35 days commencing 48 hrs after the incident of the incident.</td></tr>
<tr><td>Debriefing</td><td colspan="6">A debrief of the operation is to be conducted with the Operations Chief to confirm appropriate actions were undertaken and to identify issues/concerns/improvements to operations. This will occur on a daily basis. Findings from the debrief and completed Aerial Dispersant Application Logs must be reported back to the Planning Chief so that situational awareness can be maintained for incident action planning.
On completion of air operations respective maintenance procedures are to be conducted by individual organisations if necessary. Any serviceability issues are to be reported to the Area Staging Manager at Karratha Airport.</td></tr>
<tr><td>Stockpile management</td><td colspan="6">At the end of each day the Planning Chief (via the Resources Unit in the Planning section) compiles the records of dispersant use and determines the amount of dispersant on hand and what is required for the next mission. Delivery of extra stocks is organised by the Logistics Chief.
WA stockpiles will be accessed first followed by interstate and globall stockpiles. All dispersants in the available stockpiles have been shown to be effective on Wandoo Crude.
Application rates may be varied if considered appropriate to ensure longevity of dispersant stockpiles.</td></tr>
</table>

Tasks	Aerial dispersant operations implementation guide
Incident action planning	At the completion of the aerial missions, the Planning Chief will review the aerial dispersant operations and provide a recommendation to the Incident Commander for future aerial dispersant operations.

12.3.2 Marine Dispersant Operations

Table 12-7: Marine dispersant operations implementation guide

<table>
<tr><th>Task</th><th colspan="6">Marine dispersant operations implementation guide</th></tr>
<tr><td colspan="7">Marine delivery of dispersant will take place if aerial application is not possible or if there are parts of the slick that are better targeted by a vessel. The objective of the marine dispersant operations will be to disperse oil that has formed windrows and through trajectory modelling may imminently impact environmental sensitivities. The output will be to have vessels continuously ‘chasing’ and spraying dispersant onto the oil. The Planning and Operations Chiefs will decide according to the situational awareness gained if marine based dispersant use is activated.</td></tr>
<tr><td rowspan="4">Identify marine operating base and source vessel</td><td colspan="6">Logistics Chief to identify marine operating base that can accommodate vessel and crews is close to the response site – most likely to be Toll (refer to VOGA Emergency Response Logistics Management Plan [VOG-7000-RH-0008] for contractor details).</td></tr>
<tr><td colspan="6">Logistics Chief to source offshore vessel that either has dispersant spray equipment already fitted; or a vessel that is able to secure an afedo dispersant spray system to the vessel (refer to VOGA Emergency Response Logistics Management Plan [VOG-7000-RH-0008] for contractor details).</td></tr>
<tr><th>Outcomes</th><th>Resources and source</th><th>48 hours</th><th>5 days</th><th>10 days</th><th>20 days</th></tr>
<tr><td>Marine operating base that can accommodate vessel and crews is close to the response site</td><td>TOLL supply base</td><td>Wharf space
Loading areas
Forward operating area</td><td>Wharf space
Loading areas
Forward operating area</td><td>Wharf space
Loading areas
Forward operating area</td><td>Wharf space
Loading areas
Forward operating area</td></tr>
</table>

Task	Marine dispersant operations implementation guide					
	Logistics to locate dispersant vessel and the dispersant spray system to mount a response for up to five days at sea	VOGA marine contracts	2 x Work vessels suitable for the NWS Crew and master for same	Available vessels suitable for the NWS Crew and master for the same	Available vessels suitable for the NWS Crew and master for the same	Available vessels suitable for the NWS Crew and master for the same
Source dispersant and dispersant spray system	Planning Chief to confirm with Logistics Chief the volume of dispersant to be mobilised to marine operating base. Move dispersant and mobilise a dispersant transfer pump to be able to transfer dispersant from IBCs to vessel storage. Initial mobilisation 4 m^3 in 48 hours.					
	Logistics Chief to source an afedo dispersant spray system (refer to VOGA Emergency Response Logistics Management Plan [VOG-7000-RH-0008] for contractor details).					
Arrange for a spotter plane to accompany marine vessel	Logistics Chief to secure a helicopter to or alternative aircraft to provide aerial dispersant spotter duties. Aircraft will be required to fly above the marine vessel and to advise pilot when to turn spray on and off. Requires communication plan between the aircraft and vessel.					
	Outcomes	**Resources and source**	**48 hours**	**5 days**	**10 days**	**20 days**
	Dispersant available at the marine base for loading when needed	AMOSC stockpile	4 m^3	12 m^3	12 m^3	24 m^3
	A system that can effectively and efficiently apply dispersant from IBCs on deck	A system that can effectively and efficiently apply dispersant from IBCs on deck	2 x Afedo spray set and ancillaries per vessel 4 x PAX to operate the same	2 x Afedo spray sets and ancillaries per vessel 4 x PAX to operate the same	2 x Afedo spray sets and ancillaries per vessel 4 x PAX to operate the same	2 x Afedo spray sets and ancillaries per vessel 4 x PAX to operate the same

Task	Marine dispersant operations implementation guide					
	A helicopter or fixed wing is able to accurately direct the vessel operator where the oil is	A helicopter or fixed wing is able to accurately direct the vessel operator where the oil is	2 x Trained spotters 2 x Aerial platforms - pilot for same	2 x Trained spotters 2 x Aerial platforms - pilots for same	2 x Trained spotters 2 x Aerial platforms - pilots for same	2 x Trained spotters 2 x Aerial platforms - pilots for same
Complete NEBA to justify test run	Planning Chief completes NEBA pro-forma with what is known about the spill at the time to record justification for testing dispersant. NEBA template available in Appendix B.					
Test run by marine vessel	Dispersant will be applied within the dispersant application zone. Seasonal environmental conditions and sensitivities will dictate application of dispersant from marine vessels. An analysis to determine these specific sectors will be undertaken at the time by the Planning Chief and implemented by the Aviation and Marine Units in Operations. Test application runs of approximately 100 m in length will be made and several passes may be required to determine dispersant effectiveness. Vessel personnel will observe the effectiveness of the dispersant on the oil slick and will report if dispersant is having a mixing effect on the oil and complete the Dispersant Monitoring Application Log (OSRL Handbook). Photographs will be taken by vessel personnel to provide to the Planning Chief and Environment Unit. The master of the marine vessel will complete a Dispersant Application Log and provide this to the Operations Chief upon completion of the mission. The Operations Chief provides this detail to the Planning Chief.					
Monitoring dispersant effectiveness (OM4a: Surface dispersant effectiveness monitoring)	Refer to the Exploration and Survey Operations OSM-BIP [VOG-1100-YH-0018]]. The Joint Industry OMP (OM4a): Surface Chemical Dispersant Fate and Effectiveness Assessment will be used to guide surface dispersant effectiveness monitoring. For this operational activity, the effectiveness of the dispersant will be continuously monitored during application, using the Joint Industry Operational Monitoring Plan (OM4a): Surface Chemical Dispersant Fate and Effectiveness Assessment (refer to OSM-BIP). This assessment is largely based on the Special Monitoring of Applied Response Technologies (SMART) protocol (NOAA, 2006). The SMART protocol assists in characterising the nature and extent of surface dispersed oil, aids in the validation and accuracy of plume trajectory models and allows for rapid quantification of data to enable the IMT to make decisions about continuation of dispersant application. The IMT will assess the effectiveness of continued dispersant use against an operational NEBA assessment.					
Operational NEBA	To determine if ongoing dispersant application should continue.					
Ongoing dispersant operations	Marine dispersant operations will be directed, as part of the IAP, to operate in situations where the greatest effectiveness of the dispersant is likely to result; and operations can be conducted in such a manner as to allow for other oil spill marine operations.					

Task	Marine dispersant operations implementation guide
Debriefing	A debrief of the operation is to be conducted with the Operations Chief to confirm appropriate actions were undertaken and to identify issues/concerns/improvements to operations. This will occur on a daily basis. Findings from the debrief and completed Dispersant Application Logs must be reported back to the Planning Chief so that situational awareness can be maintained for incident action planning. On completion of air and marine operations respective maintenance procedures are to be conducted by individual organisations if necessary.
Stockpile management	At the end of each day the Planning Chief (via the Resources Unit in the Planning section) compiles the records of dispersant use and determines the amount of dispersant on hand and what is required for the next mission. Delivery of extra stocks is organised by the Logistics Chief.
Incident action planning	At the completion of the dispersant operations, the Planning Chief will review the operations based on a briefing from the Operations Chief and provide a recommendation to the Incident Commander for future dispersant operations.

12.4 Mechanical Dispersion Strategy

Table 12-8: Mechanical dispersion strategy summary

Purpose of strategy	Mechanical dispersion is the use of fire monitors, engine wash, or other means to mechanically/ physically disperse oils into the water column, thereby increasing the speed with which weathering and biodegradation occurs.
Initiation criteria	• The slick is moving toward a sensitive receptor • The weathered oil is amenable to mechanical dispersion • A safe operating environment for responders.
Termination criteria	• Oil is not observed to be effectively dispersed into the water column. • The spill is no longer visible to human observers. Specifically, a 'silvery/grey' sheen, as defined by the BAOAC, is no longer observable.
Tactics	• Vessels 'prop wash' slick • Agitation of slick using fire monitors from vessels.
Effectiveness guidance	• Visual observation to determine whether oil is dispersing into the water column from the vessel and aerial observations: • Oil is mixing within the water column • Surface oil is reduced.

Table 12-9: Mechanical dispersion operations implementation guide

Task	Mechanical dispersion operations implementation guide
The Planning Chief will recommend this strategy be implemented based on information collected through monitoring and evaluation. If chemical dispersant is working mechanical dispersion may not be required.	
Conduct NEBA	The Environment Unit within the Planning Team of the ICT will use the outputs from monitoring and evaluation to determine if a protection priority is likely to be impacted by oil. Mechanical dispersion activities may be directed to areas of oil that could potentially impact a receptor which is unable to be treated by other response strategies. Mechanical dispersion activities will only be conducted in water deeper than 20 m.

<table>
<tr><th>Task</th><th colspan="6">Mechanical dispersion operations implementation guide</th></tr>
<tr><td>Secure offshore work vessel</td><td colspan="6">Logistics Chief to secure vessels through current contracts or vessels of opportunity to:
• prop wash the spilled products (if permitted by vessel master and owner)
• agitate using the fire monitor or alternative spray system.
• Enhancement of weathering process such as natural dispersion and dilution of oil into the water column.</td></tr>
<tr><td>Secure spotter aircraft</td><td colspan="6">Logistics Chief to secure helicopter or fixed wing aircraft to direct vessels into areas of the slick that require manual dispersion.
Spotter aircraft pilot to be able to communicate with marine vessel.
Operations Chief to brief pilot on what parts of the slick should be targeted.</td></tr>
<tr><td>Deploy vessels</td><td colspan="6">Vessels will be deployed from Dampier. Masters of vessels being used for this operation will have communication with aerial surveillance so that the leading edge of a slick can be targeted.</td></tr>
<tr><td>Develop waste management plan</td><td colspan="6">Planning Chief to develop waste management plan that prevents translocation of oil from hot zones to warm and cold zones.
The Planning Team will be cognisant of the potential for transferring oily waste when the vessel returns to Dampier, and will ensure that provisions have been made in the waste management plan to manage the risk of secondary contamination. It is possible that the resources for this response strategy may be combined with that of monitoring and evaluation or transportation for shoreline clean-up so that maximum resource efficiencies can be achieved.</td></tr>
<tr><td>Incident action planning</td><td colspan="6">At the completion of mechanical dispersion operations, the Planning Chief will review the operations based on a briefing from the Operations Chief and provide a recommendation to the Incident Commander for future mechanical dispersion activities.</td></tr>
<tr><td rowspan="2">Mechanical dispersion</td><th>Outcomes</th><th>Resources and source</th><th>48 hours</th><th>5 days</th><th>10 days</th><th>20 days</th></tr>
<tr><td>Enhancement of weathering process such as natural dispersion and dilution of oil into the water column</td><td>Vessel from VOGA marine contracts
Aircraft to direct vessel</td><td>Opportunistic offshore support vessel for prop wash and/or agitation using the fire monitor or alternative spray system
Aircraft to direct vessel</td><td>Opportunistic offshore support vessel for prop wash and/or agitation using the fire monitor or alternative spray system
Aircraft to direct vessel</td><td>Opportunistic offshore support vessel for prop wash and/or agitation using the fire monitor or alternative spray system</td><td>Opportunistic offshore support vessel for prop wash and/or agitation using the fire monitor or alternative spray system</td></tr>
</table>

12.5 Containment and Recovery Strategy

Table 12-10: Containment and recovery strategy summary

Purpose of strategy	Containment and recovery, subject to amenable weather conditions and equipment limitations, will be one of the strategies considered to corral and physically remove spilt oil from the sea surface, using different types of vessels and booming configurations.
Initiation criteria	If the information collected through MES suggests: • The slick is moving toward a sensitive receptor • Sea state and weather conditions allow effective boom and skimmer deployment • The weathered oil is able to be recovered with skimmers • A safe operating environment for responders.
Termination criteria	• Weir skimmers are recovering <10% hydrocarbon by volume, oleophilic skimmers are recovering <50% hydrocarbon by volume • Entrapment in booms is no longer effective • The observed trajectory of the oil indicates that it is heading away from sensitive receptors • Unsafe metocean conditions • Oil slick thickness less than 100 g/m^2.
Tactics	• Single vessel boom and skimmer configuration • Twin vessel boom and skimmer configuration.
Effectiveness guidance	Visual observation to determine whether booming operations are effective, more specifically is there no evidence of undercutting (losing hydrocarbon beneath the skirt of the boom), splash over (hydrocarbon splashing over the top of the boom due to wave energy) and entrainment issues (recovery is too slow resulting in too much hydrocarbon collecting in the apex of the boom). Boom type, towing speed, weather, containment configuration and currents can all affect the effectiveness of the above. Visual observation to determine whether recovery operations are effective, more specifically is hydrocarbon being recovered. Is the type of recovery system appropriate for the hydrocarbon product and its fate? What is the ratio of hydrocarbon to water? Are the temporary storage operations sufficient to maintain recovery? Recovery system type, recovery methodology (skimming while vessels are moving) and timing can be altered to increase effectiveness. The Planning Chief will consider: • The potential to contain oil contained booms • The potential for oil recovery – weir skimmers recovering > 10% oil; oleophilic skimmers recovering > 50% oil

	• Availability of waste storage of required capacity.

Table 12-11: Containment and recovery implementation guide

<table>
<tr><th>Task</th><th>Containment and recovery operations implementation guide</th></tr>
<tr><td>Planning Chief to undertake a NEBA of containment and recovery operations and consider the following:</td><td>Is the slick is moving toward a sensitive receptor - consider time to impact, volume and probability?
Is the sea-state and weather conditions amenable for effective boom and skimmer deployment?
Is the weathered oil able to be recovered with skimmers?
Is there a safe operating environment for responders?</td></tr>
<tr><td>Do weather conditions and sea state permit safe and effective deployment of booms and skimmers?</td><td>Metocean conditions required for safe and effective boom and skimmer deployment:
<table>
<tr><th>Equipment</th><th>Maximum sea state (Beaufort scale)</th><th>Maximum current (knots)</th><th>Winds (knots)</th></tr>
<tr><td>Booms</td><td>3-4</td><td>1</td><td>14-22</td></tr>
<tr><td>Weir skimmer</td><td>1</td><td>1</td><td>7</td></tr>
<tr><td>Disc skimmer</td><td>2-3</td><td>1</td><td>11-14</td></tr>
<tr><td>Vacuum skimmer</td><td>1</td><td>1</td><td>7</td></tr>
</table></td></tr>
<tr><td>Does containment and recovery appear feasible?</td><td>Boom Encounter Rate (BER) is a limiting factor of effective containment and recovery operations.
Considerations to take into account:
Is the oil thick enough for effective recovery?
Will containment and recovery treat a notable portion of the spill volume?</td></tr>
<tr><td colspan="2">If the decision is made in the ICT to proceed with containment and recovery (based on Planning Chief's recommendation) the following tasks are to be completed.</td></tr>
<tr><td>Mobilise vessels suitable for either offshore or near shore operations</td><td>Six on water teams have been included in this implementation guide. Work vessels that can carry and deploy offshore booms and skimmers are required for this strategy along with a mechanism for storing and transporting waste.
Logistics Chief to secure offshore work vessels. Ideally vessels would have the ability to carry, deploy and retrieve booms and skimmers up to the size of ro-boom and the GT-185 weir skimmer or similar, as well as temporary waste storage. Availablity of suitable vessels will determine the configuration of the onwater operations, ie two vessel or single vessel teams.</td></tr>
</table>

Task	Containment and recovery operations implementation guide
	Deployment of ro-boom, large skimmers and at-sea waste storage equipment requires vessels that can maintain the correct configuration of the towed booms at very low speeds through the water. The OSRL Containment and Recovery Field Guide provides some guidance on the ideal vessel specifications required for this type of operation. The operational time of the vessels on the water conducting this response activity will be dictated by the available waste collection capacity; once waste tanks are full the vessels will demobilise from the oil site to unload collected waste. To maintain longer operational periods, the Planning Chief may consider an application to AMSA (Commonwealth waters) or DTMI (State waters) to decant oily water from waste collection tanks back into the oil plume collected behind the boom. The total amount of oily waste water returned to shore may be reduced by at-sea decanting (allowing oil to settle on the surface of the waste storage container and decanting water from the bottom). The IPIECA Oil Spill Joint Industry Practice (JIP) report 'The Use of Decanting during Offshore Oil Spill Recovery Operations', provides some guidance on this practice.
Mobilise booms and skimmers	Logistics Chief to mobilise booms, skimmers and temporary waste storage equipment from AMSNOR, the AMOSC stockpiles in Broome and Exmouth, as well as the AMSA National Plan stockpiles in Dampier and Fremantle.
Mobilise trained equipment operators	Logistics Chief to source people with experience and training operating equipment from marine vessels from: • AMS • AMOSC core group members • OSRL. Logistics Chief to ensure that personnel forms and information is completed and forwarded to the Finance Chief for cost tracking.
Spotter plane to direct operations	Logistics Chief to activate aircraft to direct vessels to thickest part of slick to contain and recover oil. Aircraft will need ability to communicate with marine vessels and a communication plan as well as observation logs to report back to the Operations Chief.
Establish a forward operating base for temporary storage of equipment and waste	Logistics Chief to activate a Forward Operating Post at Toll in Dampier where VOGA has personnel who can manage the receipt and deployment of equipment. It is in this yard where equipment can be stored and readied for deployment. Toll will manage the transport of equipment that VOGA requires in Dampier.
Deploy booms, skimmers and temporary waste storage	Deployment of ro-boom, large skimmers and at-sea waste storage equipment requires vessels that can maintain the correct configuration of the towed booms at very low speeds through the water. The OSRL Containment and Recovery Field Guide provides some guidance on the ideal vessel specifications required for this type of operation.

<table>
<tr><th>Task</th><th colspan="6">Containment and recovery operations implementation guide</th></tr>
<tr><td>Develop waste storage and transport plan</td><td colspan="6">Logistics Chief in consultation with Planning Chief activates temporary waste storage capacity and activate towable storage barges such as lancer barges held by AMSA in Dampier and Fremantle.
Consideration will be made in the waste management plan for how to best manage contaminated equipment when it returns from operations to Dampier. A hot, warm and cold zone will be established in the laydown area along with a decontamination station and plan to manage the risk of secondary contamination.
The operational time of the vessels on the water conducting this response activity will be dictated by the available waste collection capacity; once waste tanks are full the vessels will demobilise from the oil site to unload collected waste. To maintain longer operational periods, an application will be made by the ICT to AMSA (Commonwealth waters) or DTMI (State waters) to decant oily water from waste collection tanks back into the oil plume collected behind the boom. The total amount of oily waste water returned to shore may be reduced by at-sea decanting (allowing oil to settle on the surface of the waste storage container and decanting water from the bottom). The IPIECA Oil Spill JIP report ‘The Use of Decanting during Offshore Oil Spill Recovery Operations’ provides some guidance on this practice.</td></tr>
<tr><td>Incident action planning</td><td colspan="6">At the completion of the containment and recovery operations, the Planning Chief will review the operations based on a briefing from the Operations Chief and provide a recommendation to the Incident Commander for future containment and recovery operations.</td></tr>
<tr><td rowspan="4">Containment and recovery</td><th>Outcomes</th><th>Resources and source</th><th>48 hours</th><th>5 days</th><th>10 days</th><th>20 days</th></tr>
<tr><td>Marine operating base that can accommodate vessel and crews is close to the response site</td><td>TOLL supply base</td><td>Wharf space
Loading areas
Forward operating area</td><td>Wharf space
Loading areas
Forward operating area</td><td>Wharf space
Loading areas
Forward operating area</td><td>Wharf space
Loading areas
Forward operating area</td></tr>
<tr><td>A system that can effectively and efficiently corral oil offshore</td><td>2,400 m ro-boom
NOFI current buster sourced from State and National stockpiles</td><td>Mobilisation of equipment and personnel</td><td>6 x 400 m ro-booms (or similar)
NOFI current buster
5 x Crew to operate the system</td><td>6 x 400 m ro-booms (or similar)
NOFI current buster
5 x Crew to operate the system</td><td>6 x 400 m ro-booms (or similar)
NOFI current buster
5 x Crew to operate the system</td></tr>
<tr><td>High-capacity skimmers that can recover both fresh</td><td>Active recovery or weir skimmers sourced from State</td><td>6 x Active weir skimmer recovery systems or similar, e.g. GT1852</td><td>6 x Active weir skimmer recovery systems or similar, e.g. GT1852</td><td>6 x Active weir skimmer recovery systems or similar, e.g. GT1852</td><td>6 x Active weir skimmer recovery systems or similar, e.g. GT1852</td></tr>
</table>

Task	Containment and recovery operations implementation guide					
	and weathered crudes	and National stockpiles	12x Crew to operate the system			
	12,000 L of on-board storage or 25,000 L towable storage per team	IBCs from waste contractor Towable storage barges from AMOSC stockpile	Varying capacities of IBCs, other suitable combined storage, e.g. lancer barge	Varying capacities of IBCs, or other suitable combined storage, e.g. lancer barge	Varying capacities of IBCs, or other suitable combined storage, e.g. lancer barge	Varying capacities of IBCs, or other suitable combined storage, e.g. lancer barge
	A fixed wing or helo is able to accurately direct the vessel operator where the oil is	VOGA aviation contracts	6 x Trained spotter 6 x Aerial platform Pilot for the same	6 x Trained spotter 6 x Aerial platform Pilot for the same	6 x Trained spotter 6 x Aerial platform Pilot for the same	6 x Trained spotter 6 x Aerial platform Pilot for the same
	Vessels that can store up to 5,000 L of oil/water waste, skimmer system and 4 tonnes bollard pull Vessel to lead the boom operation, 4 tonne bollard pull	VOGA marine vessel contracts	6 x Work vessels suitable for the NWS Crew: 7 x for boom deployment and recovery, oil storage and transfer management and master for the same	6 x work vessels suitable for the NWS Crew: 7 x for boom deployment and recovery, oil storage and transfer management) and master for the same	6 x work vessels suitable for the NWS Crew: 7 x for boom deployment and recovery, oil storage and transfer management) and master for the same	6 x work vessels suitable for the NWS Crew: 7 x for boom deployment and recovery, oil storage and transfer management) and master for the same

12.6 Protection and Deflection Strategy

Table 12-12: Protection and deflection strategy summary

Purpose of strategy	The use of physical barriers to separate oil from environmental sensitivities, or to deflect to other areas where it may be naturally collected, or deflect it to other areas where the oil will do less harm.
Initiation criteria	If the information collected through MES suggests: • Sensitive receptors are predicted to be impacted by oil • The slick is greater than 10 g/m^2 thick • Sea state and weather permit boom deployment • A safe operating environment for responders.
Termination criteria	• Booms are unable to be deployed because of safety concerns or sea state and weather prevents effective deployment of equipment. • The spill is no longer visible to human observers. Specifically, a 'silvery/grey' sheen, as defined by the BAOAC, is no longer observable.
Tactics	This strategy involves a combination of near-shore booming using vessel-based operations ('near-shore operations') while the spill remains on a predicted shoreline impact trajectory, and the placement of shoreline boom around areas to: • Protect sensitive shorelines • Deflect the oil back to ocean or to easier locations for shoreline clean-up • Reduce the volume of oil impacting sensitive shoreline habitats to ALARP • Align the response strategy with NEBA.
Effectiveness guidance	• Visual observation to determine whether a booming operation is 'protecting' and/or 'deflecting' the impact of hydrocarbon towards sensitivity • Boom type, deployment angle, anchoring, quantity and variation in materials can all be altered to increase effectiveness.

Table 12-13: Protection and deflection operations implementation guide

Task	Protection and deflection operations implementation guide
Analysis of trajectory modelling and NEBA	Planning Chief and Environment Unit Leader analyse trajectory models (pre-event modelling and real-time modelling) to predict which shorelines may be impacted by oil, time to impact, probability and quantity of oil to shore. Priority resource protection areas are compared with the shorelines that are predicted to be oiled and operational/tactical plans are activated. Outputs from MES will confirm protection priorities that require action to prevent oiling. Priority of the implementation of tasks to support this strategy will be focused on protecting the highest shoreline and near-shore environmental sensitivities. Oil at sea may come ashore and strand. Using deterministic modelling during a spill, combined with situational awareness gained through ongoing MES, VOGA will implement this strategy in these areas to protect sensitive shorelines.
Analysis of aerial observation and current situational awareness	Planning Chief and Environment Unit Leader to use aerial surveillance data, information gathered by the Situation Unit and the protection priorities identified in pre-spill planning as a starting point for deployment of protection and deflection operations.
Understanding of real time currents and tides	Booming configuration will depend on the tidal movements and speed of currents in the location in which booms are to be deployed. Booms will fail when the forces of water movement push oil over or under the boom, or when there is failure of anchoring systems. This can be in currents of as little as 1 knot, however there are ways in which booms can be set up (e.g. chevron booming, staggered booming) so that oil is directed with the current onto another boom or into a collection area.
NEBA	Priority of the implementation protection and deflection is to oiling of shorelines with the highest environmental sensitivities (location and season). Planning Chief and Environment Unit leader in consultation with DTMI to determine where the optimum mitigation outcomes will be achieved through protection and deflection activities. Shoreline protection priorities are mangrove environments and identified turtle nesting beaches during nesting and hatching season. Where trajectory modelling indicates likely multiple stranding of oil, and a NEBA indicates no likely worse outcome, shores may be left to allow oil to collect utilising areas of natural containment. Identification and request of relevant TRPs from other titleholders for priority shorelines.

<table>
<tr><th>Task</th><th colspan="6">Protection and deflection operations implementation guide</th></tr>
<tr><td>Determine and source resources required and booming configuration</td><td colspan="6">Planning Chief to liaise with Operations Chief to determine type of booms (including ancillaries such as anchors and power packs for land sea booms) required and a booming configuration that can effectively and efficiently direct oil away from a resource, or prevent contact by oil. Refer to OSRL handbook for Shoreline Operations for recommended booming configurations.
Use available TRPs from Chevron as guidance for response tactics on Barrow Island.
Logistics Chief to secure vessels (including crew) and equipment operators (AMOSC core group or AMSA NRT) to deploy booms and vessels to assist in shallow areas for an initial deployment of 5 teams, expanding to 10 teams.
Booms can be deployed in various configurations to either exclude oil from a sensitivity or deflect the oil away from it. Trained operators will be required for this task and are available from the AMOSC Core Group, AMSA NRT or OSRL. Protection and deflection strike teams will establish exact equipment and resource requirements for specific shoreline protection and deflection according to the specific incident.
Daily inspection and maintenance of deployed booms to be undertaken by response personnel.</td></tr>
<tr><td>Induction</td><td colspan="6">Operations Chief to ensure that teams are informed of how to minimise damage to flora and avoid encounters with fauna. Induction and training of onshore teams accessing to uninhabited islands to include that spill response teams should avoid disruption of environment and take practical tactical precautions to avoid contact with flora and fauna. The number of staff and teams required will vary according to the sensitivities being protected.</td></tr>
<tr><td>Marine vessel transport of people and equipment</td><td colspan="6">Logistics Chief to secure marine vessel(s) capable of carrying crew and spill equipment to remote islands.</td></tr>
<tr><td rowspan="2">Aerial surveillance and/or transport</td><td colspan="6">Logistics Chief to secure aircraft to enable ongoing aerial surveillance of shorelines and/or transport of people and equipment.</td></tr>
<tr><th>Outcomes</th><th>Resources and source</th><th>48 hours</th><th>5 days</th><th>10 days</th><th>20 days</th></tr>
<tr><td></td><td>Marine vessel(s) capable of carrying crew and spill equipment to remote islands
Capable of logistics support/accommodation for 10 POB,</td><td>VOGA marine contracts
Vessels of opportunity such as charter and industry vessels</td><td>5 x Aluminium catamarans and/or flat bottom boats
1 x Shallow draft work boat-perational crew for same</td><td>10 x Aluminium catamarans and/or flat bottom boats
2 x Shallow draft work boat - operational crew for same</td><td>10 x Aluminium catamarans and/or flat bottom boats
2 x Shallow draft work boat - operational crew for same</td><td>10 x Aluminium catamarans and/or flat bottom boats
2 x Shallow draft work boat - operational crew for same</td></tr>
</table>

	crew, accessing remote islands Vessel capable of assisting land-side crews to secure booms in waterways and in the shallow seas					
	Crew capable of securing booms	AMOSC Core Group AMSA NRT	1 x Trained operator/Team Leader 4 x Labourers	10 x Trained operators/ Team Leaders 40 x Labourers	10 x Trained operators/ Team Leaders 40 x Labourers	10 x Trained operators/ Team Leaders 40 x Labourers
	Aerial surviellance of operational area	VOGA aviation contracts	1 x aircraft and 2 x trained observers	1 x aircraft and 2 x trained observers	1 x aircraft and 2 x trained observers	1 x aircraft and 2 x trained observers
	A system that can effectively and efficiently direct or prevent the movement of oil	Nearshore and shoreline booms from AMOSC stockpile or AMSA National Plan stockpile	Various lengths of land/sea boom, shoreline protection booms, sorbent booms totalling 1,000 m	Various lengths of land/sea boom, shoreline protection booms, sorbent booms totalling 2,000 m	Various lengths of land/sea boom, shoreline protection booms, sorbent booms totalling 2,000 m	Various lengths of land/sea boom, shoreline protection booms, sorbent booms totalling 2,000 m
Consider constraints	The major constraint for protection and deflection, especially in areas of northwest WA is the tidal range of and current speed that may be experienced. It may not physically be possible to deploy protection and deflection booming systems if the tide and current are not favourable. Other constraints include: • Access to remote islands and mainland beaches • Biosecurity issues associated with moving people and equipment between remote islands and the mainland • Access to sites (habitat, terrain, distance from the mainland, landing/mooring sites for vessels) • Transport of equipment to remote sites • Weather and sea-state Hazardous wildlife.					

12.7 Shoreline Cleanup Strategy

Table 12-14: Shoreline cleanup strategy summary

Purpose of strategy	Shoreline clean-up involves removing or monitoring oil with the objectives to: • Minimise exposure hazards to human health • Speed recovery of impacted areas if possible • Reduce the threat of additional or prolonged natural resource impacts.
Initiation criteria	Shoreline clean-up operations are likely to be activated if the information collected through MES suggests: • Shorelines are predicted to be impacted by oil at a thickness greater than 100 g/m^2 • Wildlife and/or wildlife habitats are at risk of oiling greater than 10 g/m^2 • A safe operating environment for responders.
Termination criteria	Oil needs to be at least 100 g/m^2 thick to enable effective manual clean-up. The National Plan Environment and Scientific Working Group developed Foreshore Assessment and Termination Guidelines (2007) that suggest shoreline oiling of a thickness of <0.01 cm (100 g/m^2) which can be seen as a stain, should be left to self-clean through wave action only. Refer to Table 13-1: Shoreline cleanup termination points for site specific termination points.
Tactics	• Natural recovery • Physical cleaning – removal and disposal of oil and oily debris • Physical cleaning – washing • Physical cleaning – surf washing/sediment reworking • Treatment – bioremediation.
Effectiveness guidance	• OM6 – Shoreline assessment. • OM3 – Sediment quality assessment • Shoreline surveys undertaken. • Information collected in surveys used to inform clean-up activities. • Shoreline clean-up activities don't do further damage than oil alone. • Waste stored and removed offsite. • Shoreline clean-up endpoints agreed to and closed out by stakeholder representatives.

Table 12-15: Shoreline clean-up operations implementation guide

Task	Shoreline clean-up operations implementation guide
Analysis of trajectory modelling	Planning Chief and Environment Unit Leader analyse trajectory models (pre-event modelling and real-time modelling) to predict which shorelines may be impacted by oil, time to impact, probability and quantity of oil to shore. Priority coastline sections are compared with the shorelines that are predicted to be oiled and available tactical plans are activated.
Analysis of aerial observation and current situational awareness	Planning Chief and Environment Unit Leader to use aerial surveillance data, information gathered by the Situation Unit and the protection priorities identified in pre-spill planning as a starting point for shoreline surveys and clean-up activities. Deploy OM6 SCAT teams to validate observations and collect real time shoreline data to priority shorelines.
NEBA	Priority of the implementation of tasks to support this strategy will be focused on cleaning oil from shorelines with the highest environmental sensitivities. Planning Chief and Environment Unit leader to determine where the optimal mitigation outcomes will be achieved through shoreline clean-up activities. This analysis will require information gathered by shoreline assessment field teams, and consulting with WA DTMI representatives to confirm protection priorities. Shorelines will be assessed for the extent of the oiling through OM6 Shoreline Assessment, with this information reported back to the VOGA ICT to determine which shoreline(s) is/are the priority for clean-up. This determination will be made based on the strategic NEBA, and the NEBA that will be undertaken at the time by the Planning Unit within the ICT. Shoreline clean-up will follow a three-stage methodology (refer to ITOPF Technical Information Paper No. 7): 1. Emergency phase – collection of oil floating close to the shore and pooled bulk oil removal. 2. Project phase – removal of stranded oil and oiled shoreline material that cannot be cleaned in-situ. 3. Polishing phase – final clean-up of light oil contamination and removal of oil stains, where the incident NEBA demonstrates this is necessary. Actual clean-up tasks for each of the three stages will be selected based on an assessment of suitability for the clean-up task for the oil character and shoreline type. Where trajectory modelling indicates likely multiple strandings of oil, and a NEBA indicates no likely worse outcome, shores may be left to recover without intervention. In undertaking this three-step process, VOGA contractors, employees and support agencies will work to effectively and efficiently clean shorelines where possible.
Deploy shoreline clean-up teams	Deploy 5 shoreline clean up teams by Day 4 to priority coastline sections verified by the OM6 SCAT survey, NEBA and OSTM analyses. One trained shoreline team leader and ten shoreline clean up workers per team.
Logistics	Logistics Chief activate resources in VOGA Emergency Response Logistics Management Plan [VOG-7000-RH-0008].

Task	Shoreline clean-up operations implementation guide
	Finance Chief to ensure that personnel records are completed.
Induction and training	Operations Chief to ensure that shoreline teams are informed of how to minimise damage to flora and avoid encounters with fauna. Induction and training of onshore teams accessing to uninhabited islands to include that spill response teams should avoid disruption of environment and take practical tactical precautions to avoid contact with flora and fauna. The number of staff and teams required will vary according to the sensitivities being protected. Operations Chief to also ensure the waste management plan prepared by Planning and Logistics is implemented on site. OM6 SCAT teams complete online OSRL SCAT JIT training module.
Marine vessel transport of people and equipment	Logistics Chief to secure marine vessel(s) capable of carrying crew and spill equipment to remote islands.
Aerial surveillance and/or transport	Logistics Chief to secure aircraft to enable ongoing aerial surveillance of shorelines and/or transport of people and equipment.
Ongoing clean-up operations	Planning Chief and Operations Chief decide in each IAP cycle which shorelines are to be cleaned and the clean-up method to be used. The decision to use particular clean-up methods will be based on the information provided by the SCAT teams and operational teams working the shorelines. Shoreline clean-up, subject to amenable weather conditions and access, is the use of a variety of clean-up methods on shorelines to remove stranded hydrocarbons, and to minimise the potential ongoing environmental damage caused by those hydrocarbons. Priority of the implementation of tasks to support this strategy will be focused on cleaning oil from shorelines with the highest environmental sensitivities. Shoreline clean-up teams will be directed (as part of the IAP) to mount operations in areas where the optimum mitigation outcomes will be achieved. This analysis will be undertaken at the time by the Planning Team, using shoreline assessment field teams, and consulting with WA DTMI representatives to confirm protection priorities. The WA DTMI will be consulted in the NEBA process and response strategy selection for OSR that impacts State waters. Sorbents will not be used for shoreline clean-up on high energy shorelines. Mechanical removal and high pressure flushing will not be undertaken in mangrove areas. Water from high pressure flushing will not be directed in between rocks and onto sediment.

<table>
<tr><th>Task</th><th colspan="6">Shoreline clean-up operations implementation guide</th></tr>
<tr><td>Waste collection and transport</td><td colspan="6">Where shoreline clean-up is occurring, VOGA will implement the establishment of hot, warm and cold zones, to minimise secondary contamination. Local sites will be used for the temporary storage of soiled material, liquid waste and solid waste/oil mixes, to enable appropriate final waste solution to be effectively implemented.
Shoreline waste generation can be reduced by identifying shorelines likely to be impacted and pre-cleaning the shore of debris and vegetation before oil strands, thus reducing the total amount of oily waste to dispose of. Shoreline waste generation can range from three to over 10 times the amount of oil stranded.
Sorbent materials will be stored in a contained storage area prior to transport and disposal to prevent any further contamination of habitats.</td></tr>
<tr><td>Incident action planning</td><td colspan="6">At the completion of shoreline clean-up operations, the Planning Chief will review the operations based on a briefing from the Operations Chief and provide a recommendation to the Incident Commander for future shoreline clean-up activities.</td></tr>
<tr><td rowspan="3">Shoreline cleanup</td><th>Outcomes</th><th>Resources and source</th><th>48 hours</th><th>5 days</th><th>10 days</th><th>20 days</th></tr>
<tr><td>Shoreline teams are informed of how to minimise damage to flora and avoid encounters with fauna</td><td>AMOSC Core Group
AMSA NRT</td><td>1 x Trainer</td><td>1 x Trainer</td><td>1 x Trainer</td><td>1 x Trainer</td></tr>
<tr><td>Floating oil close to shore collected and pooled bulk oil removed. Stranded oil removed
Cleanup of light oil contamination (polishing phase)</td><td>Leaders sourced from AMOSC Core Group or AMSA NRT
Team members sourced from AMOSC Core Group, AMSA NRT or labour hire</td><td>Activation and mobilisation of shoreline cleanup team leaders and members to the forward operating base to implement response strategies identified in SCAT surveys.</td><td>5 x team leaders and 50 x clean-up workers (55 x people)</td><td>25 x shoreline clean-up teams on site (275 x people – 1 x trained team leader, 10 x workers per team)</td><td>25 x shoreline clean-up teams on site (275 x people – 1 x trained team leader, 10 x workers per team)</td></tr>
</table>

Task	Shoreline clean-up operations implementation guide					
	Crews are safe, have access to accommodation, food and water, and communication devices	VOGA accomodation providers VOGA PPE	Mobilisation of PPE, food, water, shelter, communications network	PPE, food, water, shelter, communications network. Amenities for 275 pax.	PPE, food, water, shelter, communications network. Amenities for 275 pax.	PPE, food, water, shelter, communications network. Amenities for 275 pax.
	Marine vessel(s) capable of carrying crew and spill equipment to remote islands	VOGA marine contracts	Marine vessels	5 x vessels to support transport of personnel, equipment and ammenities 4 x vessels capable of accomodating shoreline. clean-up teams working at priority island locations	5 x vessels to support transport of personnel, equipment and ammenities 4 x vessels capable of accomodating shoreline. clean-up teams working at priority island locations	5 x vessels to support transport of personnel, equipment and ammenities 4 x vessels capable of accomodating shoreline. clean-up teams working at priority island locations
	Cleaning equipment and decontamination set selected according to suitablity for clean-up task and shoreline type	20 x VOGA shoreline cleanup kit at TOLL Dampier. Additional kits from the AMOSC stockpile.	5 x shoreline clean-up kits made up of shovels, plastic bags, rakes, buckets, wheelbarrows Decon kit	25 x shoreline clean-up kits made up of shovels, plastic bags (20 kg capacity), rakes, buckets, wheelbarrows and PPE Decontamination stations (1 per operational zone)	25 x shoreline clean-up kits made up of shovels, plastic bags (20 kg capacity), rakes, buckets, wheelbarrows and PPE Decontamination stations (1 per operational zone)	25 x shoreline clean-up kits made up of shovels, plastic bags (20 kg capacity), rakes, buckets, wheelbarrows and PPE Decontamination stations (1 per

Task	Shoreline clean-up operations implementation guide					
						operational zone)
	Aerial surviellance of operational area	VOGA aviation contracts	1 x aircraft and 2 x trained observers	1 x aircraft and 2 x trained observers	1 x aircraft and 2 x trained observers	1 x aircraft and 2 x trained observers
	A system that can effectively and efficiently direct or prevent the movement of oil.	Nearshore and shoreline booms from AMOSC stockpile or AMSA NRT stockpile	Various lengths of land/sea boom, shoreline protection booms, sorbent booms totalling 1,000 m Crew to operate the system	Various lengths of land/sea boom, shoreline protection booms, sorbent booms totalling 1,000 m Crew to operate the system	Various lengths of land/sea boom, shoreline protection booms, sorbent booms totalling 1,000 m Crew to operate the system	Various lengths of land/sea boom, shoreline protection booms, sorbent booms totalling 1,000 m Crew to operate the system
	Short and long term waste collection (refer to Section 15)	VOGA waste contracts	Temporary waste storage capability activated	Temporary waste storage on site and longer term waste storage options	Temporary waste storage on site and longer term waste storage options	Temporary waste storage on site and longer term waste storage options

12.8 Oiled Wildlife First Response Strategy

Table 12-16: Oiled wildlife first response strategy summary

Purpose of strategy	To minimise the impacts of an oil spill on wildlife by prevention of oiling and mitigation of effects when oiling has taken place.
Initiation criteria	• All spill events that are visible to human observers • Confirmation from OM5: Rapid Marine Fauna Assessment of confirmed or imment wildlife contact.
Termination criteria	Termination criteria for oiled wildlfie response is dependent on the incident and will be based on the termination criteria described in the WAOWRP.
Tactics	• First strike • Reconnaissance • Rescue, rehabilitation, release as per WAOWRP.
Effectiveness guidance	In liaison with DBCA, initiate a wildlife first strike response within a minimum of 24 hours (if required) of a confirmed or imminent wildlife contact as reported by OM5: Rapid Marine Fauna Assessment.

Table 12-17: Oiled wildlife first response implementation guide

<table>
<tr><th>Task</th><th colspan="6">Oiled wildlife first response implementation guide</th></tr>
<tr><td>Activate WAOWRP.</td><td colspan="6">Call the DBCA State Duty Officer on telephone (08) 9219 9108. The DBCA State Duty Officer will notify an Oiled Wildlife Advisor (OWA).
Appoint a Wildlife Division Coordinator. First strike response activities may be undertaken within the Environment Unit of the Planning section until a Wildlife Division Coordinator is actually in the ICC.</td></tr>
<tr><td>Rapidly assess the situation.</td><td colspan="6">Review OSTM – both the model used in response planning and the real time when available.
SITREP – reports of wildlife both oiled and active within the response area.</td></tr>
<tr><td>Provide advice to the IMT in relation to the wildlife assets at risk.</td><td colspan="6">Wildlife Division Coordinator to undertake.
Use WAOWRP to identify wildlife assets at risk, cross reference with wildlife information contained in NEBA.</td></tr>
<tr><td rowspan="3">Liaise with OWA.</td><td colspan="6">Wildlife Division Coordinator to liaise with the DBCA appointed OWA.</td></tr>
<tr><td>Outcomes</td><td>Resources and source</td><td>48 hours</td><td>5 days</td><td>10 days</td><td>20 days</td></tr>
<tr><td>WAOWRP is activated.</td><td colspan="5">VOGA activate WAOWRP and source support from AMOSC</td></tr>
</table>

Task	Oiled wildlife first response implementation guide					
	OWA and Wildlife Division Coordinator are activated and assigned to the ICT.	DBCA OWA OWR Division Coordinator	1 x OWA 1 x OWR Division Coordinator	1 x OWA 1 x OWR Division Coordinator	1 x OWA 1 x OWR Division Coordinator	1 x OWA 1 x OWR Division Coordinator
Activate first strike response kits.	Wildlife Division Coordinator and OWA to discuss and get approval from IC for deployment . First strike kits are portable and contain equipment to allow stabilisation of wildlife before triage and possible treatment at an oiled wildlife facility.					
	Outcomes	**Resources and source**	**48 hours**	**5 days**	**10 days**	**20 days**
	First strike response kits are mobilised to staging areas.	AMOSC	Vehicles/small trucks to deliver 6 x first strike response kits to operational sectors. Vessels/aircraft to take kits to islands. 1 x OWA 1 x OWR Division Coordinator	1 x OWA 1 x OWR Division Coordinator	1 x OWA 1 x OWR Division Coordinator	1 x OWA 1 x OWR Division Coordinator
	Two OWR containers are mobilised to an OWR facility location in Dampier.	AMOSC and AMSA	2 x OWR containers from Dampier (AMSA) and Fremantle (AMOSC)	2 x OWR containers	N/A – containers deployed	N/A – containers deployed
Reconnaissance.	Reconnaissance across priority shorelines with specific locations determined by OSTM and the NEBA at the time of the spill. Resources are required to identify and record location of oiled wildlife as well as determining the presence of wildlife in areas predicted to be					

<table>
<tr><th>Task</th><th colspan="6">Oiled wildlife first response implementation guide</th></tr>
<tr><td rowspan="3"></td><td colspan="6">impacted by oil. Real time wildlife reconnaissance is necessary to ground truth information due to seasonal and inter-annual variation in abundance and distribution of wildlife.
Depending on Exploration and Survey Operations OSM-BIP [VOG-1100-YH-0018] activations this task may be undertaken by teams implementing OM5 – Marine Fauna Surveillance.</td></tr>
<tr><td>Outcomes</td><td>Resources and source</td><td>48 hours</td><td>5 days</td><td>10 days</td><td>20 days</td></tr>
<tr><td>Situational awareness regarding wildlife that has been oiled and wildlife present within the path of the spill trajectory is gained.</td><td>AMOSC and AMSA</td><td>1 x aerial observation over extent of predicted trajectory requires 1 x aircraft</td><td colspan="3">Aerial based survey: 1 x aerial observation over extent of predicted trajectory requires 1 x aircraft
Boat based survey: 1 x small vessel (<12 m length) 1 x boat driver; 2 x crew
Shoreline survey: 2 x Quad motorbike or 4WD vehicle; 4 x survey crew</td></tr>
<tr><td rowspan="3">Develop wildlife sub-plan for the IAP based on WAOWRP procedures.</td><td colspan="6">Transition to response cycle and procedures in WAOWRP for OWR activities based on the spill scenario.</td></tr>
<tr><td>Outcomes</td><td>Resources and source</td><td>48 hours</td><td>5 days</td><td>10 days</td><td>20 days</td></tr>
<tr><td>Future OWR activities arrangement developed based on the spill scenario</td><td>To be determined according to WAOWRP procedures</td><td>1 x OWR Advisor; 1 x OWR Planning officer; 1 x OWR Division Coordinator</td><td colspan="3">To be determined according to WAOWRP procedures</td></tr>
</table>

12.9 Cumulative Resource Requirement

The cumulative resource requirement for OPP2 is calculated and presented in Table 12-18. The scale of resources required for OPP2 exceeds that of OPP1. Resources have been grouped according to the type and response strategy for the duration of 20 days. The actual total for each resource type would only eventuate if all response strategies required that resource at the same time. SIMOPs and sequential tasking of response and monitoring activities is to be expected such as an aircraft for aerial surveillance in the MES response strategy could be deployed to another strategy after completing its initial tasking. The same principle applies to vessels, such as at the completion of offshore tasking the vessels could be used nearshore or for monitoring tasks. Core Group personnel could also be redeployed between response strategy tasking if required.

OSM-BIP capability requirements are presented in Section 10 of the Exploration and Survey Operations OSM-BIP [VOG-1100-YH-0018]. Monitoring Service Providers undertake the sampling design and collection, and provide the specialists equipment required for sample collection and reporting. VOGA is responsible for providing the logistics to support mobilisation and deployment of the teams. This includes travel and accommodation, vessels, and aircraft.

WAOWRP capability requirements will be highly dependent on the scale and nature of the incident, the time of year and location of contact by oil. Two OWR containers have been positioned in the North West with and additional six facilities available from around Australia that could be mobilised. The WAOWRP Manual sets out the type of equipment required and skill sets of responders. AMOSC convenes an industry oiled wildlife working group for industry updates and preparedness including the collation of a register of wildlife responders and resources in the state, nationally and internationally.

Details of current and potential providers for resources are maintained in the VOGA Emergency Response Logistics Management Plan [VOG-7000-RH-0008]. This is a live document maintained by the VOGA Logistics team and is based on the resource requirements for OPP2. Table 12-19 summarises the resource requirements and providers of that capability.

Table 12-18: Cumulative resource requirements by response strategy first 20 days

Cumulative resource requirement for each response strategy at Day 20	MES	Chemical dispersant	Mechanical dispersion	Containment & recovery	Protection & deflection	Shoreline cleanup	Oiled wildlife 1st response	OSM	Day 20 total
Observer - facility	1	0	0	0	0	0	0	0	1
Satellite tracking buoy	8	0	0	0	0	0	0	0	8
Oil spill trajectory modelling service	1	0	0	0	0	0	0	0	1
Satellite imagery service	1	0	0	0	0	0	0	0	1
Drone	1	0	0	0	0	0	0	0	1
Aircraft – observation/spotter	1	6	1	6	1	1	1	2	19
Aerial observers	2	6	1	6	1	2	0	0	18
Fixed wing aerial dispersant air tractors	0	4	0	0	0	0	0	0	4
Aerial Attack Coordinator for dispersant application	0	6	0	0	0	0	0	0	6
Airbase	0	1	1	0	1	0	1	1	5
Dispersant (m^3)	0	850	0	0	0	0	0	0	850
Dispersant amenability shake test kit	0	1	0	0	0	0	0	0	1
Marine base	0	1	1	1	1	4	1	1	10
Vessels – large work vessels	0	2	1	6	0	0	0	2	11
Vessel based dispersant application system	0	2	0	0	0	0	0	0	2
Vessel crew to operate OSR equipment	0	4	0	42	0	0	0	0	46
Near shore vessels	0	0	0	0	8	9	1	2	20
Offshore booming system (m)	0	0	0	2,400	0	0	0	0	2,400
Weir or active recovery offshore skimmers	0	0	0	6	0	0	0	0	6

Cumulative resource requirement for each response strategy at Day 20	MES	Chemical dispersant	Mechanical dispersion	Containment & recovery	Protection & deflection	Shoreline cleanup	Oiled wildlife 1st response	OSM	Day 20 total
Onboard oily waste water storage (e.g. IBCs)	0	0	0	30	0	0	0	0	30
Towable oily waste water storage (e.g. Lancer Barge)	0	0	0	12	0	0	0	0	12
Nearshore and shoreline booming systems	0	0	0	0	1,000	1,000	0	0	2,000
OSR trained personnel/team leaders	0	0	0	0	4	25	4	10	43
OSR labourers/team members	0	0	0	0	16	250	0	0	266
Accommodation, meals, transport (pax)	0	16	0	48	20	275	2	90	451
Shoreline cleanup kits	0	0	0	0	0	30	0	0	30
Decontamination and waste collection sites	0	0	0	0	0	25	0	0	25
Oiled wildlife response containers	0	0	0	0	0	0	2	0	2

Table 12-19: Resource requirements and source

Resource requirements for response strategies	Source as at 31 August 2026 (*refer to VOGA Emergency Response Logistics Plan [VOG-7000-RH-0008] for annual updates*)
Observer - facility	VOGA field personnel
Satellite tracking buoy	4 x on board WNB supplied by Fastwave
Oil spill trajectory modelling service	Current contract with RPS
Satellite imagery service	KSAT service activated through AMOSC
Drone	1 x on board WNB
Aircraft – observation/spotter	Aviation contracts with AviAir for fixed wing aircraft and OSA for rotary aircraft
Aerial observers	AMOSC Staff and Core Group

Resource requirements for response strategies	Source as at 31 August 2026 (*refer to VOGA Emergency Response Logistics Plan [VOG-7000-RH-0008] for annual updates*)
Fixed wing aerial dispersant air tractors	4 x FWADC air tractors Aerotech
Aerial Attack Coordinator for dispersant application	AMOSC Core Group
Airbase	Karratha airport
Dispersant	AMSA stockpile in Karratha AMOSC stockpile in Exmouth
Dispersant amenability shake test kit	AMSA Karratha stockpile
Marine base	TOLL wharf Dampier Dampier Cargo Wharf
Vessels – large work vessels	Contracts with AMS Dampier and Bhagwan Marine Vessels of opportunity including Cyan Renewables, Jetwave Marine, GO Offshore.
Vessel based dispersant application system	AMS Dampier – vessel AMSA Karratha stockpile for dispersant spray unit AMOSC Exmouth stockpile for dispersant spray unit
Vessel crew to operate OSR equipment	AMOSC Core Group
Near shore vessels	Contracts with AMS Dampier and Bhagwan Marine. Vessels of opportunity including Cyan Renewables, Jetwave Marine, GO Offshore.
Offshore booming system	AMSA Karratha stockpile AMOSC Exmouth stockpile.
Weir or active recovery offshore skimmers	AMSA Karratha stockpile AMOSC Exmouth stockpile.
Onboard oily waste water storage (e.g. IBCs)	TOLL
Towable oily waste water storage (e.g. Lancer Barge)	AMSA Karratha stockpile

Resource requirements for response strategies	Source as at 31 August 2026 (*refer to VOGA Emergency Response Logistics Plan [VOG-7000-RH-0008] for annual updates*)
	AMOSC Exmouth stockpile.
Nearshore and shoreline booming systems	AMOSC Karratha stockpile AMOSC Exmouth stockpile.
OSR trained personnel/team leaders	• 75 x AMOSC Core Group field and 21 duel field and ICT • AMSA NRT.
OSR labourers/team members	• 75 x AMOSC Core Group field and 21 duel field and ICT • AMSA NRT • Labour Hire such as Manpower and Access Human Talent.

Accommodation, meals, transport	• Hotels and Motels in Karratha
	• Workcamps in Karratha:
	  ○ Searipple Karratha
	  ○ Karratha Village
	  ○ Civeo Karratha Village
	  ○ Velocity Village Karratha.
	• Remote camp providers including Asco Australia and TCLH mobile camps
	• Sealanes contract for food and PPE.

Shoreline cleanup kits	VOGA stores at TOLL Dampier.
Decontamination and waste collection sites	AMOSC decontamination kits.
Oiled wildlife response containers	AMOSC and AMSA.

Section 13 – Termination and Recovery

13.1 Response Strategies Termination Criteria

Consistent with the National Plan, VOGA's priority in a response to an oil spill incident is human health and safety, meaning that response activities will cease if operations cannot be carried out in a manner that do not present unmanageable risks to human safety.

Termination criteria will aid the decision to terminate OSR activities for each strategy. Note that these termination criteria only apply if the strategy is able to be operationally implemented (e.g. the weather conditions allow marine/aerial operations to take place).

Response strategies are monitored throughout implementation and the following considerations are taken into account (in addition to safety issues) when determining if a response strategy is lowering impacts to ALARP:

- Measures are no longer effective
- Further cleanup is likely to cause greater environmental damage (NEBA)
- The level of response is out of proportion to the amount of oil on the water
- When the costs of the response are exceeding the likely benefits, i.e. the point of diminishing returns is reached in terms of monetary costs.

As per the spill response planning process outlined in Figure 3-1, the operational NEBA provides guidance to the identification of termination criteria, by assessing if the:

- Response strategy reduces the probability of impact of to the sensitive receptors
- Response strategy increases the number of days before impact to the sensitive receptors
- Response strategy reduces the average and/or total amount of oil to impact the sensitive receptors
- Response operation has more of a negative impact than untreated oil
- Controls that are put in place to mitigate impacts associated with the proposed response strategy.

If risks associated with the response strategy are aligned with the Wandoo Field Exploration Drilling EP, then KPIs (effectiveness measures which inform termination criteria) are developed, response strategies implemented and assessed. If termination criteria are met then the response strategy ceases. Shoreline cleanup termination criteria are explained in more detail separately because of the complexity that maybe present in a shoreline response (Table 13-1).

13.1.1 Shoreline Termination Criteria

Due to the site and spill-specific nature of shoreline cleanup, termination points are developed for the specific incident, however, there are some guiding principles that VOGA will consider when working with the State ESC and stakeholders to identify termination points.

Termination points, also known as end points for shoreline cleanup, are likely to be selected based on the general cleanup objectives, which are to:

- Minimise exposure hazards for human health
- Speed recovery of impacted areas if possible
- Reduce the threat of additional or prolonged natural resource impacts.

These objectives lead to developing cleanup strategies and end points that do not cause more harm to the environment than good (Oil Spill Response, 2011).

Ideally, cleanup efforts will return the resource to its baseline condition without suffering further impact or affecting other resources. Aggressive and inappropriate cleanup techniques can make matters worse. Less intrusive methods or natural recovery are often preferable. The best cleanup strategy is often not the one that removes the most oil; rather, it is the strategy that removes oil that poses a greater risk of injury than would result from cleanup, and allows remaining oil to be removed by natural processes.

The Environment Unit within the Planning Section will provide the following in regards to shoreline cleanup:

- Guide the Operations Section in conducting specific cleanup methods to minimise adverse environmental impact (best management practices).
- Provide the Operations Section with environmental and safety constraints on conducting cleanup activities in specific habitats.
- Develop spill-specific cleanup objectives, guidelines and termination points. This will require input from the State ESC because the DTMI is the Control Agency and jurisdictional authority for OSR in State waters. Examples for shoreline cleanup that may be used as the basis for developing the spill-specific cleanup termination points with the State ESC are described in Table 13-1.
- Identify time-critical and degree-of-use issues to be combined with cleanup priorities and end points.
- Identify sensitive resources that may be adversely affected by the proposed treatment methods (e.g. rich intertidal biota on rocky shores where low pressure ambient water flushing will be used).

Table 13-1: Shoreline cleanup termination points

No oil observed: not detectable by sight, smell, feel	• This end point is often used for sand beaches where oil removal can be effective without delaying resource recovery. • Visual inspections are preferred over chemical analysis of samples because of: difficulty of sampling areas with high variability; time and costs to complete sampling and analysis; and lack of guidelines on what levels are safe.
Visible oil but no more than background	• This termination point is often applied where there is a significant background rate of tar ball deposition on the shoreline.
No longer generates sheens that will affect sensitive	• This termination point is used where sheening persists after cleanup efforts become ineffective, or on sensitive habitats where further cleanup

areas, wildlife, or human health	efforts will cause more harm than natural removal. Residual sheening should persist over a relatively short time period. • Sheen is an oil film ranging from barely visible to dull colours. Sorbents effectiveness is usually limited in recovery of sheens. Consider the amount and duration of sheening, and the distance to sensitive resources, to determine if sheening poses a significant threat. • Consider the degree of exposure: high wave/tidal exposure speeds removal and breaks up sheens; sheltered areas will sheen longer and sheens will be more persistent. • Consider the degree and timing of use: sheening may be tolerated in areas or during periods of low use; even minor sheens may not be tolerated in areas of high use, such as swimming beaches.
No longer rubs off on contact	• This termination point is usually defined as oil removal to a stain or coat, or weathering to the point that it is no longer sticky. It is applied to hard substrates (rocky shores, seawalls, riprap, and gravel) and vegetation (marshes, mangroves). • The objective is to prevent oiling of fur, feathers, and feet of wildlife, and oiling of people and property during contact with oiled surfaces. • Consider the degree and timing of use: high-use areas often require higher cleanliness, whereas natural removal is allowed in low-use areas where further cleanup efforts will be disruptive.
Oil removal to allow recovery/re-colonisation without causing more harm than natural removal of oil residues	• This termination point is used where further oil removal will result in excessive habitat disruption (e.g. trampling of soft sediments and plant roots, mixing oil deeper, extensive sediment removal, vegetation cutting) or high biota mortality (e.g. from high-pressure, hot-water washing of intertidal communities). • It is also used for areas with difficult access, which limits the type of cleanup that can be conducted along that shoreline segment. • Consider the potential for erosion from excessive sediment removal, particularly where erosion/deposition patterns of the beach cycle will rework and clean sediments within an acceptable timeframe.

13.2 Relevant Person Engagement in Termination

Government and relevant person understandings and expectations will play a role in both the decision to terminate a response and the acceptability of the decision. Consultation with these groups will be undertaken by VOGA prior to any termination decisions being implemented.

13.3 Post-response Recovery

Following termination of the incident response, VOGA will undertake an investigation to identify any ongoing impacts to the environment or communities and provide a coordinated plan for addressing these impacts. A debriefing and post-incident analysis will be undertaken with responders and stakeholders, to identify any improvements to this plan as appropriate.

Section 14 – Incident Command Team (ICT) Arrangements

14.1 ICT Personnel

Arrangements and plan for full-scale activation of ICT resources is provided in Table 14-1. Activation plan is based on OPP2 requirements. During the early stages of a spill response the plan should be validated to ensure appropriate ICT support is provided to in-field operations. For activation of OPP1, the Planning Chief is responsible for reviewing and adjusting the activation plan in Table 14-1.

Key assumptions of the activation plan are:

- The ICT will run for 24 hours a day for up to 10 days before transitioning to a sustainable model as defined by the planning team.
- The ICT shifts will be staggered with Operations and Logistics functions operating 0500 to 1700 and the Planning, Incident Command, and Finance functions operating 0800 to 2000.
- A skeleton crew of 3 will staff the ICT overnight, between 2000 and 0500, in Perth. Night shift consists of Incident commander, administrator and situation unit.
- Vermilion's international associated companies providing ICT staffing remotely overnight.
- The ICT team size should be fit-for-purpose considering:
  - that the span of control should not exceed more than 7 direct reports within the ICT itself
  - that the workload can be spread across other individuals on an as needs basis because the training standards in critical roles are the same
  - the Incident Commander and Section Chief roles are identified as critical to a successful response and must be filled within 12 hours of activation
  - the Incident Commander must have current competence training in PMAOMIR418 and oil spill response to undertake their role
  - the Planning/Logistics/Operations Sections Chiefs must have current competence training in PMAOMIR322 and oil spill response to undertake their role.
- A time-on/time-off roster should be established no earlier than day 7 for continuity of response and no later than day 10 to manage fatigue. Table 14-1 assumes roster change occurs on day 5.
- The response is expected to reach a 'steady state' by day 20, meaning that detailed plans for day 20 to spill termination should be in place by day 20.

The competence and quantity of staff required to successfully respond to a hydrocarbon spill has leveraged off the detailed planning in OPP1 and OPP2, the initial IAP in place for these events. Further, the VOGA response systems, other response plans (e.g. the Logistics Plan and the OSM BIP) are in place to assist all ICT personnel, particularly in the early stages of a response.

VOGA has the capability to staff an ICT with appropriately trained and competent personnel, to meet the basic resource requirements of an ICT within an hour or full activation within 48 hours. VOGA maintains trained onshore personnel for ICT roles with each core role being assigned between 2 and 5 personnel who can fill the role or support it in an extended ICT. Personnel from the Wandoo facilities (off rostered, and then on-site personnel if conditions enable this) would be available to provide personnel to the IMT within between 48 and 96 hours.

ICT roles can be staffed from any of the following sources and are summarised in Table 14-3:

- VOGA local staff and contractors. Personnel who are required to be available within 12 hours are 'on roster'
- Vermilion International staff (some roles can be filled remotely)
- Consultants (usually with Master Service Arrangements in place)
- Semi-skilled contractors (temporary contract hires)
- AMOSC Staff: Under the AMOSC Service Agreement, AMOSC can provide Industry Liaison Officer
- AMOSC Staff and Core Group: Under the AMOSC Service Agreement and Response Plan, Vermilion is able to scope specific response activities to AMOSC and as such AMOSC are able provide resources as outlined in Table 14-1 through their response structure; this includes support from WA DTMI.

Table 13-2 provides a minimum resource and competency requirements by source to enable the resource plan in Table 14-1 to be achieved. VOGA manages our business and capability arrangements to ensure we have sufficient contingency, through training majority of office staff and managing leave; ensuring we have sufficient capacity to maintain access to VOGA numbers as outlined in Table 13-2. In addition, under the National Plan, a National Response Team (NRT), comprising experienced personnel from operator to senior response manager level from Commonwealth/State/NT agencies, industry and other organisations, has been developed. The services of the NRT will be obtained through the Environment Protection Group and AMSA for the release of designated personnel for OSR activities. Personnel resources from these sources have not been included in the estimates of personnel available because they are likely to be deployed by AMSA/WA DTMI to support the government response.

Further highly trained staff from OSRL and the Global Response Network can be called upon to staff ICT roles either remotely or later in the response. Personnel resources from these sources have not been included in the estimates of personnel available to ensure surge capability is available.

VOGA has prepared an induction package to enable third party ICT members to gain adequate knowledge of the specific VOGA oil spill arrangements.

14.1.1 ICT Resources and Activation Plan

Table 14-1: ICT resources and activation plan

ICT	Role	Task/Function	Competence		Response arrangement		Total ICT resource need over time				
							Day 1	Day 2	Day 5	Day 10	Day 20
			Skill and attribute assessment	Additional training or experience or qualification required	Source	Immediate need/timeliness of arrangement	Required/ Need (FTE)	Required/ Need (FTE)	Required/ Need (FTE)	Required/ Need (FTE)	Required/ Need (FTE)
CCT	CC Operations Chief	Provides the interface between the ICT and CCT. Provides updates to the CCT regarding IAPs and communicates any needs for support if required. Responsible for ensuring VOGA's corporate objectives are communicated to the ICT and are also reflected in the IAP.	Experience to attain role is sufficient to perform role	Nil	VOGA Local	Within 12 hours	1	1	2	2	2
IC	Incident Commander	Maintain control responsibilities for the incident response. Provide professional OSR command to the IMT. Approve IAP and, where required, engage State Maritime Environmental Emergency Coordinator/DTMI Incident Controller for agreement/endorsement of plan for activities within, or potentially impact, WA waters.	Oil spill competence gap between day-to-day role and response role	PMAOMIR418 + OSR Training or IMO Level 3	VOGA Local	Within 1 hour of activation	1	2	4	4	4
IC	Safety Officer	Assesses unsafe situations and develops measures for assuring personnel safety. Confirms safety regulatory authorities and applicable departments have been notified. Ensures implementation of safety measures and monitoring and recording of personnel exposures to hazardous products. Supports accident investigations, recommends corrective action, and prepares accident report.	Oil spill competence gap between day-to-day role and response role	PMAOMIR322 + OSR Training	VOGA Local	Within 24 hours	1	1	2	2	2
IC	Stakeholder Liaison Officer	Coordinates investigation of reportable events. Responsible for managing regulatory engagement and coordinating any regulatory approvals required to implement response strategies. Coordinates engagement of relevant persons who are impacted from the spill or response activities. Acts as the functional interface between these various parties. Implements VOGA Communications Plan, providing media information support and serving as the dissemination point for all VOGA media releases.	Oil spill competence gap between day-to-day role and response role	PMAOMIR322 + OSR Training	VOGA Local	Within 24 hours	1	1	2	2	2

ICT	Role	Task/Function	Competence		Response arrangement		Total ICT resource need over time				
							Day 1	Day 2	Day 5	Day 10	Day 20
			Skill and attribute assessment	Additional training or experience or qualification required	Source	Immediate need/timeliness of arrangement	Required/ Need (FTE)	Required/ Need (FTE)	Required/ Need (FTE)	Required/ Need (FTE)	Required/ Need (FTE)
IC	Public Information Officer	Represent VOGA and provide timely information of the incident and the incident response to government stakeholders.	Full competence overlaps between day-to-day role and response role	Nil	Contractor	Within 24 hours	1	1	2	2	2
IC	Liaison Officer (Industry)	Identifies the assisting and cooperating companies and agencies, including communications link and location; provides list to the CCT. Functions as "point of contact" for assisting and cooperating agency representatives. Responsible for ensuring that parties who have agreed to undertake specific functions under the OPEP are undertaking the functions consistent with the OSR strategies, EPOs and EPSs.	Full competence overlaps between day-to-day role and response role	PMAOMIR322 + OSR Training	AMOSC Staff	Within 24 hours	1	1	2	2	2
IC	Administration Unit	Record response data in the Incident Log.	Full competence overlaps between day-to-day role and response role	Nil	VOGA Local, Contractors	Within 24 hours	1	2	4	4	4
IC	Administration Unit	Record response data in the Incident Log.	Full competence overlaps between day-to-day role and response role	Nil	Labour Hire	Day 5	0	0	20	40	60
Planning	Planning Chief	Supervises the VOGA ICT and leads the IAP process. Records and displays data for information, planning and programming, allocation and justification. Documents and maintain records of all Wandoo Offshore Installation and VOGA ICT actions. Manages critical information requirements. Coordinate and document the response Incident Action Plan (IAP) including Interfaces with State Maritime Environmental Emergency Coordinator or State Environmental and Scientific Coordinator (ESC) for input into IAP for activities impacting state waters.	Oil spill competence gap between day-to-day role and response role	PMAOMIR322 + OSR Training	VOGA Local	Within 1 hour of activation	1	1	2	2	2
Planning	Consultation Unit	Control the release of the IAP to appropriate stakeholders.	Full competence overlaps between day-to-day role and response role	Nil	Contractor	Within 48 hours	0	1	2	2	2

ICT	Role	Task/Function	Competence		Response arrangement		Total ICT resource need over time				
							Day 1	Day 2	Day 5	Day 10	Day 20
			Skill and attribute assessment	Additional training or experience or qualification required	Source	Immediate need/timeliness of arrangement	Required/ Need (FTE)	Required/ Need (FTE)	Required/ Need (FTE)	Required/ Need (FTE)	Required/ Need (FTE)
Planning	Situation Unit (Day)	Collect information from the field on the incident response status and other in-field observations. Develop maps of oil spill source area, oil spill response areas, and maps of location of response assets for inclusion in IAPs and for communication with response stakeholders (Common Operating Pictures).	Oil spill competence gap between day-to-day role and response role	PMAOMIR322 + OSR Training	VOGA Local	Within 12 hours	1	2	2	2	2
Planning	Situation Unit (Night)	Collect information from the field on the incident response status and other in-field observations. Develop maps of oil spill source area, oil spill response areas, and maps of location of response assets for inclusion in IAPs and for communication with response stakeholders (Common Operating Pictures).	Oil spill competence gap between day-to-day role and response role.	PMAOMIR322 + OSR Training or IMO 2	OSRL or AMOSC	Within 24 hours	0	2	2	2	2
Planning	Environment Unit (Lead)	Manage scientific monitoring activities and any required oiled wildlife response. Conducts net environmental benefit/impact assessments. Responsible for the collection and collation of environment data/advice, e.g. obtains environmental data from OSRA and scientific monitoring (DTMI ESC and local sources) with support from Environment Unit Lead (EUL) role. Deploy and control scientific monitoring activities	EUL – potential gap	EUL – bachelor's degree in environmental management/ science; >5 years' experience in environmental management; PMAOMIR322 or IMO 2; Unit – nil (as per contract)	EUL – VOGA local or consultant	EUL - within 24 hours	1	1	2	2	2
Planning	Environment Unit	Manage scientific monitoring activities and any required oiled wildlife response. Conducts net environmental benefit/impact assessments. Responsible for the collection and collation of environment data/advice, e.g. obtains environmental data from OSRA and scientific monitoring (DTMI ESC and local sources) with support from EUL role. Deploy and control scientific monitoring activities	Contracted in expertise	Bachelor's degree in environmental management/ science; >5 years' experience in environmental management	Contractor/ Consultants	Within 48 hours	0	3	8	13	16

ICT	Role	Task/Function	Competence		Response arrangement		Total ICT resource need over time				
							Day 1	Day 2	Day 5	Day 10	Day 20
			Skill and attribute assessment	Additional training or experience or qualification required	Source	Immediate need/timeliness of arrangement	Required/ Need (FTE)	Required/ Need (FTE)	Required/ Need (FTE)	Required/ Need (FTE)	Required/ Need (FTE)
Planning	Monitoring Coordination Team	Final approval of monitoring scopes of work. Coordinates the oil spill standby and response services. Determine when initiation and termination criteria are met.	Contracted in expertise	Nil – as per contract	Consultants	Within 48 hours	0	2	4	4	4
Logistics	Logistics Chief	Activate and deploy PT assets and resources to the response. Activate PT supply contracts for the response. Liaison with combat agencies; industry, including adjacent operators and contractors. Responsible for establishing any Simultaneous Operations (SIMOPS) Plan to manage the risk generated by multiple activities. Develops logistics plan to support operations and provides overall resource support to emergency incident sites.	Oil spill competence gap between day-to-day role and response role	PMAOMIR322 + OSR Training	VOGA Local	Within 1 hour of activation	1	1	2	2	2
Logistics	Communications Unit	Provide input into the acquisition, installation and maintenance of communications equipment. Assist the Planning Section to produce the Communications Plan for the effective use of incident communications equipment and facilities; installation and testing of communications equipment; supervision of the Incident Communications Centre; distribution of communications equipment to incident personnel; and the maintenance of communications equipment.	Full competence overlaps between day-to-day role and response role	Nil	Contractor	Within 48 hours	0	1	2	2	2
Logistics	Procurement Unit	The Procurement Unit acquires and distributes equipment and materials for infrastructure support. Ensures supplies are appropriately stored and maintained. Obtain extra resources (people, vehicles, equipment etc.) as required. Includes supporting the incident with the provision of food and drinks to personnel involved in the incident across the ICC and all on-ground sites across different mealtimes and duty shifts (considering specific dietary requirements).	Full competence overlaps between day-to-day role and response role	Nil	VOGA International	Within 48 hours	0	1	6	6	6

ICT	Role	Task/Function	Competence		Response arrangement		Total ICT resource need over time				
							Day 1	Day 2	Day 5	Day 10	Day 20
			Skill and attribute assessment	Additional training or experience or qualification required	Source	Immediate need/timeliness of arrangement	Required/ Need (FTE)	Required/ Need (FTE)	Required/ Need (FTE)	Required/ Need (FTE)	Required/ Need (FTE)
Logistics	Services Unit	Obtains and manages the necessary facilities and accommodation to support operations and incident control and maintains them in working order. Responsible for the setup, maintenance and demobilisation of incident facilities, e.g. base, ICC and staging areas, as well as security services required to support incident operations. Provides sleeping and sanitation facilities for incident personnel and manages Base operations. Each facility is assigned a manager who reports to the facilities unit leader and is responsible for managing the operation of the facility.	Full competence overlaps between day-to-day role and response role	Nil	VOGA International	Within 48 hours	0	1	4	4	4
Logistics	Transport Unit	Responsible for providing transport for personnel, equipment, supplies and food, together with fuelling, mechanical maintenance and security of all equipment and vehicles at the incident. Develop and implement a Traffic Management Plan for in and around the incident.	Full competence overlaps between day-to-day role and response role	Nil	VOGA International	Within 48 hours	0	1	4	4	4
Logistics	Resource Unit	This function gathers, maintains and presents information on incident resources and contributes to the plans for demobilisation. The Resource Unit is responsible for maintaining the status of all assigned tactical resources and personnel at an incident.	Full competence overlaps between day-to-day role and response role	Nil	VOGA International	Within 48 hours	0	1	4	4	4
Operations	Operations Chief	Implement appropriate OSR strategies. Provide communication link in the IMT Incident Command Centre (ICC) with the field response. Control the field-based response activities in collaboration with WA DTMI as required.	Oil spill competence gap between day-to-day role and response role	PMAOMIR322 + OSR Training	VOGA Local	Within 3 hours of activation	1	1	2	2	2
Operations	Marine Unit	Provide IMT management of marine activities.	Full competence overlaps between day-to-day role and response role	Nil	AMOSC Core Group	Within 48 hours	0	2	4	8	12
Operations	Shoreline Unit	Provide IMT management of shoreline activities.	Full competence overlaps between day-to-day role and response role	Nil	AMOSC Core Group	Within 48 hours	0	1	2	2	2
Operations	Aviation Unit	Provide IMT management of aviation activities.	Full competence overlaps between day-to-day role and response role	Nil	AMOSC Core Group	Within 48 hours	0	2	2	4	4

ICT	Role	Task/Function	Competence		Response arrangement		Total ICT resource need over time				
							Day 1	Day 2	Day 5	Day 10	Day 20
			Skill and attribute assessment	Additional training or experience or qualification required	Source	Immediate need/timeliness of arrangement	Required/ Need (FTE)	Required/ Need (FTE)	Required/ Need (FTE)	Required/ Need (FTE)	Required/ Need (FTE)
Operations	Waste Management Unit	Work with State Control Agency to support oil spill waste management (DTMI and DER).	Full competence overlaps between day-to-day role and response role	Nil	AMOSC Core Group	Within 48 hours	0	2	4	4	4
Operations	Wildlife Unit	Work with State Control Agency to support oil wildlife response (DBCA).	Full competence overlaps between day-to-day role and response role	Nil	AMOSC Staff	Within 48 hours	0	1	2	2	2
Finance	Finance Chief	Provides monetary, insurance, legal, risk and human resources, related administrative functions to support emergency operations and to preserve vital records documenting work performed and associated costs in the event of disaster or major emergency.	Full competence overlaps between day-to-day role and response role	Nil	VOGA Local/ International	Within 24 hours	1	1	2	2	2
Finance	Finance Unit	Monitor and record the ongoing costs of the response and access PT funds to pay for the response.	Full competence overlaps between day-to-day role and response role	Nil	VOGA International	Within 24 hours	1	1	2	6	6
WA DTMI Support	As directed by DTMI	Mandated resources to support the response activities in State waters.		PMAOMIR322 + OSR Training	VOGA Local	Within 24 hours	3	3	3	3	3
WA DTMI Support	As directed by DTMI	Mandated resources to support the response activities in State waters.	AMOSC Core Group IMT capable persons have IMO 2 competence	Nil	AMOSC Core Group	Within 48 hours	0	4	8	8	8

Table 14-2: Minimum ICT resource and OSR training needs over time (by source)

Source and role	OSR training: arrangements during response																			
	No specific training					Core group course					PMAOMIR322 + OSR Training (or IMO 2)					PMAOMIR418 + OSR (or IMO 3)				
	Day 1	Day 2	Day 5	Day 10	Day 20	Day 1	Day 2	Day 5	Day 10	Day 20	Day 1	Day 2	Day 5	Day 10	Day 20	Day 1	Day 2	Day 5	Day 10	Day 20
AMOSC Core Group (total)						**0**	**8**	**8**	**8**	**8**	**0**	**1**	**8**	**14**	**18**					
As directed by DTMI						0	8	8	8	8	-	-	-	-	-					
Aviation Unit						-	-	-	-	-	0	0	2	4	4					
Marine Unit						-	-	-	-	-	0	0	4	8	12					
Shoreline Unit						-	-	-	-	-	0	1	2	2	2					
AMOSC Staff (total)	**1**	**2**	**2**	**2**	**2**						**1**	**1**	**2**	**2**	**2**					
Liaison Officer (Industry)	1	1	2	2	2						1	1	2	2	2					
Wildlife Unit	0	1	2	2	2															
Consultants (total)	**0**	**5**	**12**	**17**	**20**															
Environment Unit	0	3	8	13	16															
Monitoring Coordination Team	0	2	4	4	4															
Contractor (total)	**0**	**3**	**10**	**10**	**10**															
Communications Unit	0	1	2	2	2															
Consultation Unit	0	1	2	2	2															
Public Information Officer	0	1	2	2	2															
Waste Management Unit	0	0	4	4	4															
Labour Hire (total)	**0**	**0**	**20**	**40**	**60**															
Administration Unit	0	0	20	40	60															
VOGA Local (total)											**7**	**11**	**17**	**17**	**17**	**1**	**2**	**4**	**4**	**4**
As directed by DTMI											0	3	3	3	3	-	-	-	-	-
Environment Unit Lead											1	1	2	2	2	-	-	-	-	-
Incident Commander											-	-	-	-	-	1	2	4	4	4
Logistics Chief											1	1	2	2	2	-	-	-	-	-
Operations Chief											1	1	2	2	2	-	-	-	-	-
Planning Chief											1	1	2	2	2	-	-	-	-	-
Safety Officer											1	1	2	2	2	-	-	-	-	-
Stakeholder Liaison Officer											1	1	2	2	2	-	-	-	-	-
Situation Unit (Day)											1	2	2	2	2	-	-	-	-	-
VOGA Local, Contractors (total)	**1**	**7**	**24**	**24**	**24**															
Administration Unit	1	2	4	4	4															
Communications Unit	0	1	2	2	2															
Procurement Unit	0	1	6	6	6															
Resource Unit	0	1	4	4	4															
Services Unit	0	1	4	4	4															
Transport Unit	0	1	4	4	4															
VOGA Local, VOGA International (total)	**2**	**2**	**4**	**8**	**8**															

Source and role	OSR training: arrangements during response																			
	No specific training					Core group course					PMAOMIR322 + OSR Training (or IMO 2)					PMAOMIR418 + OSR (or IMO 3)				
	Day 1	Day 2	Day 5	Day 10	Day 20	Day 1	Day 2	Day 5	Day 10	Day 20	Day 1	Day 2	Day 5	Day 10	Day 20	Day 1	Day 2	Day 5	Day 10	Day 20
Finance Chief	1	1	2	2	2															
Finance Unit	1	1	2	6	6															
OSRL or AMOSC- Situation Unit (Night)	-	-	-	-	-	-	-	-	-	-	**0**	**2**	**2**	**2**	**2**	-	-	-	-	-
Grand Total	**12**	**16**	**70**	**99**	**122**	**0**	**8**	**8**	**8**	**8**	**8**	**15**	**29**	**35**	**39**	**1**	**2**	**4**	**4**	**4**

Table 14-3: ICT requirements and source of personnel

Source and Role	Total ICT Need at Day 20	Total availability from source
AMOSC Core Group	22	26 ICT + 21 dual ICT and field = total 47 (confirmed by AMOSC 13 May 2026) Total Core Group members = 122 (AMOSC Members Hub report 5 August 2026)
AMOSC Staff	4	Fulltime staff = 18 (AMOSC Members Hub report 5 August 2026)
Consultants: • Environment Unit • Monitoring Coordination Team	5 EU 4 MCT	Environment personnel available through VOGA contract with Xodus 6 personnel (Joint Industry Operational and Scientific Monitoring capability report July 2026)
Contractors: • Communications, consultation, liaison • Waste management	6 2	Communications, consultation, liaison personnel available through VOGA contract with FTI Waste advisors available through VOGA contract with Cleanaway
Labour hire (administration)	10	Labour hire JIT arrangement
VOGA Local	19	27 VOGA local personnel (ICT personnel register 5 August 2026)
VOGA Local, Contractors	14	41 additional VOGA local personnel listed on personnel register
VOGA Local, VOGA International	4	41 additional VOGA local personnel listed on personnel register VOGA international personnel – Canada, Ireland, Netherlands, France
OSRL or AMOSC – Situation Unit (Night)	2	18 OSRL staff as per SLS

PART 6: Support Plans

Section 15 – Waste Management

15.1 Waste Management Strategy

The purpose of the strategy is to ensure during an OSR, VOGA:

- Engage government agencies to obtain the appropriate waste management approvals necessary for the collection and transportation of waste
- Cater for credible recovered waste during a response
- Activate the key logistic contractors for the storage, transportation and disposal of collected waste
- Ensure the collect segregation practices of waste are undertaken
- Terminate the waste management program on completion of the response.

VOGA waste management guidance for Logistics personnel is contained in VOGA's Emergency Response Logistics Management Plan [VOG-7000-RH-0008].

15.2 Waste Management Activation

Activation of the waste management plan assignments is an action step in the IAP and is the responsibility of the ICT Planning Chief for identification and ICT Logistic Chief for resource assessment and ICT Operations Chief for implementation.

Not all oil spill events will trigger a waste management activation. Once oily waste is planned to be contained or collected, then the waste management plan would be activated.

Key aspects to be acted on are:

- Assessment and decision making – determine the likely volume and types of waste likely to be collected
- Regulatory approvals – apply for DER licence to operate temporary waste storage facility
- Collection/recovery/transportation/storage (intermediate and final) – activation of the Logistic Plan for activation of containment and transportation methods
- Final disposal – monitor the final disposal methods
- Termination.

15.3 Waste Management Basis

To develop a feasible waste management strategy for implementation during a response, VOGA has considered:

- VOGA waste contractor's capability – assessed within the Exploration and Survey Operations Oil Spill Response Capability Review [VOG-1100-YH-0019]

- Decanting wastewater at sea JIP
- OSTM outputs for shoreline oiling greater than 100 g/m^2
- Environmental risks and the controls associated with waste management
- Upper credible recovery rate for spill strategies
- ITOPF technical papers to guide likely waste to hydrocarbon quantities ('bulking rates') associated with these strategies (refer to ITOPF Technical Information Paper 7 and 9) (ITOPF, 20144; 2014e)
- AMSA management and disposal of oily waste and debris information.

15.4 Regulatory Approvals

The waste management plan will require the support of logistics to source storage and transport options and to obtain the necessary approvals required for contaminated waste transportation and disposal.

Temporary waste storage and treatment facilities established during an oil spill response may trigger the Category 61 prescribed premises thresholds under the *Environmental Protection Act 1986* and associated regulations. Where applicable, approvals and licences administered by the Department of Water and Environmental Regulation (DWER) may be required for the storage or treatment of wastes. As works approvals and licences are issued to specific premises, and suitable premises may not be identified until an incident occurs, obtaining these approvals in advance is generally not practicable. Consequently, incident-specific regulatory approvals will be sought from DWER as part of the waste management activation process.

Specific regulatory approvals required or potentially required are listed in Table 15-1.

Table 15-1: Regulatory approvals for waste management activities

Approval required	Authority	Process
S75 Emergency approval for temporary waste storage	DWER	1. Identification of suitable land for operations. 2. Preparation of indicative site plan and operational flowchart. 3. VOGA to request emergency approval for waste storage of DWER CEO. 4. Approval granted for 14 days. 5. Further approval requested for extra 14 days if required.
Approval of temporary laydown area	DWER	1. Design of temporary laydown area prepared for consultation with DWER, DTMI and DBCA. 2. VOGA apply for temporary licence at time of incident. 3. Required works commence. 4. Application received, and advertised in prescribed manner. 5. DER issue operating licence for lay-down area.

During offshore recovery operations, it may be beneficial as a waste reduction strategy to discharge low concentrations of oily water recovered back into the boomed area to reduce the bulking factor volume of oily water recovered.

Offshore discharges of oil in WA State waters also fall under WA *Pollution of Waters by Oil and Noxious Substances Act 1987*. If discharge of oily water becomes necessary, approval from:

- AMSA (Commonwealth waters), or
- DTMI (State waters) must be obtained through submission of the MARPOL Exception Form for discharges of oily water.

15.5 Key Waste Streams

VOGA's Emergency Response Logistics Management Plan [VOG-7000-RH-0008] appendices present a detailed list of waste streams and likely containment requirements for a typical remote shoreline impact and a vessel offshore booming and recovery operation.

15.5.1 Non-oiled Waste

Prior to impact, recovery of flotsam and jetsam that may be impacted by a spill will greatly reduce the type and volume of oiled waste generated. Pre-impact removal of organic and non-organic waste will be undertaken where time and logistic support is available.

15.5.2 Offshore Oily Waters

Assuming favourable conditions, vessels operating offshore will collect floating oil via trawling booms and skimmers.

Offshore discharges of oily water are specified through MARPOL regulations, which are in turn regulated by AMSA for Commonwealth waters, and the DTMI within State waters.

In the event that approval for discharge of the water phase is not obtained through AMSA and/or the DTMI, the complete collected fluids will remain in the collection tanks and all will be treated as a collected waste. In this event, the duration of containment and recovery operations will be reduced due to restricted available ullage.

15.5.3 Onshore Oily Waters

It is intended that shoreline storage of liquids will be of short duration, with third-party contractors removing waste as soon as is practicable. All temporary storage of liquids will be performed within bunded areas and as per regulatory requirements.

15.5.4 Solid Wastes

While oil-contaminated sand, rocks and debris from mechanical and manual cleanup operations will have considerable oil-contents (2–10%), recovery of these oils and cleaning of absorbed debris is difficult. At present, there are no readily available treatment options for these materials to reduce waste volumes from the operations, and disposal via landfill or incineration are the only options available.

Oily sands will be collected along the affected coastlines, skip bins will be distributed by telehandlers and readily accessible by cleanup crews. Wastes will then be either collected by operating mobile plant such as excavators, or through manual waste removal (bagged waste), and deposited into these bins.

In areas that are inaccessible by vehicles, barges may be used for the initial transfer operations, and transported to the marine operational base for pickup.

Oil-contaminated sands and soils recovered during the operations will be deemed requiring Class III or Class IV landfills for disposal. In the event that oils are collected in such a form as to be too contaminated for landfill disposal, yet not liquid enough to be incorporated into the waste oil stream, then these solids will be segregated and despatched for incineration.

15.5.5 Oily Organics

In conjunction with oil-contaminated sand, rocks and debris from mechanical and manual cleanup operations, it is anticipated that approximately 5% of the total solids stream will be organic in nature, consisting predominantly of seaweed, seagrasses and animal carcasses. In line with the waste hierarchy, it is desired to segregate these wastes and dispose to a composting facility to be turned into compost suitable for reuse.

Animal carcasses may be collected in plastic bags and stored in refrigerated containers were appropriate for later pathology testing or as directed by DBCA. Authorised third parties will transport the waste to a commercial composter.

15.5.6 Remote Location/Islands

Methods used for cleaning up shorelines on Islands or remote areas of coastline will be similar to those for mainland shorelines. However, unlike on the mainland, the options of large mechanical waste collectors (bulldozers), easily accessible accommodation and immediate waste transfer via trucks is not available. These logistical challenges are overcome through the use of vessels capable of shoreline landings, smaller machinery and helicopters to deliver equipment and personnel and remove collected waste.

Access and all cleanup activities will be conducted via vessels or helicopters and require the establishment of hot/cold/warn areas to mitigate contamination waste collection will generally be undertaken manually with waste collected in 20 kg bags to mitigate manual handling risks. As the response develops, tactical plans will establish if small mechanical equipment can be delivered to remote locations.

15.5.7 Oil Spill Equipment Cleanup

During and after response activities, all oil contaminated PPE and disposable equipment/items will be placed in separate plastic bags and transported in skips to a waste facility for final disposal. Reusable equipment will be placed in skips and transported to the boom maintenance area for cleaning.

15.6 Waste Assessment

Waste will generally be associated from two cleanup locations:

- At-sea response operations

- Shorelines.

Table 15-2 presents a summary of the type of waste generated from these two activities:

Table 15-2: Summary of waste generated

Cleanup location	Type of waste generated
At-sea response operations	• Non contaminated organic materials (pre-impact) • Recovered oil • Contaminated water/oil in water • Contaminated containment and recovery equipment • Containment/storage equipment • Vessel hull • Contaminated PPE, sorbent • Organic and non-organic flotsam and jetsam • Animal carcasses.
Shorelines	• Recovered oil • Water in oil • Contaminated substrata sand, pebbles, rocks • Organic and non-organic flotsam and jetsam • Contaminated organic material seaweed etc. • Animal carcasses • Contaminated recovery and storage equipment • Containment – 20 kg bags, drums, plastic sheeting etc. • PPE • Responders waste for habitation.

Shoreline cleanup and containment and recovery are likely to develop significant volumes of waste. However, particularly for shoreline cleanup, the amount generated will be significantly less given prudent work practices to minimise the amount of hard waste generated, and the likely impact being only a portion of the slick stranding, rather than the mass of volume assumed in shoreline cleanup waste calculations.

VOGA will leverage the waste hierarchy principles of waste reduction, reuse, recycling and disposal to minimise the amount of ultimate waste produced, thus reducing environmental and economic costs.

An assessment of waste estimates for containment and recovery and shoreline cleanup assumptions have guided VOGA to establish upper maximum waste volumes which have been planned for within this OPEP. Total volume of oil ashore from a single worst case spill trajectory is basis from which oil estimates are calculated using a bulking factor of 10 and in this case is 22,150 m^3 (Section 7.8.3). Oily waste water collected through at sea containment and recovery operations is estimated to be 9,600 m^3 (Section 7.6.1.1).

The best configuration of waste storage options will be chosen at the time of a spill to ensure the most appropriate size storage is allocated to land based and offshore waste collection. An estimation of resources required per 100 m of shoreline section, shore based responders and offshore containment and recovery operations is set out in the VOGA Emergency Response Logistics Plan [VOG-7000-RH-0008].

Waste recovery from open water and onshore will take several days to ramp up, which will provide time for shore-handling capacity to build sustainable storage and transport capacity.

Sufficient capacity at recovery sites both offshore and onshore to contain above quantities on a daily turnaround basis is required. Transfer points from offshore to onshore require capacity to offload liquid to tankers or vacuum trucks for transport to processing or temporary storage, or swap out of IBCs where these are being used will also be required.

15.7 Waste Management Implementation Guide

Table 15-3: Waste first response implementation guide

<table>
<tr><th>Tasks</th><th colspan="6">Waste management implementation guide</th></tr>
<tr><td rowspan="3">Waste minimisation strategy developed and implemented</td><td colspan="6">• Responder Induction to raise awareness of minimising collection or low/partial contaminated materials minimising collection or low/partial contaminated materials.
• At-sea operations – Decant waste water at sea as per the OSR JIP-17 http://oilspillresponseproject.org/sites/default/files/uploads/JIP-17-Decanting.pdf
• Offshore and onshore – where practical access pre-impact and remove all flotsam and jetsam, miscellaneous material from water and between low-high water mark.
• Sort and classify waste into appropriate waste streams ASAP at source.
• Ensure a control on operations to comply with minimisation strategy.
• Consideration or washable PPE in lieu of disposals where appropriate.
• Early establishment of Hot and Cold areas to avoid cross contamination.
• Temporary storage areas are adequately contained plastic sheeting/bunds to avoid secondary contamination.</td></tr>
<tr><th>Outcomes</th><th>Resources and source</th><th>48 hours</th><th>5 days</th><th>10 days</th><th>20 days</th></tr>
<tr><td>Both oily and non oily waste volumes are minimised.</td><td>Waste contractor engaged to develop strategy with VOGA ICT.</td><td>Preparation of waste management strategy, identification of resources required and relevant waste permits acquired.</td><td colspan="3">Implementation of plan and mobilisation of resources.</td></tr>
<tr><td>Waste segregation</td><td colspan="6">• Responders Induction on need for waste segregation on work sites to manage waste collection and temporary storage.
• Segregation to consider the final treatment and disposal options.
• Sorting waste at source.
• Use of multiple containers to aid segregation of waste aligned with disposal/treatment practices.</td></tr>
</table>

<table>
<tr><th>Tasks</th><th colspan="6">Waste management implementation guide</th></tr>
<tr><td rowspan="2"></td><td>Outcomes</td><td>Resources and source</td><td>48 hours</td><td>5 days</td><td>10 days</td><td>20 days</td></tr>
<tr><td>Waste is disposed of according to type.</td><td>Waste management strategy.</td><td>Induction package prepared.</td><td colspan="3">Responders undertake induction and waste management plan implemented.</td></tr>
<tr><td rowspan="3">At sea containment and recovery</td><td colspan="6">• Waste reduction – oil/water decanted back into the pocket of the boom to be re-skimmed and concentrated on-board. Oil-in-water concentration increases from 10% to at least 50%, thus reducing the bulking factor.
• Waste reduction – skimmers will be changed out to maximise the amount oil vs water captured during the process (i.e. brush/disk skimmers over weir skimmers).
• The use of brush/disk skimmers can provide 90% oil concentration.
• Waste storage on-vessel – vessels will use a combination of IBCs and tanks to store larger volumes of oil/water.
• Temporary waste storage at marine terminal – robust logistics chain to enable efficient vessel/terminal unloading of product with 24/7 operations moving waste to final waste solution. This practice can help even out surges in generation/collection of waste.
• Final waste movement – 24/7 operations from temporary storage waste to final waste solution.</td></tr>
<tr><td>Outcomes</td><td>Resources and source</td><td>48 hours</td><td>5 days</td><td>10 days</td><td>20 days</td></tr>
<tr><td>Oily waste water collected at sea</td><td>IBCs from waste contractor and towable storage barges from OSRO</td><td>Activation of waste contractor to supply IBCs
Activation of OSRO to supply towable waste storage barges</td><td>30 x IBC
6 x lancer barges</td><td>30 x IBC
6 x lancer barges</td><td>30 x IBC
6 x lancer barges</td></tr>
<tr><td>Shoreline cleanup</td><td colspan="6">• Pre-clean shorelines (where appropriate) of debris before oil strands to reduce solid waste.
• Waste reduction – manual over mechanical recovery. By applying this practice the bulking factor can be halved.
• Waste reduction – single bulk cleanup of shorelines rather than multiple cleanups. By applying this practice the bulking factor can be halved, however this practice can only be applied where NEBA process supports this.
• Waste storage on-site – utilising areas of natural containment. This practice can help even out surges in generation/collection of waste.</td></tr>
</table>

<table>
<tr><th>Tasks</th><th colspan="6">Waste management implementation guide</th></tr>
<tr><td rowspan="3"></td><td colspan="6">• Waste storage on-site – allowing product to be temporary stored in bunds and bins.
• Final waste movement – 24/7 operations from temporary storage waste to final waste solution.</td></tr>
<tr><td>Outcomes</td><td>Resources and source</td><td>48 hours</td><td>5 days</td><td>10 days</td><td>20 days</td></tr>
<tr><td>Waste storage options for various waste streams provided at each shoreline segment.</td><td>IBCs, skip bins, wheelie bins, plastic sheeting and bags provided by waste management contractor.
Portable toilets and refrigerators provided by hire company.</td><td>Waste management strategy for shoreline cleanup operations developed based on MES and SCAT.</td><td colspan="3">Waste management strategy for shoreline cleanup operations developed based on MES and SCAT.
Resources identified and mobilised.
For each 100 m segment:
18 x wheelie bins
11 x IBCs
16 x skip bins
1,800 x 20 kg wet/dry bags
6 x 20 m long plastic rolls
4 x portable toilets
1 x refrigerator
For each offshore team:
2 x skip bins
6 x IBCs
1 x refrigerator.</td></tr>
</table>

Section 16 – Relevant Person Engagement

16.1 Relevant Persons

Relevant Persons engagement is an important part of emergency management response, whether assisting with coordination of control and mitigation measures, liaison with regulatory bodies or responding to potential impacts on surrounding communities and businesses.

This section outlines the strategy to engage stakeholders during an OSR. The process for engaging relevant stakeholders pre-environmental plan approval or pre-campaign is addressed in the EP.

The stakeholders covered under this section of the plan include:

- Key stakeholders for regulatory approval purposes
- Influencers
- Interested parties (including communities, indigenous landowners and businesses) who are or may potentially be impacted by the oil spill or the associated response activities.

Key response/resource agencies are engaged through other sections of the ICT.

16.2 Relevant Persons Engagement Strategy

16.2.1 Overview

In the very unlikely event of a significant event occurring, VOGA's primary responsibility is to the health and safety of all personnel impacted by the spill or the spill response. The relevant person engagement process will at all times reflect and support this responsibility.

The purpose of the strategy is to ensure during an OSR, VOGA:

- Engage government agencies to obtain the appropriate approvals and address regulatory requirements during an OSR
- Manage/mitigate the impact to surrounding communities, commercial operations including fishing and other petroleum operators
- Keep stakeholders informed as required.

The strategy to engage relevant persons during an OSR is provided in the following section. The engagement can be broken down into five distinct phases:

1. Pre-activity.
2. Activity.
3. Post-spill/pre-exposure.
4. Post-spill/post-exposure.
5. Termination.

The nature and frequency of further and ongoing stakeholder engagement will depend on the scale, duration, impact and other specifics of each incident.

16.2.2 Pre-activity

During this stage of the project, the objective is to ensure that:

- Stakeholders have been defined, classified and consulted as appropriate
- Regulatory requirements are being met
- The socio-economic activities that may be impacted by a potential spill or the response are identified
- Stakeholder contacts list has been checked and updated, if required
- Capability to provide response has been confirmed and outlined in a plan to implement the strategy available.

16.2.3 Activity

During this stage of the project, the focus is to maintain contact details and ensure information on the project and associated EP is accessible. A dedicated email address will be available at all times to interested parties wishing to contact the company.

16.2.4 Post-spill/Pre-exposure

The purpose during this stage is to manage the potential impact that spill and response activities may have on stakeholders. This process is initiated as soon as a spill has occurred and the ICT is activated. During this stage, VOGA manages/mitigates the impact to stakeholders by:

- Continually identifying specific stakeholders who may potentially be impacted by the spill and response strategy
- Where possible, contacting relevant interested parties prior to impact and keeping these stakeholders regularly informed and engaged
- Providing regulatory notifications and updates
- Providing relevant safety information on the event and potential hazards and precautions associated with the spill and response activities
- Confirming the process to engage with stakeholders regarding potential socio-economic impacts the spill and associated response may have and recording stakeholder input and responses
- Providing information to media and engage influencers as required.

16.2.5 Post-spill/Post-exposure

The purpose of this stage is to manage the direct impact that the spill and response activities have on stakeholders. During this stage, VOGA manages and attempts to limit the impact to stakeholders by:

- Continuing to identify specific stakeholders who are being impacted by the spill and response strategy
- Providing relevant safety information on the event and potential hazards and precautions associated with the spill and response activities
- Engaging with relevant interested parties and keeping them regularly informed
- Implementing a process to monitor, report and record socio-economic impacts (positive and negative) as a direct result of a spill and spill response
- Where possible, implementing measures to manage or limit the direct socio-economic impact of the spill and spill response (e.g. counselling, establishing community and recreational centres, providing financial support)
- Providing regulatory notifications and updates
- Providing information to media and engage influencers as required.

16.2.6 Termination of Oil Spill Response

Community and stakeholder understandings and expectations will play a role in both the decision to terminate a response and the acceptability of that decision. Consultation with these groups would be undertaken by VOGA prior to any termination decisions being implemented.

It should be noted that although the OSR may be terminated, there will be a continued and ongoing consultation with stakeholders impacted by the oil spill until a resolution is achieved.

16.2.7 Roles and Responsibilities

The initial high-level division of engagement responsibilities can be summarised as follows:

- Stakeholder Liaison Officer – regulators, VOGA employees and VOGA contractors (not spill responders), VOGA Head Office.
- Logistics Officer – combat agencies; industry, including adjacent operators and contractors (spill responders).
- Public Information Officer:
  - Community Liaison – local communities and interested parties, business, non-governmental organisations
  - Media Liaison – local, national and international media
  - Public Information Controller – manage and coordinate all external communications.

The above three positions are located with the ICT and are involved in the regular debriefs and issuing of the IAP. These positions all report to the Corporate Command Operations Chief either directly or through the Stakeholder Liaison Officer.

16.2.8 Documentation and Record Keeping

All external communications occurring through the ICT, including with government, industry and community stakeholders, are documented in the ICT spill log or each officer's personal log. The Public Information Officer also records and manages all media inquiries and responses.

VOGA maintains comprehensive information on all identified stakeholders, including telephone, email and personnel details, and has access to an external email communications system in the event of impact to its own system.

Section 17 Operational and Scientific Monitoring

OSM is a key component of the environmental management document framework for offshore petroleum activities, which includes activity EPs and OPEPs. Operational monitoring is instrumental in providing situational awareness of a hydrocarbon spill, enabling the ICT to mount a timely and effective spill response and continually monitor the effectiveness of the response. Scientific monitoring is also the principal tool for determining the extent, severity and persistence of environmental impacts from a hydrocarbon spill and for informing resultant remediation activities.

VOGA has developed the Exploration and Survey Operations Operational and Scientific Monitoring Bridging Implementation Plan (OSM-BIP) [VOG-1100-YH-0018] which describes a program of monitoring oil pollution that will be adopted in the event of a hydrocarbon spill incident (Level 2–3) to marine waters relevant to the Exploration and Survey Operations activities. It aligns with the Joint Industry Operational and Scientific Monitoring Framework (APPEA, 2021) and describes how this Framework applies to Vermilion's activities and spill risks for the Wandoo Field Exploration Drilling Environment Plan [AUPD24001-VOG-1100-YH-0015].

The OSM-BIP is structured so that it can provide a flexible framework that can be adapted to individual spill incidents. A series of Operational Monitoring Plans (OMPs) and Scientific Monitoring Plans (SMPs) form part of the Joint Industry Framework and provide detail on monitoring design, standard operating procedures, data management and reporting. Details on personnel, resources, logistics and mobilisation times are outlined in the OSM-BIP. Table 17-1 lists the plans that are relevant to Vermilion's Survey and Exploration Drilling activities.

There are two types of monitoring that would occur following a Level 2–3 spill event:

- Operational Monitoring (OM) – which is undertaken during the course of the spill and includes any physical, chemical and biological assessments which may guide operational decisions such as selecting the appropriate response and mitigation methods and/or to determine when to terminate a response activity. This monitoring is additional to the activities (visual surveillance, tracking buoys, oil spill trajectory modelling and satellite tracking) performed as part of the Monitor and Evaluate Strategy. The design of operational monitoring requires judgements to be made about scope, methods, data inputs and outputs that are specific to the individual spill incident, balancing the operational needs of the response with the logistical and time constraints of gathering and processing information. There is a need for information to be collected and processed rapidly to suit response needs, with a lower level of sampling and accuracy needed than for scientific purposes. For details on initiation and termination criteria for OMs refer to the OSM-BIP.
- Scientific Monitoring (SM) – which can extend well beyond the termination of response operations. Scientific monitoring has objectives relating to attributing cause-effect interactions of the spill or associated response with changes to the surrounding environment. The SMs will be conducted on a wider study area, extending beyond the spill footprint, will be more systematic and quantitative and aim to account for natural or sampling variation. For further details on the SMs refer to the OSM-BIP.

Vermilion will review the initiation criteria for OMPs and SMPs (Provided in Section 9 of the Joint Industry Operational and Scientific Monitoring Framework (APPEA, 2021)) during the preparation of the initial IAPs, and subsequent IAPs. If any initiation criteria are met, then that relevant OMP and/or SMP will be activated via the relevant Monitoring Service Provider.

Table 17-1: Joint Industry OSM Plans relevant to Exploration Wells and Survey activities

Operational Monitoring	Relevant for Wandoo Facility and Well Construction EP spill scenarios
OM1: Hydrocarbon Characterisation	✓
OM2: Hydrocarbon in water assessment	✓
OM3: Hydrocarbon in sediment assessment	✓
OM4a: Surface dispersant effectiveness monitoring	✓
OM4b: Subsea dispersant injection effectiveness monitoring	×
OM5: Rapid Marine Fauna Surveillance	✓
OM6: Shoreline Cleanup Assessment	✓
Scientific Monitoring	
SM1: Water Quality Impact Assessment	✓
SM2: Sediment Quality Impact Assessment	✓
SM3: Intertidal and Coastal Habitat Assessment	✓
SM4: Seabirds and Shorebirds Assessment	✓
SM5: Marine Mega-fauna Assessment	✓
SM6: Benthic Habitat Assessment	✓
SM7: Marine fish and elasmobranch assemblages assessment	✓
SM8: Fisheries Impact Assessment	✓
SM9: Heritage Features Assessment	✓
SM10: Social Impact Assessment	✓

Section 18 – Health and Safety

VOGA is committed to the health and safety of all personnel involved in OSR. VOGA's company policies and procedures in regard to safe working practices will be maintained during all OSRs.

Key resources providing OSR support are provided with OH&S information (including Safety Datasheets) as part of the briefing pack.

AMSA has a specific health and safety guideline for marine oil spill operations which includes a risk assessment for OSR operations as well as Standard Operating Procedures for National Plan equipment. This information will be considered in the development of task-specific instructions.

All operational activities will include a process such as a Job Hazard Analysis (JHA) to identify hazards, the risk rating associated with hazards and mitigation measures to ensure a safe work environment.

Section 19 – Logistics Management

The VOGA Emergency Response Logistics Management Plan [VOG-7000-RH-0008] contains outputs from the identification of resources required and the scope of works/services required to deliver those resources. The plan provides details of the logistics support available to support the implementation of this.

On activation of the ICT for OSR, incident specific logistic plans will be developed to support effective logistics management and deployment. Depending on the size of logistics activities, SIMOPS plans may be developed to manage the hazards associated with multiple logistics interfaces within a confined area. The Logistics Officer is responsible for creating the logistics and SIMOPS plans.

Figure 19-1: Structure of VOGA logistics planning

Resource lists

- Resources required for each spill category and response strategy.
- Included in the OPPs.

Contractor scope of works/ services

- Resource specifications identified and matched with existing VOGA contractors. Capability gaps identified and filled with alternative contract arrangements/ agreements/memberships.
- Included in the Exploration and Survey Operations Oil Spill Response Capability Review [VOG-1100-YH-0019].

Logistics plan

- The plan is managed by VOGA logistics team, maintained outside of this OPEP because of its dynamic status. The Emergency Response Logistics Management Plan contains:
  - Logistics roles and responsibilities.
  - Activation of spill response resources.
  - Equipment categories and timelines.
  - Resources and services (aviation, marine, equipment, transport, waste, personnel, accomodation, scientific service providers).
  - Regional information.

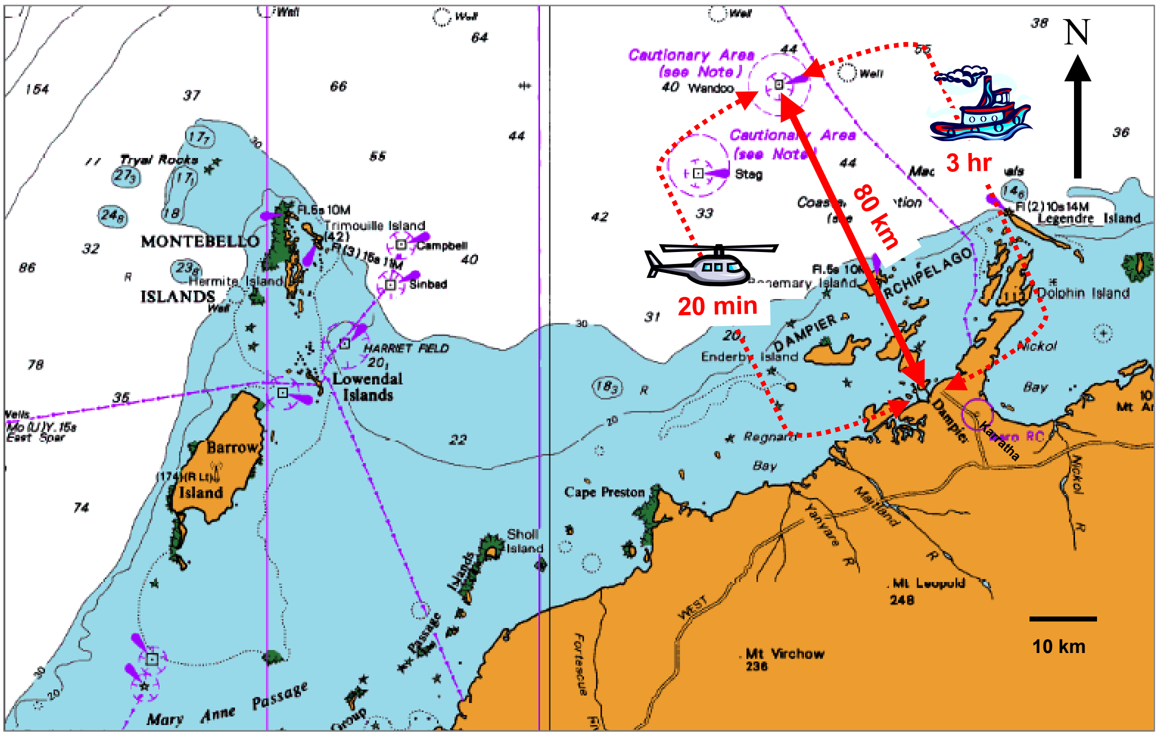
Table 19-1 provides approximate travel times by air and sea as well as distance in nautical miles between the Wandoo facilities and neighbouring locations. This information can be used to inform the aerial surveillance and aerial dispersant operations of travel times, distances and be used to estimate endurance out on site. Figure 19-2 depicts these travel times and distance on an image of a navigation chart.

Table 19-1: Travelling time between Wandoo facilities and neighbouring locations

Location	Approximate flying time to	Approximate sailing time	Distance (nm)
Wandoo Tanker/CALM Buoy	5 minutes	10 minutes	1.5
Karratha	20 minutes	n/a	48
Dampier	n/a	3.5 hours	35
North Rankin A	15 minutes	3.5 hours	38
Barrow Island	35 minutes	6.5 hours	65
Port Hedland	1 hour 15 minutes	12.5 hours	125
Onslow	1 hour 10 minutes	11.5 hours	115
Perth	2 hours 20 minutes	n/a	n/a

Note: Flying time based on S76 helicopter (@ 140 knots).

Figure 19-2: Distance and travel time to Wandoo facilities from Dampier



Section 20 – Tactical Response Plans

Oil Spill Tactical Response Plans (TRPs) identify site-specific response actions for locations predicted to be contacted by oil in a spill event. Development of these plans reduces the response time and improves the effectiveness of a response.

TRPs include photographs, maps, environmental sensitivity information, and detailed response information of use to responders such as booming locations.

The tactical planning process identifies how an oil spill IAP will be implemented at a specific location. In contrast to the broader OPEP documents, TRPs provide a response perspective with specific short-term actions and details that allow responders to best access, assess, and quickly respond to spills.

VOGA has access to shoreline tactical plans for priority shorelines, either previously obtained or available on request from the relevant titleholders. Priority was identified based primarily on locations with shoreline contact within 7 days and sensitivity rated very high or high, as per marine oil pollution risk assessment and protection priorities for Pilbara region released by WA DTMI (reference DTMI 307215, date October 2017), with consideration of extent and likelihood of shoreline contact.

A gap analysis of available information from titleholders and agencies against priority areas has been undertaken with assistance from DTMI and potential cooperative arrangements investigated (Table 20-1). Each listed titleholder has indicated agreement to provision of the relevant TRPs upon request by VOGA at the time of an incident.

Table 20-1 TRP availability

Priority location	Titleholder/Organisation with TRP
Dampier Archipelago	Pilbara Port Authority (PPA), Woodside, Santos, VOGA (Delambre Island)
Montebello Islands	Woodside, Santos
Barrow Island	Chevron
Legendre Island	Woodside, Santos, PPA
Lowendal Island Group	Woodside
Murion Islands	Woodside
Serrurier Island Group	Chevron
North West Cape	Woodside, Santos

Section 21 – Environmental Performance

The control measures, EPOs, EPSs and measurement criteria to be achieved in a spill response have been identified in Table 21-1.

Table 21-1: Environmental performance during a spill response

Environmental Performance Outcome	Control Measure	Environmental Performance Standard	Measurement Criteria
In the event of loss of hydrocarbons, implement NOPSEMA-accepted spill response documents.	Response – NOPSEMA-accepted Exploration and Survey Operations Oil Pollution Emergency Plan [AUPD24001-VOG-1100-YH-0016].	Oil spill response strategies shall be implemented in accordance with the Exploration and Survey Operations Oil Pollution Emergency Plan [AUPD24001-VOG-1100-YH-0016].	IAP records.
	Response – NOPSEMA-accepted Exploration and Survey Operations Operational and Scientific Monitoring Bridging Implementation Plan [VOG-1100-YH-0018].	Operational and scientific monitoring shall be implemented in accordance with the Exploration and Survey Operations Operational and Scientific Monitoring Bridging Implementation Plan [VOG-1100-YH-0018].	IAP records.
Monitoring, Evaluation and Surveillance			
To gather information from multiple sources to establish an accurate common operating picture as soon as possible and predict the fate and behaviour of the spill to validate planning assumptions and adjust response plans as	Response – oil spill trajectory monitoring.	Provide available data from monitor, evaluation and surveillance activities to oil spill trajectory modelling (OSTM) provider within 3 hours to help improve spill model accuracy.	IAP records.
		OSTM is updated every 48 hours using latest observational data.	IAP records.
	Response – visual surveillance.	Visual observation from aircraft (in daylight hours only) has been requested within 3 hours of a spill.	IAP records.
		Completed Visual Surveillance Observation Logs to be sent to IMT within 2 hours of observations being recorded.	Completed Visual Surveillance Observation Logs.
		1 x observer from platform and/or 1 x observer from vessels working in the field available for the first 20 days of a spill.	IAP records.

Environmental Performance Outcome	Control Measure	Environmental Performance Standard	Measurement Criteria
appropriate to the scenario.	Response – vessel surveillance.	Response vessels stand-off at night with lighting required for safety only.	IAP records.
	Response – tracking buoys.	Deploy tracking buoy close to leading edge of spill (providing it is safe to do so) within 2 hours of being made aware of the spill from the MODU.	IAP records.
		One satellite tracking buoy deployed each day for 4 days.	IAP records.
	Response – satellite imagery.	Satellite imagery requested within 3 hours.	IAP records.
	Response – MES.	Operational monitoring shall be available to inform IAP process prior to implementation of strategies that have an environmental impact (e.g. dispersant application).	IAP records.
		Available monitoring data incorporated into the Common Operating Picture and Operational NEBA at the end of each operational period to aid in response decision making.	IAP records.
		Response operations conducted during daylight hours only.	IAP records.
	Response – OSM – BIP.	Activate the Joint Industry Operational and Scientific Monitoring Service Providers using instructions in Section 13 of the Exploration and Survey Operations OSM-BIP [VOG-1100-YH-0018] within 4 hours of Operational Monitoring initiation criteria being met.	IAP records.
	Response – consultation.	Relevant notifications have been made to government departments within 2 hours of a spill.	IAP records.
VOGA maintains capability to implement operational monitoring the first 20 days of an OPP2 spill.	Response – personnel capability.	Minimum monitor, evaluation and surveillance response personnel available for the first 20 days of the spill response, includes: • 1 x Wandoo B platform observer • 2 x AMOSC staff or Core Group members with oil spill assessment training • Vessel observers and crew • Aerial observers and crew.	Contracts, memberships and pre-qualification records are current.
	Response – service agreements.	VOGA maintains the following agreements to maintain operational response capabilities for the duration of the activities provided for under this OPEP:	Contracts, memberships and pre-qualification records are current.

Environmental Performance Outcome	Control Measure	Environmental Performance Standard	Measurement Criteria
		• AMOSC membership • Fastwave contract • Aviation support services • Marine support services.	
Oiled Wildlife			
Minimise and mitigate the number of wildlife oiled based on the spill scenario, upon initiation of the strategy.	Response – first strike kits.	Six first strike response kits are activated within 48 hours of a spill.	IAP records.
	Response – OWR containers.	Two OWR containers are mobilised to an OWR facility location in Dampier within 48 hours.	IAP records.
	Response – IAP sub-plan.	IAP wildlife sub-plan developed within 48 hours.	IAP records.
	Response – staging area.	Wildlife rescue and staging site establishment is activated within 72 hours.	IAP records.
	Response – OSM – BIP.	In liaison with DBCA, initiate a wildlife first strike response within a minimum of 24 hours (if required) of a confirmed or imminent wildlife contact, as reported by OM5: Rapid Marine Fauna Assessment.	IAP records.
Minimise potential impacts on fauna caused by oiled wildlife response activities.	Response – induction and training.	Induction and training shall cover any special handling requirements to minimise further detrimental impacts to flora and fauna.	Induction material and records.
	Response – consultation.	Wildlife strategy including hazing, if required, shall be developed in consultation with the DBCA and DTMI.	Consultation records with DBCA and DTMI.
VOGA maintains capability to implement operational monitoring for the first 20 days of an OPP2 spill.	Response – personnel capability.	An Oiled Wildlife Advisor and Wildlife Division Coordinator are activated and assigned to the ICT once the WAOWRP is activated.	IAP records.
		Minimum OWR response personnel available for the first 20 days of the spill response, including: • 1 x DBCA OWA • 1 x OWR Division Coordinator.	Contracts, memberships and pre-qualification records are current.
	Response – service agreements.	VOGA maintains the following agreements to maintain operational response capabilities for the duration of the activities provided for under this OPEP:	Contracts, memberships and pre-qualification records are current.

Environmental Performance Outcome	Control Measure	Environmental Performance Standard	Measurement Criteria
		• AMOSC membership • Waste management contract • Marine support services.	
Dispersant Application			
Increase the rate of biodegradation to reduce the environmental impact from surface oil and oil stranding on shoreline sensitivities by the effective use of dispersant, upon initiation of the strategy.	Response – dispersant.	Dispersant application (aerial and marine) shall be available to be deployed when Wandoo Crude is most amenable to dispersant for the most effective results.	IAP records.
		Dispersant mobilised within 6 hours.	IAP records.
		Total of 30 m^3 of dispersant from the AMOSC stockpile available within the first 10 days.	IAP records.
		Sufficient dispersant available to be applied within the dispersant application zone.	IAP records.
	Response – dispersant staging area.	Establish an aerial and marine operating base and within 24 hours.	IAP records.
	Response – aerial dispersant application.	Activate FWADC via AMOSC to conduct test spray run within 6 hours.	IAP records.
		Undertake operational NEBA to determine if dispersant strategy will be implemented within 2 hours of completion of test run.	NEBA.
		Aerial dispersant will be available to be applied within 30 hours.	IAP records.
		Two air tractors to be available to deliver two sorties within 48 hours, upon initiation of the aerial dispersant strategy.	IAP records.
	Response – marine dispersant application.	Marine dispersant will be available to be applied within 30 hours.	IAP records.
		Two vessels with afedo dispersant spray system to be available within 48 hours, upon initiation of the marine dispersant strategy.	IAP records.
	Response – OSM-BIP.	The effectiveness of the dispersant will be continuously monitored during application, using the Joint Industry Operational Monitoring Plan (OM4a): Surface Chemical Dispersant Fate and Effectiveness Assessment.	Operational dispersant efficacy report.
VOGA maintains capability to implement operational	Response – personnel capability.	Minimum chemical dispersion response personnel available for the duration of the spill response, including:	Contracts, memberships and pre-qualification records are current.

Environmental Performance Outcome	Control Measure	Environmental Performance Standard	Measurement Criteria
monitoring for the first 20 days of an OPP2 spill.		• 2 x AAC sourced from Core Group • 2 x crew to operate afedo spray sets • Vessel observers and crew • Aerial observers and crew.	
	Response – service agreements.	VOGA maintains the following agreements to maintain chemical dispersion response capabilities for the duration of the activities provided for under this OPEP: • AMOSC membership • OSRL Service Agreement and GDS • TOLL contract • Aviation support services • Marine support services.	Contracts, memberships and pre-qualification records are current.
Minimise environmental impacts associated with dispersant application.	Response – dispersant.	Use of Oil Spill Control Register (OSCA) approved dispersants only.	IAP records.
		Dispersant Application Zone in place that excludes the following areas from the spraying of dispersant: • Waters shallower than 20 m (lowest astronomical tide) • Within 4 km of Coastal Waters maritime boundary • Within 10 km of Australian Marine Parks (excluding Multiple Use Zones) • Within 10 km of State Marine Protected Areas • Within 10 km of World National and Commonwealth Heritage List areas • Within 10 km of sensitive receptors (e.g. Glomar Shoals and Rankin Bank).	IAP records.
	Response – OSM – BIP.	No dispersant applied within the vicinity of protected marine fauna (based on fauna observations as per the Exploration and Survey Operations OSM-BIP [VOG-1100-YH-0018].	IAP records.

Environmental Performance Outcome	Control Measure	Environmental Performance Standard	Measurement Criteria
		Conduct surface dispersant efficacy monitoring in accordance with the Exploration and Survey Operations Operational and Scientific Monitoring – Bridging Implementation Plan [VOG-1100-YH-0018] and OM4a: Surface Dispersant Effectiveness Monitoring (APPEA, 2021).	IAP records.
Mechanical dispersion			
Assist natural dispersion of oil into the water column to reduce environmental impact from surface oil, upon initiation of the strategy.	Response – mechanical dispersion.	Mechanical dispersion is a secondary strategy that will be used opportunistically based on IAP outcomes.	IAP records.
		Mechanical dispersion shall only be undertaken in water deeper than 20 m.	IAP records.
Containment and Recovery			
Reduce overall volume of surface oil to minimise impacts to environmental sensitivities via containment and recovery, upon initiation of the strategy.	Response – booming equipment.	Containment and recovery booming and high-capacity skimmer systems will be available to be deployed within 48 hours.	IAP records.
		Equipment available for containment and recovery will be suitable for the hydrocarbon type.	Oil spill equipment maintenance records.
Minimise environmental impacts associated with improperly deployed containment and recovery equipment.	Response – personnel training.	Deployments shall be undertaken by trained incident response personnel.	Response personnel training records.
VOGA maintains capability to implement operational monitoring for the first 20 days of an OPP2 spill.	Response – personnel capability.	Minimum containment and recovery response personnel available for the first 20 days of the spill response, including: • 5 x crew to operate NOFI current buster/ro-booms • 7 x crew for boom deployment and recovery, oil storage and transfer management • 12 x crew to operate high-capacity skimmers • Vessel observers and crew	Contracts, memberships and pre-qualification records are current.

Environmental Performance Outcome	Control Measure	Environmental Performance Standard	Measurement Criteria
		• Aerial observers and crew.	
	Response – service agreements.	VOGA maintains the following agreements to maintain operational response capabilities for the duration of the activities provided for under this OPEP: • AMOSC membership • AMOSPlan Industry Mutual Aid (equipment) • TOLL contract • Aviation support services • Marine support services.	Contracts, memberships and pre-qualification records are current.
Protection and Deflection			
Minimise environmental impacts to priority near-shore environmental sensitivities via protection and deflection, upon initiation of the strategy.	Response – boom and ancillary equipment.	Protection and deflection equipment and resources required to be deployed to protection priorities on-site within 48 hours of the spill event.	IAP records.
		Equipment available for protection and deflection will be suitable for the hydrocarbon type, and access to equipment will be maintained.	Oil spill equipment maintenance records.
	Response – shoreline personnel.	One trained Team Leader and 4 operators to be available on-site within 48 hours.	IAP records.
	Response – NEBA.	An operational NEBA is undertaken to determine net benefits with DTMI to confirm implementation of the response strategy.	Operational NEBA.
Minimise environmental impacts associated with improperly deployed protection and deflection equipment.	Response – personnel training.	Deployments shall be undertaken by trained incident response personnel.	Response personnel training records.
	Response – tactical response plans.	Tactical response plans will be available for VOGA priority shorelines.	Tactical response plans.
Minimise impact to fauna from protection and deflection activities.	Response – shoreline response.	Establish demarcation zones for vehicle and personnel movement considering sensitive vegetation, bird nesting and roosting areas, and turtle nesting habitat.	IAP records.
	Response – shoreline response consultation.	Protection and deflection booms shall only be installed after consultation with the DTMI and consideration of the sensitive receptors outlined in the Environment Plans.	Consultation records with DTMI.
Minimise impact to cultural heritage and		In consultation with DTMI, engage with First Nation groups to facilitate site surveys and tagging out and protection of identified areas or importance.	Consultation records.

Environmental Performance Outcome	Control Measure	Environmental Performance Standard	Measurement Criteria
social values from protection and deflection activities.			
VOGA maintains capability to implement operational monitoring for the first 20 days of an OPP2 spill.	Response – personnel capability.	Minimum protection and deflection response personnel available for the duration of the spill response, including: • 10 x trained boom operators/team leaders • 40 x labourers • Vessel observers and crew • Aerial observers and crew.	Contracts, memberships and pre-qualification records are current.
	Response – service agreements.	VOGA maintains the following agreements to maintain protection and deflection response capabilities for the duration of the activities provided for under this OPEP: • AMOSC membership • AMOSPlan Industry Mutual Aid (equipment) • Waste management contract • Aviation support services • Marine support services.	Contracts, memberships and pre-qualification records are current.
Shoreline Cleanup			
Remove stranded hydrocarbons from shorelines without causing greater environmental impact than leaving the hydrocarbons in-situ, upon initiation of the strategy.	Response – boom and ancillary equipment.	Shoreline cleanup equipment and resources required to be deployed to protection priorities on-site within 48 hours of the spill event.	IAP records.
		20 shoreline cleanup kits available onsite within 48 hours.	IAP records.
		Shoreline cleanup will implement a three-stage methodology: • Emergency phase – collection of oil floating close to the shore and pooled bulk oil removal. • Project phase – removal of stranded oil and oiled shoreline material that cannot be cleaned in-situ.	IAP records.

Environmental Performance Outcome	Control Measure	Environmental Performance Standard	Measurement Criteria
		• Polishing phase – final cleanup of light oil contamination and removal of oil stains, where the incident Spill Impact Mitigation Assessment demonstrates this is necessary.	
	Response – shoreline personnel.	Shoreline teams will be informed of how to minimise damage to flora and avoid encounters with fauna.	Response personnel training records.
		Shoreline teams will complete surveys before cleanup team complete assignments, so that priority locations are worked on and suitable techniques are used.	Completed SCAT survey records.
	Response – shoreline waste.	Waste storage and transport plan will be developed within 72 hours of the spill event.	IAP records.
	Response – NEBA.	An operational NEBA is undertaken to determine net benefits with DTMI to confirm implementation of the response strategy.	Operational NEBA.
Minimise impact to key shoreline habitats associated with shoreline cleanup activities.	Response – shoreline cleanup operational restrictions.	Methods and techniques employed for shoreline cleanup operations will be based on the information provided by the SCAT teams and in consultation with DTMI representatives.	Shoreline assessment form. Consultation records with relevant persons.
		Sorbents shall not be used for shoreline cleanup on high energy shorelines.	IAP records.
		Mechanical removal and high-pressure flushing shall not be undertaken in mangrove areas.	Restriction noted in tactical response plans.
		Water from high pressure flushing shall not be directed in between rocks and onto sediment.	Restriction noted in tactical response plans.
		All shoreline cleanup sites will be zoned and marked before cleanup operations commence to minimise secondary contamination and minimise the mixing of clean and oiled sediment and shoreline substrates	Restrictions noted in tactical response plans.
		Steam cleaning shall not be undertaken on surfaces that support living plants or animals. Tactical response plans will be available for VOGA priority shorelines outlining potential cleanup and waste collection methodologies.	Tactical response plans.
		Establish demarcation zones for vehicle and personnel movement considering sensitive vegetation, bird nesting and roosting areas, and turtle nesting habitat.	Restrictions noted in tactical response plans.

Environmental Performance Outcome	Control Measure	Environmental Performance Standard	Measurement Criteria
Minimise impact to cultural heritage and social values from shoreline cleanup activities.	Response – shoreline response consultation.	In consultation with DTMI, engage with First Nation groups to facilitate site surveys and tagging out and protection of identified areas or importance.	Consultation records.
VOGA maintains capability to implement operational monitoring for the first 20 days of an OPP2 spill.	Response – personnel capability.	Minimum shoreline cleanup response personnel available for the duration of the spill response, including: • 1 x shoreline cleanup trainers • 10 x shoreline cleanup team leaders • 275 x shoreline cleanup labourers • Personnel for boom deployment and recovery, oil storage and transfer management • Vessel observers and crew • Aerial observers and crew.	Contracts, memberships and pre-qualification records are current.
	Response – service agreements.	VOGA maintains the following agreements to maintain shoreline cleanup response capabilities for the duration of the activities provided for under this OPEP: • AMOSC membership • AMOSPlan Industry Mutual Aid (equipment) • Aviation support services • Marine support services.	Contracts, memberships and pre-qualification records are current.
Operational and Scientific Monitoring			
In the event of loss of hydrocarbons, implement NOPSEMA-accepted operational and scientific monitoring documents.	Response – OSM-BIP.	OMPs and SMPs will be activated in accordance with the initiation criteria provided in Table 9-1 and 9-2 of the Joint Industry OSM Framework (APPEA, 2021).	Incident Action Plan and Incident Log confirm OMPs and SMPs are activated in accordance with the initiation criteria provided in Table 9-1 and 9-2 of the Joint Industry OSM Framework (APPEA, 2021).

Environmental Performance Outcome	Control Measure	Environmental Performance Standard	Measurement Criteria
		Initiation criteria of OMPs and SMPs will be reviewed during the preparation of the initial IAPs and subsequent IAPs; and if any criteria are met, relevant OMPs and SMPs will be activated.	IAP records.
		Mobilisation and implementation of OMPs and SMPs will be undertaken in accordance with the indicative timeframes and sequencing described in Part B of the Exploration and Survey Operations OSM-BIP [VOG-1100-YH-0018].	Incident log and monitoring records.
		Implementation of operational and scientific monitoring will comply with the Minimum Standards listed in Appendix A of the Joint Industry OSM Framework (APPEA, 2021).	Incident log and monitoring records.
		Once post-spill SMP monitoring reports are drafted they will be peer reviewed by an expert panel.	Monitoring records.
Termination Criteria			
Response strategy end points do not cause more harm to the environment than good.	Response – OPP termination criteria.	OPPs will be terminated in accordance with the termination criteria provided in this OPEP.	IAP and Incident Log confirm OPPs are terminated in accordance with the termination criteria provided in this OPEP.
		Consultation with Government and relevant persons will be undertaken by VOGA prior to any termination decisions being implemented.	Consultation records.
	Response – OSM-BIP.	OMPs and SMPs will be terminated in accordance with the termination criteria provided in Tables 9-1 and 9-2 of the Joint Industry OSM Framework (APPEA, 2021).	IAP and Incident Log confirm OMPs and SMPs are terminated in accordance with the termination criteria provided in Tables 9-1 and 9-2 of the Joint Industry OSM Framework (APPEA, 2021).
ICT Personnel			
Activate and sustain an ICT for the duration of response activities.	Response – ICT personnel.	ICT planning meeting is convened within 3 hours to confirm and document incident response aim; priorities and objectives; response strategies and priority resources required to be requested.	IAP records.

Environmental Performance Outcome	Control Measure	Environmental Performance Standard	Measurement Criteria
		Capability for resources are maintained for the duration of a response through the IAP process. Forecast resource requirements are based on real time incident data. Capability assurance will be monitored and adjusted if required to suit to the particular situation.	IAP records. Shift logs.
Waste			
Remove hydrocarbons from the environment without causing greater environmental impact than leaving the hydrocarbons in-situ.	Response – waste equipment.	Activation of waste contractor to supply IBCs and OSRO to supply towable waste storage barges within 48 hours.	IAP records.
		Ten IBCs and 2 lancer barges onsite within 5 days of activation for oily waste water collected at sea.	IAP records.
		IBCs, skip bins, wheelie bins, plastic sheeting and wet/dry bags commensurate to the risk will be provided by the waste management contractor by day 5 for shoreline waste collection.	IAP records.
		For each offshore team, skip bins, IBCs and refrigerators commensurate to the risk will be provided by the waste management contractor by day 5 for shoreline waste collection.	IAP records.
VOGA maintains capability to implement operational monitoring for the first 20 days of an OPP2 spill.	Response – service agreements.	VOGA maintains the following agreements to maintain waste response capabilities for the duration of the activities provided for under this OPEP: • Waste management contractor • Marine support services.	Contracts, memberships and pre-qualification records are current.

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Appendices

Appendix A
Safety Data Sheets

SAFETY DATA SHEET

1. IDENTIFICATION OF THE MATERIAL AND SUPPLIER

1.1 Product identifier

Product name	**WANDOO CRUDE OIL**
Synonyms	AMPOLEX WANDOO CRUDE OIL (FORMERLY) ● VERMILION WANDOO CRUDE OIL

1.2 Uses and uses advised against

Uses	CRUDE OIL

1.3 Details of the supplier of the product

Supplier name	**VERMILION OIL & GAS AUSTRALIA PTY LTD**
Address	Level 5, 30 The Esplenade, Perth, WA, 6000, AUSTRALIA
Telephone	(08) 9215 0300

1.4 Emergency telephone numbers

Emergency	(08) 9215 0300

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

CLASSIFIED AS HAZARDOUS ACCORDING TO SAFE WORK AUSTRALIA CRITERIA

Physical Hazards

Not classified as a Physical Hazard

Health Hazards

Germ Cell Mutagenicity: Category 1B
Carcinogenicity: Category 1B

Environmental Hazards

Not classified as an Environmental Hazard

2.2 GHS Label elements

Signal word **DANGER**

Pictograms

Hazard statements

H340	May cause genetic defects.
H350	May cause cancer.

Prevention statements

P202	Do not handle until all safety precautions have been read and understood.
P280	Wear protective gloves/protective clothing/eye protection/face protection/hearing protection.

Response statements

P308 + P313	IF exposed or concerned: Get medical advice/ attention.

Storage statements

P405	Store locked up.

Disposal statements

P501 Dispose of contents/container in accordance with relevant regulations.

2.3 Other hazards

No information provided.

3. COMPOSITION/ INFORMATION ON INGREDIENTS

3.1 Substances / Mixtures

Ingredient	CAS Number	EC Number	Content
MINERAL OIL (UNTREATED AND MILDLY TREATED)	-	-	>60%
NAPHTHENIC HYDROCARBON(S)	-	-	<1%
OLEFINIC HYDROCARBONS	-	-	<10%

4. FIRST AID MEASURES

4.1 Description of first aid measures

Eye If in eyes, hold eyelids apart and flush continuously with running water. Continue flushing until advised to stop by a Poisons Information Centre, a doctor, or for at least 15 minutes.

Inhalation If inhaled, remove from contaminated area. To protect rescuer, use a Type A (Organic vapour) respirator or an Air-line respirator (in poorly ventilated areas). Apply artificial respiration if not breathing.

Skin If skin or hair contact occurs, remove contaminated clothing and flush skin and hair with running water. Continue flushing with water until advised to stop by a Poisons Information Centre or a doctor.

Ingestion For advice, contact a Poisons Information Centre on 13 11 26 (Australia Wide) or a doctor (at once). If swallowed, do not induce vomiting.

First aid facilities Eye wash facilities and safety shower should be available.

4.2 Most important symptoms and effects, both acute and delayed

See Section 11 for more detailed information on health effects and symptoms.

4.3 Immediate medical attention and special treatment needed

Treat symptomatically.

5. FIRE FIGHTING MEASURES

5.1 Extinguishing media

Dry agent, carbon dioxide or foam. Prevent contamination of drains and waterways.

5.2 Special hazards arising from the substance or mixture

Combustible. May evolve carbon oxides and hydrocarbons when heated to decomposition. Eliminate all ignition sources including cigarettes, open flames, spark producing switches/tools, pilot lights, heaters, naked lights, mobile phones, etc when handling. Earth containers when dispensing fluids.

5.3 Advice for firefighters

Evacuate area and contact emergency services. Toxic gases may be evolved in a fire situation. Remain upwind and notify those downwind of hazard. Wear full protective equipment including Self Contained Breathing Apparatus (SCBA) when combating fire. Use waterfog to cool intact containers and nearby storage areas.

5.4 Hazchem code

None allocated.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Wear Personal Protective Equipment (PPE) as detailed in section 8 of the SDS. Clear area of all unprotected personnel. Ventilate area where possible.

6.2 Environmental precautions

Prevent product from entering drains and waterways.

6.3 Methods of cleaning up

Contain spillage, then cover / absorb spill with non-combustible absorbent material (vermiculite, sand, or similar), collect and place in suitable containers for disposal.

6.4 Reference to other sections

See Sections 8 and 13 for exposure controls and disposal.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Before use carefully read the product label. Use of safe work practices are recommended to avoid eye or skin contact and inhalation. Observe good personal hygiene, including washing hands before eating. Prohibit eating, drinking and smoking in contaminated areas.

7.2 Conditions for safe storage, including any incompatibilities

Store in a cool, dry, well ventilated area, removed from incompatible substances, heat or ignition sources and foodstuffs. Ensure containers are adequately labelled, protected from physical damage and sealed when not in use. Check regularly for leaks or spills. Large storage areas should have appropriate fire protection systems.

7.3 Specific end uses

No information provided.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

8.1 Control parameters

Exposure standards

Ingredient	Reference	TWA		STEL	
		ppm	mg/m³	ppm	mg/m³
Mineral Oil Mist	SWA [AUS]	--	5	--	--

Biological limits

No biological limit values have been entered for this product.

8.2 Exposure controls

Engineering controls Avoid inhalation. Use in well ventilated areas. Where an inhalation risk exists, mechanical extraction ventilation is recommended. Flammable/explosive vapours may accumulate in poorly ventilated areas. Vapours are heavier than air and may travel some distance to an ignition source and flash back. Maintain vapour levels below the recommended exposure standard.

PPE

Eye / Face Wear splash-proof goggles.

Hands Wear PVC or rubber gloves. When using large quantities or where heavy contamination is likely, wear Viton® or nitrile gloves.

Body When using large quantities or where heavy contamination is likely, wear coveralls.

Respiratory Where an inhalation risk exists, wear a Type A (Organic vapour) respirator.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

Appearance	DARK OILY VISCOUS LIQUID
Odour	MINERAL OIL ODOUR
Flammability	CLASS C2 COMBUSTIBLE
Flash point	144°C
Boiling point	NOT AVAILABLE
Melting point	NOT AVAILABLE
Evaporation rate	NOT AVAILABLE

9.1 Information on basic physical and chemical properties

pH	NOT AVAILABLE
Vapour density	NOT AVAILABLE
Solubility (water)	INSOLUBLE
Vapour pressure	25 kPa @ 37.8°C
Upper explosion limit	NOT AVAILABLE
Lower explosion limit	NOT AVAILABLE
Partition coefficient	NOT AVAILABLE
Autoignition temperature	NOT AVAILABLE
Decomposition temperature	NOT AVAILABLE
Viscosity	NOT AVAILABLE
Explosive properties	NOT AVAILABLE
Oxidising properties	NOT AVAILABLE
Odour threshold	NOT AVAILABLE

9.2 Other information

Density	0.9368 kg/L @ 15°C
Pour point	-30°C

10. STABILITY AND REACTIVITY

10.1 Reactivity
Carefully review all information provided in sections 10.2 to 10.6.

10.2 Chemical stability
Stable under recommended conditions of storage.

10.3 Possibility of hazardous reactions
Hazardous polymerisation is not expected to occur.

10.4 Conditions to avoid
Avoid shock, friction, heavy impact, heat, sparks, open flames and other ignition sources.

10.5 Incompatible materials
Incompatible with oxidising agents (e.g. hypochlorites), acids (e.g. nitric acid), alkalis (e.g. sodium hydroxide), heat and ignition sources.

10.6 Hazardous decomposition products
May evolve carbon oxides and hydrocarbons when heated to decomposition.

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity	May be harmful if swallowed, in contact with skin, and/or if inhaled. The toxicity profile is dictated by the levels of polycyclic aromatic hydrocarbons (PAHs).
Skin	Contact may result in drying and defatting of the skin, rash and dermatitis.
Eye	Contact may result in irritation, lacrimation and redness.
Sensitisation	Not classified as causing skin or respiratory sensitisation.
Mutagenicity	May cause genetic defects.
Carcinogenicity	Over exposure to crude petroleum products has been associated with higher rates of cancer as they contain polycyclic aromatic hydrocarbons (PAHs).
Reproductive	Certain petroleum streams have been shown to be developmentally toxic by the dermal route of exposure. Effects include increased incidence of resorptions and decrease in foetal body weight. Whilst the developmental toxicity of several refinery streams may be correlated with polycyclic aromatic hydrocarbon (PAH) concentrations, other compositional characteristics may also influence toxicity.
STOT - single exposure	Over exposure may result in irritation of the nose and throat, coughing, dizziness, drowsiness and headache.
STOT - repeated exposure	Not classified as causing organ damage from repeated exposure.
Aspiration	Aspiration or inhalation may cause chemical pneumonitis and pulmonary oedema.

12. ECOLOGICAL INFORMATION

12.1 Toxicity
No information provided.

12.2 Persistence and degradability
No information provided.

12.3 Bioaccumulative potential
No information provided.

12.4 Mobility in soil
No information provided.

12.5 Other adverse effects
No information provided.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Waste disposal For small amounts, absorb with sand, vermiculite or similar and dispose of to an approved landfill site. Contact the manufacturer/supplier for additional information if disposing of large quantities (if required). Prevent contamination of drains and waterways as aquatic life may be threatened and environmental damage may result.

Legislation Dispose of in accordance with relevant local legislation.

14. TRANSPORT INFORMATION

NOT CLASSIFIED AS A DANGEROUS GOOD BY THE CRITERIA OF THE ADG CODE, IMDG OR IATA

	LAND TRANSPORT (ADG)	SEA TRANSPORT (IMDG / IMO)	AIR TRANSPORT (IATA / ICAO)
14.1 UN Number	None allocated.	None allocated.	None allocated.
14.2 Proper Shipping Name	None allocated.	None allocated.	None allocated.
14.3 Transport hazard class	None allocated.	None allocated.	None allocated.
14.4 Packing Group	None allocated.	None allocated.	None allocated.

14.5 Environmental hazards
No information provided.

14.6 Special precautions for user

Hazchem code None allocated.

15. REGULATORY INFORMATION

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

Poison schedule A poison schedule number has not been allocated to this product using the criteria in the Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP).

Classifications Safe Work Australia criteria is based on the Globally Harmonised System (GHS) of Classification and Labelling of Chemicals (GHS Revision 7).

Inventory listings **AUSTRALIA: AIIC (Australian Inventory of Industrial Chemicals)**
All components are listed on AIIC, or are exempt.

16. OTHER INFORMATION

Additional information

MINERAL OILS - NON REFINED: Animal experiments and human experience have shown cancer risks when handling mineral oils. Such cases are reported to have occurred in conditions where poor occupational hygiene practices resulted in prolonged skin contact. CLEANING MINERAL OIL CONTAMINATED CLOTHING: Cleaners are advised that when cleaning oil contaminated clothing it is essential that freshly distilled solvent is used for each batch, including final rinse, as even filtered solvent will leave oil residues.

EXPOSURE STANDARDS - TIME WEIGHTED AVERAGES: Exposure standards are established on the premise of an 8 hour work period of normal intensity, under normal climatic conditions and where a 16 hour break between shifts exists to enable the body to eliminate absorbed contaminants. In the following circumstances, exposure standards must be reduced: Strenuous work conditions; hot, humid climates; high altitude conditions; extended shifts (which increase the exposure period and shorten the period of recuperation).

PERSONAL PROTECTIVE EQUIPMENT GUIDELINES:
The recommendation for protective equipment contained within this report is provided as a guide only. Factors such as form of product, method of application, working environment, quantity used, product concentration and the availability of engineering controls should be considered before final selection of personal protective equipment is made.

HEALTH EFFECTS FROM EXPOSURE:
It should be noted that the effects from exposure to this product will depend on several factors including: form of product; frequency and duration of use; quantity used; effectiveness of control measures; protective equipment used and method of application. Given that it is impractical to prepare a report which would encompass all possible scenarios, it is anticipated that users will assess the risks and apply control methods where appropriate.

Abbreviations

ACGIH	American Conference of Governmental Industrial Hygienists
CAS #	Chemical Abstract Service number - used to uniquely identify chemical compounds
CNS	Central Nervous System
EC No.	EC No - European Community Number
EMS	Emergency Schedules (Emergency Procedures for Ships Carrying Dangerous Goods)
GHS	Globally Harmonized System
GTEPG	Group Text Emergency Procedure Guide
IARC	International Agency for Research on Cancer
LC50	Lethal Concentration, 50% / Median Lethal Concentration
LD50	Lethal Dose, 50% / Median Lethal Dose
mg/m^3	Milligrams per Cubic Metre
OEL	Occupational Exposure Limit
pH	relates to hydrogen ion concentration using a scale of 0 (high acidic) to 14 (highly alkaline).
ppm	Parts Per Million
STEL	Short-Term Exposure Limit
STOT-RE	Specific target organ toxicity (repeated exposure)
STOT-SE	Specific target organ toxicity (single exposure)
SUSMP	Standard for the Uniform Scheduling of Medicines and Poisons
SWA	Safe Work Australia
TLV	Threshold Limit Value
TWA	Time Weighted Average

Report status

This document has been compiled by RMT on behalf of the manufacturer, importer or supplier of the product and serves as their Safety Data Sheet ('SDS').

It is based on information concerning the product which has been provided to RMT by the manufacturer, importer or supplier or obtained from third party sources and is believed to represent the current state of knowledge as to the appropriate safety and handling precautions for the product at the time of issue. Further clarification regarding any aspect of the product should be obtained directly from the manufacturer, importer or supplier.

While RMT has taken all due care to include accurate and up-to-date information in this SDS, it does not provide any warranty as to accuracy or completeness. As far as lawfully possible, RMT accepts no liability for any loss, injury or damage (including consequential loss) which may be suffered or incurred by any person as a consequence of their reliance on the information contained in this SDS.

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[End of SDS]

Diesel 10

Automotive Diesel Fuel

Description

Diesel 10 is a special purpose light distillate fuel for use in high speed diesel engines (i.e. those operating at greater than 800 rpm), in services involving frequent and relatively wide variations in loads and speeds. It is used in private automotive vehicles, commercial fleet uses (on and off road), marine and industrial applications.

Performance Features

Diesel 10 is formulated to deliver adequate lubricity, to help protect fuel pumps and injectors from excessive wear. The cloud point is controlled on a regional and seasonal basis for the purposes of delivering operability across Australia.

Shell Diesel 10 is an Ultra Low Sulphur Diesel fuel. The sulphur content is controlled to less than 10 mg/kg

Shell Dieseline 10 specification meets and exceeds the US ASTM D975 and is equivalent to the European EN590 diesel specifications.

Applications

Diesel 10 is an Ultra Low Sulphur Diesel fuel designed for modern high-speed compression ignition engines. The diesel meets all the requirements of the Australian Fuel Quality Standards Act 2000 (Cth) and has a maximum sulphur content of 10 ppm.

This fuel is suitable for use in modern engines that are fitted with Euro 5/6 or V/VI emission control systems..

Health, Safety and Environment

Guidance on health and safety is available on the appropriate Safety Data Sheet which can be obtained from the Viva Energy Technical Help Desk or from www.Vivaenergy.com.au

Storage

Drums of fuel should be stored in an upright position under cover protected from rain an diret sunlight or with drum top covers to prevent ingress of water. Ensure buildings are well ventilated.

Product in an unopened drum should be acceptable for use in a 12 month period. Product stored for longer than 12 months or in containers that have been openned should be check to verify freedom from water, contamination or degradation.

Specifications / Approvals / Recommendations

Viva Energy Diesel 10 is manufactured to meet the specifications of:

Australian Fuel Quality Standards Act 2000
Fuel Standard (Diesel) Determination 2019
AS 3570 -1998 for Cold Flow Properties

Diesel 10

Automotive Diesel Fuel

Typical Characteristics			
Properties	**Units**	**Methods**	**DL 10Typical**
Density @ 15°C	kg/m^3	ASTM D1298 / D4052	840 (820-850 max)
Viscosity @ 40°C	mm^2/s	ASTM D445	2.0-4.5
Flash Point	°C	ASTM D93	70 (61.5 min)
Sulphur	mg/kg	ASTM D2622/D5453	10 max
Cetane Index	-	ASTM D4737	49 (46 min)
Distillation - 95%	°C		360 max
Water	mg/kg	ASTM D6304	70 (200 max)
Ash	% mass	ASTM D482	0.02 (0.1 max)
Sediment	% mass	ASTM D473	0.002 (0.01 max)
Filterability Test	-	IP 387	1.01 (2.0 max)
Strong Acid Number	mg KOH/gm	ASTM D664/D974	Nil
Total Acid Number	mg KOH/gm	ASTM D664/D974	<0.1 (2.5 max)
Copper Corrosion	-	ASTM D130	1a
Lubricity (HFRR test)	µm	IP 450	400 (460 max)
Conductivity	pS/m	ASTM D2624	100 (50 min)
FAME Content	%v/v	EN14078 or declaration	0 (5.0 max)

Technical Help Desk	
Phone	**1300 134 205**
Email	**technicalhelpdesk@vivaenergy.com.au**

Appendix B
Net Environmental Benefit Analysis (NEBA)

1 The NEBA Process

The Net Environmental Benefit Analysis (NEBA) process provides a means to determine the environmental gain/reduction from implementing each response strategy by considering the potential impacts on each identified protection priority, and will enable informed decisions to be made.

1.1 Responsibility to Complete the NEBA

A NEBA is most likely to be undertaken by the Environment Unit team leader with assistance from the Planning Chief. Advice from the Operations Chief regarding the execution of response strategies (i.e. limitations, constraints, advantages of strategy); and the Resource Unit team leader or Logistics Chief regarding resource availability will also be sought.

1.2 Information Requirements for the NEBA Process

- A copy of the OPP for the spill scenario
- Current situation report (SITREP from) that includes details about the spill, weather, currents and tides, action taken to date, forecast situation
- Oil spill trajectory model outputs from the OSCP
- Forecast oil spill trajectory model outputs based on real time spill and metocean conditions
- Preferred response options from the OSCP
- Priority protection areas/resources from the OPP
- Sensitive resources at risk from oiling
- Dispersant efficacy laboratory data
- Outputs from monitoring, evaluation and surveillance (MES) operations (e.g. aerial surveillance)
- Knowledge of response strategy impacts, advantages, constraints and limitations as outlined in the EPs.

1.3 How Data is used in the NEBA Process

Once oil type, quantity, real-time weather information and a trajectory pathway are known, the sensitivities within the ZPI need to be identified. Review the protection priority ranking that has been provided in the OPPs and consider:

- Outputs from OSTM analysis:

  - the probability of impact – will the response strategy reduce the probability of impact sensitive receptor?
  - minimum time to impact (days) – will the response strategy increase the number of days before impact sensitive receptor?
  - severity of impact (quantity of oil) – will the response strategy reduce the average and/or total amount of oil to impact sensitive receptor?

- Impacts associated with the proposed response strategy – will the response operation have more of a negative impact than untreated oil?
- The recovery time of the sensitive receptor after exposure to hydrocarbons – is recovery time likely to be short or long term?

1.4 Recommended Response Strategies and Controls

Response strategy recommendations are made at the conclusion of the NEBA process and controls identified to minimise the impacts associated with response operations. Development of response strategy controls is the last step of the NEBA process to ensure that the operation does not have an more of a negative impact than the spill alone. Controls are defined according to:

- Risk, impacts and benefits associated with each strategy and whether it is consistent with the EP
- Environmental sensitivities and their priority (environmental significance, severity of impact and recovery time) as per Table 1 and Table 2
- Seasonal and migratory patterns as per Table 2
- Fish and coral spawning times whale aggregation periods
- State (WA) jurisdictional requirements and approvals.

Controls are used to mitigate the risks associated with response strategies and are defined for hazards in the EPs.

Consideration of the environmental benefit for each strategy has also been considered when preparing the Oil Pollution Plans in the OPEP and are represented in Table 2. This information is used in the NEBA when assessing proposed response strategies and attention should be paid to the notes that accompany the headings in this table.

For each sensitive receptor, independently assess each response strategy for suitability by determining whether its use will result in an increase or decrease in environmental benefit. If there are conflicting outcomes for a particular response option then the sensitive receptor with the higher priority becomes the preferred response option.

A check of the decision then needs to be made to ensure that the risks and impacts associated with the response options are consistent with those identified in the EPs. If the risks and impacts are not consistent with those identified in the EPs then the following will occur:

- Response strategy controls are identified and assessed

- An alternative response strategy is assessed, or
- An application for approval to implement the response strategy will be made.

This process is consistent with the spill response phase of Figure 3-1 of the Wandoo Field OSCP.

1.5 Protection Priorities

A decision must be made as to which sensitive receptors have the highest protection and/or clean-up priority and which response strategy/strategies will result in an overall net environmental benefit. Priority shorelines and habitats are mangroves, turtle nesting beaches during nesting and hatching season and significant bird breeding/nesting sites. Table 1 is a graphic representation of protection priorities for habitats or shoreline considering the recovery time and potential impact from oil.

Table 1: Protection priority matrix (obtained from AMOSC training material)

		RECOVERY TIME RAPID ⟷ SLOW			
		<1 year	2-5 years	5-10 years	>10 years
Potential Impact Rank	Slight	Low	Low	Low	Medium
	Minor	Low	Medium	Medium	High
	Major	Low	Medium	High	High
	Severe	Medium	High	High	High

1.6 NEBA Frequency

The NEBA will be completed on the following timeline:

- Within 24 hours of the spill as part of the OPEP
- Every 24 hours as part of the Incident Action Plan cycle
- As required if the situation changes beyond what is planned for and response strategies require evaluation
- Until termination criteria are met for response strategies and ultimately the incident.

1.7 Decision Making Toolbox

1.7.1 Overview

A number of tools exist that can aid the Environment Unit leader and Planning Chief in completing a NEBA for an oil spill response. Specific sections within the OSCP and associated EPs are identified in the following two sections.

1.7.2 References in the OSCP and EP that can Assist in Completing the NEBA Template

The following sections of the OSCP may assist the Environment Unit leader and Planning Chief to complete the NEBA template:

- Key sensitivities and potential impacts
- Response strategies
- Termination criteria
- Oil Pollution Plans
- OSTM outputs.

The following sections of the EPs can assist the Planning Chief to complete the NEBA template:

- Description of the environment and sensitivity maps
- Impact assessment of oil spill scenarios and response strategies.

Table 2 NEBA Matrix

Sensitivity	Protection Priority[1] **(based on likelihood of impact, severity of impact and recovery time)**	Seasonal presence in Zone of Potential Impact												Response Strategy **(↑ Increase in environmental benefit; ↓ Decrease in environmental benefit; X not applicable)**					
		J	F	M	A	M	J	J	A	S	O	N	D	Monitor and evaluate[2]	Chemical dispersant[3]	Mechanical dispersion[4]	Contain and recover[5]	Protect and deflect[6]	Shoreline clean-up[7]
Ecological																			
Whales (resting/calving)	High (T,M)							✓	✓	✓	✓			↑	↓	↑	↑	X	X
Dugongs (foraging)	High (M)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	↑	↓	↑	↑	X	X
Dolphins	High (M)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	↑	↓	↑	↑	X	X
Sharks	High (T,M)			✓	✓	✓	✓							↑	↓	↑	↑	X	X
Turtle nesting	High (T,M)	✓	✓	✓						✓	✓	✓	✓	↑	↑	↑	↑	↑	↑
Migratory birds	High (T,M)	✓	✓	✓	✓					✓	✓	✓	✓	↑	↑	↑	↑	↑	↑
Sea birds	Medium	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	↑	↑	↑	↑	X	X
Shore birds	Medium	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	↑	↑	↑	↑	↑	↑
Coral spawning	Medium	✓	✓	✓	✓					✓	✓	✓	✓	↑	↓	↑	↑	X	X
Habitat/Ecosystem																			
Mangroves	High	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	↑	↑	↑	↑	↑	↓
Intertidal rocky reef	Medium	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	↑	↓	↓	↑	X	X
Coral reef	Medium	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	↑	↓	↓	↑	X	X
Seagrasses	Medium	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	↑	↓	↓	↑	X	X
Marshland	Medium	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	↑	↑	↑	↑	↑	↓
Mudflats	Medium	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	↑	↑	↑	↑	↑	↓
Subtidal rocky reef	Low	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	↑	↓	↓	↑	X	X
Sandy beaches	Low	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	↑	↑	↑	↑	↑	↑
Rocky shore	Low	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	↑	↑	↑	↑	↑	X
Open waters	Low	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	↑	↓	↑	↑	X	X

Sensitivity	Protection Priority[1] **(based on likelihood of impact, severity of impact and recovery time)**	Seasonal presence in Zone of Potential Impact												Response Strategy **(↑ Increase in environmental benefit; ↓ Decrease in environmental benefit; X not applicable)**					
		J	F	M	A	M	J	J	A	S	O	N	D	Monitor and evaluate[2]	Chemical dispersant [3]	Mechanical dispersion[4]	Contain and recover[5]	Protect and deflect[6]	Shoreline clean-up[7]
Socioeconomic																			
Protected shipwrecks	Low	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	↑	↓	↓	↑	↑	X
Fisheries	Low	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	↑	↓	↓	↑	↑	X
Petroleum activity	Low	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	↑	↑	↑	↑	↑	X

1 Protection priority: This ranking is based on a combination of factors including the likelihood of impact (time of year), severity of impact (type of exposure to the sensitivity, where the sensitivity is listed as Threatened (T) or Migratory (M) under the EPBC Act) and recovery time after exposure to hydrocarbons. Table 6 1 can be used to assess the risk of sensitivity).

2 Monitor and evaluate: This strategy is important for gathering and maintaining situational awareness throughout a response and will always have a positive benefit.

3 Chemical dispersant: Each sensitivity in the above table must be assessed independently and each strategy must also be assessed independently. Where chemical dispersant has been given a ↓, this indicates that when used alone chemical dispersant will reduce the overall environmental benefit.

The purpose of applying chemical dispersant is to break up the surface oil into small droplets of oil and to suspend the oil through the water column to accelerate the breakdown process through biodegradation. Effective dispersant application is capable of reducing the amount of oil that could potentially reach the shoreline as a surface slick.

For some species/habitats the use of chemical dispersants has been shown to reduce the severity of hydrocarbon impact. Dispersing oil into the water column reduces the quantity of oil on the surface, subsequently reducing the amount of oil that can strand and smother any resource in which it comes into contact with, i.e. mangrove pneumatophores (rhizomes that grow upwards vertically out of the mud – used for respiration and salt balance). Mangroves support a vast ecosystem of organisms below the water surface, as do seagrass beds. Dispersed oil in the water column is likely to have an adverse impact compared with oil remaining on the sea surface.

4 Mechanical dispersion: This strategy will have a positive benefit where it is beneficial to assist with the natural dispersion process, encouraging an oil slick to evaporate and mix becoming suspended within the water column where it can be more easily biodegraded. Mechanical dispersion will be more effective on smaller spills where the expected fate of the hydrocarbon is to evaporate and disperse within 24-72 hours or where it is used to assist with chemical dispersion when sea conditions are calm.

5 Containment and recovery: The containment of an oil slick with boom and recovery using mechanical devices minimises the severity of impact to sensitivities by reducing the quantity of product that could come in to contact with sensitivity. Where it is operationally feasible to use this equipment the result will have a positive environmental benefit.

6 Protection and deflection: The deployment of protection and deflection boom can assist with minimising the potential impact and/or deflecting an oil slick away from a known sensitivity towards an area where collection can be more effective. This strategy is dependent on the right environmental conditions and habitat type, however it has the capacity to have a very positive environmental benefit.

7 Shoreline clean-up: Where shoreline clean-up has been given a ↓, this indicates that the use of equipment, machinery and personnel in that environment is likely to have negative effect, potentially causing more damage and reducing the recovery and environmental benefit to that sensitivity.

NOTE: A NEBA is a decision-making process and will ultimately result in a trade-off of priorities and response strategies. It is possible for a response strategy to be used for one sensitivity – even if it has been identified that this response option may not benefit one or several other sensitivities. The final outcome of the response however should result in an overall net environment benefit.

1.8 NEBA Template

NET ENVIRONMENTAL BENEFIT ANALYSIS FOR ASSESSING OIL SPILL RESPONSE STRATEGIES	
Response strategy being assessed (one NEBA for each strategy):	
Operational period for which response strategy is being considered:	
Date and time response required: (specify to whom and their role)	
Names of persons contributing to the NEBA (environment unit):	
Factors for consideration when completing this NEBA: **Spill dependant factors** – quantity spilled, aerial coverage, oil thickness and character, oil viscosity **Site dependant factors** – water depth, wind speed, wave height, current speed **Equipment/operator dependent factors** – mobilization time, typical oil treatment rate, availability of operators, logistical limitations, safety limitations. **Ecological resources at risk** – sensitive and vulnerable resources at risk of oiling, expected and potential damage to resources, recovery potential of the resources, importance of resources, likelihood and extent to which oil will be persistent.	
Spill specific information:	
1. What is the oil type and how much has been spilled? Is it a continuous spill?	
2. What are the conditions on site? *Weather – current temperature, wind speed, forecast weather conditions* *Currents and tides – real time and forecast*	
3. How is the oil expected to weather? *Consider rate of spreading, evaporation, emulsification, natural dispersion, dilution etc.*	
4. What response measures have been used and how effective have they been? *Use visual observation of dispersant effectiveness guideline (OSRL handbook); and observations from aerial and vessel based observations.*	
5. Where is the oil expected to go? *Consider oil spill trajectory models, 3D modelling of sub surface oiling concentrations and changes in characteristics of oil over time. Use the outputs from trajectory models to inform this step (both pre-incident models and real time models).*	

6. What is the expected time to impact of sensitive receptors?

Use the outputs from trajectory models to inform this step (both pre-incident models and real time models).

7. How much oil is expected to strand on sensitive receptors?

Use the outputs from trajectory models to inform this step (both pre-incident models and real time models).

8. What is the probability (likelihood) of oil impacting sensitive receptors?

Use the outputs from trajectory models to inform this step (both pre-incident models and real time models).

Effectiveness of response strategies:

9. How effective is the response strategy likely to be?

Use pre incident modelling, laboratory efficacy testing and in-situ dispersant testing (if available) to inform this step.

Consider the likelihood of an effective at-sea recovery operation removing the bulk of the oil including equipment and personnel required. Will the Boom Encounter Rate will be sufficient to warrant the effort to respond with this method? Use BER calculations in OSCP.

Consider the effectiveness of booming operations for protection and deflection.

Consider effectiveness and appropriateness of shoreline clean-up methods.

10. What is the window of opportunity?

As oil weathers it becomes less amenable to chemical dispersants, are the required personnel available eg. aerial surveillance to support aerial spraying?

How fast is the oil spreading will it be of a sufficient thickness for effective containment and recovery?

Understanding the impacts associated with response strategies:

11. Is the environmental impact of the response strategy likely to be less than the impact of untreated oil?

How vulnerable and acutely sensitive to oil are the surface, sub-surface and coastal resources?

Consider seasonality, oil spill trajectory model and water depth. Acute sensitivity is resource specific and a function of their tolerance to the chemical toxicity and physical smothering of the oil.

12. What potential impacts could oil and/or the response strategy have on wildlife?

Consider seasonality of wildlife patterns, depth of water, distance from coastline. Refer to Table 3 NEBA matrix for seasonality information.

13. How persistent will the oil be?

Consider the wave exposure of the shoreline and the oil type. Dispersed oil is usually rapidly diluted and biodegraded, unless it becomes entrained in deep muddy seabed sediments where it could remain indefinitely.

14. How important is the resource?

Consider importance to community, adjacent ecosystems (productivity), biodiversity, rarity and commercial importance.

15. Can the response strategy be applied safely and effectively?

Consider standard operating procedures and risk assessment prepared by AMSA

16. Have necessary approvals been obtained?

Dispersant application (NOPSEMA accepted OSCP; State ESC approval)

17. What are the potential impacts of the response strategy ?

Refer to Hazard Assessment tables in EPs

18. What controls could mitigate these risks?

Refer to Hazard Assessment tables in EPs

What is the conclusion of the analysis?

Is the response strategy appropriate from the environment group's point of view?

What are the Environment Group's recommendations and advice for this response strategy in terms of response controls?

E.g. what should responders do to prevent unwanted impacts?

Position	**Agree with recommendation**	**Disagree with recommendation**
Environment Unit leader sign off:		
Planning Chief sign off:		
Incident Commander sign off:		

Appendix C
Exploration and Survey Operations Operational and Scientific Monitoring Bridging Implementation Plan (OSM-BIP) [VOG-1100-YH-0018]

VERMILION
Oil & Gas
Australia Pty. Ltd.

VERMILION OIL & GAS AUSTRALIA

Exploration and Survey Operations Operational and Scientific Monitoring Bridging Implementation Plan

VOG-1100-YH-0018

Revision	Date	Originator	Checker	Approver
1	2 September 2026	Social Resources	HSE Manager	Engineering Manager

Revision History

Revision	Date	Description	Originator	Checker	Approver
0	30 March 2026	For Use	MW	NJ	BG
1	2 September 2026	Updates to SCAT capability	MW	NJ	BG

Distribution List

No.	Location
1	VOGA Perth Office Document Control
2	VOGA Intranet
3	Wandoo B Platform – HSE MS Library

Table of Contents

Overview

This Operational and Scientific Monitoring-Bridging Implementation Plan (OSM-BIP) is presented in two parts:

- Part A: *Preparedness* outlines the relationship between Vermilion Oil and Gas Australia (Vermilion) environmental management document framework and the Joint Industry Operational and Scientific Monitoring (OSM) Framework (APPEA, 2021).
- Part B: *Implementation* provides operationally focussed guidance for Vermilion personnel and OSM Service Providers and/or sub-contracted Monitoring Service Providers to coordinate the implementation of monitoring plans.

Part A Preparedness

Preparedness outlines the relationship between Vermilion Oil and Gas Australia (Vermilion) environmental management document framework and the Joint Industry OSM Framework (APPEA, 2021).

Section 1 Introduction

1.1 Background

OSM is a key component of the environmental management document framework supporting offshore petroleum activities, alongside Environment Plans (EP) and Oil Pollution Emergency Plans (OPEP). Vermilion 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 Australian Energy Producers (AEP) Environment Publications Webpage.

The framework contains two primary monitoring components; operational monitoring (OM) and scientific monitoring (SM). OM aims to provide situational awareness of a hydrocarbon spill, enabling Incident Management Teams (ICT) to arrange timely and effective spill response and continually monitor the effectiveness of the response. SM is implemented to determine the extent, severity and persistence of environmental impacts from a hydrocarbon spill as well as inform potential remediation activities.

As outlined in NOPSEMA's Regulatory Advice Statement (RAS) (NOPSEMA, 2021) regarding APPEAs Joint Industry OSM Framework, each Titleholder is required to develop a Bridging Implementation Plan (this document) that explains how the Framework aligns with their activities, oil spill risks and internal management systems. Appendix A provides guidance on the RAS requirements and reference to the relevant section of this document (or the broader suite of environmental management framework documents) which addresses each requirement.

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

Mobilisation of OSM should follow the process listed in Section 12.

Table 1-1: Key documents in Vermilion's environmental management framework

VOGA documents	Description
Wandoo Field Exploration Drilling Environment Plan [AUPD24001-VOG-1100-YH-0015] and Wandoo Field Geotechnical and Geophysical Survey EP [AUPD24001-VOG-1100-YH-0014]	Each EP describes the activity, 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, credible spill scenarios, potential impacts from hydrocarbon spills and the environment that may be affected (EMBA).
Exploration and Survey Operations Oil Pollution Emergency Plan (OPEP) [AUPD24001-VOG-1100-YH-0016]	Provides the planning and preparedness elements of oil spill response for Vermilion's Exploration and Survey Operations activities. It includes detail on the Vermilion incident management process, approach to response planning, an overview of response strategies and performance management aspects. Provides notification and activation requirements, detailed implementation guidance for individual response strategies and spill response support plans.
Vermilion Oil and Gas Australia Exploration and Survey Operations	The purpose of this document is to understand the required and current capability for VOGA's oil spill response preparedness. Capability is used in the context of this document as the arrangements, contracts, Memoranda of Understanding (MoU), directories and

VOGA documents	Description
- Oil Spill Response Capability Review [VOG-1100-YH-0019]	agreements in place with service providers and personnel who may be involved in response efforts for an oil spill incident.
Vermilion Oil and Gas Australia Emergency Response Logistics Management Plan [VOG-7000-RH-0008]	This document contains details of contractors and service providers engaged to undertake oil spill response activities and supporting services such as transport and accommodation.
Vermilion Oil and Gas Australia Wandoo Emergency Response Plan (ERP) [VOG-2000-RD-0017]	Outlines the emergency response procedures for Vermilion operations, including marine maintenance, and drilling and completions activities conducted in the Wandoo Field. It provides guidance on the initial response process, responder checklists, reference guides and Incident Command Team forms.
Vermilion Oil and Gas Australia Emergency Contact List [VOG-2000-RD-0050]	Contains all relevant contact and communications information to enable effective communication amongst the response personnel and external stakeholders, including relevant OSM contacts.

1.2 Scope

This Operational and Scientific Monitoring – Bridging Implementation Plan (OSM-BIP) addresses the requirements of the Offshore Petroleum Greenhouse Gas Storage (Environment) Regulations 2023 (OPGGS(E) Regulations) for Vermilion activities within the Wandoo Field Exploration Drilling Environment Plan [AUPD24001-VOG-1100-YH-0015] and Wandoo Field Geotechnical and Geophysical Survey EP [AUPD24001-VOG-1100-YH-0014]. This BIP supersedes Vermilion's Wandoo Field Operational and Scientific Monitoring Plan [WAN-2000-RD-0001.03].

A Field Change Management: Management of Change (MoC) Screening Checklist (No. 6642) has been compiled to document Vermilion's transition to, and adoption of, the Joint Industry OSM Framework via this OSM-BIP. This MoC also describes the process for replacing accepted SM and OM components within existing Vermilion OPEPs. It is accompanied by technical note Joint Industry OSM Gap Analysis [VOG-1000-RH-0037], that contains a comparison of the OMPs and SMPs in the previous Operational and Scientific Monitoring Plan [WAN-2000-RD-0001.03] and the Joint Industry OSM Framework to ensure that performance and capability is not diminished by adoption of the framework.

This OSM-BIP addresses the Vermilion Wandoo Field Exploration Drilling Environment Plan [AUPD24001-VOG-1100-YH-0015] and Wandoo Field Geotechnical and Geophysical Survey EP [AUPD24001-VOG-1100-YH-0014]. OSM requirements for the Wandoo Facility (operations and well construction) will be managed via the Wandoo Facility OSM-BIP [VOG-1100-RG-0002].

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

Section 2 OSM Planning Area and Monitoring Priorities

2.1 OSM Planning Area

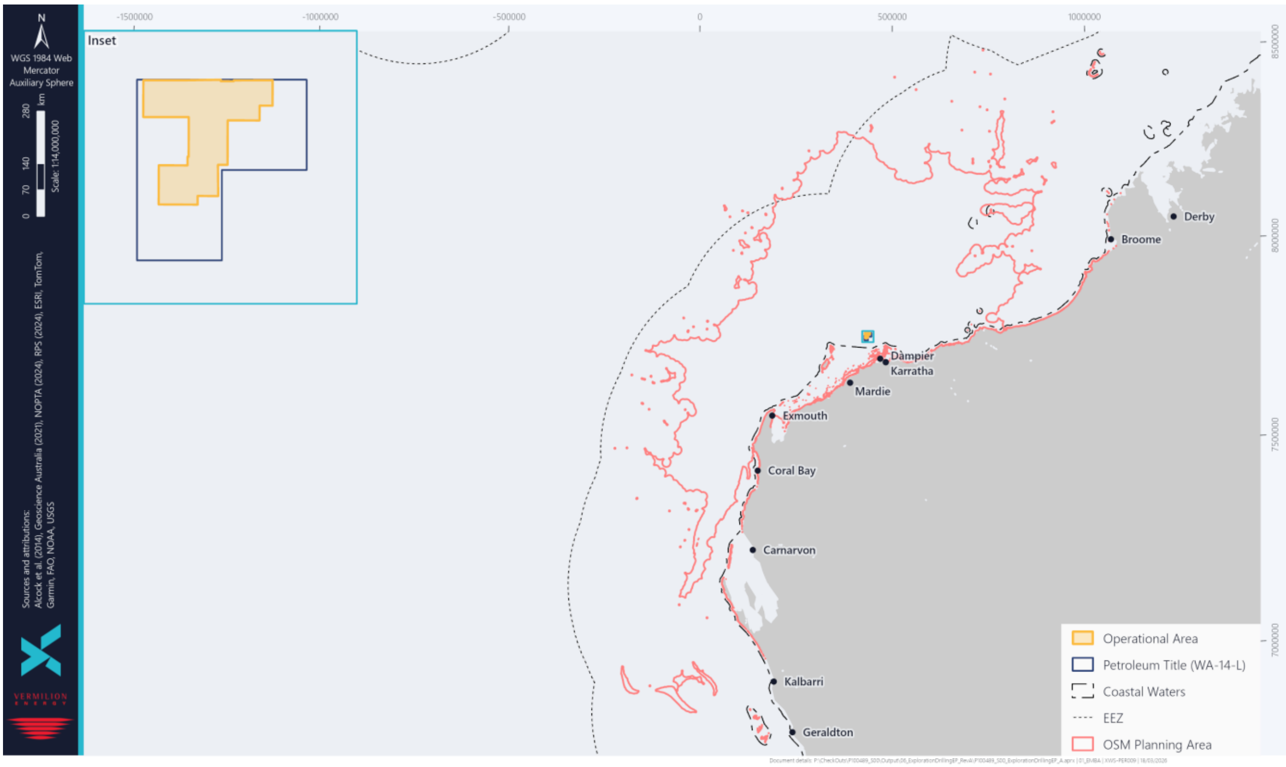
This OSM-BIP provides monitoring guidance and arrangements for Vermilion's Exploration Drilling and Geotechnical and Geophysical Survey activities. An OSM Planning Area has been prepared to represent these activities and the resultant geographical extent of this OSM-BIP (Figure 2-1). The OSM Planning Area is aligned to the Environment that May be Affected (referred to in the Exploration Drilling EP and Geotechnical and Geophysical Survey EP) and 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 corresponds generally with potential for exceedance of water quality triggers
- 10 ppb entrained hydrocarbons represents the low exposure zone and corresponds generally with potential for exceedance of water quality triggers.

The OSM Planning Area is based on the above low thresholds as outlined in the NOPSEMA Information Paper: Application of oil spill modelling in Environment Plans (NOPSEMA, 2025). The OSM Planning Area (all based on the low thresholds) can be considered as the absolute outer limit of OSM efforts for the Exploration Drilling and Geotechnical and Geophysical Survey activities.

For a description of the environment within the EMBA/OSM Planning Area, refer to the activity EP. The EPs include 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.

Figure 2-1: OSM Planning Area



2.2 Monitoring Priorities

Sensitive receptors were identified through analysis of hydrocarbon spill modelling results against the location of key sensitive receptors with high conservation value; including habitat (e.g. State/Commonwealth protected areas), species (e.g. protected species), International Union of Conservation of Nature (IUCN) marine protected area categories, and important socio-economic/heritage values.

Monitoring prioritisation during a spill should focus on sensitive receptors with the highest risk of adverse consequences. For planning purposes, monitoring priorities have been drawn from the key receptor locations and sensitivities identified in the OPEP (Section 7.8.2.1 and 7.8.2.2).

2.2.1 Assess Spill Exposure Risk using Trajectory Modelling

Oil spill modelling provides useful tool for assessing monitoring priorities, as it predicts the probability and minimum time at which individual receptors may be contacted. Receptors predicted to be contacted sooner and with higher probability are prioritised for monitoring, as there is little opportunity for pre-contact data collection. By contrast, receptors predicted to have longer contact times may allow for the collection of reactive baseline data prior to impact.

Vermilion has assessed oil spill modelling results for its Exploration Drilling activity to identify these priority receptors. Table 2-1 presents the modelling results for the subsea LOWC of 26,678 m^3 of crude over 35 days and Table 2-2 present the modelling results for the 300 m^3 MDO spill resulting from a vessel collision (which also represents the MDO spill for the Field Geotechnical and Geophysical Survey activity).

The modelling results presented below include receptors predicted to be contacted at the low thresholds for entrained (≥10 ppb), dissolved (≥10 ppb), floating (≥1 g/m^2), and shoreline contact (≥10 g/m^2) within 14 days at a probability >5%. Appendix B lists these receptors and identifies their relevant OMPs and SMPs.

Supplementary information on receptor presence, distribution, seasonality, and where relevant, reproductive state is provided in Appendix C.

The inclusion of entrained hydrocarbons at concentrations greater than 10 ppb is used to denote exposure but does not necessarily imply toxicity. For entrained whole-oil droplets, the toxic fraction is small, as many hydrocarbon constituents remain sequestered and not bioavailable (French-McCay 2024). During the initial monitoring response, emphasis will be placed on receptors contacted by floating, shoreline, and dissolved hydrocarbon phases. If a receptor is only contacted by low concentrations of entrained hydrocarbons and not by any other hydrocarbon phase, it will be considered a lower priority during the initial monitoring response.

2.2.2 Evaluate Availability of Adequate Baseline Data

The availability of baseline data further influences monitoring priorities. Section 4 outlines Vermilion's baseline review and evaluation process, and Table 4-3 summarises the baseline data assessment for the sensitive receptors identified in Figure 2-1 and Table 2-1. Greater priority may be given to undertaking post-spill pre-impact monitoring for receptors with no or insufficient baseline data.

Where short contact times prevent post-spill pre-impact monitoring, prior knowledge of data gaps helps guide the rapid finalisation of each SMP design and the need to include alternative approaches (e.g. the Gradient Approach versus Before-After Control-Impact (BACI) design). During a spill, it may be necessary to identify additional unaffected control sites for comparative monitoring where possible. As such, control sites have been factored into capability planning in Section 8.

2.2.3 Consideration of Key Ecological Features, Biologically Important Areas and Transient Receptors

In addition to these locations, there are receptors that are transient (i.e. cetaceans, seabirds, whale sharks) and others that are broadscale, such as managed fisheries with large spatial extents, Key Ecological Features (KEFs) and Biologically Important Areas (BIAs).

A number of broadscale ecological features are located within the OSM Planning Area and have been considered in monitoring prioritisation and OSM capability planning. Section 3.6.7 of the Wandoo Field Exploration Drilling Environment Plan [AUPD24001-VOG-1100-YH-0015] and Wandoo Field Geotechnical and Geophysical Survey EP [AUPD24001-VOG-1100-YH-0014] describes all KEFs within the OSM Planning Area.

A number of KEFs are within 100 km of Vermilion's Exploration Drilling and Geotechnical and Geophysical Survey Operational Areas, so are at a higher risk of contact with hydrocarbons, including:

- Ancient coastline at 125 m depth contour (62 km N)
- Glomar Shoals (40 km NE).

These KEFs include subsea receptors (benthic and pelagic habitats; demersal fish communities; marine fauna aggregations) that may be at higher risk from subsea releases. Whilst the scenarios include no subsea releases (refer Table 2-1), OSM planning and resourcing still includes relevant monitoring requirements, such as water quality, sediment quality, benthic habitats and fish if the spill is predicted to pass over the features (refer Appendix B and Section 8.1).

The OSM Planning Area also overlaps a number of BIAs and protected species potentially occurring in the area, as described in Section 3.4.4 of the Wandoo Field Exploration Drilling Environment Plan [AUPD24001-VOG-1100-YH-0015] and Section 3.4.3 of the Wandoo Field Geotechnical and Geophysical Survey EP

[AUPD24001-VOG-1100-YH-0014]. A number of the BIAs and protected species are located within the monitoring priorities listed in Table 2-1 and Table 4-3, such as marine turtles within the Montebello AMP, so would automatically be included in the relevant SMPs for that monitoring priority location (Refer to Table 8-1). Where BIAs and protected species are situated away from the monitoring priorities listed in, they will be captured in the Offshore Environs monitoring unit described in Table 8-1.

2.2.4 Initial Monitoring Priorities

Monitoring priorities are subsequently identified as those receptors with high conservation value predicted to be contacted within 14.0 days at a probability >5% at the low exposure values. Higher priority is also given to receptors where baseline data is either not available or not sufficient (as depicted in Table 4-3 and outlined in Section 4).

Another important consideration for monitoring prioritisation is a receptor's vulnerability to different forms and levels of hydrocarbon exposure, as well as its inherent sensitivity. For example, coral is highly sensitive to hydrocarbons, but its vulnerability depends on the form of exposure. If the hydrocarbon is floating on the sea surface during calm conditions, it may pass over the coral without causing interaction. However, if the hydrocarbon is dissolved in the water column with sufficient exposure duration, the coral may become directly vulnerable to its toxic effects.

It should be noted that the monitoring priorities provided in Table 4-3 and Appendix B: Sensitive Receptors and their Relevant OMPs and SMPs are listed for planning purposes only. Vermilion will work with its monitoring providers and key stakeholders in the initial stages of the spill regarding priority receptors and to assist in the finalisation of the monitoring design. This process is outlined in Section 13.

Table 2-1: Spill modelling results – subsea release of 26,678 m^3 of crude over 35 days following a LOWC with a probability of contact >5% and <14 days (RPS, 2026)

Receptor grouping	Receptor	Probability (%) of ≥1 g/m^2 floating	Min. arrival time ≥1 g/m^2 floating (days)	Probability (%) of ≥10 g/m^2 shoreline accumulation	Min. arrival time ≥10 g/m^2 shoreline accumulation (days)	Probability (%) of contact of ≥10 ppb dissolved	Min. arrival time ≥10 g/m2 dissolved (days)	Probability (%) of contact of ≥10 ppb entrained	Min. arrival time ≥10 ppb entrained (days)
AMP	Dampier*	32 (S)	3.16 (S)	NA	NA	11 (W)	11.08 (W)	47 (S)	3.21 (S)
	Gascoyne*	29 (W)	1.2 (W)	NA	NA	11 (T)	14.21 (T)	68 (W)	9.75(W)
	Montebello*	97 (W)	1.6 (W)	NA	NA	89 (W)	1.13 (W)	99 (W)	0.88(W)
Marine Parks (MP)	Barrow Island	38 (W)	4.5 (W)	NA	NA	17 (T)	5.83 (T)	86 (W)	3.54W)
	Montebello	72 (S)	3.25 (S)	NA	NA	69 (S)	2.93 (W)	93 (W)	2.38(W)
	Ningaloo	34 (S)	9.08 (S)	NA	NA	20 (W)	9.63 (W)	72 (W)	9.13 (W)
Nature Reserves (NR)	Great Sandy Island	3 (S)	26.13 (S)	NA	NA	NC	NC	55 (W)	10.71 (W)
	Lowendal Islands	19 (S)	11.17 (S)	NA	NA	7 (W)	11.29 (W)	79 (W)	6.38 (W)
	Thevenard Island	9 (S)	12.08 (S)	NA	NA	1 (T)	36.58 (T)	57 (W)	7.83 (W)
Shorelines	WA11.East (104) - West Intercourse Island - Dolphin Island N point (B) – Dampier Archipelago	NC	NC	32 (S)	8.92 (S)	NC	NC	NC	NC
	WA11.East (105) - West Intercourse Island - Dolphin Island N point (C) - Dampier Archipelago	NC	NC	43 (S)	4.58 (S)	NC	NC	NC	NC
	WA11.East (106) - West Intercourse Island - Dolphin Island N point (D) – Karratha	NC	NC	16 (S)	8.17 (S)	NC	NC	NC	NC

Receptor grouping	Receptor	Probability (%) of ≥1 g/m² floating	Min. arrival time ≥1 g/m² floating (days)	Probability (%) of ≥10 g/m² shoreline accumulation	Min. arrival time ≥10 g/m² shoreline accumulation (days)	Probability (%) of contact of ≥10 ppb dissolved	Min. arrival time ≥10 g/m2 dissolved (days)	Probability (%) of contact of ≥10 ppb entrained	Min. arrival time ≥10 ppb entrained (days)
	WA11.East (107) - West Intercourse Island - Dolphin Island N point (E) – Karratha	NC	NC	10 (S)	6.8 (S)	NC	NC	NC	NC
	WA11.East (108) - Pelican Point - West Intercourse Island – Karratha / Cape Preston	NC	NC	19 (S)	5.2 (S)	NC	NC	NC	NC
	WA11.East (109) - James Point - Cape Preston – Karratha	NC	NC	28 (W)	7.6 (W)	NC	NC	NC	NC
	WA11.West (110) - Mount Salt coast W - James Point – Great Sandy Island	NC	NC	21 (W)	12.2 (W)	NC	NC	NC	NC
	WA11.West (111) - Peter Creek coast E - Mount Salt coast W – Ashburton	NC	NC	17 (S)	12.5 (S)	NC	NC	NC	NC
	WA11.West (112) - Weld Island coast S - Peter Creek coast E - Ashburton	NC	NC	6 (S)	12.7 (S)	NC	NC	NC	NC
	WA11.West (113) - Coolgra Point W - Yardie Landing (A) – Port of Onslow	NC	NC	6 (S)	12.45 (S)	NC	NC	NC	NC
	WA11.West (114) - Coolgra Point W - Yardie Landing (B) – Ashburton Port	NC	NC	10 (W)	14 (W)	NC	NC	NC	NC
	WA11.West (115) - Hope Point - Locker Point (A) - – Ashburton Port	NC	NC	39 (W)	11.2 (W)	NC	NC	NC	NC

Receptor grouping	Receptor	Probability (%) of ≥1 g/m^2 floating	Min. arrival time ≥1 g/m^2 floating (days)	Probability (%) of ≥10 g/m^2 shoreline accumulation	Min. arrival time ≥10 g/m^2 shoreline accumulation (days)	Probability (%) of contact of ≥10 ppb dissolved	Min. arrival time ≥10 g/m2 dissolved (days)	Probability (%) of contact of ≥10 ppb entrained	Min. arrival time ≥10 ppb entrained (days)
	WA11.West (116) - Hope Point - Locker Point (B) – Exmouth Gulf East	NC	NC	11 (W)	12.1 (W)	NC	NC	NC	NC
	WA10 (121) - Bundegi - Shothole Canyon N (B) – Exmouth Gulf West	NC	NC	46 (W)	10.6 (W)	NC	NC	NC	NC
	WA10 (122) - Vlamingh Head - North West Cape	NC	NC	59 (W)	9.9 (W)	NC	NC	NC	NC
	WA10 (123) - Low Point - Vlamingh Head (A) – Exmouth	NC	NC	45 (W)	10.0 (W)	NC	NC	NC	NC
	WA10 (124) - Low Point - Vlamingh Head (B) – Exmouth	NC	NC	48 (W)	12.2 (W)	NC	NC	NC	NC
	WA11.East (315) - Dolphin Island N point - Cinders Rd coast – Port Walcott	NC	NC	34 (S)	8.9 (S)	NC	NC	NC	NC
	WA11.East (316) - West Intercourse Island - Dolphin Island N point (F) – Dampier Archipelago	NC	NC	39 (S)	3.2 (S)	NC	NC	NC	NC
	WA11.East (317) - West Intercourse Island - Dolphin Island N point (G) - Dampier Archipelago	NC	NC	34 (S)	3.5 (S)	NC	NC	NC	NC
	WA11.West (318) - Barrow Island and Montebello	NC	NC	61 (T)	3.5 (T)	NC	NC	NC	NC

Receptor grouping	Receptor	Probability (%) of ≥1 g/m² floating	Min. arrival time ≥1 g/m² floating (days)	Probability (%) of ≥10 g/m² shoreline accumulation	Min. arrival time ≥10 g/m² shoreline accumulation (days)	Probability (%) of contact of ≥10 ppb dissolved	Min. arrival time ≥10 g/m2 dissolved (days)	Probability (%) of contact of ≥10 ppb entrained	Min. arrival time ≥10 ppb entrained (days)
	Islands (A) - Montebello Islands								
	WA11.West (319) - Barrow Island and Montebello Islands (B) - Montebello Islands	NC	NC	89 (W)	4.2 (W)	NC	NC	NC	NC
	WA11.West (320) - Barrow Island and Montebello Islands (C) – Barrow Island	NC	NC	89 (W)	4.2 (W)	NC	NC	NC	NC
	WA11.West (321) - Barrow Island and Montebello Islands (D) – Barrow Island	NC	NC	79 (W)	5.2 (W)	NC	NC	NC	NC
	WA11.West (323) - Yardie Landing - Weld Island coast S (A)	NC	NC	13 (S)	11.4 (S)	NC	NC	NC	NC
	WA11.West (324) - Yardie Landing - Weld Island coast S (B) - Airlie Island	NC	NC	57 (W)	12 (W)	NC	NC	NC	NC
	WA11.West (325) - Coolgra Point W - Yardie Landing (C) - Thevenard Island	NC	NC	59 (W)	7.2 (W)	NC	NC	NC	NC
	WA11.West (326) - Baresand Point - Entrance Point E - Serrurier Island, Bessieres Island, Round Island	NC	NC	76 (W)	7.2 (W)	NC	NC	NC	NC

Receptor grouping	Receptor	Probability (%) of ≥1 g/m² floating	Min. arrival time ≥1 g/m² floating (days)	Probability (%) of ≥10 g/m² shoreline accumulation	Min. arrival time ≥10 g/m² shoreline accumulation (days)	Probability (%) of contact of ≥10 ppb dissolved	Min. arrival time ≥10 g/m2 dissolved (days)	Probability (%) of contact of ≥10 ppb entrained	Min. arrival time ≥10 ppb entrained (days)
	WA11.West (327) - Hope Point - Locker Point (E) - Observation Island	NC	NC	61 (W)	9.8 (W)	NC	NC	NC	NC
	WA11.West (328) - Hope Point - Locker Point (F) – Fly Island	NC	NC	49 (W)	11.5 (W)	NC	NC	NC	NC
	WA11.West (329) - Locker Point - Baresand Point – Muiron Islands	NC	NC	74 (W)	8.3 (W)	NC	NC	NC	NC
Reefs, Shoals and Banks (RSB)	Australind Shoal*	NC	NC	NA	NA	NC	NC	8 (W)	12.5 (W)
	Barrow Island Reefs and Shoals*	NC	NC	NA	NA	NC	NC	59 (W)	10.6 (W)
	Beryl Reef*	NC	NC	NA	NA	NC	NC	27 (W)	10.9 (W)
	Brewis Reef*	NC	NC	NA	NA	NC	NC	56 (W)	7.2 (W)
	Cod Bank*	NC	NC	NA	NA	NC	NC	20 (S)	4.6 (S)
	Combe Reef*	NC	NC	NA	NA	2 (W)	20 (W)	62 (W)	9.79 (W)
	Courtenay Shoal*	NC	NC	NA	NA	NC	NC	17 (S)	6.3 (S)
	Dailey Shoal*			NA	NA	5 (W)	9.6 (W)	67 (W)	8.6 (W)
	Exmouth Reef*	NC	NC	NA	NA	NC	NC	46 (W)	10.8 (W)
	Fairway Reef*	NC	NC	NA	NA	2 (W)	15.5 (W)	58 (W)	8.8 (W)
	Fortescue Reef*	NC	NC	NA	NA	NC	NC	8 (W)	11.5 (W)
	Glomar Shoals*	39 (S)	8.3 (S)	NA	NA	6 (W)	7.2 (W)	77 (S)	6 (S)
	Hammersley Shoal*	20 (S)	6.9 (S)	NA	NA	2 (S)	32.3(W)	31 (S)	6.4 (S)

Receptor grouping	Receptor	Probability (%) of ≥1 g/m^2 floating	Min. arrival time ≥1 g/m^2 floating (days)	Probability (%) of ≥10 g/m^2 shoreline accumulation	Min. arrival time ≥10 g/m^2 shoreline accumulation (days)	Probability (%) of contact of ≥10 ppb dissolved	Min. arrival time ≥10 g/m2 dissolved (days)	Probability (%) of contact of ≥10 ppb entrained	Min. arrival time ≥10 ppb entrained (days)
	Lightfoot Reef*	NC	NC	NA	NA	NC	NC	6 (S)	11.6 (S)
	Madeleine Shoals*	28 (S)	6.9 (S)	NA	NA	3 (S)	8.5 (S)	46 (S)	4.8 (S)
	McLennan Bank*	9 (W)	15.5 (W)	NA	NA	NC	NC	13 (S)	4.8 (S)
	Montebello Shoals*	42 (W)	5.1 (W)	NA	NA	44 (W)	5.3 (W)	93 (W)	3.0 (W)
	North West Reef*	5 (S)	24.7 (S)	NA	NA	5 (T)	28.9 (T)	17 (S)	4.9 (S)
	Outtrim Patches*	6 (W)	11.7 (W)	NA	NA	14 (W)	8.8 (W)	71 (W)	8.5 (W)
	Pearl Reef*			NA	NA	NC	NC	21 (W)	11.7 (W)
	Penguin Bank*	24 (W)	9.3 (W)	NA	NA	17 (W)	7.7 (W)	77 (W)	6.2 (W)
	Poivre Reef*	17 (T)	12.2 (T)	NA	NA	4 (W)	9.0 (W)	75 (W)	5.7 (W)
	Rankin Bank*	47 (W)	7.9 (W)	NA	NA	3 (T)	15 (T)	80 (W)	6.8 (W)
	Ripple Shoals*	6 (W)	12.7 (W)	NA	NA	1 (W)	18.2 (W)	50 (W)	12.4 (W)
	Rosily Shoals*	26 (W)	7.7 (W)	NA	NA	8 (W)	11.8 (W)	75 (W)	6.6 (W)
	Santo Rock*	3 (W)	19 (W)	NA	NA	NC	NC	24 (W)	13.5 (W)
	Spider Reef*	1 (W)	28.2 (W)	NA	NA	1 (W)	15.7 (W)	48 (W)	11.9 (W)
	Sultan Reef*	6 (W)	12.1 (W)	NA	NA	NC	NC	35 (W)	7.8 (W)
	Taunton Reef*	6 (W)	12.7 (W)	NA	NA	NC	NC	42 (W)	13.6 (W)
	Trap Reef*	7 (T)	11.8 (T)	NA	NA	1 (W)	21.2 (W)	66 (W)	7.2 (W)
	Tryal Rocks*	65 (W)	5.7 (W)	NA	NA	54 (W)	2.7 (W)	93 (W)	2.1 (W)
	Web Reef*	1 (W)	28.5 (W)	NA	NA	2 (W)	16.1 (W)	50 (W)	14 (W)
Key									
NA	Not applicable								
*	Submerged receptor that has no features above the sea surface. Modelling indicates floating contact with these receptors when the hydrocarbons pass over the receptor on the sea surface.								

Receptor grouping	Receptor	Probability (%) of ≥1 g/m² floating	Min. arrival time ≥1 g/m² floating (days)	Probability (%) of ≥10 g/m² shoreline accumulation	Min. arrival time ≥10 g/m² shoreline accumulation (days)	Probability (%) of contact of ≥10 ppb dissolved	Min. arrival time ≥10 g/m2 dissolved (days)	Probability (%) of contact of ≥10 ppb entrained	Min. arrival time ≥10 ppb entrained (days)
	Receptor only contacted by entrained hydrocarbons at greater than 5% probability within 14 days								
NC	No contact to receptor predicted for specified threshold by oil spill modelling								

Table 2-2: Spill modelling results – 300 m³ MDO spill resulting from vessel collision with a probability of contact >5% and <14 days (RPS, 2026)

Receptor grouping	Receptor	Probability (%) of ≥1 g/m² floating	Min. arrival time ≥1 g/m² floating (days)	Probability (%) of ≥10 g/m² shoreline accumulation	Min. arrival time ≥10 g/m² shoreline accumulation (days)	Probability (%) of contact of ≥10 ppb dissolved	Min. arrival time ≥10 g/m2 dissolved (days)	Probability (%) of contact of ≥10 ppb entrained	Min. arrival time ≥10 ppb entrained (days)
AMP	Gascoyne*	NC	NC	NA	NA	NC	NC	13 (W)	9.9 (W)
	Montebello*	NC	NC	NA	NA	7 (W)	1.1 (W)	54 (W)	0.91 (W)
Marine Parks (MP)	Barrow Island	NC	NC	NA	NA	NC	NC	13 (W)	3.5 (W)
	Montebello	NC	NC	NA	NA	1 (S)	1.0 (S)	37 (W)	2.3 (W)
	Ningaloo	NC	NC	NA	NA	NC	NC	13 (W)	9.4 (W)
Nature Reserves (NR)	Lowendal Islands	NC	NC	NA	NA	NC	NC	7 (W)	6.7 (W)
Shorelines	WA11.West (318) - Barrow Island and Montebello Islands (A) - Montebello Islands	NC	NC	15 (W)	3.8 (W)	NC	NC	NC	NC
Reefs, Shoals and Banks (RSB)	Dailey Shoal*	NC	NC	NA	NA	NC	NC	5 (W)	8.7 (W)
	Montebello Shoals*	NC	NC	NA	NA	NC	NC	22 (W)	3.3 (W)
	Outtrim Patches*	NC	NC	NA	NA	NC	NC	10 (W)	8.7 (W)

Receptor grouping	Receptor	Probability (%) of ≥1 g/m^2 floating	Min. arrival time ≥1 g/m^2 floating (days)	Probability (%) of ≥10 g/m^2 shoreline accumulation	Min. arrival time ≥10 g/m^2 shoreline accumulation (days)	Probability (%) of contact of ≥10 ppb dissolved	Min. arrival time ≥10 g/m2 dissolved (days)	Probability (%) of contact of ≥10 ppb entrained	Min. arrival time ≥10 ppb entrained (days)
	Penguin Bank*	NC	NC	NA	NA	NC	NC	6 (W)	6.5 (W)
	Poivre Reef*	NC	NC	NA	NA	NC	NC	7 (W)	5.8 (W)
	Tryal Rocks*	NC	NC	NA	NA	NC	NC	23 (W)	2.1 (W)
Key									
NA	Not applicable								
*	Submerged receptor that has no features above the sea surface. Modelling indicates floating contact with these receptors when the hydrocarbons pass over the receptor on the sea surface.								
	Receptor only contacted by entrained hydrocarbons at greater than 5% probability within 14 days								
NC	No contact to receptor predicted for specified threshold by oil spill modelling								

Section 3 Baseline Information

Vermilion is part of a Joint Industry Collaborative Group who are working together to determine the extent, quality and suitability of existing baseline data for the marine environments in the North West Shelf, Browse and Timor Sea Regions of Australia.

The Joint Industry Marine Environment Baseline Database includes the following baseline data sources that are relevant to the high value receptors in the OSM Planning Area:

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 geographical information system (GIS) platform, OSRA displays datasets collated from a range of custodians allowing decision makers to visualise environmental sensitivities and response considerations for both contingency and incident planning. OSRA is managed by DTMI’s Maritime Environmental Emergency Response team and is part funded through the National Plan for Maritime Environmental Emergencies and the Australian Maritime Safety Authority (AMSA). Vermilion ICT members can log in to the OSRA here.

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).

3.5 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.

3.6 Other Sources

Other sources include:

- The Protected Matters Search Tool Department of Climate Change, Energy, the Environment and Water (DCCEEW)
- 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
- 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. A list of baseline data sources is provided in Appendix D.

Section 4 Baseline Data Review

Baseline monitoring provides information on the condition of ecological receptors prior to, or spatially independent (e.g. if used as an unaffected control site) 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 and quantify environmental impact from the spill (compared to natural variation and/or impacts unrelated to the spill) is necessary.

Understanding the presence or absence, suitability and quality of baseline data for locations and associated receptors predicted to be contacted within 14 days is an important preparatory measure for prioritising monitoring. During a spill event, prioritisation of capability may be given to those receptors with insufficient baseline data, where it is possible to collect baseline data post-spill pre-impact. Further, 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 Marine Environment Baseline Database includes available data for all receptors relevant to the Joint Industry OSM Framework (apart from Fisheries and Heritage and Social Impacts) and has assessed the spatial and temporal relevance of this data and comparison of methods and parameters to those outlined in the Joint Industry SMPs.

Using the Marine Environment Baseline Database, Vermilion has reviewed the baseline data for all of the receptors listed in Table 2-1 to determine which receptors and key features have insufficient or no baseline data available, as part of the process for evaluating monitoring prioritisation, along with the other considerations outlined in Sections 2.2 and Section 13 . Appendix D provides a high-level summary of some of the data sources included in the Marine Environment Baseline Database.

An overview of the process used to assess baseline data is provided in the steps below:

1. **Identification of receptors requiring a baseline review:** Receptors predicted to be contacted within 14 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 receptors is located (as per sources outlined in Section 3) and included (if it is not already included) in the Marine Environment Baseline Database. Appendix D: OSM baseline data sources provides a high-level summary of selected data sources included in the Marine Environment Baseline Database.

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

    a. 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:** Regular 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 receptor 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 C) 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:
   - 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)?
   - Does the data collectively cover all the species/biological communities required for the relevant Joint Industry SMP and that may be present at the receptor/location?

5. **Assessment outcome:** Each location and associated receptor is then categorised as follows, and summarised in Table 4-3**:**

   a. Comprehensive baseline data or ongoing monitoring collected within the last 5 years. Data align with Joint Industry SMP parameters and methods, cover required species/communities and span the necessary spatial extent, or

   b. Historical data (>5 years old) that remain of value, or some current but not extensive baseline data[1], or

   c. No baseline data available, or existing data are inadequate in quality, scope, or relevance.

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

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

SMP	Key parameter	Key methodology
SM1 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.
SM2 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.

[1] Baseline data are considered not extensive where they are limited in spatial and/or temporal coverage, sample size, or representativeness of species and / or the marine environment (e.g. life stages, habitats, seasonality). Such data may not capture natural variability or interannual trends, may be seasonally, taxonomically, or methodologically biased, or may rely on opportunistic or inconsistent datasets with variable data quality.

SMP	Key parameter	Key methodology
SM3 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.
SM4 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.
SM5 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.
SM5 Marine megafauna- whale sharks, dugong and cetaceans	At least one key parameter: species identification, abundance/counts, key behaviour.	Aerial or vessel surveys, acoustic monitoring.
SM6 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.
SM7 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.
SM8 Fisheries impact assessment	At least one key parameter: Abundance, catch-rate, stock structure, size structure.	Catch and effort for stock assessment.

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 = less than 5 years old	High = >4 years	High = 4+ sampling trips per year	High	High
Medium = between 5-10 years old	Medium = 2–4 years	Medium = 2–3 sampling trips per year	-	-
Low = greater than 10 years old	Low = <2 years	Low = one-off sampling trip	Low	Low

Table 4-3: Baseline data assessment versus SMPs for receptors predicted at being contacted >5% probability and <14 days

Receptor	SMP									
	Water quality impact assessment	Sediment quality impact assessment	Intertidal and coastal habitat assessment	Seabirds and shorebirds	Marine megafauna assessment – reptiles	Marine megafauna assessment – whale sharks, dugong and cetaceans	Benthic habitat assessment	Marine fish and elasmobranch assemblages assessment	Fisheries impact assessment^	Heritage and social impact assessment+
Dampier AMP*			N/A		Sea snakes					
Gascoyne AMP*			N/A			Pygmy blue whales				
Montebello AMP*			N/A		Sea snakes	Pygmy blue whales				
Barrow Island & Barrow Island MP*	Barrow Island Port	Barrow Island Port			Flatback turtle Green and hawksbill turtles Sea snakes					
Dampier Archipelago					Turtles: Rosemary Island Turtles elsewhere Sea snakes					
Exmouth Gulf										
Ningaloo (incl. State MP)					Turtles	Whale sharks				

Receptor	SMP									
	Water quality impact assessment	**Sediment quality impact assessment**	**Intertidal and coastal habitat assessment**	**Seabirds and shorebirds**	**Marine megafauna assessment – reptiles**	**Marine megafauna assessment – whale sharks, dugong and cetaceans**	**Benthic habitat assessment**	**Marine fish and elasmobranch assemblages assessment**	**Fisheries impact assessment^**	**Heritage and social impact assessment+**
					Sea snakes					
Lowendal Islands (incl. Nature Reserve)			Mangroves at Varanus Isl.	Seabirds	Turtles at Varanus Isl.					
				Shorebirds	Sea snakes Turtles elsewhere					
Middle & Northern Pilbara Islands & shoreline	Mardie	Mardie			Turtles			Green sawfish		
					Sea snakes					
Muiron Islands					Turtles					
					Sea snakes					
Montebello Islands				Wedge-tailed shearwater at Ah Chong Is						
Southern Pilbara Islands and Shoreline	Ashburton Port	Ashburton Port		Urala Station, Onslow, Airlie, Serrurier & Thevenard Isl.	Turtles: Onslow, Thevenard & Airlie Islands			Green sawfish		
					Turtles elsewhere					
					Sea snakes					

Receptor	SMP									
	Water quality impact assessment	Sediment quality impact assessment	Intertidal and coastal habitat assessment	Seabirds and shorebirds	Marine megafauna assessment – reptiles	Marine megafauna assessment – whale sharks, dugong and cetaceans	Benthic habitat assessment	Marine fish and elasmobranch assemblages assessment	Fisheries impact assessment^	Heritage and social impact assessment+
Rankin Bank* and Glomar Shoals*			N/A	N/A						
Reefs Shoals and Banks (RSB)*			N/A	N/A						
Key										
	Comprehensive baseline data or ongoing monitoring collected within the last 5 years. Data align with Joint Industry SMP parameters and methods, cover required species/communities and span the necessary spatial extent.									
	Historical data (>5 years old) that remain of value, or some current but not extensive baseline data.									
	No baseline data available, or existing data are inadequate in quality, scope, or relevance.									
	N/A: Not applicable									
^	Locations to be determined in consultation with key stakeholders to reflect current fishing zones/effort									
+	Locations to be determined in consultation with key stakeholders									

Section 5 OSM Organisational Structure

Vermilion's Incident Command Team (ICT) runs an incident control system analogous to the Australasian Inter-Service Incident Management System (AIIMS) to which the National Plan is also aligned, as described in the activity EPs and/or OPEPs. The ICT will be responsible for coordinating OSM activities, which will be implemented by the Planning Section within the ICT, with support from each ICT Section, in particular the Operations Section.

The Vermilion ICT structure is shown in Figure 5-1. The ICT 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 5-2 illustrates the structure of the OSM Management Team during the response phase.

In the event that a spill crosses into state waters where the DTMI is the Control Agency, the ICT will be managed through coordinated command and Vermilion will continue monitoring activities in State waters, with oversight from the DTMI.

Figure 5-1: Vermilion ICT structure

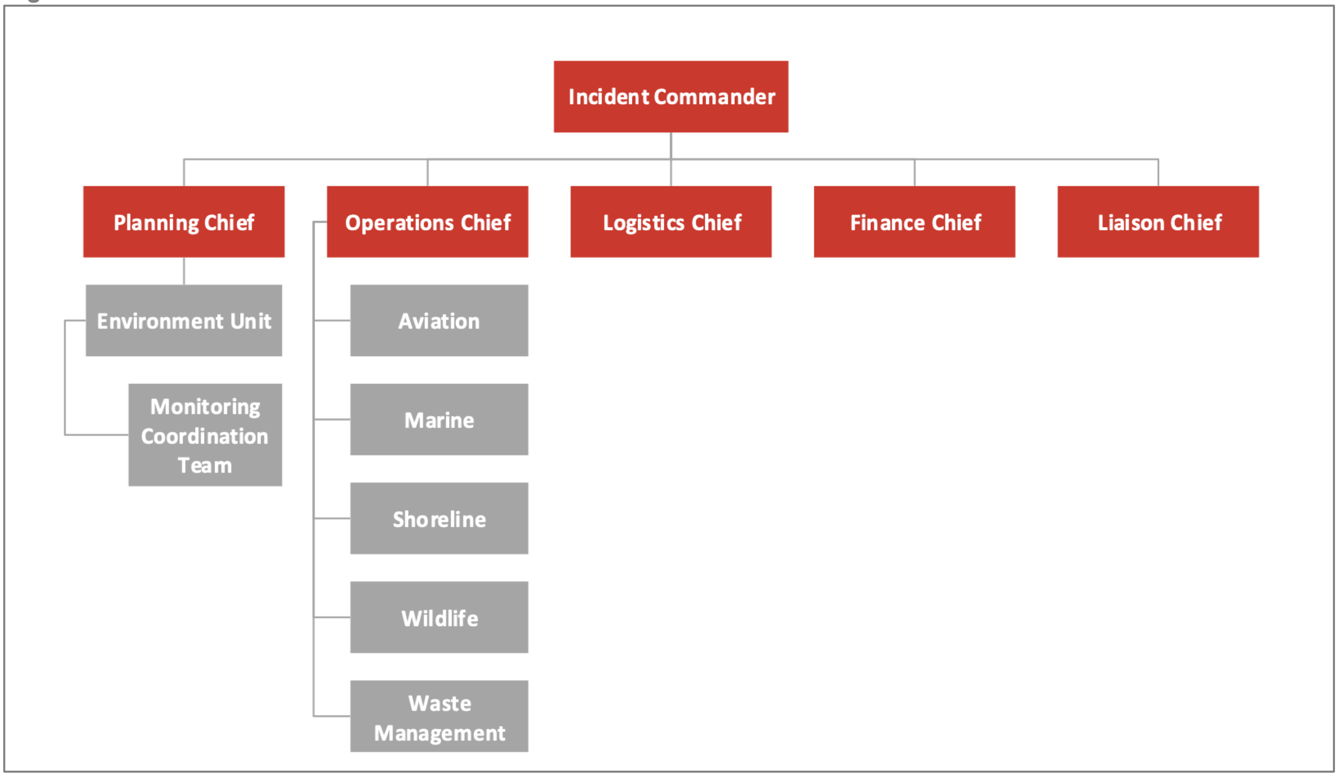
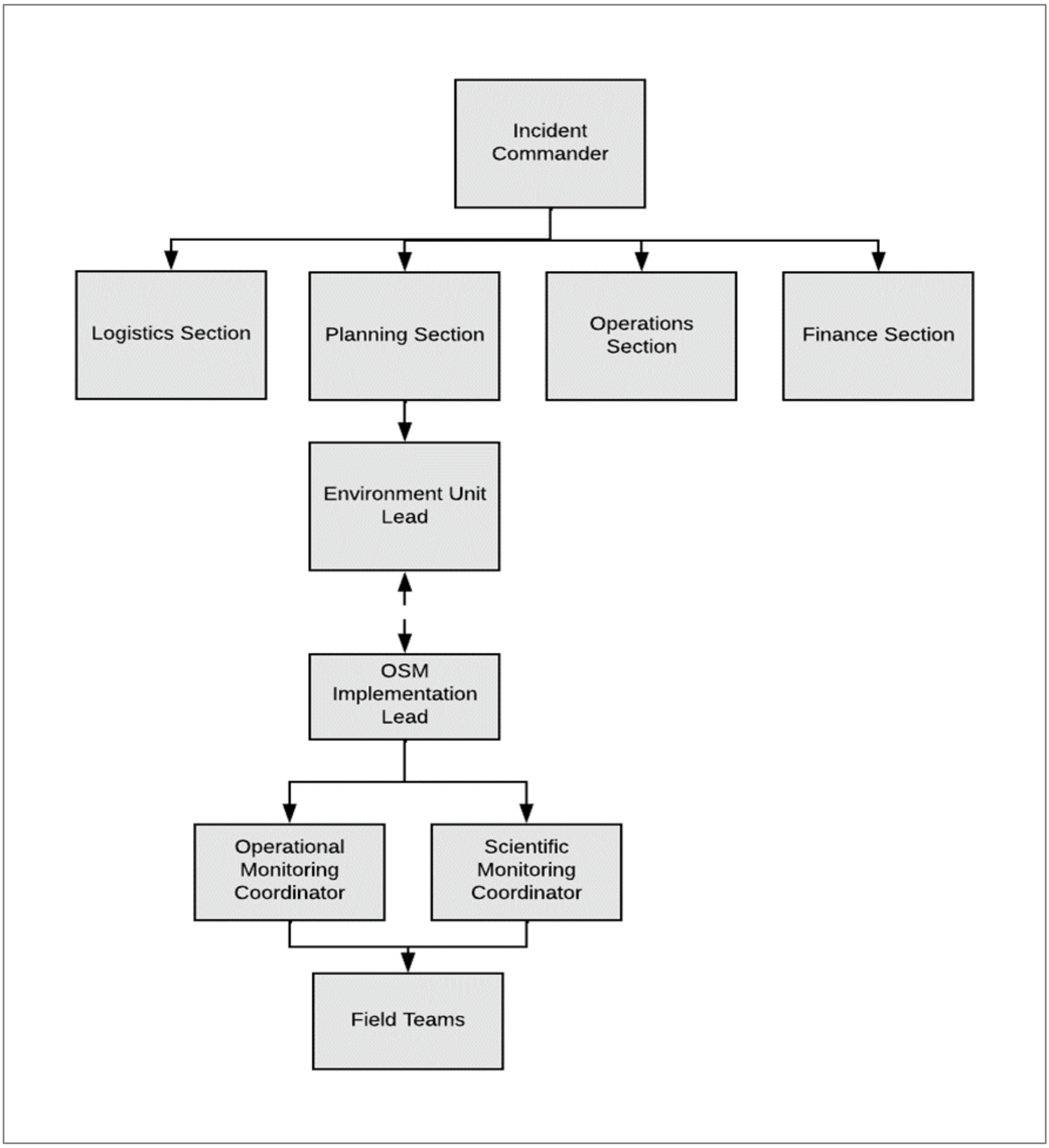


Figure 5-2: Vermilion ICT structure with OSM team



Section 6 OSM Roles and Responsibilities

OSM roles and responsibilities are listed in Section 10.13.2 of the Joint Industry OSM Framework, which will be adopted by Vermilion and its OSM Services Provider. Table 6-1 outlines the OSM roles held by Vermilion and the OSM Service Provider.

During the post-response phase the Environment Unit Lead and/or the OSM Service 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	Vermilion (ICT)
OSM Implementation Lead	OSM Service Provider
Operational Monitoring Coordinator and/or Scientific Monitoring Coordinator	OSM Service Provider
OM and/or SM Group Supervisors and Managers	Vermilion / OSM Service Provider
OSM Field Teams	OSM Service Provider

Section 7 Mobilisation and Timing of OMP and SMP Implementation

Table 7-1 provides an indicative implementation schedule for OMPs and SMPs in the OSM Planning Area 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).

Through Vermilion's membership in the OSRL OSM Supplementary Agreement, OSM services are available for preparedness, activation, and monitoring (Section 9). This agreement ensures operational monitoring personnel can deploy within 72 hours of notification, and scientific monitoring personnel within 5-7 days, which is reflective of the implementation schedule provided in Table 7-1.

The Exploration and Survey Operations OPEP - Oil Spill Response Capability Review [VOG-1100-YH-0019] details the response capability statements for all response strategies. The Exploration and Survey Operations OPEP - Oil Spill Response Capability Review [VOG-1100-YH-0019] specifies implementation times for response strategies, including components of OSM capability, including initial aerial surveillance within 48 hours of IMT activation (Table 3-2 of the OPEP) and SCAT within 72 hours (on site) (Table 11-21 of the OPEP), which will assist in the IMT in initial decision making for relevant response operations.

Due to short contact times, there may be instances where post-spill pre-impact monitoring is not feasible. For these receptors, 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 OM Team Leads. Finalise OMPs. Aerial surveillance – which will also document fauna observations. Commence activation and mobilisation of OM personnel.	• OM1: Hydrocarbon Characterisation, where resources are available (e.g. Supply Vessel with onboard sampling equipment). • OM2: Hydrocarbons in Water Assessment • OM3: Hydrocarbons in Sediment Assessment • OM4a: Surface Chemical Dispersant Effectiveness (commencing with Tier 1 SMART Protocol) • OM5: Rapid Marine Fauna Surveillance • 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 ICT (e.g. Planning) 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.	• SM1: Water quality impact assessment • SM2: Sediment quality impact assessment • SM6: Benthic Habitat Assessment	Continued.	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
				• SM7: Marine fish and elasmobranch assemblages assessment.		
Sensitive receptors (including shorelines, reefs, banks and shoals) predicted to be contacted within 7 days	OM	Activation of OMP Team Leads. Finalise OMPs. Aerial surveillance – which will also document fauna observations. Commence activation and mobilisation of OM personnel.	• OM1: Hydrocarbon Characterisation • OM2: Hydrocarbons in Water Assessment • OM3: Hydrocarbons in Sediment Assessment • OM5: Rapid Marine Fauna Surveillance • OM6: Shoreline clean-up assessment • Continue to finalise OPs. • 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 ICT (i.e. Planning) 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.	• SM1: Water Quality Impact Assessment • SM2: Sediment Quality Impact Assessment • SM6: Benthic Habitat Assessment • SM3: Intertidal and Coastal Habitat 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
				• SM4: Seabirds and Shorebirds • SM5: Marine Mega-fauna Assessment-Reptiles • SM5: Marine Mega-fauna Assessment-Cetaceans, Whale Sharks, Dugong • SM7: Marine Fish and Elasmobranch Assemblages assessment • SM8: Commercial and recreational fisheries impact assessment • SM9: Heritage Assessment • SM10: Social Impact Assessment.		
Sensitive receptors (including shorelines, reefs, banks and shoals) predicted to be contacted week 1-2	OM	-	-	• Additional Activation of OM 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. • OM2: Hydrocarbons in Water Assessment	As results from implemented OMPs are available, data are provided to relevant personnel in ICT (i.e. Planning) and used in the Incident Action Planning process for the next operational period. OMP is

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
					• OM3: Hydrocarbons in Sediment Assessment • OM5: Rapid Marine Fauna Surveillance • OM6: Shoreline clean-up assessment.	redesigned or reallocated according to the specifics of the actual spill until termination criteria are met.
	SM	-	-	• Additional Activation of SM Team Leads. • Commence activation and mobilisation of additional SM personnel.	• SM1: Water quality impact assessment • SM2: Sediment quality impact assessment • SM5: Marine Mega-fauna assessment - reptiles • SM7: Marine fish and elasmobranch assemblages assessment • SM3: Intertidal and coastal habitat assessment • SM4: Seabirds and shorebirds • SM6: Benthic habitat assessment • SM8: Commercial and recreational fisheries impact assessment • SM9: Heritage 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
					• SM10: Social Impact Assessment.	

Section 8 Resourcing Requirements

To guide resourcing requirements, the spill scenario most likely to require the greatest initial and on-going capability for Vermilion's Exploration Drilling and Geophysical and Geotechnical Survey activities was selected. Selection was based on stochastic modelling results, focussing on the scenarios with the greatest predicted number of receptors contacted at the low thresholds (Section 2.1) within 7 days; followed by the greatest number of receptors contacted within 7-14 days; and at the highest contact probabilities. If a receptor is only contacted by low concentrations of entrained hydrocarbons and not by any other hydrocarbon phase, it will be considered a lower priority during the initial monitoring response as outlined in Section 2.2.

Other factors influencing the selection of the scenario with the highest resource requirements were location of the spill, proximity to receptors, and hydrocarbon properties. The subsea release of 26,678 m^3 of crude over 35 days following a LOWC was determined to be Vermilion's worst-case spill scenarios requiring the greatest OSM resources (Section 8.2).

8.1 Monitoring Units

Using stochastic modelling results, Vermilion has grouped its monitoring priorities into monitoring 'units' (Table 8-1). These units incorporate all of the possible receptors that may be contacted by the scenarios shown in Table 2-1. These unit groupings are based on consultation with experienced monitoring personnel and planners, who often group these receptors together for time-bound monitoring projects. The grouping of units is based on factors such as access and distance to ports, SIMOPS of multiple vessels and teams working in a close area, travel time between individual locations/receptors, time taken to collect samples for each SMP, the boundaries of KEFs, and the boundaries of BIAs.

The monitoring units presented in Table 8-1 also include transient species. Additional information on the seasonality of the receptors can be found in Appendix C and in Section 3 of the relevant EP. Each monitoring unit will require 1-2 teams during the initial response (1-2 weeks). The number of teams allocated to each unit will depend on the extent of the spill, the outcome of the monitoring prioritisation finalised at the time of the spill (Section 13), the Operational Net Environmental Benefit Analysis and SIMOPs.

It should be noted that not all monitoring units will be contacted by a single spill and that the list below has been generated from stochastic modelling results from all receptors identified in Table 2-1.

Table 8-1: Monitoring units relevant to stochastic modelling results

Monitoring Unit	Receptors within Monitoring Unit
Barrow	Barrow Island (including Boodie and Middle Islands) Barrow Islands MMA and Barrow Island MP (State)* Lowendal Islands Lowendal Islands NR Poivre Reef* Seabird and shorebird BIAs Marine turtle BIAs Humpback whale (migration) BIA Pygmy blue whale (distribution) BIA Whale shark (foraging) BIA

Monitoring Unit	Receptors within Monitoring Unit
	Ancient Coastline at 125 m depth contour KEF* Continental Slope Demersal Fish Communities KEF* Exmouth Plateau*
Dampier	Dampier AMP* Cape Bruguieres Dampier Archipelago Dampier Islands Courtenay Shoal* Hammersley Shoal* Madeleine Shoals* Pygmy blue whale (distribution) BIA Humpback whale (migration) BIA Marine turtle BIAs Seabird and shorebird BIAs Whale shark (foraging) BIA
Southern Pilbara	Southern Pilbara – Islands and Shoreline (including Serrurier Island, Bessieres Island, Round Island, Thevenard Island, Observation Island, Fly Island) Ashburton Muiron Islands Muiron Islands MP* Australind Shoal* Baylis Patches* Brewis Reef* Combe Reef* Dailey Shoals* Fairway Reef* Outtrim Patches* Rosily Shoals* Santo Rock* Spider Reef* Web Reef* Marine turtle BIAs Pygmy blue whale (distribution) BIA Humpback whale (migration) BIA Seabird and shorebird BIAs Dugong (breeding) BIA Ancient Coastline at 125 m depth contour KEF* Continental Slope Demersal Fish Communities KEF* Canyons linking the Cuvier Abyssal Plain and the Cape Range Peninsula*
Middle Pilbara	Middle Pilbara – Islands and Shoreline (Including Airlie Island) Great Sandy Island NR Penguin Bank* Ripple Shoals* Trap Reef* Marine turtle BIAs

Monitoring Unit	Receptors within Monitoring Unit
	Humpback whale (migration) BIA Seabird and shorebird BIAs
Montebello	Montebello Islands Montebello AMP* Montebello Islands MP* Tryal Rocks* Montebello Shoals* Seabird and shorebird BIAs Marine turtle BIAs Humpback whale (migration) BIA Pygmy blue whale (distribution) BIA Ancient Coastline at 125 m depth contour KEF* Continental Slope Demersal Fish Communities KEF*
Ningaloo nearshore	Ningaloo AMP* Exmouth and islands Exmouth Gulf Cape Range Ningaloo Coast World Heritage Ningaloo MP (State)* Ningaloo Reef* North West Reef* Continental Slope Demersal Fish Communities KEF* Commonwealth Waters Adjacent to Ningaloo Reef KEF*
Ningaloo offshore	Gascoyne AMP* Canyons linking the Cuvier Abyssal Plain and the Cape Range Peninsula KEF* Commonwealth waters adjacent to the Ningaloo Reef KEF* Continental Slope Demersal Fish Communities KEF* Exmouth Plateau KEF* Seabird and shorebird BIAs Marine turtle BIAs Pygmy blue whale (distribution) BIA Whale shark (foraging) BIA Dugong BIA
Offshore Environs	Rankin Bank* Glomar Shoals* Ancient Coastline at 125 m depth contour KEF* Continental Slope Demersal Fish Communities KEF* Humpback whale (migration) BIA Pygmy blue whale (distribution) BIA Whale shark (foraging) BIA Marine turtle BIAs Seabird and shorebird BIAs
Control sites	Control sites
Key	
*	Denotes submerged receptor

8.2 Worst-case OSM Resourcing Requirements

To better understand worst-case capability OSM requirements, deterministic modelling was undertaken for the subsea release of 26,678 m^3 of crude over 35 days following a LOWC. The deterministic run with the most receptors contacted by either floating, shoreline or dissolved hydrocarbons at the low thresholds and within 14 days was selected for further analysis. Deterministic modelling enables oil spill planners to assess the results of a single run from the stochastic oil spill modelling results, helping to assess the possible worst-case capability requirements. The results of this deterministic assessment are presented in Table 8-2.

The resources required to assist the ICT in the coordination and management of OSM are outlined in Table 8-3. Whilst the resources required to commence operational and scientific monitoring components during weeks 1–2 are presented in Table 8-4 and Table 8-5 respectively.

Table 8-4 and Table 8-5 are based on the implementation schedule outlined in Table 7-1, and the stochastic modelling results (Section 2).

If additional resources are required to be scaled in to support the monitoring effort, this will be identified as soon as practicable following the spill and mobilised via the OSM Services Provider contract, which includes provision of scale-up resources.

8.3 Co-mobilisation of Monitoring Teams

Where monitoring programs share compatible objectives, spatial footprints, sampling methods or logistical dependencies, co-mobilisation of OMP and/or SMP teams may be undertaken to maximise efficiency and minimise vessel movements, provided that safety, data integrity and analytical objectives are not compromised. Table 8-4 and Table 8-5 outline when co-mobilisation of OMP and/or SMP teams may be undertaken. Co-mobilisation is particularly applicable where monitoring programs:

- Target the same or adjacent environmental compartments (e.g. water column and sediment)
- Use comparable sampling and analytical techniques (e.g. grab or water sampling, fluorometry, or visual transects)
- Operate within the same geographic area or under the same environmental conditions (e.g. similar tidal or meteorological windows)
- Are required within a comparable timeframe following the spill (e.g. within 0–14 days post-activation).

Compatibility of OMPs and SMPs arises because many operational and scientific monitoring elements are designed to be complementary rather than sequential. For example, data collected under OM1 - OM3 (hydrocarbon characterisation, water and sediment assessments) provide the initial exposure information required to inform SMPs such as SM1 and SM2 (water and sediment impact assessments). These programs use consistent sample media, laboratory protocols and QA/QC chains, enabling co-deployment without compromising scientific rigour. Similarly, concurrent vessel-based aerial or visual surveys for OM5 (Rapid Marine Fauna Surveillance) can support the early stages of SM4 and SM5 (Seabird, Shorebird and Marine Megafauna Assessments) through shared platforms and observation windows.

This approach reduces duplication of mobilisation logistics, minimises transit times between sites and sample transport while maintaining representative spatial and temporal coverage. It also supports ALARP principles by limiting the number of concurrent field assets, thereby reducing SIMOPs, vessel congestion, and overall operational risk. Where subsequent SMP phases require extended sampling or increased replication, these will be implemented independently once initial monitoring is underway.

Co-mobilisation decisions will be confirmed post-spill through the Incident Action Planning process, in consultation with the OSM Services Provider, monitoring specialists and relevant stakeholders, taking into account safety, receptor access, timing and data-quality considerations.

Table 8-2: Scenario 1 – Deterministic modelling results at >5% probability – subsea release of 26,678 m^3 of crude over 35 days following a LOWC (Run 31) (RPS, 2026)

Receptor	Minimum arrival time floating oil ≥1 g/m^2 (days)	Minimum arrival time shoreline oil accumulation ≥10 g/m^2 (days)	Maximum accumulated volume on shoreline (m^3) ≥10 g/m^2	Minimum arrival time dissolved exposure at ≥ 10 ppb (days)	Maximum dissolved hydrocarbon concentration (ppb)	Minimum arrival time entrained ≥10 ppb (days)	Maximum entrained hydrocarbon concentration (ppb)
Montebello AMP*	2.3	NA	NA	1.41	94	1.1	1,412
Montebello Islands MP	5.8	NA	NA	3.4	66	2.7	2,062
Barrow Island MP	6	NA	NA	5.8	32	4.7	415
Lowendal Islands NR	NC	NA	NA	NC	NC	13.5	294
WA11.West (318) - Barrow Island and Montebello Islands (A) (Montebello Islands)	6	3.5	2,570	4.8	66	3.3	2,062
WA11.West (319) - Barrow Island and Montebello Islands (B) (Montebello Islands)	6.9	5.8	187	18.7	49	5.3	766
WA11.West (320) - Barrow Island and Montebello Islands (C) (Barrow Island)	6.6	5.7	32	NC	NC	5.4	110
WA11.West (321) - Barrow Island and Montebello Islands (D) (Barrow Island)	6.2	5.8	60	22	25	5.4	336
WA11.West (324) - Yardie Landing - Weld Island coast S (B) (Airlie Island)	21.5	25.5	8	25	18	5.8	526
WA11.West (325) - Coolgra Point W - Yardie Landing (C) (Thevenard Island)	25.4	25.1	37	NC	NC	13	289
Montebello Shoals*	6	NA	NA	5.1	32	3.4	581

Receptor	Minimum arrival time floating oil ≥1 g/m² (days)	Minimum arrival time shoreline oil accumulation ≥10 g/m² (days)	Maximum accumulated volume on shoreline (m^3) ≥10 g/m²	Minimum arrival time dissolved exposure at ≥ 10 ppb (days)	Maximum dissolved hydrocarbon concentration (ppb)	Minimum arrival time entrained ≥10 ppb (days)	Maximum entrained hydrocarbon concentration (ppb)
Penguin Bank*	22.3	NA	NA	NC	NC	5.9	261
Poivre Reef*	21.8	NA	NA	25	18	6.9	244
Rosily Shoals*	25.1	NA	NA	NC	NC	12	149
Tryal Rocks*	16.3	NA	NA	19.7	15	8.1	217
Key							
	Receptor only contacted by entrained hydrocarbons within 14 days and >5% probability						
*	Submerged receptor that has no features above the sea surface. Modelling indicates floating contact with these receptors when the hydrocarbons pass over the receptor on the sea surface.						
NA	Not applicable						
NC	No contact to receptor predicted for specified threshold by oil spill modelling						

Table 8-3: Resources required for key OSM coordination roles

Role	Resources required	Arrangement
OSM Implementation Lead (OSM Monitoring Provider/s)	1 x OSM Implementation Lead	Oil Spill Response Limited (OSRL) OSM Supplementary Service Agreement
Operational Monitoring Coordinator and Scientific Monitoring Coordinator (OSM Service Provider/s)	1 x Operational Monitoring Coordinator 1 x Scientific Monitoring Coordinator	
OSM Field Operations Manager (OSM Service Provider/s)	1 x OSM Field Operations Manager	

Table 8-4: Resources required for implementing operational monitoring plans

OMP	Week 1 (total)#	Week 2 (total)#	Arrangement
OM1: Hydrocarbon characterisation*^	1 team (spill site and surrounds) 1 team Montebello Unit 1 team Barrow Unit **Total 3 teams**	1 team (spill site and surrounds) 1 team Montebello Unit 1 team Southern Pilbara Unit **Total 3 teams**	OSRL OSM Supplementary Service Agreement Marine contractors Laboratory arrangement
OM2: Hydrocarbon in water assessment*	Refer to OMP: Hydrocarbon properties and weathering behaviour at sea resourcing (all sites)		OSRL OSM Supplementary Service Agreement Marine contractors
OM3: Hydrocarbon in sediment assessment*	Refer to OMP: Hydrocarbon properties and weathering behaviour at sea resourcing (all sites)		OSRL OSM Supplementary Service Agreement Marine contractors
OM4a: Surface dispersant effectiveness monitoring	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 MSA Marine contractors
OM5: Rapid Marine Fauna Surveillance^	1 team to conduct initial aerial surveys for all sites (2 observers per aircraft) Note: Fauna related SMPs are likely to be initiated simultaneously or following aerial assessment with vessel and ground based fauna surveys carried out as part of the relevant fauna SMP.		OSRL OSM Supplementary Service Agreement Marine contractors Aviation contractors
OM6: Shoreline clean-up assessment	10 ground based SCAT teams, 3 members per team.		AMOSC Master Services Agreement (MSA) and/or OSRL OSM Supplementary Service Agreement Marine contractors State/Territory Response Teams and AMSA National Response Team

** Initial co-mobilisation between OM1: Hydrocarbon properties and weathering behaviour at sea, OM4a: Surface chemical dispersant effectiveness and fate, OM2: Hydrocarbon in water assessment and OM3: Hydrocarbon in sediment assessment.*

 # Specific monitoring units 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 and the ability to access these locations (i.e. with consideration of safety and simultaneous operations (SIMOPS)) would be assessed. This would be identified and managed as part of implementation as per the guidance in Section 13.

^ These resources may not be required if relevant scientific monitoring components' initiation criteria have been triggered

Table 8-5: Resources required for implementing scientific monitoring plans

SMP	Week 1 (total)#	Week 2 (total)#+	Arrangement
SM1: Water quality impact assessment*^	1 team (spill site and surrounds) 1 team Montebello Unit 1 team Barrow Unit 1 team Control Sites **Total 4 teams**	1 team (spill site and surrounds) 1 team Montebello Unit 1 team Barrow Unit 1 team Control Sites **Total 4 teams**	OSRL OSM Supplementary Service Agreement Marine contractors Laboratory arrangement
SM2: Sediment quality impact assessment*	Refer to SMP: Water quality impact assessment (all sites)		OSRL OSM Supplementary Service Agreement Marine contractors Laboratory arrangement
SM:3 Intertidal and coastal habitat assessment	1 team (spill site and surrounds) 1 team Montebello Unit 1 team Barrow Unit 1 team Control Sites **Total 4 teams**	1 team (spill site and surrounds) 1 team Montebello Unit 1 team Barrow Unit 1 team Control Sites **Total 4 teams**	OSRL OSM Supplementary Service Agreement Marine contractors Laboratory arrangement
SM4: Seabirds and shorebirds^	1 team to conduct initial aerial surveys for Montebello Unit and Barrow Unit **Total 1 aerial team** 1 team to conduct vessel-based surveys for Montebello Unit 1 team to conduct vessel-based surveys for Barrow Unit 1 team control site(s) (surveys would include all fauna [birds, reptiles, cetaceans, dugong and whale shark]) **Total 3 vessel-based teams**	1 team to conduct initial aerial surveys for Montebello Unit and Barrow Unit **Total 1 aerial team** 1 team to conduct vessel-based surveys for Montebello Unit 1 team to conduct vessel-based surveys for Barrow Unit 1 team control site(s) (surveys would include all fauna [birds, reptiles, cetaceans, dugong and whale shark]) **Total 3 vessel-based teams**	OSRL OSM Supplementary Service Agreement Marine contractors Aviation contractors Laboratory arrangement

SMP	Week 1 (total)#	Week 2 (total)#+	Arrangement
	1 team to conduct ground-based surveys for Montebello Unit 1 team to conduct ground-based surveys for Barrow Unit 1 team control site(s) (1 experienced ornithologists per team) **Total 3 ground-based teams**	1 team to conduct ground-based surveys for Montebello Unit 1 team to conduct ground-based surveys for Barrow Unit 1 team control site(s) (1 experienced ornithologists per team) **Total 3 ground-based teams**	
SM5: Marine megafauna assessment **(whale shark, dugong and cetaceans)^**	Aerial surveys refer to SMP: Seabirds and shorebirds Vessel surveys refer to SMP: Seabird and shorebirds		OSRL OSM Supplementary Service Agreement Marine contractors Aviation contractors Laboratory arrangement
SM5: Marine mega-fauna assessment **(reptiles)^**	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 Marine contractors Aviation contractors Laboratory arrangement
SM6: Benthic habitat assessment	1 team (spill site and surrounds) 1 team Montebello Unit 1 team Barrow Unit 1 team Control Sites **Total 4 teams**	1 team (spill site and surrounds) 1 team Montebello Unit 1 team Barrow Unit 1 team Control Sites **Total 4 teams**	OSRL OSM Supplementary Service Agreement Marine contractors Laboratory arrangement
SM7: Marine fish and elasmobranch assemblages assessment	1 team (spill site and surrounds) 1 team Montebello Unit 1 team Barrow Unit 1 team Control Sites **Total 4 teams**	1 team (spill site and surrounds) 1 team Montebello Unit 1 team Barrow Unit 1 team Control Sites **Total 4 teams**	OSRL OSM Supplementary Service Agreement Marine contractors Laboratory arrangement

SMP	Week 1 (total)#	Week 2 (total)#+	Arrangement
SM8: Fisheries impact assessment	Total 2 teams to cover all relevant Commonwealth and State fisheries.	Total 2 teams to cover all relevant Commonwealth and State fisheries.	OSRL OSM Supplementary Service Agreement Marine contractors Laboratory arrangement
SM9: Heritage features assessment	1 team	1 team	OSRL OSM Supplementary Service Agreement Marine contractors Laboratory arrangement
SM10: Social impact assessment	1 team	1 team	OSRL OSM Supplementary Service Agreement

** Initial co-mobilisation between SM1: Water quality impact assessment and SM2: Sediment quality impact assessment.*

^ This SMP may replace the relevant OMP if the OMPs termination criteria are triggered.

 # Specific units 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.

+ Depending on the circumstances of the spill, additional resources will be scaled in to cater for monitoring needs beyond week 2.

Section 9 Capability Demonstration

Vermilion is a Member of the OSRL OSM Supplementary Service Agreement (SA), which provides shared OSM Annual Services and Response Services to members who have subscribed to this supplementary service. This OSM Supplementary SA includes access to the OSRL (referred to in this document as OSM Service Provider) sub-contracted Monitoring Service Providers within Australia (who will report through the OSM Service Provider) to deliver monitoring capability. The OSM Supplementary SA includes provision of scale-up capability in the event of response activation, allowing for scalability and adaptability of OSM resourcing.

The OSM Service Provider, via the SA is contracted to provide Members with a monthly Capability Register which details personnel requirements for contracted 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.

Details of OSM services available through the OSM Supplementary SA are provided in Table 9-1 below.

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

OSM Services Provided During Preparedness and Activation/Monitoring Phases
Preparedness[2]
24/7 Duty Manager accessed through 24 hour Hotline
Provision of suitably trained operational monitoring personnel
Monthly reports on personnel and equipment availability
Access to OSM Service Provider's subcontracted Monitoring Service Providers
Access to OSM Service Provider's network of laboratories and equipment providers
Activation/Monitoring[3]
Provision of an OSM Services Lead and OSM Implementation Lead to the Vermilion ICT within 12 hours of notification
Provision of an initial 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 Vermilion in the finalisation of monitoring plans
Provision of scientific monitoring personnel within 5-7 days of notification
Access to OSM Service Provider laboratories and equipment

9.1 Personnel Competencies

The OSRL OSM Supplementary SA specifies the training and competency requirements for key OSM personnel consistent with the specified training and competencies stated in Table 11-1 of the Joint Industry OSM Framework. In addition, competencies of SMP Field Teams are consistent with Appendix D of the Joint Industry OSM Framework.

[2] Defined as Annual OSM Services in OSM Supplementary Service Agreement

[3] Defined as Response Services in OSM Supplementary Service Agreement

The OSM Supplementary SA commits to nominated monitoring personnel providing copies of their CVs/Resumes, along with certificates or evidence meeting the competency requirements. This information is stored in the OSRL Operational and Scientific Monitoring Document Management System for capability tracking and assurance purposes. The Monthly Capability Register is updated so that it reflects changes to personnel availability or gaps in competency and training. The role of the OSM Implementation Lead aligns with the responsibilities listed in the Joint Industry OSM Framework.

In addition, and where practicable, Vermilion will engage additional subject matter experts in the initial stages of the monitoring program to assist in activation and mobilisation of monitoring teams and support the OSM Service Provider in the preparation of monitoring designs.

9.2 Equipment

Equipment requirements for each OMP and SMP are listed by each OMPs and SMPs within the OSM Framework (APPEA, 2021). In accordance with the OSRL OSM Supplementary SA, the OSM Services Provider will provide specialised field monitoring equipment to implement individual OMPs and SMPs. Vermilion will remain responsible for support and field logistics, including monitoring platforms (e.g. vessels, vehicles and aircraft), flights, accommodation, and transportation/couriers for samples to be sent back to laboratories.

Availability of key equipment is listed in the OSM Service Provider's Equipment Register, available via the OSM Service Providers MSP Capability Register. A generalised breakdown of Vermilion's equipment and the source is listed in provided in Table 9-2.

Table 9-2: Vermilion OSM equipment

Equipment type	Source
Vermilion acquired equipment	
Desktop equipment (e.g. Oil Spill Response Atlas)	Coordinated through ICT
Logistical equipment (e.g. in-field accommodation, vessels, aircraft)	Refer to list of external support agencies and contracts held by Vermilion as listed in the VOGA Emergency Response Logistics Management Plan [VOG-7000-RH-0008].
Dispersant shake test kits (initial shake jar test only)	2 x test kits in Fremantle; 2 x test kits in Karratha. Available through the National Plan.

9.3 Exercises

The OSM Service Provider, via the OSM Supplementary SA, is contracted to maintain an OSM Services Annual Assurance Program. As part of this program, the OSM Service Provider conducts numerous exercises, which are outlined in Table 9-3. The purpose of this testing is to confirm that response arrangements and planned capability is in place, available when needed, and function as intended.

Following the Notification and Tabletop exercises listed in Table 9-3, the OSM Service Provider will prepare exercise reports and track any action items to completion. The reports will be available to all Members.

In addition, Vermilion will conduct an annual notification test of the OSM Service Provider, outlined in the Vermilion Emergency Response Schedule [VOG-1100-YH-0001].

Table 9-3: Exercise types

Exercise Type	Responsibility	Description	Frequency
Assurance Program Workshop	OSRL, Industry Member Technical Advisory Group (IMTAG) and Monitoring Service Providers	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	Vermilion with OSRL	Test procedures to notify and activate the OSM Services, including subcontracted Monitoring Service Providers.	Annually
Tabletop exercise	IMTAG and OSRL to agree a lead Titleholder for each Calendar Year	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	Monitoring Service Providers & OSRL	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

Section 10 Capability Assessment

Table 10-1 provides a comparison of Vermilion's worst-case OSM resource requirements (as outlined in Table 8-4 and Table 8-5) 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 OM1: Hydrocarbon Characterisation can also carry out the OM2: Hydrocarbon in Water Asessment or OM3: Hydrocarbon in Sediment concurrently. During the capability assessment, available personnel were allocated to one monitoring team only to ensure capability is met despite synergies between OMP and SMP personnel.

This information has been transcribed across to the VOGA Exploration and Survey Operations - Oil Spill Response Capability Review [VOG-1100-YH-0019].

Table 10-1: OSM capability

Component	Maximum No. personnel required (Weeks 1–2) ^	Personnel available via OSM Service Provider#	Personnel available via OSROs	Vermilion	Total personnel available
OSM Personnel embedded in IMT	1 OSM Implementation Lead 1 OM Coordinator 1 SM Coordinator 1 OSM Field Operations Manager	1 OSM Implementation Lead 1 OM Coordinator 1 SM Coordinator 1 OSM Field Operations Manager	-	1 OSM Implementation Lead (initial)	1 OSM Implementation Lead 1 OM Coordinator 1 SM Coordinator 1 OSM Field Operations Manager
OMPs					
OM1: Hydrocarbon characterisation*	3 teams	6 teams	-	Initial sampling kits (Toll Dampier Supply Base) and procedures for untrained personnel to obtain samples	6 teams
OM2: Hydrocarbon in water assessment*	Refer to OM1: Hydrocarbon characterisation				
OM3: Hydrocarbon in sediment assessment*	Refer to OM1: Hydrocarbon characterisation				
OM4a: Surface dispersant effectiveness monitoring	Visual observations: 1 team Water quality assessment – refer to OM2: Hydrocarbon in water assessment*	1 visual observation team Refer to OM2: Hydrocarbon in water assessment*	4 AMOSC Staff 2 AMOSC Core Group trained personnel	-	Visual observations: 1 team (OSM Services Provider) 4 AMOSC Staff 2 AMOSC Core Group trained personnel
OM5: Rapid Marine Fauna Surveillance	1 aerial team	2 teams	N/A	N/A	2 teams
OM6: Shoreline clean-up assessment	10 teams	18 OSRL personnel	60 + AMOSC Core Group	-	60 + AMOSC Core Group 12 AMOSC staff

Component	Maximum No. personnel required (Weeks 1–2) ^	Personnel available via OSM Service Provider#	Personnel available via OSROs	Vermilion	Total personnel available
			12 AMOSC staff trained in SCAT		18 OSRL
SMPs					
SM1: Water quality impact assessment+	4 teams	6 teams	-	-	6 teams
SM2: Sediment quality impact assessment	Refer to SMP: Water quality impact assessment* (all sites)				
SM3: Intertidal and coastal habitat assessment	4 teams	6 teams	-	-	6 teams
SM4: Seabirds and shorebirds+	1 aerial team 3 vessel teams (surveys would include all fauna [birds, reptiles, cetaceans, dugong and whale shark]) 3 ground-based teams	2 aerial teams 5 vessel teams 5 ground based teams (plus 1 team member per team experienced with ground turtle surveys – see Marine mega-fauna assessment [reptiles])	-	-	2 aerial teams 5 vessel teams 5 ground based teams (plus 1 team member per team experienced with ground turtle surveys – see Marine mega-fauna assessment [reptiles])
SM5: Marine mega-fauna assessment (whale shark, dugong and cetaceans) +	Refer to SMP: seabirds and shorebirds				
SM5: 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)				
SM6: Benthic habitat assessment	4 teams	6 teams	-	-	6 teams

Component	Maximum No. personnel required (Weeks 1–2) ^	Personnel available via OSM Service Provider#	Personnel available via OSROs	Vermilion	Total personnel available
SM7: Marine fish and elasmobranch assemblages assessment	4 teams	6 teams	-	-	6 teams
SM8: Fisheries impact assessment	2 teams	2 teams	-	-	2 teams
SM9: Heritage features assessment	1 team	1 team	-	-	1 team
SM10: Social impact assessment	1 team	1 team	-	-	1 team

** Initial co-mobilisation between OM1: Hydrocarbon characterisation, OM4a: Surface dispersant effectiveness monitoring, OM2: Hydrocarbon in water assessment and OM3: Hydrocarbon in sediment assessment*

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

+ Can initially be performed by the same team as the relevant OMP. This SMP may replace the relevant OMP, if the relevant OMP's termination criteria are triggered.

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

Section 11 Review of Plan

As part of Vermilion's annual oil spill capability review, this document will be reviewed and revised as required, in accordance with Section 8.3.1 *Determining requirements* of the Wandoo Field Oil Spill Contingency Plan – Planning and Preparedness [WAN-2000-RD-0001.01]. 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 BIP and resultant requirements for regulatory resubmission will be informed by the relevant Commonwealth regulations, i.e. OPGGS (E) Regulations.

Part B Implementation

Control Agencies and Jurisdictional Authorities

Vermilion's EPs 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 DTMI is the Control Agency, OM6: Shoreline Clean-up Assessment will be implemented under their direction, with resources provided by Vermilion.

In addition, Part 4 of the Exploration and Survey Operations Oil Pollution Emergency Plan (OPEP) [AUPD24001-VOG-1100-YH-0016] titled activation of oil pollution emergency plan, provides regulatory and stakeholder notification and reporting requirements. Whilst all notification and reporting will be performed by Vermilion's ICT personnel, monitoring personnel should be aware of these requirements and confirm all relevant notifications and reporting have been completed prior to undertaking monitoring activities.

Section 12 Mobilisation and Activation

The Vermilion ICT Environment Unit Lead is responsible for initiating the activation of OSM components, subject to authorisation from the Incident Commander. Table 12-1 outlines the OSM Supplementary SA activation process to be followed by Vermilion and the OSM service providers.

Table 12-1: OSM mobilisation and activation process

Responsibility	Task	Timeframe	Complete
Environment Unit Lead (Vermilion)	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 authorisation from Incident Commander to activate OSM Service Provider	Within 4 hours of spill notification	☐
	Contact OSM Service Provider and verbally notify their Duty Manager of the incident, requesting provision of OSM Implementation Lead (if required by Vermilion) to the ICT. Complete Call Off Order Form (Appendix E) and submit to OSM Services Provider[4] 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 ICT	☐
	Liaise with Vermilion's 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	☐
	The Environment Unit Lead and Planning Chief will determine whether SCAT capability will be sourced locally or activated through the OSRL OSM Service (OM6: Shoreline Cleanup Assessment), noting that local assets can generally be mobilised more quickly; available SCAT resources and capability are outlined in Table 10-1. [5]	Within 1 hour of ICT determining that SCAT is required	☐
Logistics Section Chief (Vermilion)	Commence arrangements for vessels, accommodation and transport to mobilise monitoring teams	Within 24 hours of spill notification	☐
OSM Service Provider	Duty Manager to activate relevant Monitoring Service Providers	Within 30 minutes of Call Off Order	☐

[4] A copy of the Call Off Order Form is provided in Appendix E; however, the OSRL Duty Manager will send an updated version upon verbal notification.

[5] SCAT teams, led by trained AMOSC Core Group leaders, assess shoreline oiling and provide response strategy recommendations to the Planning Chief, who briefs the Operations Chief on required data collection within the Shoreline Operations Unit, after which operational clean-up teams implement the SCAT recommendations.

Responsibility	Task	Timeframe	Complete
		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 ICT	Within 12 hours of notification being made to OSM Services Provider	☐
	Liaise directly with the 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 ICT	☐
	Confirm availability of initial personnel and equipment resources	Within 5 hours of monitor and evaluate data being received from ICT	☐

Section 13 Monitoring Priorities

As described in Section 2 and Section 4 of this Plan, the available stochastic spill modelling has been analysed to understand the likely 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) in the event of a 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
Vermilion 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 ICT	☐
Vermilion Environment Unit Lead with input from OSM Services Provider	Confirm monitoring receptors/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); • Analysis of the Joint Industry Marine Environment Baseline Database for relevant receptors; • 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); and • Monitoring priorities identified Section 2 and Table 4-3.	Within 12 hours of monitor and evaluate data being received from ICT	☐
	Using the results of the baseline data analysis in Table 4-3 and the information above, determine priority receptors for post-spill, pre-impact monitoring	Within 12 hours of monitor and evaluate data being received from ICT	☐
	Confirm the need for any additional reactive baseline monitoring data for SMPs and determine suitable receptors, noting that suitable control or reference sites may be outside of the OSM Planning Area	Within 12 hours of monitor and evaluate data being received from ICT	☐

Responsibility	Task	Timeframe	Complete
	Continually re-evaluate monitoring priorities in consultation with Environment Unit Lead and relevant key stakeholders throughout spill response	Ongoing	☐

Section 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.

Vermilion's activity-specific EPs outline the management plans, recovery plans and conservation advice statements relevant for the protected matters within the OSM Planning Area that are likely to be relevant to the final design of the OMPs and SMPs. The EPs and Appendix C also include 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
Vermilion 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 the activity-specific EP 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 SM5: 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	☐

Section 15 Finalising Monitoring Design

The methods presented in the Joint Industry OMPs and SMPs are designed to allow the OSM Service Provider and their sub-contracted Monitoring Service Providers 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 (e.g. weather, logistical restraints) of the Joint Industry OSM Framework.

Vermilion's checklist for finalising monitoring designs post-spill is provided in Table 15-1. The Environment Unit Lead and OSM Implementation Lead provided by a Monitoring Service Provider, 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
Vermilion Environment Unit Lead and OSM Implementation 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 ICT	☐
	Determine suitable sampling frequency	Within 48 hours of initial monitoring priorities being confirmed by ICT	☐
	Finalise standard operating procedures	Within 48 hours of initial monitoring priorities being confirmed by ICT	☐
	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 Vermilion 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	☐
	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 ICT	☐

Section 16 Mobilisation

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

The OSM Service Provider will be required to coordinate the availability of personnel and equipment for all monitoring programs. Vermilion will be responsible for flights, accommodation, and provisions for field personnel. Vermilion 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.

Table 16-1: Checklist for mobilisation of monitoring teams

Responsibility	Task	Complete
OSM Services Provider with input from Vermilion 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 ICT and process requirements, including data transfer approach and frequency/timing	☐
	Confirm data formats and metadata requirements with personnel receiving data	☐
	Logistics	
	Confirm Vermilion Logistics Section have arranged flights, accommodation, and car hire	☐
	Develop field survey schedules, detailing staff rotation	☐
	Equipment	
	Confirm Vermilion 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 Vermilion 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)	☐

Responsibility	Task	Complete
	forms and 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	☐

Section 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, fauna and managed fisheries. Table 17-1 lists relevant protected areas within the OSM Planning Area and the jurisdictional authority to be contacted to obtain the necessary permit or access permission. For a list of all relevant receptors and fisheries refer to the activity-specific EPs.

The OSM Service Provider will work alongside Vermilion to request access and submit permit applications to all relevant Jurisdictional Authorities in order to conduct monitoring for OMPs and SMPs.

Table 17-1: Permits required in the OSM Planning Area

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 - https://www.dcceew.gov.au/environment/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.dcceew.gov.au/environment/epbc/our-role/what-is-protected
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 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: https://www.dcceew.gov.au/science-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	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

Receptor	Jurisdictional Authority	Relevant information on permits
	Heritage (DPLH)	Aboriginal heritage sites in WA: https://www.wa.gov.au/service/aboriginal-affairs/aboriginal-cultural-heritage/search-aboriginal-sites-or-heritage-places and https://www.dplh.wa.gov.au/information-and-services/aboriginal-heritage
Defence/restricted military area	Department of Defence	Unexploded Ordnances (mapping information): https://www.defence.gov.au/UXO/default.asp Maritime military firing practice and exercise areas: https://www.google.com/url?sa=t&source=web&rct=j&opi=89978449&url=https://www.hydro.gov.au/n2m/2010/annual/n2m/9.pdf&ved=2ahUKEwi08LDJ_c-PAxWiamwGHUmjCiQQFnoECB0QAQ&usg=AOvVaw0A_L5br6pqJx_IZgW7N15M
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

Section 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 OSM Implementation Lead via field reporting forms, debriefs and reports. Laboratory analysis reports should also be directed to the OSM Implementation Lead.

The OSM Implementation Lead, provided by the Monitoring Service Provider, 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 ICT 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 OSM Implementation Lead, who will then distribute the data from each monitoring component to the relevant ICT Section. Table 18-2 provides guidance on the type of data generated from each OMP, which ICT Section 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 Vermilion 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 ICT during regular situation debriefs.

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

Responsibility	Task	Timeframe	Complete
OSM Services Provider – Field Team Lead	Data collected whilst implementing OMPs and SMPs is QA/QC checked that it aligns with the requirements listed in the finalised OMPs and SMPs (where applicable)	Ongoing	☐
	Communicate data back the Vermilion ICT via field reporting forms, debriefs and reports	Ongoing	☐
OSM Implementation Lead (Monitoring Service Provider)	Ensure OM data (including verbal reports) is provided to the Vermilion ICT as soon as possible to ensure data collected during an operational period can be used within the same, or next operational period to aid decision making	As soon as possible after data collected	☐
	Interpret and analyse OM data	Ongoing	
	Distribute the data from each monitoring component to the relevant ICT Section	Ongoing	☐

Responsibility	Task	Timeframe	Complete
OSM Service Provider	Oversee the collection of data by sub-contracted Monitoring Service Provider field teams, including QA/QC assessment in accordance with the requirements listed in the finalised OMPs and SMPs (where applicable).	Ongoing	☐
	Provide OMP data to the ICT Situation Unit Lead	Daily and ongoing	☐
Vermilion Operations Section (Shoreline Unit)	Reports from OM6: Shoreline Clean-up Assessment will be provided to the ICT daily, detailing the assessed areas to maximise effective utilisation of resources	Daily reporting	☐
Vermilion Planning Chief/Situation Unit Lead	Incorporate OMP data into Common Operating Picture	Daily and ongoing	☐
Vermilion 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 ICT in decision-making

OMP	Data generated[6]	ICT Section requiring data	How data may be used by ICT
OM1: Hydrocarbon characterisation	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
OM2: Hydrocarbon in water 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.
OM3: Hydrocarbon in sediment 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
OM4a: 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)
OM5: Rapid Marine Fauna Surveillance	Rapid assessment of presence and distribution of marine fauna;	Planning Section for use in IAP; Oiled Wildlife Unit/Division to help in	• Understanding of species, populations and geographical locations at greatest risk from spill impacts. ICT can use this information to help qualify locations with highest level of protection priority

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

OMP	Data generated[6]	ICT Section requiring data	How data may be used by ICT
	evaluate impact of spill and response activities on fauna	developing Wildlife Response Sub-plan	(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 ICT 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)
OM6: 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 ICT can rely on the recommendations of Assessment Teams (e.g. flagging access issues, suitable tactics, likely resourcing needs).

18.2 Impacts from Response Activities

Table 10-4 of the Joint Industry OSM Framework (APPEA, 2021) 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, provided by the Monitoring Service Provider, 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 Vermilion Environment Unit Lead 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.

Section 19 Data Management

Minimum standards for data management are provided in Section 10.11 of the Joint Industry OSM Framework (APPEA, 2021) and will be adopted by Vermilion and the OSM Service Provider.

Section 20 Quality Assurance and Quality Control

Refer to Section 10.11 of the Joint Industry OSM Framework (APPEA, 2021) for QA/QC minimum standards which will be adopted by Vermilion and the OSM Service Provider.

Section 21 Communication Protocols

21.1 OSM Service Provider

Communication protocols between Vermilion and its OSM Service 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 Vermilion and its OSM Service Provider during the preparedness phase (pre-spill) will be between the nominated Industry Member Technical Advisory Group representative and the OSM Service Provider.
- Communication between Vermilion and its OSM Service Provider during activation will be between the Environment Unit Lead and the OSM Service Provider representative.
- During implementation (post deployment), primary communication occurs via two pathways:
  - Environment Unit Lead and the OSM Service Provider Duty Manager for contractual, management, scientific and general direction matters; and
  - Vermilion Division Commander / On-Scene Commander and the OSM Field Team Leaders for on-site matters.
- All key OSM decisions should be logged in an ICS 214 Log Form 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 Vermilion 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 Vermilion and the OSM Services Provider during a response should be recorded and kept on file.
- All communication received by OSM Service 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 Service Provider outside of these protocols should be confirmed via the Vermilion Environment Unit Lead or On-Scene Commander prior to implementation.

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

21.2 External Stakeholders

Results of OMPs and SMPs will be discussed with relevant stakeholders through Vermilions ICT Public Information Officer. 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.

Stakeholder communications post-response will be managed by the Vermilion Stakeholder Liaison team.

Section 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, Vermilion is responsible for coordinating a lessons-learnt meeting between the OSM Service Provider, sub-contracted Monitoring Service Providers and other relevant stakeholders.

It is the responsibility of Vermilion 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
Vermilion 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	☐

Section 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.

French-McCay D (2024) Considerations for Development of Entrained Oil Thresholds for Oil Spill Risk Assessments. RPS Ocean Science. Australian Energy Producers.

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.

NOPSEMA (2021) Regulatory Advice Statement on APPEA's Joint Industry Operational and Scientific Monitoring Framework.

NOPSEMA (2024) Operational and Scientific Monitoring Programs N-04750-IP1349, A343826.

NOPSEMA (2025) Information Paper: Application of oil spill modelling in Environment Plans, December 2025. N-04750-IP2376, A1289237.

RPS (2026) Vermilion Kullingal Oil Spill Modelling Report. GOC367176. Final. 20 March 2026.

Appendices

Appendix A: Demonstration of Meeting OSM Framework Regulatory Requirements

RAS Requirement	Relevant Section of Documentation that Addresses the Requirement
Conducted an appropriate risk assessment of worst-case oil pollution scenario(s) supported by spill modelling.	Vermilion has assessed its worst-case oil pollution scenarios, including spill volumes, hydrocarbon types, and potential release locations, within its EP, OPEP and OSM-BIP. As part of this process Vermilion has reviewed stochastic spill modelling outputs for each scenario to evaluate spill risks relevant to OSM planning (Section 2 and Section 8). A full assessment of worst-case oil pollution scenarios is incorporated in the activity Environment Plan.
Evaluated and adopted all reasonably practicable measures to reduce oil pollution risks by preventing incidents and preparing for a timely and effective response to pollution events.	The control measures for reducing oil pollution risks are included in the activity EP in the unplanned activities risk assessment section. Information pertaining to response preparedness is provided in the OPEP.
Identified monitoring arrangements and resource requirements based on the worst-case oil pollution scenario(s).	Section 8 outlines the process for determining the greatest OSM resource requirements based on the worst-case scenarios for Vermilion's activities. Monitoring arrangements, including contracted and internal capability are presented in Section 9 and Section 10.
Presented monitoring arrangements and capability that are scalable and adaptable and will provide timely information.	Section 9 outlines Vermilion's monitoring arrangements via OSRL's OSM Supplementary Service Agreement, including scalable resourcing, if it is required.
Identified suitably qualified personnel who will be in decision making roles and implementing the monitoring and who are prepared for their responsibilities in advance of the incident occurring.	Section 6 outlines personnel who will fill key OSM decision making roles. Roles filled by the OSM Services Provider are managed via the OSRL OSM Supplementary Services Agreement which specifies responsibilities for OSM response.
Established operational monitoring requirements based on the response needs and capacity reasoning applied to demonstrate ALARP for the response control measures detailed in the OPEP	Vermilion has assessed its OSM control measures and required capability in preparing this OSM-BIP. In addition, Vermilion has undertaken an ALARP assessment in the Environmental Impact of Oil Spill Response (Section 5.16) of the activity EP to determine if any improvements could be made to the existing suite of control measures.

RAS Requirement	Relevant Section of Documentation that Addresses the Requirement
Demonstrated all feasible preparatory actions to improve reliability, effectiveness and timeliness of response arrangements and capability (including operational monitoring), have been implemented where costs are not grossly disproportionate to the environmental benefit gained	The Environmental Impact of Oil Spill Response (Section 5.15) of the Wandoo Field Exploration Drilling EP demonstrates a detailed control measure options analysis was undertaken and all feasible control measures for OSM have been implemented.
Set environmental performance standards that reflect the level of performance required of the response control measures (including monitoring) to achieve the defined environmental performance outcomes.	The EP (Section 5.16.5) details all OSM control measures and performance standards, many of which relate directly to the RAS Requirements. Section 18.3 outlines tasks for the OSM Implementation Lead and Environment Unit Leader to ensure environmental performance standards are met via operational monitoring activities.
The EP clearly commits to initiate all OMPs as listed in Table 5-1 as per initiation criteria listed in Table 9-1.	Table 12-1 outlines the guidance to be followed during mobilisation. In addition, the EP (Section 5.15.5) commits to activating OMPs in line with the initiation criteria set out in the Framework.
The EP clearly commits to initiate all SMPs as listed in Table 6-1 as per initiation criteria listed in Table 9-2.	Table 12-1 outlines the guidance to be followed during mobilisation. In addition, the EP (Section 5.16.5) commits to activating SMPs in line with the initiation criteria set out in the Framework.
The EP clearly commits to the Termination Criteria listed in Table 9-1 for operational monitoring and Table 9-2 for scientific monitoring.	Table 22-1 outlines the guidance to be followed during termination of OSM. In addition, the EP (Section 5.16.5) commits to terminating SMPs in line with the termination criteria set out in the Framework.
The EP clearly commits to the quality assurance and quality control items listed in Section 10.11 of the framework.	Section 20 commits that Vermilion and the OSM Services Provider will use Section 10.11 of the Joint Industry OSM Framework for QA/QC minimum standards.
The EP includes a clear commitment to use the same description of the roles and responsibilities for key emergency response personnel presented in the framework in Table 10-6.	Section 6 commits that Vermilion and the OSM Services Provider will use the key roles and responsibilities provided in Section 10.13.2 of the Framework.
The EP clearly commits to emergency response personnel having the competencies outlined in Table 11-1. However, Titleholders need to ensure that regardless of the university qualifications that personnel may have, ultimately the monitoring undertaken must be of suitable experimental design, and with personnel who are trained and competent in experimental design and in situ monitoring implementation, irrespective of their qualifications, this may not be achieved.	Personnel competencies in Section 9.1 commits that Vermilion and the OSM Services Provider will use the competencies outlined in Table 11-1 of the Framework.
The EP clearly commits to the minimum standards identified in Appendix A, with the addition of replacing language in the form of "should" and "where possible" with "will". EP's that commit to the standards identified in this appendix without replacing	The EP (Section 5.16.5) commits that Vermilion will comply with the minimum standards listed in Appendix A of the Joint Industry OSM Framework. In addition, the minimum standards have been reviewed and integrated into this OSM-BIP.

RAS Requirement	Relevant Section of Documentation that Addresses the Requirement
the text described above with more definitive language will likely to be subject to a more comprehensive assessment of the arrangements in accordance with the risk factors particular to the EP and receive requests for clarification from NOPSEMA during the assessment process.	
The EP clearly commits to meet the competencies identified for teams in Appendix D Table D1.	Personnel competencies in Section 9.1 commits that Vermilion and the OSM Services Provider will use the competencies for SMP Field Teams as outlined in Appendix D of the Framework.
The EP clearly commits to an annual review and reviews where all the suggested triggers apply as advised in the template.	Section 11 and the EP (Section 5.16.5) commit to conducting an annual review of the OSM-BIP, providing the criteria for the review.
The EP uses the process described in Sections 2 and 13 of the template to identify the environment that may be affected and the protection and monitoring priorities, including the application of oil concentration thresholds consistent with the exposure values for oil spill modelling presented in NOPSEMA's oil spill modelling bulletin, and fully justifies the outcome.	Section 2 demonstrates that Vermilion has applied the NOPSEMA oil spill modelling low thresholds (NOPSEMA Information Paper: Application of oil spill modelling in Environment Plans [NOPSEMA, 2025]) for determining the Scientific Monitoring Planning Area (Step 1 of the BIP Template). Section 2.2 also outlines Vermilion's process for identifying monitoring priorities, as required by Section 2 of the BIP Template (step 3). This process incorporates the key elements listed in the BIP Template, including analysis of spill modelling results with receptors of high conservation value (especially receptors predicted to be contacted at higher probabilities and a rapid timeframe) and availability of baseline data. As noted in Section 2 of the BIP template, the monitoring priorities listed are for planning purposes only and Vermilion and its OSM Services Provider will follow the process outlined in Section 13 when confirming monitoring priorities in the event of a spill.
The EP adheres to the process described in Sections 3 and 4 of the template to undertake baseline data analysis and fully justifies the outcome.	Section 3 and Section 4 follow the guidance provided in the BIP Template, with the addition of more information to support continuous improvement in this area. Noting this, Vermilion is part of a Joint Industry Collaborative Group who are working together to determine the extent, quality and suitability of existing baseline data for the marine environments in the North West Shelf, Browse and Timor Sea Regions of Australia. The Marine Environment Baseline Database includes available data for all receptors relevant to the Joint Industry OSM Framework and has assessed the spatial and temporal relevance of this data and comparison of methods and parameters to those outlined in the Joint Industry SMPs, as recommended in Section 7 and Appendix A of the Framework and Section 4 of the BIP Template.

RAS Requirement	Relevant Section of Documentation that Addresses the Requirement
The EP makes clear, unambiguous commitment that scientific monitoring reports “will be” peer reviewed by an expert panel (Section 4, p10).	The EP (Section 5.16.5) commits that draft OSM data reports will be peer reviewed by an expert panel for data integrity. This is also stated in Section 20.
The EP includes clear, unambiguous activation, mobilisation, and implementation timeframes, which are relevant to the predicted time to contact of the pollution with sensitive receptors, baseline data available, sensitivities affected, practicability of implementation and/or other factors. Indicative mobilisation timeframes for OSM activities presented as worked examples in the template, for example, activation timeframes in Table 7-1 and Section 12 and implementation timeframes in Sections 13 and 15, should be revised to reflect each activity’s oil pollution scenario(s) and specific response requirements.	Section 12 provides the mobilisation and activation process and timeframes for the OSRL OSM Supplementary Services Agreement. Section 7 provides timeframes for mobilisation and activation that are relevant to Vermilion’s activities, including predicted time to contact to sensitive receptors (from spill modelling), availability of baseline data and practicability of implementation (i.e. remote environments, timeframes for mobilising specialised equipment and personnel).
Monitoring implementation timeframes consider any time requirements to finalise SMPs prior to implementation being required or take actions to reduce timeframes during the pre-spill (preparedness) phase.	The timeframes for finalising SMPs have been accounted for in the timeframes provided in Part B of the OSM-BIP, in particular, Section 15.
The EP includes OMPs that are sufficiently developed and/or finalised to ensure that they are ready to implement in the identified timeframes for operational monitoring to provide information to support initial and ongoing response decision-making.	The Joint Industry Framework includes well developed OMPs that have been socialised with the OSM Services Provider and will be finalised in the event of a spill. The timeframe for finalising the OMPs is factored into the implementation timeframes provided in Section 7.
The EP identifies that operational monitoring detailed in the OMPs will be initiated, monitoring teams deployed, and information provided to the incident management team (IMT) in timeframes that match those identified and applied to the oil pollution emergency response planning in the development of the OPEP.	As described in Section 7, the OPEP describes additional monitoring activities that will support the implementation of response strategies. This includes SCAT teams to support shoreline protection and clean-up; aerial surveillance to support oiled wildlife activities and marine fauna monitoring.
The EP identifies monitoring resources in the BIP that match the monitoring and response needs in terms of numbers of personnel, teams, equipment, sites etc. Tables 8-2, 8-3 and 10-1 in the template provide a suitable method of presenting the number of personnel and teams required to resource a monitoring program, however, the content of these tables will be assessed by NOPSEMA in the context of the oil pollution scenario(s), response needs analysis and capacity reasoning presented in the EP.	Section 8 outlines the spill scenarios expected to place the highest demand on Vermilion’s initial and on-going monitoring capability. These scenarios form the basis of the OSM capability assessment. As per Section 8 of the BIP Template, Vermilion has determined its resourcing requirements by considering spill modelling outputs, implementation timeframes and monitoring priorities. Additionally, the use of ‘Monitoring Units’ has been incorporated, as described in Section 8.1 Monitoring Units, and also to demonstrate how BIAs, KEFs and broadscale features are integrated into the capability assessment.
The EP adheres to the exercise and testing process described in Section 9.3. Additionally, the BIP should identify the specific objectives of the testing of monitoring arrangements, ensure the frequency of the schedule of testing is consistent with the regulatory requirements and provide information on any aspects of the testing of	Section 9.3 is consistent with the BIP Template, outlining the types of exercises that shall be conducted by the OSM Services Provider, as per the OSRL OSM Supplementary Services Agreement; and also by Vermilion.

RAS Requirement	Relevant Section of Documentation that Addresses the Requirement
monitoring that differ to the OPEP testing arrangements described elsewhere in the EP.	
The EP confirms that the aims and objectives of the OMPs and SMPs are appropriate for a Titleholder's monitoring requirements and address the potential impacts and risks and response activities.	The OPEP (Section 16) confirms which OMPs and SMPs are relevant to the activity and that the aims and objectives of these monitoring plans are appropriate to the needs of the spill, its risks and response activities.
The EP uses the method provided in the template for Titleholders to ensure special requirements for Matters Protected Under Part 3 of the EPBC Act are met through the proposed monitoring (Section 14). However, the method indicates that this would be done prior to finalisation of OMPs and SMPs, which may not be completed in a Titleholder's EP. Titleholders should ensure that relevant requirements are at least identified in the EP. This process would also be repeated during finalisation of OMPs and SMPs in the event of an oil pollution emergency to ensure any changes to requirements since submission of the EP or the latest review are included.	Vermilion summarises special requirements for Matters Protected Under Part 3 of the EPBC Act in Section 3 of the activity EPs. The process for ensuring all relevant Protected Matters are integrated into the final monitoring design is outlined in Section 14.
The EP sets environmental performance outcomes, standards and measurement criteria that relate to the environmental impacts and risks and required level of performance of the proposed monitoring arrangements (preparedness and implementation) defined in the BIP.	The EP (Section 5.15.5) outlines a number of environmental performance outcomes, standards and measurement criteria committing Vermilion to OSM preparedness and implementation performance relevant to this OSM-BIP.

Appendix B: Sensitive Receptors and their Relevant OMPs and SMPs

Receptor	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	SMP: Water quality impact assessment	SMP: Sediment quality impact assessment	SMP: Intertidal and coastal habitat assessment	SMP: Seabirds and shorebirds	SMP: Marine megafauna assessment- reptiles	SMP: Marine megafauna assessment- whale sharks, dugong and cetacean	SMP: Benthic habitat assessment	SMP: Marine fish and elasmobranch assemblages assessment	SMP: Fisheries impact assessment	SMP: Heritage and social impact assessment
AMPs															
Dampier AMP	✓	✓	✓	-	✓	✓	✓	-	⊙	⊙	⊙	✓	✓	✓	✓
Gascoyne AMP	✓	✓	✓	-	✓	✓	✓	-	⊙	⊙	⊙	✓	✓	✓	✓
Montebello AMP	✓	✓	✓	-	✓	✓	✓	-	⊙	⊙	⊙	✓	✓	✓	✓
Shorelines															
WA11.East (104) - West Intercourse Island - Dolphin Island N point (B) – Dampier Archipelago	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
WA11.East (105) - West Intercourse Island - Dolphin Island N point (C) - Dampier Archipelago	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
WA11.East (106) - West Intercourse Island - Dolphin Island N point (D) – Karratha	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
WA11.East (107) - West Intercourse Island - Dolphin Island N point (E) – Karratha	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
WA11.East (108) - Pelican Point - West Intercourse Island – Karratha / Cape Preston	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
WA11.East (109) - James Point - Cape Preston – Karratha	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
WA11.West (110) - Mount Salt coast W - James Point – Great Sandy Island	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
WA11.West (111) - Peter Creek coast E - Mount Salt coast W – Ashburton	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Receptor	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	SMP: Water quality impact assessment	SMP: Sediment quality impact assessment	SMP: Intertidal and coastal habitat assessment	SMP: Seabirds and shorebirds	SMP: Marine megafauna assessment- reptiles	SMP: Marine megafauna assessment- whale sharks, dugong and cetacean	SMP: Benthic habitat assessment	SMP: Marine fish and elasmobranch assemblages assessment	SMP: Fisheries impact assessment	SMP: Heritage and social impact assessment
WA11.West (111) - Peter Creek coast E - Mount Salt coast W – Ashburton	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
WA11.West (112) - Weld Island coast S - Peter Creek coast E - Ashburton	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
WA11.West (113) - Coolgra Point W - Yardie Landing (A) – Port of Onslow	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
WA11.West (114) - Coolgra Point W - Yardie Landing (B) – Ashburton Port	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
WA11.West (115) - Hope Point - Locker Point (A) - – Ashburton Port	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
WA11.West (116) - Hope Point - Locker Point (B) – Exmouth Gulf East	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
WA10 (121) - Bundegi - Shothole Canyon N (B) – Exmouth Gulf West	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
WA10 (122) - Vlamingh Head - North West Cape	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
WA10 (123) - Low Point - Vlamingh Head (A) – Exmouth	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
WA10 (124) - Low Point - Vlamingh Head (B)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
WA11.East (315) - Dolphin Island N point - Cinders Rd coast – Port Walcott	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
WA11.East (316) - West Intercourse Island - Dolphin Island N point (F) – Dampier Archipelago	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
WA11.East (317) - West Intercourse Island - Dolphin Island N point (G) - Dampier Archipelago	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
WA11.West (318) - Barrow Island and Montebello Islands (A) (Montebello Islands)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
WA11.West (319) - Barrow Island and Montebello Islands (B) (Montebello Islands)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Receptor	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	SMP: Water quality impact assessment	SMP: Sediment quality impact assessment	SMP: Intertidal and coastal habitat assessment	SMP: Seabirds and shorebirds	SMP: Marine megafauna assessment- reptiles	SMP: Marine megafauna assessment- whale sharks, dugong and cetacean	SMP: Benthic habitat assessment	SMP: Marine fish and elasmobranch assemblages assessment	SMP: Fisheries impact assessment	SMP: Heritage and social impact assessment
WA11.West (320) - Barrow Island and Montebello Islands (C) (Barrow Island)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
WA11.West (321) - Barrow Island and Montebello Islands (D) (Barrow Island)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
WA11.West (323) - Yardie Landing - Weld Island coast S (A)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
WA11.West (324) - Yardie Landing - Weld Island coast S (B) (Airlie Island)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
WA11.West (325) - Coolgra Point W - Yardie Landing (C) (Thevenard Island)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
WA11.West (326) - Baresand Point - Entrance Point E (Serrurier Island, Bessieres Island, Round Island)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
WA11.West (327) - Hope Point - Locker Point (E) (Observation Island)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
WA11.West (328) - Hope Point - Locker Point (F) – Fly Island	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
WA11.West (329) - Locker Point - Baresand Point (Muiron Islands)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Marine Parks (MP) and Nature Reserves (NR)															
Barrow Islands MMA and Barrow Island MP (State)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Great Sandy Island NR	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Lowendal Islands NR	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Montebello Islands MP	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Receptor	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	SMP: Water quality impact assessment	SMP: Sediment quality impact assessment	SMP: Intertidal and coastal habitat assessment	SMP: Seabirds and shorebirds	SMP: Marine megafauna assessment- reptiles	SMP: Marine megafauna assessment- whale sharks, dugong and cetacean	SMP: Benthic habitat assessment	SMP: Marine fish and elasmobranch assemblages assessment	SMP: Fisheries impact assessment	SMP: Heritage and social impact assessment
Muiron Islands MP & MMA	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Ningaloo MP	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Reefs, Shoals and Banks															
All	✓	✓	✓	-	✓	✓	✓	-	⊙	⊙	⊙	✓	✓	✓	-
KEFs															
Ancient Coastline at 125 m depth contour	-	✓	✓	-	✓	✓	✓	-	⊙	⊙	⊙	✓	-	-	-
Canyons linking the Cuvier Abyssal Plain and the Cape Range Peninsula	-	✓	✓	-	✓	✓	✓	-	✓	⊙	✓	✓	✓	-	-
Canyons linking the Argo Abyssal Plain with the Scott Plateau	-	✓	✓	-	✓	✓	✓	-	⊙	⊙	⊙	✓	✓	-	-
Continental Slope Demersal Fish Communities	-	✓	✓	-	✓	✓	✓	-	⊙	⊙	⊙	✓	✓	-	-
Commonwealth waters adjacent to Ningaloo Reef	-	✓	✓	-	✓	✓	✓	-	✓	⊙	✓	✓	✓	-	-
Exmouth Plateau	-	✓	✓	-	✓	✓	✓	-	⊙	⊙	⊙	✓	⊙	-	-
Glomar Shoals	-	✓	✓	-	✓	✓	✓	-	⊙	⊙	⊙	✓	✓	-	-
Mermaid Reef and Commonwealth waters surrounding Rowley Shoals	-	✓	✓	-	✓	✓	✓	-	⊙	⊙	⊙	✓	✓	-	-
Perth Canyon and adjacent shelf break, and other west coast canyons	-	✓	✓	-	✓	✓	✓	-	⊙	⊙	⊙	✓	✓	-	-
Wallaby Saddle	-	✓	✓	-	⊙	✓	✓	-	-	⊙	⊙	✓	⊙	-	-
Western demersal slope and associated fish communities	-	✓	✓	-	✓	✓	✓	-	⊙	⊙	⊙	✓	✓	-	-
BIAs															
Dwarf sawfish	-	✓	-	-	✓	✓	-	-	-	-	✓	-	-	-	✓

Receptor	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	SMP: Water quality impact assessment	SMP: Sediment quality impact assessment	SMP: Intertidal and coastal habitat assessment	SMP: Seabirds and shorebirds	SMP: Marine megafauna assessment- reptiles	SMP: Marine megafauna assessment- whale sharks, dugong and cetacean	SMP: Benthic habitat assessment	SMP: Marine fish and elasmobranch assemblages assessment	SMP: Fisheries impact assessment	SMP: Heritage and social impact assessment
Freshwater sawfish/ largetooth sawfish	-	✓	-	-	✓	✓	-	-	-	-	✓	-	-	-	✓
Green sawfish	-	✓	-	-	✓	✓	-	-	-	-	✓	-	-	-	✓
Whale shark BIA	-	✓	-	-	✓	✓	-	-	-	-	✓	-	-	-	✓
Pygmy blue whale BIA	-	✓	-	-	✓	✓	-	-	-	-	✓	-	-	-	-
Dugong BIA	-	✓	-	-	✓	✓	-	-	-	-	✓	✓	-	-	-
Humpback whale BIA	-	✓	-	-	✓	✓	-	-	-	-	✓	-	-	-	-
Flatback turtle BIAs	-	✓	-	✓	✓	✓	✓	-	-	✓	-	✓	-	-	-
Green turtle BIAs	-	✓	-	✓	✓	✓	✓	-	-	✓	-	✓	-	-	-
Hawksbill turtle BIAs	-	✓	-	✓	✓	✓	✓	-	-	✓	-	✓	-	-	-
Loggerhead turtle BIAs	-	✓	-	✓	✓	✓	✓	-	-	✓	-	✓	-	-	-
Bridled tern	-	✓	-	✓	✓	✓	✓	-	✓	-	-	-	-	-	-
Fairy tern BIA	-	✓	-	✓	✓	✓	✓	-	✓	-	-	-	-	-	-
Lesser crested tern BIA	-	✓	-	✓	✓	✓	✓	-	✓	-	-	-	-	-	-
Lesser frigatebird BIA	-	✓	-	✓	✓	✓	✓	-	✓	-	-	-	-	-	-
Little shearwater	-	✓	-	✓	✓	✓	✓	-	✓	-	-	-	-	-	-
Roseate tern BIA	-	✓	-	✓	✓	✓	✓	-	✓	-	-	-	-	-	-
Wedge-tailed shearwater BIA	-	✓	-	✓	✓	✓	✓	-	✓	-	-	-	-	-	-
Brown booby BIA	-	✓	-	✓	✓	✓	✓	-	✓	-	-	-	-	-	-
White-tailed tropicbird BIA	-	✓	-	✓	✓	✓	✓	-	✓	-	-	-	-	-	-
Little tern BIA	-	✓	-	✓	✓	✓	✓	-	✓	-	-	-	-	-	-
Sooty tern	-	✓	-	✓	✓	✓	✓	-	✓	-	-	-	-	-	-
White-tailed tropicbird	-	✓	-	✓	✓	✓	✓	-	✓	-	-	-	-	-	-
Key															

Receptor	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	SMP: Water quality impact assessment	SMP: Sediment quality impact assessment	SMP: Intertidal and coastal habitat assessment	SMP: Seabirds and shorebirds	SMP: Marine megafauna assessment- reptiles	SMP: Marine megafauna assessment- whale sharks, dugong and cetacean	SMP: Benthic habitat assessment	SMP: Marine fish and elasmobranch assemblages assessment	SMP: Fisheries impact assessment	SMP: Heritage and social impact assessment
✓	It is highly likely that the initiation criteria would be met for the relevant OMP/SMP														
⦿	It is possible that the initiation criteria may or may not be met for the relevant OMP/SMP														
-	Not applicable														

Appendix C: Background Information for Key Sensitivities

Table C-1: Background information for key sensitivities predicted to be contacted within 14 days, at a probability >5%

Receptor	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). Foraging area for seabirds.	Extensive intertidal mudflats occur along the southern and south-eastern shores of Barrow Island, where sheltered coastal areas allow sand or mud to accumulate over rocky platforms. These largely unvegetated flats offer important foraging habitat for migratory shorebirds (Weller et al. 2020). Beyond the shoreline, offshore intertidal reefs also contribute valuable habitat. Notably, Bandicoot Bay in the island's south contains a large intertidal reef that provides important shorebird habitat (Weller et al. 2020).	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	The reproductive population of green turtles on Barrow Island is estimated at around 20,000 females, with nesting concentrated on high-energy beaches along the west and northeast coasts. In contrast, the flatback turtle (*Natator depressus*) nests predominantly on the east coast, where deep, low-energy sandy beaches with wide intertidal zones provide suitable habitat. Track-count data indicate a population of ~3,600 adult female flatbacks, of which 1,800–1,900 are estimated to nest in any given year (Chevron, n.d.). Only a small proportion of green turtles nest on the south and east coast beaches (Pendoley Environmental, 2018). Green turtle nesting abundance is also known to fluctuate cyclically in response to El Niño–Southern Oscillation (ENSO) events (Limpus & Nicholls, 2000).	Flatback: nesting activity is concentrated on the east coast of the island on sandy, low-sloped, low-energy beaches with wide, shallow intertidal zones (Pendoley 2005; Pendoley et al. 2014). Limited nesting activity has also been recorded on the south-west, south-east, north, and north-east beaches of Barrow Island (Pendoley Environmental 2010). The approximate internesting interval (duration between a successful nest and subsequent nest or nesting attempt) of Flatback	Flatback: nesting on Barrow Island occurs between October and March, with peak nesting activity occurring between December and January (Chevron Australia 2015; Chevron Australia 2016) Substantial aggregations of mating Green Turtles can occur in waters and on beaches along the west, north, and north-east coasts of Barrow Island between September and December (Chevron Australia 2005).

Receptor	Receptor	Background	Key locations	Seasonality
		Hawksbill turtle (*Eretmochelys imbricata*) nesting populations were estimated at ~100 individuals on Barrow Island, with a further 1,000 in the Lowendal Islands and 1,300 in the Montebello Islands, based on track count surveys from 1998 to 2005 (Pendoley 2005). Hawksbill nesting on Barrow Island is more temporally and spatially diffuse than flatback or green turtle nesting.	Turtles on Barrow Island is similar to other Flatback Turtle rookeries in the Pilbara region with a mean of ~14 days, and varying year to year (Pendoley et al. 2014). Satellite tracking of 33 Flatback Turtles from Barrow Island identified four patterns of inter-nesting movement, including interesting periods where turtles travelled East, south-east, or to the Mainland from Barrow Island. The slight majority of movements stayed in the nearshore area surrounding Barrow Island, within 10 km (Whittock et al. 2014). Green Turtle nesting usually occurs on the west and north-east coasts of Barrow Island. The west coast nesting beaches are high-energy, steeply sloped, sandy, and with an unobstructed foreshore approach (Chevron Australia 2005), in contrast to the low-energy beaches preferred by nesting Flatback Turtles (Pendoley 2005). Annually, only a very small percentage of these Green Turtles nest on the south and east coast beaches of Barrow Island (Pendoley Environmental 2018). Shallow foraging habitat used by adult and juvenile Green Turtles typically comprises seagrass beds or	Green Turtle nesting usually occurs between October and March each year, with a remigration interval of approximately five years (Bjorndal 1997) and peak nesting activity occurring between December and February (Chevron Australia 2005; Pendoley 2005). Hawksbill Turtle nesting in WA occurs from September/October to January, peaking in October, but the entire breeding season remains undefined (DCCEEW 2024; Pendoley 2005). Hawksbill Turtles typically have an internesting interval of ~14 days and a remigration interval of approximately three years (Chevron Australia 2005; DoE 2015b).

Receptor	Receptor	Background	Key locations	Seasonality
			algae mats, and both juvenile and adult Green Turtles have been observed feeding year-round on algae-covered, rocky intertidal and subtidal platforms, off the west and east coasts of Barrow Island (DoE 2015a; Chevron Australia 2005). Analysis of satellite tracking data for Barrow Island Green Turtles suggests interesting habitat occurs throughout the rocky intertidal and subtidal platforms common on the west coast, around to the north-eastern beaches and waters (Chevron Australia 2005; Pendoley 2005) Surveillance of Barrow Island Hawksbill Turtle nesting has found that nesting activity is more temporally and spatially diffuse than Flatback and Green Turtle nesting activity and occurs predominantly on small, rocky, north-east coast beaches, extending down to Mushroom Beach. Very low numbers of Hawksbill Turtles nest further south along the east coast (Chevron 2015).	
	Cetaceans	Humpback whales (*Megaptera novaeangliae*) are regularly observed in the waters around Barrow Island during both their northward and southward migrations. Other whale species that may occasionally visit the area include the short-finned pilot whale (*Globicephala macrorhynchus*),	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).	Humpback whale migration: June to end of October

Receptor	Receptor	Background	Key locations	Seasonality
		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 blue whale (*Balaenoptera musculus musculus*) (DEC 2006). Resident populations of bottlenose dolphins (*Tursiops truncatus*) and Australian humpback dolphins (*Sousa sahulensis*) are present in the shallow coastal waters of the inner Rowley Shelf, including the Barrow Island region (DEC 2006). Spinner dolphins (*Stenella longirostris*), common dolphins (*Delphinus delphis*), and striped dolphins (*Stenella coeruleoalba*) are also considered abundant in surrounding waters (DEC 2006).		
	Dugong	Dugong (*Dugong dugon*) significant sightings (Bancroft et al. 2000)	-	-
	Fish	The Montebello/Barrow Islands region hosts exceptionally diverse fish communities, with over 450 species recorded, most of which occur widely across the Indo–West Pacific (Allen 2000; DEC 2007). The region's fauna is closely linked to that of the Dampier Archipelago, benefiting from larval recruitment via the Leeuwin Current, and potentially acting as a recruitment source for areas further south (Hutchins 2004; DEC 2007). Surveys around Barrow Island have documented strong habitat associations: coral reefs support the greatest diversity, dominated by damselfish, parrotfish, snappers, and groupers; macroalgae habitats serve as important nurseries; sand habitats host large transient predators such as mackerel and trevally alongside smaller benthic species; and areas rich in sessile invertebrates are frequented by emperors, threadfin bream, and trevally (Chevron Australia 2012).		

Receptor	Receptor	Background	Key locations	Seasonality
	Intertidal	Restricted areas of stunted *Avicennia marina* occurring in narrow fringing strips in embayments (DEC 2006).	*Avicennia marina* grows in sparse stands only on the east coast of Barrow Island. It is distributed in a narrow band along soft sediment and rock substrates in the upper-littoral and supra-littoral zones of the intertidal area. Mangroves are recorded at Little Bandicoot Bay and Pelican Island, as well as further east at Bandicoot Bay, where a small number of trees extend further down the intertidal zone to the mid-littoral zone. Sparse stands of trees are recorded on the rocky intertidal shoreline from Stokes Point along the coast up to Shark Point. Stands of mangroves are also recorded further north at Mattress Bay, Ant Point, and Square Bay. No mangrove stands are recorded on the west coast of Barrow Island (Chevron Australia 2015)	*Avicennia marina* flowering often occurs between December and January while propagules mature mostly in March (Duke 2006).
	Benthic	Surveys around Barrow Island have identified 96 species of hard coral in 48 genera from the order Scleractinia and seven soft coral genera from the suborder Alcyoniina (Chevron 2015).	The most significant coral reefs around Barrow Island are Biggada Reef on the west coast, Dugong Reef and Batman Reef off the south-east coast and along the edge of the Lowendal Shelf on the east side of Barrow Island (DEC 2007).	There are two distinct coral recruitment periods: autumn and spring (Chevron 2015).
		The habitats on the east and west coasts of Barrow Island support different benthic macro-invertebrate assemblages. Of the 316 species of molluscs recorded from Barrow	-	-

Receptor	Receptor	Background	Key locations	Seasonality
		Island, less than one third occur on both coasts (Chevron Australia 2005). The muddier habitats on the east coast support a greater proportion of bivalve species, whilst the west coast supports a greater proportion of coral reef gastropod species (Chevron Australia 2005). The gastropod Amoria macandrewi, is endemic to sandbars within the Montebello/Barrow Islands region (Chevron Australia 2005).		
		Macroalgal-dominated limestone reef and subtidal reef platform/sand mosaic are the most extensive habitat types in the Montebello/Barrow Islands region (DEC 2007). The extensive subtidal macroalgae communities are major benthic primary producers, significantly contributing to the productivity of the region, as well as providing refuge areas for fish and invertebrates (DEC2007). The macroalgal assemblages are typically dominated by species of brown algae, particularly of the genera *Sargassum*, *Turbinaria* and *Padina* (Chevron Australia 2005; DEC 2007). Other common taxa include *Halimeda*, *Dictyopteris*, *Dictyota, Cystoseira*, *Codium* and *Laurencia*.	These communities are most commonly found on shallow limestone pavement in depths of 5–10 m (DEC 2007). Green algae from the genera *Caulerpa* and *Cladophora* and red algae from the genera Centrocer*as*, *Ceramium*, *Champia*, *Chondria*, *Gelidiopsis*, and *Hypnea* are dominant or widespread off the east coast of Barrow Island (Chevron Australia 2005; DEC 2007; RPS Bowman Bishaw Gorham 2007). Some species, such as *Avrainvillea* sp. and *Halimeda macroloba*, appear to be restricted to the east coast of Barrow Island (Chevron Australia 2005).	Macroalgal habitats in the Montebello/Barrow Islands region vary seasonally in response to water temperature, day length, reproductive cycles, physical disturbance and regrowth (DEC 2007).
		Seven species of seagrass have been recorded to date from the Montebello/Barrow Islands region: *Cymodocea angustata*, *Halophila ovalis*, *H. spinulosa*, *Halodule uninervis*, *Thalassia hemprichii*, *Thalassodendron ciliatum* and *Syringodium isoetifolium* (DEC 2007). Of these, *Halophila* spp. Are the most common on shallow soft	Seagrass do not appear to form extensive beds in the area, but rather are sparsely interspersed between macroalgae, extending from the intertidal zone to ~15 m water depth (DEC 2007).	-

Receptor	Receptor	Background	Key locations	Seasonality
		substrates and sand veneers throughout the region (DEC 2007).	Ephemeral seagrass are widespread on the east coast of Barrow Island (Chevron Australia 2005). Seagrass, most often *Halophila* spp., are patchily distributed on sandy subtidal habitats, and areas of bare sand devoid of seagrass are also common along the east coast of Barrow Island.	
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*) and hawksbill (*Eretmochelys imbricata*)	All beaches on Beacon, Bridled, Varanus, Abutilon, Parakeelya Islands Significant hawksbill nesting on Varanus Island (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).

Receptor	Receptor	Background	Key locations	Seasonality
			Hawksbill foraging around the Lowendal Island group (DSEWPC 2012a).	
	Cetaceans	Humpback whales (*Megaptera novaeangliae*) are regularly observed in the waters around Barrow Island during both their northward and southward migrations. Other whale species that may occasionally visit the area include the 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 blue whale (*Balaenoptera musculus musculus*) (DEC 2006).	-	-
	Dugong	The seagrass beds around the Lowendal Islands are thought to provide a valuable food source for dugong (*Dugong dugon*) (DEC 2006).	-	-
	Intertidal	Mangroves occupy less than 0.1% of the coastline (DEC 2006).	-	-
Montebello Islands	Birds	Historical surveys undertaken in the late 1980s and 1990s documented that the Montebello Islands support a diverse range of breeding seabirds (Burbidge & Fuller 1998), although the size, distribution, and breeding activity of these populations may have changed considerably since that time. Wedge-tailed Shearwaters (*Puffinus pacificus*) were recorded breeding extensively across many islands, including Ah Chong, Alpha, 'Beaufortia', Brooke, Gardenia, 'Gossypium', Kingcup, Flag, Pansy, and South East, with colonies ranging from small groups to very large aggregations. Pied Cormorants (*Phalacrocorax varius*)		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).

Receptor	Receptor	Background	Key locations	Seasonality
		maintained small nesting colonies on islands such as the 'Karri Islands', while Eastern Reef Egrets (*Egretta sacra*) nested sporadically on 'Bloodwood' and Buttercup. The Beach Stone-curlew (*Esacus neglectus*) appeared resident on several islands, including the 'Marri Islands', with occasional nesting observed. Both Pied (*Haematopus longirostris*) and Sooty Oystercatchers (*H. fuliginosus*) bred on multiple islands, including Alpha, 'Renewal', Hollyhock, Bluebell, and Flag. Silver Gulls (*Larus novaehollandiae*) formed large colonies on Brooke, 'Birthday', Gardenia, 'Renewal', and South East. Terns were well-represented, with Caspian Terns (*Sterna caspia*) breeding on numerous islands, including Ah Chong, Alpha, Bluebell, Dandelion, Flag, Foxglove, Gardenia, an islet south of Hermite, Ivy, 'Kunzea', Marri Islands, Primrose, 'Renewal', and Trimouille. Crested Terns (*S. bergii*) formed very large colonies in some years on Daisy, Epsilon, 'Birthday', and Bluebell Islet, while Roseate Terns (*S. dougallii*) bred on Dahlia, Dandelion, 'Pimelia', 'Myoporum', Gannet, an islet north of Gannet, 'Fig Islands', and 'Bloodwood'. Fairy Terns (*S. nereis*) were common breeders on 'Fairy Tern Island' and 'Hibbertia', and Bridled Terns (*S. anaethetus*) were presumed summer breeders based on evidence from Dahlia, 'Gossypium', and South East. Lesser Crested Terns (*S. bengalensis*) may also have bred among Crested Tern colonies on Daisy and Epsilon, although this was not confirmed (Burbidge & Fuller 1998).		Fairy tern nest in winter and spring (Nicholson 2002).
	Turtle	The Montebello Islands support nesting by green (*Chelonia mydas*), flatback (*Natator depressus*), and hawksbill (*Eretmochelys imbricata*) turtles. The islands are recognised as critical habitat for flatback turtles and for hawksbill turtles, with key sites for the latter including Ah Chong Island, South East Island, and Trimouille Island. Within the recovery plan's classification framework, the Montebello	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)

Receptor	Receptor	Background	Key locations	Seasonality
		Islands are identified as a major important nesting area for green turtles, a minor important nesting area for flatback turtles, and a major important nesting area for hawksbill turtles (Commonwealth of Australia 2017).		
	Cetaceans	A recent study by Thums et al. (2025) investigated the diving behaviour and foraging patterns of Eastern Indian Ocean pygmy blue whales (*Balaenoptera musculus brevicauda*) using data from nine individuals tagged between 2021 and 2023 across Perth Canyon and Ningaloo. The study combined satellite-linked GPS and pop-up archival dive tags to validate movement-model inferences of foraging behaviour. The aim of the study was to identify where and when whales forage during migration and to assess how well putative foraging inferred from movement models aligned with actual foraging and lunge-feeding dives. Using classified dive types merged with spatial tracks, the study identified three main foraging areas: (1) from Perth Canyon to offshore of Jurien Bay, (2) adjacent to Geraldton and the Abrolhos Islands (noting only one whale used this area), and (3) offshore of Ningaloo, extending from near Coral Bay to offshore of the Montebello Islands. These findings demonstrate that pygmy blue whales routinely forage in multiple discrete areas along Western Australia's coastline, including both well-established hotspots such as Perth Canyon and more northerly areas such as Ningaloo to the Montebello Islands, where foraging occurred during both migration and transit (Thums et al. 2025). Humpback whales (*Megaptera novaeangliae*) are regular visitors to the region during their annual migration. Several whale species are known to occasionally visit the Montebello/Barrow Islands region, including the short-finned pilot whale (*Globicephala macrorhynchus*), false killer whale (*Pseudorca crassidens*), killer whale (*Orcinus*	Anecdotal reports suggest that sheltered waters to the west of Trimouille Island in the Montebello group may be used as a resting area for females humpbacks with calves, although the importance of this site remains uncertain (DEC, 2007).	-

Receptor	Receptor	Background	Key locations	Seasonality
		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, 2007). Australian humpback dolphins (*Sousa sahulensis*) were first recorded in the Montebello Islands Marine Protected Area (MPA) in June 2015 and were subsequently sighted in summer, autumn, and winter of 2017, with repeated observations in nearshore waters suggesting a year-round presence. In 2017, a five-day vessel-based photo-identification survey of fringing coral reefs and shallow, sheltered sandy lagoons (generally <10 m deep, maximum <20 m) identified 28 individuals, including six calves (one a neonate). Despite the limited survey effort, this represents a relatively high number of individuals compared with other Pilbara sites where more intensive monitoring has occurred. No matches were found between Montebello dolphins and those from mainland Pilbara waters (Exmouth, Onslow, Dampier) or nearshore islands in the Western Australian Humpback Dolphin Catalogue, suggesting possible population separation. While nearshore habitat is clearly important to the species, it is unknown whether the open waters between the Montebello Islands and the mainland act as a barrier to movement. The authors note that increased survey effort in favourable conditions would likely identify more individuals and improve understanding of abundance, range, and connectivity (Raudino et al. 2018).		
	Dugong	Dugong (*Dugong dugon*) significant sightings (Bancroft et al. 2000)	-	-

Receptor	Receptor	Background	Key locations	Seasonality
	Fish	Historic surveys of the Montebello Islands have recorded 456 fish species across 75 families, a composition representative of reef communities on the mid-continental shelf of north-western Australia (Allen 2000). Most species are associated with coral reef habitats, with the ten most species-rich families; Gobiidae, Labridae, Pomacentridae, Blenniidae, Apogonidae, Serranidae, Chaetodontidae, Carangidae, Lutjanidae, and Acanthuridae comprising 54% of the total assemblage. These families are widely distributed and typically abundant throughout the tropical Indo-Pacific. The Montebello Islands support a slightly higher species richness than the more inshore Dampier Archipelago.	-	-
	Intertidal	Six species of mangroves occur in the Montebello Islands: white mangrove (*Avicennia marina*), ribbed-fruit orange mangrove (*Bruguiera exaristata*), yellow-leaf spurred mangrove (*Ceriops tagal*), red mangrove (*Rhizophora stylosa*), club mangrove (*Aegialitis annulata*), and river mangrove (*Aegiceras corniculatum*). The occurrence of lagoonal mangrove assemblages in an oceanic island setting is unusual and of high scientific value, with the Montebello Islands' mangrove communities regarded as globally unique (Semeniuk 1997). The largest stand, covering ~15 ha, is located in Stephenson Channel on Hermite Island, where individual trees reach heights of up to 5 m (DEC 2007).	Stephenson Channel on Hermite Island.	
	Benthic	There is a high diversity of hard coral present and they are generally in an undisturbed condition (DEC 2007).	The best developed coral reef communities are in the relatively clear water and high energy conditions of the fringing reefs to the west and south-west of the Montebello Islands, and bommies and patch reefs in the more turbid and lower energy waters along the	-

Receptor	Receptor	Background	Key locations	Seasonality
			eastern edge of the Montebello Islands (DEC 2007).	
		Macroalgal-dominated limestone reef and subtidal reef platform/sand mosaic are the most extensive habitat types in the Montebello/Barrow Islands region (DEC 2007). The macroalgal assemblage is typically dominated by species of brown algae, particularly of the genera *Sargassum*, *Turbinaria* and *Pandina*. Green algae from the genera *Caulerpa*, *Cladophora* and *Rhodophyta* are also quite common.	These communities are most commonly found on shallow limestone pavement in depths of 5–10 m (DEC 2007).	Macroalgal habitats in the Montebello/Barrow Islands region vary seasonally in response to water temperature, day length, reproductive cycles, physical disturbance and regrowth (DEC 2007).
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). In 2015, the Muiron Islands were reported to support a nesting colony of more than half a million wedge-tailed shearwaters (*Ardenna pacifica*) (DPaW 2015). In 2019, Cannell et al. (2019) estimated that there were more than 200,000 wedge-tailed shearwaters. Cannell et al. (2019) investigated the foraging behaviour of wedge-tailed shearwaters around the Muiron Islands using satellite tracking. Thirty individuals were tagged, and their movements revealed foraging trips ranging from 9 km to 1,854 km from the colony.	-	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 1 m 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).
	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).

Receptor	Receptor	Background	Key locations	Seasonality
		1987–2001, the Western Australian Marine Turtle Program operated on South Muiron Island, documenting that loggerhead (*Caretta caretta*), green (*Chelonia mydas*), and hawksbill (*Eretmochelys imbricata*) turtles nest on the island's beaches (Prince, 1993). Rob et al. (2019) conducted targeted on-beach surveys on North and South Muiron Islands from 6–12 January 2018, supported by aerial photographic surveys conducted between 6 and 8 January, which covered all island beaches and nearby Sunday Island. Four turtle species were observed nesting on the Muiron Islands: green turtles, which were the most abundant, followed by loggerhead, hawksbill, and a single flatback (*Natator depressus*) nest recorded on South Muiron Island. The surveys confirmed the importance of the Muiron Islands as a key nesting site for both green and loggerhead turtles.		
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*)	-
	Benthic	Richards et al. (2025) present a regional synthesis of shallow-water (<30 m) sessile benthic invertebrate biodiversity across Ningaloo Reef, the Muiron Islands and Exmouth Gulf, drawing on verified specimen records and photographic observations from museum collections and past surveys. For Ningaloo Reef, the study documents the highest diversity within the region, with 587 verified species	-	-

Receptor	Receptor	Background	Key locations	Seasonality
		spanning scleractinian corals, sponges, octocorals, bryozoans, tunicates, anemones, zoanthids and hydrozoans. Species richness is strongly concentrated in the northern part of the reef, reflecting both ecological patterns and uneven sampling effort, while the southern sector remains comparatively under-surveyed. The authors highlight that many specimens, particularly sponges and octocorals, remain identified only to morphospecies, indicating that the true diversity of Ningaloo Reef is likely underestimated. This synthesis provides the most current, taxonomy-supported baseline for shallow sessile invertebrates at Ningaloo Reef and identifies several taxonomic and spatial gaps that should be addressed through future targeted surveys.		
	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

Receptor	Receptor	Background	Key locations	Seasonality
	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 and 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 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). Bayliss et al. (2019) assessed dugong (*Dugong dugon*) aerial surveys in the Ningaloo–Exmouth Gulf region conducted in 1989, 1994, 1999, 2007, and 2018 as part of broader monitoring also covering Shark Bay. Across these decades, population estimates remained relatively stable (~1,000 dugongs in Ningaloo/Exmouth).	Indo-Pacific bottlenose dolphins have been found to be primarily associated with the 20 m 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 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.	Humpback whales: June through to the end of October Pygmy blue whales: April to June
	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	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.

Receptor	Receptor	Background	Key locations	Seasonality
		seabirds and waders to breed, rest and feed (Shire of Exmouth et al. 1999).		
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.	-	-
	Benthic	Long-term coral reef monitoring by DBCA formed the basis of a study on reef condition and recovery across the western Pilbara coast, from 2009–2018. Funded by the Chevron-operated Wheatstone Project and administered by DBCA, the research examined island fringing reefs and submerged shoals along a natural cross-shelf turbidity gradient (Evans et al. 2020). Baseline surveys in 2009 recorded mean hard coral cover at 45%, but three severe heatwave bleaching events in 2010/11, 2013, and 2014 caused a sharp decline to 5% by 2014, with losses dominated by *Acroporidae*, *Agaricidae*, *Pectinidae,* and *Pocilloporidae*. From 2014–2018, mean coral cover doubled from 5% to 10%, although recovery varied substantially between sites		

Receptor	Receptor	Background	Key locations	Seasonality
		(0–13%) and remained well below pre-disturbance levels (Evans et al. 2020). Offshore, low-turbidity sites showed the strongest recovery, driven primarily by *Acroporidae*, while inshore, high-turbidity sites recovered more slowly and were dominated by slower-growing genera such as *Porites*, *Mussidae*, and *Faviidae*. Sites near dredging operations, where turbidity levels and plume exposure were high, exhibited little to no recovery over the monitoring period. Coral recruitment to settlement tiles was generally low, with slightly higher rates at more turbid inshore sites, but did not strongly predict recovery trajectories (Evans et al. 2020). In contrast, juvenile coral densities particularly of Acroporidae increased markedly between 2014–2015 and 2016–2018, and were a better indicator of subsequent recovery. Recovery was positively associated with higher abundances of herbivorous fish, shallower depths, and lower macroalgal cover, and negatively influenced by turbidity, macroalgae, and greater depths. Overall, the study demonstrated that repeated bleaching events, combined with high turbidity and local stressors such as dredging, substantially constrained coral recovery in the west Pilbara (Evans et al. 2020).		
	Intertidal	Hickey et al. (2025) present the first comprehensive multidecadal mapping of arid intertidal ecosystems along ~400 km of the Pilbara coastline, spanning Exmouth Gulf to Karratha. The study aimed to model the size and distribution of habitats within the high intertidal zone of this internationally significant hypersaline ecosystem, providing an essential baseline for understanding how climate influences these environments. The mapping revealed a dynamic mosaic of habitats including mangroves, saltmarsh, cyanobacterial mats, and salt flats with marked spatial and temporal shifts over multiple time points. Saltmarsh extent was approximately five times greater than	Juvenile green turtles are known to forage on mangroves and have been recorded in both Urala Creek North and Urala Creek South (AECOM 2022).	-

Receptor	Receptor	Background	Key locations	Seasonality
		previously estimated, and algal mats occupied about twice the area of mangroves. These results provide a critical baseline for monitoring change and assessing the impacts of climate and other pressures on remote arid intertidal ecosystems. Mangroves in the area form small but sometimes complex communities in embayments and on the sheltered shores of many offshore islands.		
	Fish	The Fish and Sharks project used ~1,900 stereo-BRUVs and ~1,200 stereo-DOV transects to record about 550 species from Coral Bay and Ningaloo north to the Dampier Archipelago. Surveys focused on three themes: assemblage dynamics, habitat dependencies, and management effectiveness (CSIRO, 2017). Results showed that southern offshore islands including North and South Muiron, Serrurier, Bessieres, Thevenard, and Airlie supported the richest and most abundant assemblages of both targeted and protected species. These were linked to structurally complex reefs and oceanic influences. Shallow macroalgal habitats were identified as important juvenile habitat for blue-spotted emperor (*Lethrinus punctulatus*). Comparisons between no-take sanctuary zones (e.g. Muiron Islands, Montebello Islands) and fished areas showed higher abundances and shifts in community composition within protected zones, providing empirical evidence to guide marine park monitoring and management (CSIRO, 2017; CSIRO, 2021).		
	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	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

Receptor	Receptor	Background	Key locations	Seasonality
		(*Eretmochelys imbricata*) and Loggerhead turtle (*Caretta caretta*). Flatback BIA for nesting and internesting (DCCEEW 2023). Internesting BIA for green and loggerhead turtle (DCCEEW 2023).		nesting activity in December (Imbricata 2013).
	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	-	-
	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 D: OSM baseline data sources

Table D-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
	Chevron (2022) Marine Environment Quality Monitoring Program (MEQMP)	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
	Chevron (2024) Wheatstone Permanent Marine Outfall Marine Water Quality Monitoring (ABU 241200313)	Chevron	Ashburton Port
	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

Receptor	Existing baseline monitoring	Source / Data Custodian	Spatial extent
			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
	Chevron (2025) Enpoint Environmental Asset Management W24028_02 Enpoint. WA Oil Decommissioning Sediment Assessment	Chevron	Barrow Island
	BMT (2022) Nearshore Benthic Survey – Middle and Boodie Islands	Chevron	Middle Island Boodie Island
	Pilbara Ports Authority (2019) Marine Environmental Quality Program	Pilbara Ports Authority	Dampier 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

Receptor	Existing baseline monitoring	Source / Data Custodian	Spatial extent
	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
	Advision (2023) Thevenard Island Decommissioning Sediments Baseline Quality Assessment 2023Advisian (2019) Scarborough Sediment Sampling and Analysis Plan Implementation Report. Prepared for Woodside	Chevron	Thevenard Island
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
	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

Receptor	Existing baseline monitoring	Source / Data Custodian	Spatial extent
	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 and Yawuru ISWAG members (2021) The Kimberley Indigenous Turtle and 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

Receptor	Existing baseline monitoring	Source / Data Custodian	Spatial extent
	DBCA (long term monitoring) Ningaloo Reef Program	DBCA	Ningaloo Coast World Heritage Area
	Hadiyanto H, Prince J, Hovey RK (2025) Modelling present and future distribution of intertidal macroalgae to evaluate the efficacy of Western Australia's marine protected areas. Biodiversity and Conservation 34:1335–1363. https://doi.org/10.1007/s10531-025-03020-1	UWA	Western Australia Broome Port Hedland Ningaloo Coast World Heritage Area Gnaraloo Kalbarri Port Denison Geraldton Perth Margaret River
	Hickey, S. M., Stone, A., Radford, B., & Lovelock, C. E. (2025). Multidecadal mapping of arid intertidal ecosystems reveals a dynamic mosaic of habitats north-western Australia. Estuarine, Coastal and Shelf Science, 323, Article 109401. https://doi.org/10.1016/j.ecss.2025.109401	UWA	Pilbara Coast Exmouth Gulf Onslow Pilbara- Southern Pilbara Islands and Coast Pilbara- Northern Pilbara Islands and Coast Karratha Dampier Archipelago
	BMT (2024) Spill Baseline -eDNA Infauna Pilot Program	Chevron	Barrow Island Onslow
	EOMAP (2019) Atmospheric correction and land cover classification, NW Cape. Prepared for Woodside	Woodside	Barrow Island

Receptor	Existing baseline monitoring	Source / Data Custodian	Spatial extent
			Montebello Islands Group Pilbara Coast Exmouth Gulf Ningaloo Coast World Heritage Area Shark Bay Houtman Abrolhos Islands Dampier Archipelago
Benthic habitat	Chevron (2019) Jansz-Io Subsea Compression Benthic Video Footage Review (G7-NT-REPX0000239)	Chevron	Jansz-lo 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
	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

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
	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
	BMT (2020) Technical Note. Learmonth Benthic Habitat Survey. Prepared for MBS Environmental	BMT	Exmouth Gulf

Receptor	Existing baseline monitoring	Source / Data Custodian	Spatial extent
	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

Receptor	Existing baseline monitoring	Source / Data Custodian	Spatial extent
			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 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

Receptor	Existing baseline monitoring	Source / Data Custodian	Spatial extent
	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 Cartier Island Darwin Harbour Arafura Arnhem Marmion Rottnest Island Geographe Bay
	Ningaloo Outlook	CSIRO	Ningaloo Coast World Heritage Area

Receptor	Existing baseline monitoring	Source / Data Custodian	Spatial extent
	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 and Yawuru ISWAG members (2021) The Kimberley Indigenous Turtle and 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

Receptor	Existing baseline monitoring	Source / Data Custodian	Spatial extent
			Lalang-garram Marine Park Reefs
	Port of Broome- Ongoing Marine Monitoring Program. By O2 Marine for Kimberley Ports Authority	Kimberley Ports Authority	Broome Kimberley
	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
	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 Ningaloo Coast World Heritage Area Coral Bay

Receptor	Existing baseline monitoring	Source / Data Custodian	Spatial extent
	Keesing JK, Mortimer N, Hellmrich L, Godoy D, Babcock RC, Heyward A, Paton D, Harvey ES (2023) The short spined crown-of-thorns starfish Acanthaster brevispinus is a corallivore too. Coral Reefs 42:pp. https://doi.org/10.1007/s00338-023-02354-6	CSIRO	Ningaloo Reef Great Barrier Reef
	Mula C, Brooker RM, Fulton CJ, Parsons MJG, Wilson SK, Azofeifa-Solano JC (2025) Unique soundscapes reflect the diversity of habitats in a tropical seascape. SSRN 5243868. https://doi.org/10.2139/ssrn.5243868	UWA	Ningaloo Coast World Heritage Area Coral Bay
	BMT (2024) Spill Baseline -eDNA Infauna Pilot Program	Chevron	Barrow Island Onslow
	EOMAP (2019) Atmospheric correction and land cover classification, NW Cape. Prepared for Woodside	Woodside	Barrow Island Montebello Islands Group Pilbara Coast Exmouth Gulf Ningaloo Coast World Heritage Area Shark Bay Houtman Abrolhos Islands Dampier Archipelago
	BMT (2022) Nearshore Benthic Survey - Middle and Boodie Islands	Chevron	Middle Island Boodie Island
	Astron (2025) WA Oil Decommissioning Baseline Benthic Habiat Mapping Final Report	Chevron	Barrow Island
	Enpoint (2025) WA Oil Decommissioning Sediment Assessment	Chevron	Barrow Island
	DBCA Monitoring	DBCA	Montebello Islands Group Barrow Island

Receptor	Existing baseline monitoring	Source / Data Custodian	Spatial extent
			North Bunsen Channel (Montebello Islands) Trimouille Island North West Island (Montebello Islands) Stephenson Channel (Montebello Islands) Ah Chong Island (Montebello group) Wonnich Reef Dugong Reef
	DBCA (2018) Gorgon Dredge Offset Monitoring Evaluation and Reporting Project, Department of Biodiversity, Conservation and Attractions, Perth.	DBCA	Barrow Island Lowendal Islands Montebello Islands
	Advision (2023) Thevenard Island Decommissioning Sediments Baseline Quality Assessment 2023	Chevron	Thevenard Island
Marine fish and elasmobranchs	Chevron (2019) Jansz-Io Subsea Compression Benthic Video Footage Review (G7-NT-REPX0000239)	Chevron	Jansz-lo 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

Receptor	Existing baseline monitoring	Source / Data Custodian	Spatial extent
	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
	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

Receptor	Existing baseline monitoring	Source / Data Custodian	Spatial extent
	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
	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	CSIRO	Kimberley

Receptor	Existing baseline monitoring	Source / Data Custodian	Spatial extent
	Environmental Science Program Marine Biodiversity Hub. CSIRO, Charles Darwin University, and NPF Industry Pty Ltd.		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
	Aston C, Langlois T, Navarro M, Gibbons B, Spencer C, Goetze J (2024). Baited rather than unbaited stereo- video provides robust metrics to assess demersal fish assemblages across deeper coastal shelf marine parks. Estuarine, Coastal and Shelf Science 304: 108823	UWA DBCA	Ningaloo Coast World Heritage Area Houtman Abrolhos Islands
	Bessey C, Depczynski M, Goetze JS, Moore G, Fulton CJ, Snell M, Wilson S (2023) Cryptic biodiversity: a portfolio-approach to coral reef fish surveys. Limnology and Oceanography: Methods 21:594–605.	UWA	Ningaloo Coast World Heritage Area
	Thomson D, Vanderklift M, Pillans R, Keesing J, Donovan A, Hardiman L, Slawinski D, Orr M, Doropoulos C, Roff G, Mortimer N, Mayne B, Gunasekera R, Bessey C, Bradford R, Feutry P, Patterson T, DeGroot B. (2024) Ningaloo Outlook Phase 2 – 2024 Annual Report (Year 4)	CSIRO	Ningaloo Coast World Heritage Area
	Wilson, S.K., Depczynski, M., Fulton, C.J., Holmes, T.H., Goetze, J.S., Birt, M.J., Radford, B., Tinkler, P., Evans, R.D., Moustaka, M., Faubel, C., Noble, M., (2024). Can juvenile supply predict future abundance of large-bodied reef fishes? Mar. Environ. Res. 199, 106607. https://doi.org/10.1016/j.marenvres.2024.106607	AIMS	Ningaloo Reef

Receptor	Existing baseline monitoring	Source / Data Custodian	Spatial extent
	Ingelbrecht J, Allen MG, Bateman RL, Ebner BC, Fazeldean T, Krispyn KN, Lear KO, Lee T, Lymbery AJ, McAuley RB, Phillips NM, Whitty JM, Wueringer BE and Morgan DL (2024) Evidence of long-distance movement of green sawfish (Pristis zijsron) in Western Australia. Marine and Freshwater Research 75, MF24154. https://doi.org/10.1071/MF24154	Murdoch University	Bay of Rest (Exmouth Gulf) Ashburton River (Southern Pilbara) Fortescue River (Northern Pilbara) Cape Keraudren Broome Fitzroy River
	DBCA (2018) Gorgon Dredge Offset Monitoring Evaluation and Reporting Project, Department of Biodiversity, Conservation and Attractions, Perth.	DBCA	Barrow Island Lowendal Islands Montebello Islands
	Keesing, J.K. (Ed.) (2019). Benthic habitats and diodiversity of the Dampier and Montebello Australian Marine Parks. Report for the Director of National Parks. CSIRO, Australia	AIMS	Montebello Australian Marine Park
	Lear, K., Ebner, B., Fazeldean, T., Bateman, R. & Morgan, D. (2023). Movement patterns of Green Sawfish. In Morgan, D. & Lear, K. (eds) (2023). Wheatstone Sawfish Project: An investigation into the movement patterns, habitat utilisation, growth, kinship and catch rates of Green Sawfish (Pristis zijsron) in a globally important nursery area 2019-2022. A Freshwater Fish Group & Fish Health Unit (Centre for Sustainable Aquatic Ecosystems), Harry Butler Institute, Murdoch University reportfor Chevron Australia	Murdoch University	Onslow Pilbara Coast
	Sawfish Monitoring Project- Wheatstone	Chevron	Onslow
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

Receptor	Existing baseline monitoring	Source / Data Custodian	Spatial extent
	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	

Receptor	Existing baseline monitoring	Source / Data Custodian	Spatial extent
	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 Gorgon Gas Development – Marine Turtle Monitoring Program: Barrow Island and Mundabullangana	Chevron	Barrow Island Mundabullangana
	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

Receptor	Existing baseline monitoring	Source / Data Custodian	Spatial extent
			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 Barrow Island Long Island Dampier Mainland Coast Rosemary Island West Mid Intercourse Island

Receptor	Existing baseline monitoring	Source / Data Custodian	Spatial extent
			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 Wickham

Receptor	Existing baseline monitoring	Source / Data Custodian	Spatial extent
	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

Receptor	Existing baseline monitoring	Source / Data Custodian	Spatial extent
			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
	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

Receptor	Existing baseline monitoring	Source / Data Custodian	Spatial extent
			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 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

Receptor	Existing baseline monitoring	Source / Data Custodian	Spatial extent
	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
	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

Receptor	Existing baseline monitoring	Source / Data Custodian	Spatial extent
			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 and Yawuru ISWAG members (2021) The Kimberley Indigenous Turtle and 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

Receptor	Existing baseline monitoring	Source / Data Custodian	Spatial extent
	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
	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
	Avenant C, Fossette S, Whiting S, Hopkins AJM, HyndesGA (2024). Sea turtle eggs and hatchlings are a seasonally important food source for the generalist feeding golden ghost crab (Ocypode convexa).Estuaries and Coasts 47 821-838	ECU DBCA	Ningaloo Coast World Heritage Area
	Avenant C, Whiting S, Fossette S (2024) Extreme predation of eggs and hatchlings for loggerhead turtles in eastern Indian Ocean. Biodiversity and Conservation 33:135–159. https://doi.org/10.1007/s10531-023-02739-z	ECU DBCA	Gnaraloo Bungelup
	Thomson D, Vanderklift M, Pillans R, Keesing J, Donovan A, Hardiman L, Slawinski D, Orr M, Doropoulos C, Roff G, Mortimer N, Mayne B, Gunasekera R, Bessey C, Bradford R, Feutry P, Patterson T, DeGroot B. (2024)	CSIRO	Ningaloo Coast World Heritage Area
	Vanderklift MA, Pillans RD, Rochester W, Stubbs JL, Skrzypek G, Tucker AD and Whiting SD (2023) Ontogenetic changes in green turtle (Chelonia mydas) diet and home range in a tropical lagoon. Front. Ecol. Evol. 11:1139441. doi: 10.3389/fevo.2023.1139441	CSIRO	Ningaloo State Marine Park Mangrove Bay
	Peel LR, Whiting SD, Pendoley K, Whittock PA, Ferreira LC, Thums M, Whiting AU, Tucker AD, Rossendell J, McFarlane G, Fossette S (2024) I still call Australia home: Satellite telemetry informs the protection of flatback turtles in Western Australian waters. Ecosphere 15:e4847. https://doi.org/10.1002/ecs2.4847	DBCA	Ashburton Island Thevenard Island Locker Island Montebello Islands Group Barrow Island Delambre Island Bells Beach (Karratha) Port Hedland

Receptor	Existing baseline monitoring	Source / Data Custodian	Spatial extent
			Bedout Island Eighty Mile Beach Cable Beach Slate Island Maret Island West Govenor Island Cape Domett
	Gammon M, Bentley B, Fossette S, Mitchell NJ (2024) Reconstructed and projected beach temperatures reveal where flatback turtles are most at risk from climate change. Global Ecology and Conservation 51:e02866. https://doi.org/10.1016/j.gecco.2024.e02866	UWA	Port Hedland Cemetery Beach Mundabullangana Point Samson Delambre Island Cleaverville Rosemary Island Trimouille Island Hermite Island Barrow Island Thevenard Island Montebello Islands Group Dampier Archipelago Pilbara Coast
	Santos Turtle Monitoring	Santos	Varanus Island
	Chevron Wheatstone Flatback Turtle Monitoring Program	Chevron	Onslow Ashburton Delta Ashburton North
	Pendoley Environmental (2023) Mardie Salt Project: marine turtle monitoring program. Prepared for BCI Minerals	BCI Minerals	Mardie Creek

Receptor	Existing baseline monitoring	Source / Data Custodian	Spatial extent
			Sholl Island Long Island (Pilbara) Middle Passage Island Angel Island Stewart Island Fortescue Island Mardie Island South Passage Island Solitary Island
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

Receptor	Existing baseline monitoring	Source / Data Custodian	Spatial extent
	ECOCEAN Whale Shark Photo-Identification Library	Ecocean	Ningaloo
	AIMS (2021) Individual haplotyping of whale sharks from seawater environmental DNA.	AIMS	Ningaloo
	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 tropical 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

Receptor	Existing baseline monitoring	Source / Data Custodian	Spatial extent
			Dampier Area Dampier Archipelago Karratha Porth Hedland Area Eighty Mile Beach Southern Pilbara Islands 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

Receptor	Existing baseline monitoring	Source / Data Custodian	Spatial extent
			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 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

Receptor	Existing baseline monitoring	Source / Data Custodian	Spatial extent
			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 and Yawuru ISWAG members (2021) The Kimberley Indigenous Turtle and 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

Receptor	Existing baseline monitoring	Source / Data Custodian	Spatial extent
	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
	Thomson D, Vanderklift M, Pillans R, Keesing J, Donovan A, Hardiman L, Slawinski D, Orr M, Doropoulos C, Roff G, Mortimer N, Mayne B, Gunasekera R, Bessey C, Bradford R, Feutry P, Patterson T, DeGroot B. (2024) Ningaloo Outlook Phase 2 – 2024 Annual Report (Year 4)	CSIRO	Ningaloo Coast World Heritage Area Ningaloo Reef
	Meekan MG, Taylor BM, Lester E, Ferreira LC, Sequeira AMM, Dove ADM, Birt MJ, Aspinall A, Brooks K and Thums M (2020) Asymptotic Growth of Whale Sharks Suggests Sex-Specific Life-History Strategies. Front. Mar. Sci. 7:575683. doi: 10.3389/fmars.2020.575683	AIMS	Ningaloo Reef
	Haughey, R., Hunt, T. ., Hanf, D., Passadore, C., Baring, R. and Parra, G. . (2025), Behavioural Processes Underlying the Habitat Selection of Indo-Pacific Bottlenose Dolphins (Tursiops aduncus) in the Ningaloo Marine Park and Exmouth Gulf, at the North West Cape, Western Australia. Aquatic Conserv: Mar Freshw Ecosyst, 35: e70114. https://doi.org/10.1002/aqc.70114	DBCA	North West Cape Exmouth Gulf Mangrove Bay Ningaloo State Marine Park
	D'Antonio B, Ferreira L, Fisher R, Thums M, Pattiaratchi CB, Sequeira AMM, Faubel S, Norman B, Meekan M (2025) Natural and artificial structures influence the movement and habitat connectivity of whale sharks (Rhincodon typus) across seascapes. Diversity and Distributions 31:e13950. https://doi.org/10.1111/ddi.13950	UWA AIMS	Ningaloo Reef Shark Bay
	Hutchings MJ, Parra GJ, Totterdell JA, Wellard R, Donnelly DM, Sandoval-Castillo J, Möller L (2025) Species distribution modeling of killer whales (Orcinus orca) in Australian waters. Ecology and Evolution 15:e71359. https://doi.org/10.1002/ece3.71359	Flinders University	Australia wide Ningaloo Reef
	Thums M, Ferreira LC, Davenport A, Jenner M, Moller L, Russell G, McCauley RD, Jenner C (2025) Tracking pygmy blue whale diving behaviour and validation of foraging areas defined from horizontal movement data. Global Ecology and Conservation 57:e03362. https://doi.org/10.1016/j.gecco.2024.e03362	AIMS	Western Australia Perth Jurien Bay Houtman Abrolhos Islands Geraldton Ningaloo Reef

Receptor	Existing baseline monitoring	Source / Data Custodian	Spatial extent
			Coral Bay Montebello Islands Group Shark Bay Dirk Hartog Island
	Edwards CM, Syme J, Parra GJ (2025) Association patterns of Indo-Pacific bottlenose dolphins (Tursiops aduncus) in waters off the North West Cape, Western Australia. Marine Mammal Science. https://doi.org/10.1111/mms.70017	Flinders University	North West Cape Ningaloo State Marine Park Ningaloo Reef Exmouth Gulf
	Bignell CJ, Patterson TA, Donovan A, Vanderklift MA, Rochester W, Semmens JM, Pillans RD (2025) Satellite tracking reveals sex-specific differences in the geographical and vertical habitat use of whale sharks, Rhincodon typus, in the Eastern Indian Ocean. Marine Biology 172:105. https://doi.org/10.1007/s00227-025-04616-5	CSIRO	Ningaloo Reef
	Hanf D, Hodgson AJ, Kobryn H, Bejder L and Smith JN (2022) Dolphin Distribution and Habitat Suitability in North Western Australia: Applications and Implications of a Broad-Scale, Non-targeted Dataset. Front. Mar. Sci. 8:733841. doi: 10.3389/fmars.2021.733841	O2Marine	North West Cape Exmouth Gulf Muiron Islands Onslow Area Mainland Coast Thevenard Island Barrow Island
Seabirds and shorebirds	Chevron: Gorgon Bridled Tern Monitoring Program Env-Gor-Seabird Monitoring Report 2021/22 J01209 (ABU220500068)	Chevron	Double Island North Double Island South Parakeelya Island
	Chevron: Gorgon Wedge-tailed Shearwater Monitoring Program	Chevron	Double Island North Double Island South

Receptor	Existing baseline monitoring	Source / Data Custodian	Spatial extent
			Ah Chong Island (Montebello group) Boodie Island
	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

Receptor	Existing baseline monitoring	Source / Data Custodian	Spatial extent
			Dampier Peninsula
	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

Receptor	Existing baseline monitoring	Source / Data Custodian	Spatial extent
	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 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	Roebuck Bay Eighty Mile Beach

Receptor	Existing baseline monitoring	Source / Data Custodian	Spatial extent
		Institute for Sea Research Global Flyway Network Australasian Wader Studies Group	
	Studying seabirds: recording biodiversity above ocean waves	CSIRO	Australia wide
	BirdLife Australia (2018) Seabird and Shorebird Baseline Studies, Ningaloo Region – Report on January 2018 bird surveys. Interim Report for Woodside Energy Ltd.	Birdlife Australia	Ningaloo State Marine Park Cape Range National Park Exmouth Gulf Coral Bay Muiron Islands North Muiron Island South Muiron Island Brown Island (Exmouth Gulf) Burnside Island (Exmouth Gulf) Islam Islands (Exmouth Gulf) Doole Island (Exmouth Gulf) Dummy Spit Island (Exmouth Gulf)

Receptor	Existing baseline monitoring	Source / Data Custodian	Spatial extent
			Roberts Island (Exmouth Gulf) Shag Rock (Exmouth Gulf) Simpson Island (Exmouth Gulf) Tent Island (Exmouth Gulf) Victor Island (Exmouth Gulf) West Doole Island (Exmouth Gulf) Whalebone Island (Exmouth Gulf) Whitmore Island (Exmouth Gulf) Wilderness Island (Exmouth Gulf) Y Island (Exmouth Gulf) Wagtail Island (Exmouth Gulf)
	Santos Seabird Monitoring Program	Santos	Varanus Island Abutilion Island Beacon Island Bridled Island Parakeelya Island Airlie Island
	Santos Varanus Island Contaminated Groundwater and Soil Investigative Work Program	Santos	Varanus Island
	Santos Varanus Island Wedge-tailed Shearwater Fledgling Interaction Study	Santos	Varanus Island

Receptor	Existing baseline monitoring	Source / Data Custodian	Spatial extent
	Santos Integrated Shearwater Monitoring Program	Santos	Varanus Island Airlie Island

Appendix E: OSM Services Provider Call Out Order Form

Operational and Scientific Monitoring (OSM) Services Call-Off 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	

Document Number: OSRL-OPER-FOR-01122 Revision: 1

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		
Others (*To be Agreed)		

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		
Others (*To be Agreed)		

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.

Document Number: OSRL-OPER-FOR-01122 Revision: 1