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WANDOO FIELD OIL SPILL CONTINGENCY PLAN
DOCUMENT 2: OIL POLLUTION EMERGENCY PLAN
WAN-2000-RD-0001.02

Revision	Date	Originator	Checker	Approver
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Revision History

Revision	Date	Description
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17	17.02.21	Revised ICT resource and dispersant plan
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19	22.11.24	Revised based on OSCP update and the Joint Industry Operational and Scientific Monitoring Framework and associated OSM Bridging Implementation Plan
20	25.02.26	Revised spill scenarios for Wandoo Facility and Well Construction Activities

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15	VOGA Well Construction QHSE Advisor		X
16	VOGA Environmental Advisor		X
17	MODU Offshore Installation Manager	X	X

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PART 6: SUPPORT PLANS

Abbreviations and Acronyms

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
BAOAC	Bonn Agreement Oil Appearance Code
BER	Boom Encounter Rate
CALM Buoy	Catenary Anchor Leg Mooring Buoy
CCT	Corporate Command Team
CGS	Concrete Gravity Substructure
DEE	Department of Environment and Energy
DFAT	Department of Foreign Affairs and Trade
DMPE	Department of Mines, Petroleum and Exploration
DPIRD	Department of Primary Industries and Regional Development
DTMI	Department of Transport and Major Infrastructure
DBCA	Department of Biodiversity Conservation and Attractions
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
GIS	Geographic Information System
HMA	Hazard Management Agency
hr	hour
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
JIP	Joint Industry Practice
kg	kilograms
km	kilometres
KPI	Key Performance Indicator

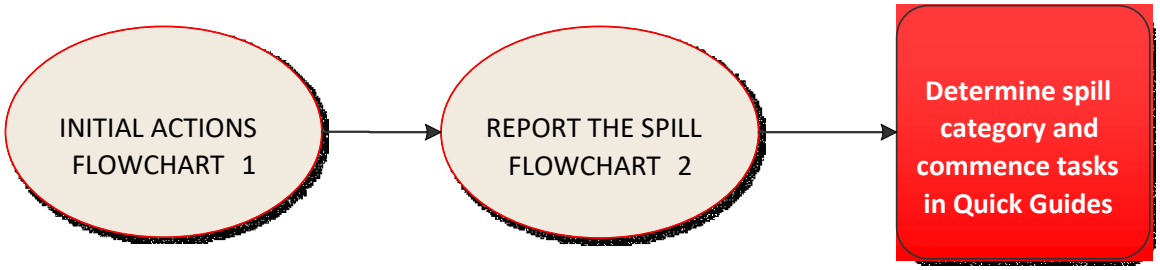
L	litres
m	metre
MEER Unit	Maritime Environmental Emergency Response Unit (within WA DTMI)
MODU	Mobile Offshore Drilling Unit
MOU	Memorandum of Understanding
National Plan	National Plan for Maritime Environmental Emergencies
NEBA	Net Environmental Benefit Analysis
NES	National Environmental Significance
nm	nautical mile
NOPSEMA	National Offshore Petroleum, Safety & Environmental Management Authority
NRT	National Response Team
OH&S	Occupational Health and Safety
OMP	Operational Monitoring Plan
OPGGSA	*Offshore Petroleum and Greenhouse Gas Storage Act 2006*
OPGGS(E)R	Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2009
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)
OSCP	Oil Spill Contingency Plan
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
OSTM	Oil Spill Trajectory Modelling
OWR	Oiled Wildlife Response
PIC	Person in Charge
POLREP	Pollution Report (Form)
PPE	Personal Protective Equipment
ppm	parts per million
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

SMOPC	State Marine Oil Pollution Committee
SMP	Scientific Monitoring Plan
SOPEP	Shipboard Oil Pollution Emergency Plan
T	tonnes
VOGA	Vermillion Oil & Gas Australia Pty Ltd
WA	Western Australia
WAOWRM	Western Australia Oiled Wildlife Response Manual
WAOWRP	Western Australia Oiled Wildlife Response Plan

PART 4: Activation of Oil Pollution Emergency Plan

WHAT TO DO IF AN OIL SPILL OCCURS

OIL SPILL RESPONSE ACTIONS



OIL SPILL RESPONSE PRIORITIES -

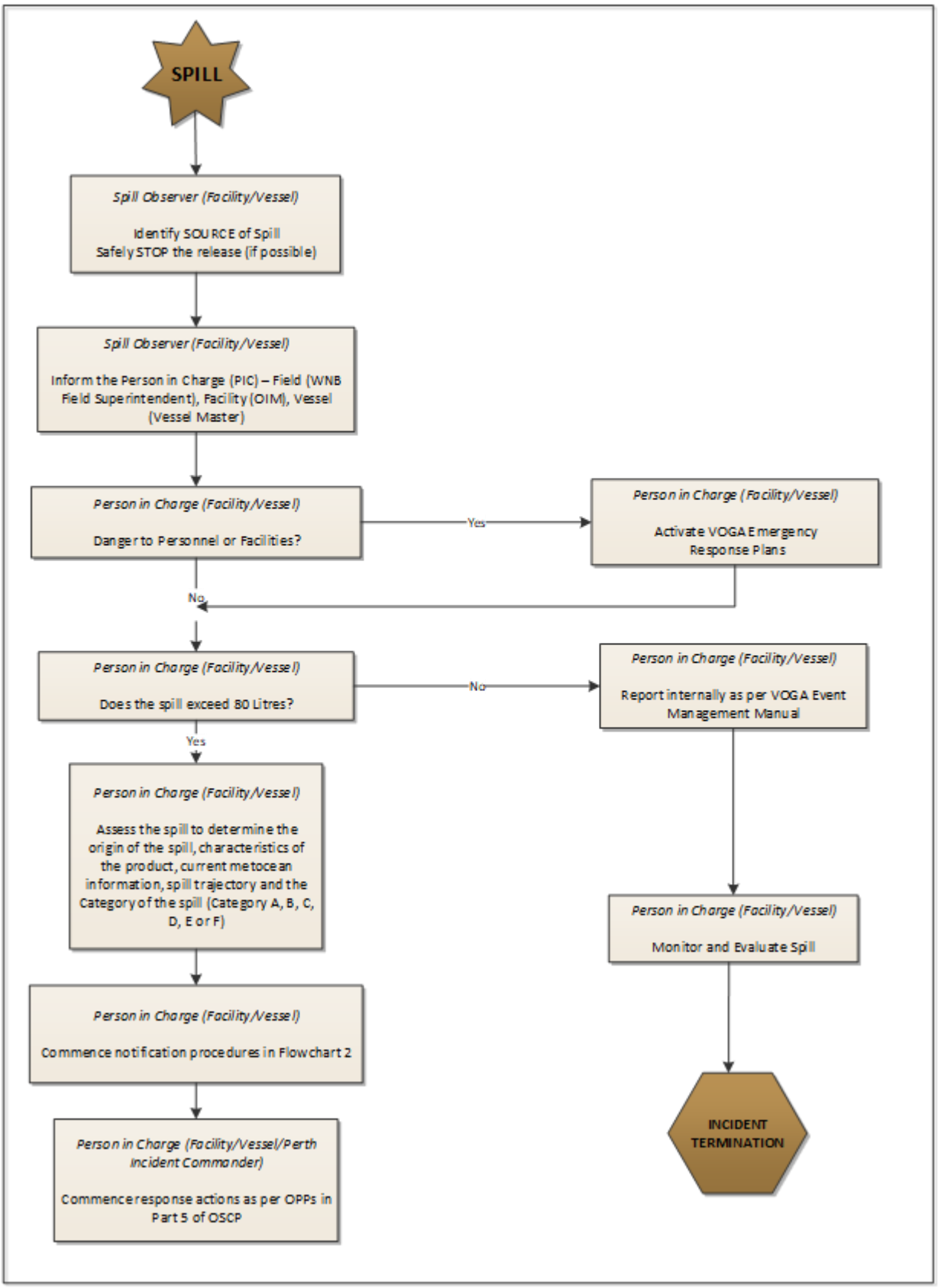
Consistent with the NatPlan , the priorities for VOGA in responding to an oil spill will be :

1. Human health and safety
2. Habitat and cultural resources
3. Rare and/or endangered flora and fauna
4. Commercial resources
5. Amenities

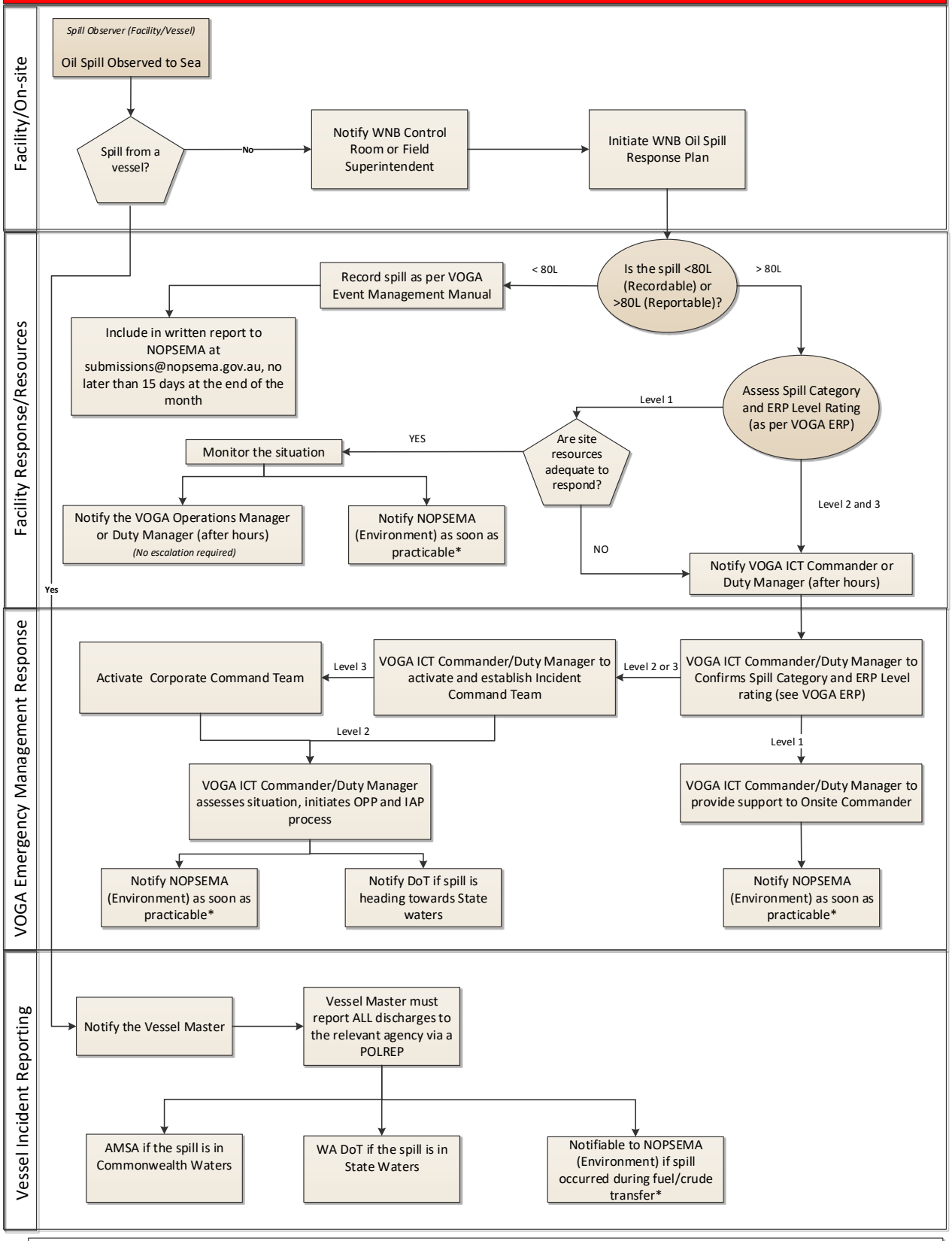
SPILL CATEGORIES AND CORRESPONDING OPP QUICK GUIDE

Spill type	Oil Pollution Plan Number	Possible cause	Credible upper spill volume	VOGA ERP incident level	National Plan incident level
Diesel	1	Vessel collision	300m^3	Level 1	1
Diesel	1	Loss of containment from Wandoo B Shaft 2	2,200m^3	Level 2	2
Wandoo Crude	2	Loss of oil from export system	300m^3	Level 2	2

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

1 Oil Pollution Plans

1.1 Purpose

Two Oil Pollution Plans (OPPs) have been prepared to assist VOGA to initiate an oil spill response through an initial IAP.

The OPPs provides support to enable first response actions to be undertaken and the resources for ongoing response to be initiated. Subsequent planning for extended response operations will need to be made as part of the continuous IAP process.

The intention is to support mobilisation of state, national and international resources required to implement response strategies in the initial phase of an event whilst the complexity and scale of the incident is determined. If the response has a surplus of resources for the required activities then the resources can be scaled back accordingly.

OPPs contain:

- objectives, strategies, tactics and tasks for first response activities
- guidance material on how to complete the tasks
- resource list to allow a scaling up and down of response operations as an appreciation of the situation is gained.

The OPPs are supported by an environmental impact assessment of the spill and response, and a Net Environmental Benefit Analysis (NEBA) process. A strategic NEBA has been generated utilising the impact assessment information within the EP (including OSTM data and identified environmental sensitivities) and provides recommendations on response strategies based on spill size, type and time of year.

An operational period of 20 days was established as the basis of the oil pollution plans as the modelling provides some certainty as to the likely fate of oil in the scenarios modelled; any further beyond this time is not useful because of the statistical uncertainty encountered.

1.2 Activation

The activation of the OPPs is outlined in Flowchart 1.

Specific response strategies will be activated through the OPPs and suitability confirmed by a NEBA spreadsheet tool that sits within the VOGA's oil spill response tools.

Activation of resources to support response activities is detailed in the VOGA Emergency Response Logistics Management Plan [VOG-7000-RH-0008] and is supported by a contracts database managed by the Logistics Chief which details suppliers, VOGA agreement numbers, contact details and services provided.

1.3 OPP 1 – Diesel

Two diesel spill scenarios are described in this OPEP a loss of 2,200 m^3 from Wandoo B shaft 2 over 12 hours (Wandoo Facility EP) and loss of 300 m^3 of diesel from a vessel collision (Well Construction EP). The loss of 2,200 m^3 from Wandoo B Shaft 2 has been used as a basis for planning in OPP1 because this scenario would provide sufficient capability for response to a 300m^3 spill from a vessel collision.

Trajectory modelling undertaken for the Wandoo B Shaft 2 scenario indicates floating oil exposure of 1 g/m^2 up to 166 km from the release location. Maximum distances for 10 g/m^2 and 50 g/m^2 were 33 km and 24 km respectively. There is a 21% probably of oil accumulation on any shoreline above 10 g/m^2 during winter conditions, at a maximum volume of 15 m^3.

Trajectory modelling for the vessel collsion scenario indicates 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.

Diesel spills are expected to remain largely offshore and weather overtime. Contingency plans for wildlife and shoreline impacts are included in OPP1.

1.4 OPP 2 – Wandoo Crude

Loss of containment of 300 m^3 of Wandoo Crude from export lines is the basis for OPP2. Trajectory modelling indicates that shoreline accumulation above 10 g/m^2 could occur on Barrow and Montebello Islands in just under 3 days during winter conditions. These shoreline cells are a priority protection area with an estimated maximum volume of 47 m^3 expected at this shoreline cell.

1.5 Oil Pollution Plan Toolbox

A number of decision support tools, response tools and handbooks are available for the ICT members and responders in the field. The purpose of the toolbox is to provide a centralised location for the ICT and responders' resources that may assist them in undertaking their specific functions within the response. Having resources prepared before a response, provides the opportunity for familiarisation during exercises, and assists members of the response when using the OPPs in a response.

Resources included in the toolbox include:

- List of tactical response plans available for high priority shorelines and relevant titleholder details to enable prompt requests for access
- OSR handbooks, technical guides templates and forms
- NEBA spreadsheet
- Websites with links to OSR organisations, research bodies and government departments
- Contractor and service provider details
- Training material.

2 OPP1 – Diesel

2.1 Instructions

- Complete the initial actions and notifications in Part 4 for activating the OSCP
- Work through the initial incident action plan Table 2-1 using the guidance and resources described in Table 2-3 to Table 2-9
- Check off tasks that have been undertaken using Table 2-2
- Generate a NEBA utilising the VOGA oil response tools (Appendix B)
- Complete the mobilisation and activation checklist within the Operational and Scientific Monitoring BIP (Appendix C)
- Transition into incident IAP process.

2.2 Initial Incident Action Plan

Table 2-1: OPP1 initial incident action plan

OBJECTIVE/S:	Ascertain extent of spill
	Prevent impact to sensitive resources
PREDICTED OUTCOMES AND 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. A 2,200m^3 spill from Shaft 2 is expected to evaporate rapidly with a moderate probability of shoreline impact at or above 10 g/m^2, of 34% during winter. The earliest shoreline impact is at 3 days and 22 hours and the greatest volume ashore is predicted to be 15 m^3. Protection Priorities: • Montebello AMP • WA11.West(318) – Barrow Island and Montebello Islands (Montebello Islands) • WA11.West (326) Baresand Point to Entrance Point E - (Serrurier Island, Bessieres Island and Round Island)	1. Monitoring, evaluation and surveillance (MES)
	2. Protection and deflection
	3. Shoreline clean-up
	4. Wildlife response

STRATEGIES	TACTICS (What is planned to be done)	TASKS (See Table 2-4 to Table 2-9 for guidance on how to complete tasks)
Monitoring, evaluation and surveillance (MES)	Visual observation from vessel or facility	Provide an 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 contract
	Aerial observation	Activate assets to fly as soon as possible in daylight hours only
		Analysis of aerial observation
		Deploy drone from Wandoo B if a drone, pilot and airspace is available
	Situational awareness	Collection and analysis of real time data – weather, tides, oil characteristics, presence of wildlife.
Protection and deflection	Boom deployment and configuration to protect shorelines/deflect oil – unlikely to be required for lower volume spills	Use OSTM and SCAT to identify protection priorities and expected timeframe oil contact.
		Secure near shore work vesssels
		Activate vessels, booms and operators.
		Monitor effectivenss of booming strategy.
Shoreline clean-up	SCAT surveys – unlikely to be required for lower volume spills	Activate WA trained SCAT personnel to identify shorelines requiring pre-cleaning or actual removal of oil from shore.
Oiled wildlife response	Wildlife first strike response and reconnaissance. Mobilisation of wildlife response management resources	Aerial reconnaissance
		Marine reconnaissance
Operational and Scientific Monitoring (OSM)	Operational Monitoring	Review initation criteria for Operational Monitoring Plans (refer to Section 9 of the Joint Industry OSM Framework) and activate OSM Services Provider via instructions in Part B of the OSM-BIP.

Table 2-2: Task checklist diesel spill first 24 hours

Task checklist initial incident action plan (First 24-48 Hours)			
	Timeframe	**Who**	**Completed**
Tasking checklist facility/on site			
Start and maintain personal log.	Immediately on spill detection	PIC Wandoo B	
Undertake visual observation from platform and/or vessels of opportunity immediately.	Immediately on spill detection	Observer on site	
Activate and deploy satellite tracking buoy.	Within two hours of spill detection	PIC Wandoo B	
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).	Within two hours of spill detection	PIC Wandoo B	
Tasking checklist VOGA Emergency Management Response – Perth ICT (Timeframe is based on notification of spill)			
Visual observation from aircraft (in daylight hours only) has been arranged.	Within three 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 three hours	Planning Chief Perth ICT	
Commission RPS to undertake real-time modelling to determine trajectory and fate of oil.	Within three hours	Planning Chief Perth ICT	
Obtain available data: • 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 three 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 four hours	Environment Unit lead in consultation with Planning Chief Perth ICT	
Complete Preliminary NEBA to identify indicative response options and protection priorities (based on Strategic NEBA in OSCP).	Within six hours	Planning Chief Perth ICT	
Activate priority resources (labour, equipment, transport and other support) based on outcomes of planning meeting and the agreed IAP.	Within six hours	Logistics Chief in consultation with Planning Officer Perth ICT	

Task checklist initial incident action plan (First 24-48 Hours)			
	Timeframe	**Who**	**Completed**
Monitor the response by scheduling and undertaking regular briefings/debriefings of ICT using SMEACS format.	Every six hours or as necessary	Incident Commander in conjunction with Planning Chief ICT	
Issue regular Situation Reports (SITREPS).	Prior to each ICT meeting.	Planning Chief Perth ICT	
Identify relevant Tactical Response Plans for protection priorities (based on strategic NEBA)	Within 48 hours	Environment Unit leader and Planning Chief Perth ICT	
Activate Oiled Wildlife Response Emergency Response Plan and Procedures (WAOWRP)	Within 48 hours	Planning Chief	
Monitor OH&S performance	Ongoing	Safety Officer	
Use information from MES and Operational Monitoring to transition to formal IAP cycle	Within 48 hours	Incident Commander Perth ICT	

2.2.1 MES Strategy

Table 2-3: Monitoring, evaluation and surveillance

Task	Guidance
Visual observation from vessel or facility	
Provide an initial situational awareness to the PIC	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?
Ongoing situational awareness	As directed by Planning Chief, provide updates on what the spill looks like, area covered, presence of wildlife or other activities.
Deploy satellite tracking buoy	
Deploy unit – PIC	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. The 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. Additional units deployed every three days.
Access real-time data	Planning Chief accesses data from the Fastwave dashboard url: https://dashboard.fastview.com.au/ user: vermilion1 pass: cali6AF7662FK Instructions on how to use the portal are in the ICT Toolbox
Interpret data	Planning Chief uses real-time data and knowledge of sensitivities to estimate spill trajectory and resources that could be impacted.

Task	Guidance
	Real-time data is also provided to RPS to validate OSTM data.

Task	Guidance
Oil spill trajectory modelling	
Activate RPS 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 in liaison with Logistics Chief activates the RPS contract for real time trajectory modelling: (1) Complete the modelling request form (editable .pdf request form provided). Please 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. Please 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, please 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 details 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.
Aerial observation	
Activate assets to fly as soon as possible in daylight hours only	Upon notification of a spill the Planning Chief requests the Logistics Chief to activate aviation contracts. Fixed wing aircraft (preferably over wing configuration) or helicopters to provide personnel with the means to observe and record details of oil on water. Request flight as soon as possible. Pilots or observers be provided with information on the anticipated location of the slick (e.g. from OSTM output).

Task	Guidance
	If possible use aircraft already in the area to provide situational awareness. Flight time to the Wandoo B is 20 minutes (48nm) based on S76 helicopter (@140 knots).
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. Secure trained aerial observers to quantify amount of oil on water and geographical spread from the resource list in the VOGA Emergency Response Logistics Management Plan (VOG-7000-RH-0008).
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.
Ongoing surveillance	Logistics Chief secures appropriate aircraft to undertake aerial observation activities twice a day – morning and afternoon until advised otherwise by Planning Chief. The information collected during aerial observations must be relayed back to the ICT for analysis by the Situation and Environment Units.
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.

Task	Guidance
Situational awareness	
Collect real-time and predicted data to enter on status boards in ICT Ongoing update	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 Bureau of Meteorology (BoM) • Real-time and predicted tidal and current movements – source from BoM, websites • Oil characteristics – properties of the oil spilled and predicted behaviour after weathering • Predicted trajectory of oil based on modelling conducted for planning and verified by real-time modelling • Resources at risk of being oiled sourced from OSCP.
Incident action planning	At the completion of the MES tasks, the Planning Chief will review information gathered provide a recommendation to the Incident Commander for MES tasks.
Operational and Scientific Monitoring	
OSM	Refer to OSM-BIP and inititation criteria for Operational Monitoring Plans
Effectiveness guidance for response strategy	Information available is: • Of sufficient quality • Consistent in reporting • Regular • Required to inform other response strategies.

Table 2-4: OPP 1 MES minimum resources required

Means/task	Outcomes	Minimum resources required for first 48 hours	Timeframe (from notification of spill)	5 days	10 days	20 days
Visual observation – from platform	Identify extent and direction of oil, visual characteristics. Ground truth OSTM.	1 x Observer.	Immediately on detection of spill			
Visual observation – from vessels of opportunity	Identify extent and direction of oil, visual characteristics. Ground truth OSTM.	1 x Vessel. 1 x Observer.	Mobilise if vessels of opportunity are already in the field.			
Visual observation – from aircraft	Identify extent and direction of oil, visual characteristics. Ground truth OSTM.	2 x Observer. 1 x Aircraft. 1 x Aerial support base.	Daylight only, two hours	2 x Observers. 1 x Aircraft. 1 x Aerial support bases.	2 x Observers. 1 x Aircraft. 1 x Aerial support bases.	
Determination of surface and dispersed oil trajectory and fate	Identify the likely trajectory and fate of the spill and dispersed oil, timeframes for the oil (surface or dispersed) to interact with environmental sensitivities.	1 x Incident Command Team member with oil spill assessment training. Contract with technical provider.	Requested within three hours	1 x Incident Command Team member with oil spill assessment training. Contract with technical provider.		
Satellite tracking buoys	Identification of the leading edge/rear edge of the spill.	1 x satellite tracking buoy Data site 'back end' to Geographic	Deployed within 3 hours.	2 x satellite tracking buoys Data site 'back end' to GIS system.		

Means/task	Outcomes	Minimum resources required for first 48 hours	Timeframe (from notification of spill)	5 days	10 days	20 days
		Information System (GIS). Current contract with satellite provider.		Current contract with satellite provider.		

LEGEND: Resource required | Resource possibly required | Resource unlikely to be required

2.2.2 Protection and Deflection Strategy

Table 2-5: Protection and deflection

Task	Guidance
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 and where the hydrocarbon slick is of a sufficent thickness to be effective (ie ≥50g/m^2).
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.

Task	Guidance
NEBA	Priority of the implementation protection and deflection is to oiling of shorelines with the highest environmental sensitivities (location and season) and where the hydrocarbon slick is of a sufficent thickness to be effective (ie ≥50g/m^2). Planning Chief and Environment Unit leader in consultation with DTMI to determine where the optimum mitigation outcomeswill 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 Tactical Response Plans from other titleholders for priority shorelines
Determine and source resources required and booming configuration	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 sensitive receptor, or prevent contact by oil. Refer to OSRL handbook for Shoreline Operations for recommended booming configurations. Use of available Tactical Response Plans as guidance. Logistics Chief to source booms and skimmers (if being used to recover oil) from AMOSC stockpiles and the AMSA National Plan stockpiles. 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. 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 the DoT State Response Team. 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.
Induction	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.
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.
Consider constraints	Diesel slicks are unlikely to be of a sufficient thickness to effectively divert or direct onto shorelines using booming strategies.

Task	Guidance
	The major environmental 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; and • hazardous wildlife.
Incident action planning	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 protection and deflection operations.
Effectiveness guidance for response strategy	• 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 2-6: Protection and deflection minimum resource requirements

Means/task	Outcomes	Minimum resources required for first 48 hours	Timeframe (on spill notification)	5 days	10 days	20 days
Landside (based on one team, resources will need to be scaled up for additional teams)						
Marine vessels	Marine vessel(s) capable of carrying crew and spill equipment to remote islands. Capable of logistics support/accommodation for 10 POB, crew, accessing remote islands.	1 x Aluminium catamaran or flat bottom boat.	48 hours on site	2 x Aluminium catamarans and/or flat bottom boats.	2 x Aluminium catamarans and/or flat bottom boats.	

Means/task	Outcomes	Minimum resources required for first 48 hours	Timeframe (on spill notification)	5 days	10 days	20 days
Crew	Crew capable of securing booms.	1 x Trained operator/Team Leader. 4 x Labourers.	48 hours on site	2 x Trained operators/ Team Leaders. 8 x Labourers.	2 x Trained operators/ Team Leaders. 8 x Labourers.	
Booming systems	A system that can effectively and efficiently direct or prevent the movement of oil.	Various lengths of land/sea boom, shoreline protection booms, sorbent booms.	48 hours on site	Various lengths of land/sea boom, shoreline protection booms, sorbent booms.	Various lengths of land/sea boom, shoreline protection booms, sorbent booms.	
Marine side (based on one team, resources will need to be scaled up for additional teams)						
Vessel	Vessel capable of assisting land-side crews to secure booms in waterways and in the shallow seas.	1 x Shallow draft work boat. Operational crew for same.	48 hours on site	2 x Shallow draft work boat. Operational crew for same.	2 x Shallow draft work boats. Operational crew for same.	
Crew	Crew capable of securing booms.	1 x Trained Operator/Team Leader. 2 x Labourers on-board.	48 hours on site	2 x Trained Operators/ Team Leaders. 4 x Labourers on-board.	2 x Trained Operators/ Team Leaders. 4 x Labourers on-board.	
Booming systems	A system that can effectively and efficiently direct or prevent the movement of oil.	Various lengths of land/sea boom, shoreline protection booms, sorbent booms. Crew to operate the system.	48 hours on site	Various lengths of land/sea boom, shoreline protection booms, sorbent booms. Crew to operate the system	Various lengths of land/sea boom, shoreline protection booms, sorbent booms. Crew to operate the system	

LEGEND:	Resources required	Resources possibly required	Resources unlikely to be required

2.2.3 Shoreline Clean-up Response Strategy

Table 2-7: Shoreline clean-up

Task	Guidance
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. *Depending on OSM-BIP activations SCAT maybe undertaken by Monitoring Service Providers as OM6 SCAT. If not, the following guidance is provided for local teams.*	
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.
NEBA and SCAT surveys	Priority of the implementation of tasks to support this strategy will be focused on cleaning oil from shorelines with the highest environmental sensitivities. WAMOPRA shoreline cell WA11.West (318) – Barrow Island and Montebello Islands has been identified in OSTM as the highest priority for first response. 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 DoT representatives to confirm protection priorities. SIMA Shorelines will be assessed for the extent of the oiling, 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 preparatory 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 SIMA 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.

Task	Guidance
	In undertaking this three-step process, VOGA contractors, employees and support agencies will work to effectively and efficiently clean shorelines where possible. A number of technical guidance notes exist for shoreline assessment and clean-up operations. These include the Environment Canada SCAT Guidelines (2007), the POSOW Shoreline Clean-up Guidelines, the UK SCAT Manual (2004), and the WA DTMI Oiled Shoreline Field Book. DTMI SCAT documentation and forms can be used to complete SCAT surveys.
Deploy shoreline clean-up teams	Deploy 6 shoreline clean up teams by Day 4 to priority coastline sections verified by the OMP6 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 Logistics Management Plan [VOG-7000-RH-0008]. 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.
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.
Equipment	Cleaning equipment, decontamination set. The type and amount of equipment required for shoreline clean-up will depend on the technique used) and operational constraints such as access to the shoreline and weather conditions. Equipment held in the State stockpiles (DoT) is suitable for shoreline clean-up activities as well as the equipment held in AMOSC and AMSA stockpiles. Additional resources can be accessed from OSRL.
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.

Task	Guidance
	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 DoT representatives to confirm protection priorities. The WA DoT will be consulted in the SIMA 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.
Waste collection and transport	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.
Incident action planning	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.
Effectiveness guidance for response strategy	• 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.

Means/ task	Outcomes	Minimum resources required for first 48 hours	Timeframe (on spill notification)	5 days	10 days	20 days
Induction	Shoreline teams are informed of how to minimise damage to flora and avoid encounters with fauna.	1 x Trainer.	72 hours on site	1 x Trainer. 4 shoreline clean-up teams on site (44 people – 1 trained team leader, 10 workers per team).		
Manual shoreline clean-up activities	Floating oil close to shore collected and pooled bulk oil removed. Stranded oil removed. Cleanup of light oil contamination (polishing phase). Physical removal of oil likely to be feasible at concentrations greater than 100g/m^2 which the OSTM indicates has a probability of 3% occuring.	2 team leaders and 20 clean-up workers (44 people) sourced and mobilised to forward operating base.	4 shoreline clean-up teams (40 workers and 2 team leaders) mobilised and on site for induction within 72 hours	4 shoreline clean-up teams (40 workers and 2 team leaders) mobilised and on site	4 shoreline clean-up teams (40 workers and 2 team leaders) mobilised and on site	
Logistics	Crews are safe, fed, in contact with other	Mobilisation of PPE, food, water, shelter,	72 hours on site.	Mobilisation of PPE, food, water, shelter,	Mobilisation of PPE, food, water, shelter,	

Means/ task	Outcomes	Minimum resources required for first 48 hours	Timeframe (on spill notification)	5 days	10 days	20 days
	parts of the response and watered.	communications network.		communications network.	communications network.	
Marine vessels	Marine vessel(s) capable of carrying crew and spill equipment to remote islands.	2 x Marine vessels.	72 hours on site	2 x Marine vessels	2 x Marine vessels	
Equipment	Cleaning equipment and decontamination set selected according to suitablity for clean-up task and shoreline type.	4 x shoreline clean-up kits made up of shovels, plastic bags, rakes, buckets, wheelbarrows. Decon kit.	72 hours on site	4 x shoreline clean-up kits made up of shovels, plastic bags, rakes, buckets, wheelbarrows. Decon kit.	4 x shoreline clean-up kits made up of shovels, plastic bags, rakes, buckets, wheelbarrows. Decon kit.	
Waste collection, storage and transport	Short term waste collection.	Temporary waste storage capability activated.	72hrs onsite	Waste storage	Waste storage	

LEGEND:	Resources required	Resources possibly required	Resources unlikely to be required

2.2.4 Oiled Wildlife First Response

Table 2-8: Oiled Wildlife response

Task	Guidance
Activate WAOWRP	Call the DBCA State Duty Officer on telephone **(08) 9219 9108.** The DBCA State Duty Officer will notify an 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.
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 to the wildlife assets at risk	Wildlife Division Coordinator to undertake. Use WAOWRP to identify wildlife assets at risk, cross reference with wildlife information contained in NEBA..
Liaise with Oiled Wildlife Advisor	Wildlife Division Coordinator to liaise with OWA.
Activate first strike response kits	Wildlife Division Coordinator and OWA discuss get approval from IC. First strike kits are portable and contain equipment to allow stabilisation of wildlife before triage and possible treatment at an oiled wildlife facility.
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. Depending on OSM-BIP activations this task could be undertaken by teams implementing OM5 – Marine Fauna Surveillance.
Develop wildlife sub-plan for the IAP based on WAOWRP procedures.	Transition to response cycle and procedures in WAOWRP for OWR activities based on the spill scenario.

Table 2-9: OWR minimum resources

Means/task	Outcomes	Minimum resources required for first 48 hours	Timeframe (on spill notification)	5 days	10 days	20 days
Wildlife first strike response	WAOWRP is activated.	N/A – activation task only	Within 24 hours	N/A – activation task only	N/A – activation task only	N/A – activation task only
	OWA and Wildlife Division Coordinator are activated and assigned to the ICT.	1 x OWA. 1 x OWR Division Coordinator.	Once WAOWRP is activated.	N/A – activation task only	N/A – activation task only	N/A – activation task only
Mobilisation of resources	First strike response kits are mobilised to staging areas	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.	Within 48 hours.	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.	2 x OWR containers from Dampier (AMSA) and Fremantle (AMOSC).	Within 48 hours.	2 x OWR containers deployed to Dampier OWR facility.	N/A – containers deployed	N/A – containers deployed
Wildlife reconnaissance	Situational awareness regarding wildlife that has been oiled and wildlife present within the path of the spill trajectory is gained.	1 x aerial observation over extent of spill combined with MES tasks. 1 x aerial observation over extent of predicted trajectory requires 1 x aircraft.	Concurrently with MES and SCAT tasks. Wildlife specific reconnaissance within 48 hours.	Aerial based survey: 1 x aerial observation over extent of predicted trajectory requires 1 x aircraft Boat based survey: 1 x small vessel (<12m length) 1 x boat driver; 2 x crew Shoreline survey: 2 x Quad motorbike or 4WD vehicle; 4 x survey crew.		
IAP wildlife sub-plan development	Future OWR activities arrangement developed based on the spill scenario.	1 x OWR Advisor; 1 x OWR Planning officer; 1 x OWR Division Coordinator.	Within 48 hours.	To be determined according to WAOWRP procedures.		

3 OPP2 – Wandoo Crude

3.1 Instructions

- Complete the initial actions and notifications in Part 4 for activating the OSCP
- Work through the initial incident actin plan Table 3-1 using the guidance and resources described in Table 3-2 to Table 3-18
- Check off tasks that have been undertaken using Table 3-2
- Generate a NEBA utilising the VOGA oil response tools (Appendix B)
- Complete the mobilisation and activation checklist within the VOGA Operational and Scientific Monitoring BIP (Appendix C)
- Transition into incident IAP process.

3.2 Initial Incident Action Plan

Table 3-1: OPP2 initial incident action plan

INCIDENT OBJECTIVE/S:	Ascertain extent of spill
	Prevent impact to sensitive resources
PREDICTED OUTCOMES AND PROTECTION PRIORITIES	**OIL SPILL RESPONSE STRATEGIES** (Means of accomplishing objectives)
Modelling suggests 66% contact to shorelines in Winter at 10 g/m^2 threshold 27% in Summer and 37% in Transitional season. The earliest shoreline impact is at 2 days, 20 hours and greatest volume ashore is predicted to be 62.8 m^3 Montebello AMP WA11.West (318) Barrow Island and Montebello Islands (A) (Montebello Islands) WA11.West (326) Baresand Point to Entrance Point E - (Serrurier Island, Bessieres Island and Round Island)	1. Monitoring, evaluation and surveillance
	2. Chemical dispersion
	3. Mechanical dispersion
	4. Containment and recovery
	5. Protection and deflection
	6. Shoreline clean-up.
	7. Wildlife Response

STRATEGIES	**TACTICS** (What is planned to be done?)	**TASKS** (See Table 3-3 to Table 3-18 for guidance on how to complete tasks)
Monitoring, Evaluation and Surveillance	Visual observation from vessel or facility	Provide initial situational awareness to the PIC
		Ongoing situational awareness
	Deploy satellite tracking buoy	Deploy unit – PIC
		Access real-time data
		Interpret data

STRATEGIES	TACTICS (What is planned to be done?)	TASKS (See Table 3-3 to Table 3-18 for guidance on how to complete tasks)
	Oil spill trajectory modelling	Activate RPS modelling contract
	Aerial observation	Activate assets to fly as soon as possible in daylight hours only
		Analysis of aerial observation
		Deploy drone from Wandoo B if there is a drone, pilot and airspace available.
	Situational awareness	Collect real-time and predicted data to enter on status boards in ICT
		Obtain satellite imagery
		Preliminary NEBA and incident action planning for guidance on response strategies and protection prioririte s.
		Effectiveness guidance for response strategy
		Analysis of trajectory modelling
		Analysis of aerial observation and current situational awareness
		Consider constraints
		Decide on which shorelines will be prioritised for SCAT surveys
		Analysis of resources and logistics required
Chemical dispersion	Aerial dispersant operations	Activate FWADC through AMOSC within six hours of the spill
		Mobilise dispersant to Karratha Airport within six hours of the spill
		Set up operating post at Karratha Airport
		Monitoring dispersant effectiveness of test spray runs using visual observation (refer to OM4)
		Arrange for a spotter plane to accompany air tractor
		Arrange for trained AAC to be available for test spray run
		Pre-flight briefing
		Test spray run by air tractor
		Monitoring dispersant effectiveness of test spray runs using visual observation via OSM as per below.
		Planning Chief to undertake a NEBA of chemical dispersion operations – operational activities
		Secure trained personnel to run dispersant operation
		Pre-flight briefing
		Ongoing dispersant operations
		Volume of dispersant and number of aircraft required

STRATEGIES	TACTICS (What is planned to be done?)	TASKS (See Table 3-3 to Table 3-18 for guidance on how to complete tasks)
		Monitoring dispersant effectiveness – ongoing operations (via OSM as per below)
		Debriefing
		Stockpile management
		Incident action planning
		Effectiveness guidance for response strategy
	Marine dispersant operations	Identify marine operating base
		Source vessel
		Dispersant stocks
		Dispersant spray system
		Arrange for a spotter plane to accompany marine vessel
		Planning Chief to undertake a NEBA of chemical dispersion operations – test run activities
		Test run by marine vessel
		Monitoring dispersant effectiveness (via OSM as per below)
		Planning Chief to undertake a NEBA of chemical dispersion operations – operational activities
		Ongoing dispersant operations
		Debriefing
		Stockpile management
		Incident action planning
		Effectiveness guidance for response strategy
Mechanical dispersion	Mechanical dispersion operations	Planning Chief to undertake a NEBA of mechanical dispersion operations
		Secure offshore work vessel
		Secure spotter aircraft
		Deploy vessels
		Incident action planning
		Effectiveness guidance for response strategy
Containment and recovery	Offshore and near shore containment and recovery	Planning Chief to undertake a NEBA of containment and recovery operations
		Do weather conditions and sea state permit safe and effective deployment of booms and skimmers?
		Does containment and recovery appear feasible?
		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.
		Mobilise vessels suitable for either offshore or near shore operations
		Mobilise booms and skimmers

STRATEGIES	TACTICS (What is planned to be done?)	TASKS (See Table 3-3 to Table 3-18 for guidance on how to complete tasks)
		Mobilise trained equipment operators
		Spotter plane to direct operations
		Establish a forward operating base for temporary storage of equipment and waste
		Deploy booms, skimmers and temporary waste storage
		Develop waste storage and transport plan
		Incident action planning
		Effectiveness guidance for response strategy
Protection and deflection	Near shore protection and deflection operations	Analysis of trajectory modelling and baseline monitoring data
		Analysis of aerial observation and current situational awareness
		Understanding of real time currents and tides
		Planning Chief undertakes a NEBA for protection and deflection operations
		Determine and source resources required and booming configuration (identify and access relevant Tactical Response Plans for guidance)
		Induction
		Marine vessel transport of people and equipment
		Aerial surveillance and/or transport
		Consider constraints
		Incident action planning
		Effectiveness guidance for response strategy
Shoreline clean up	Shoreline clean-up operations	Analysis of trajectory modelling
		Analysis of aerial observation and current situational awareness
		Planning Chief undertakes a NEBA for shoreline clean-up operations
		Consider constraints
		Decide on which shorelines will be cleaned and monitored based on SCAT
		Analysis of resources required
		Logistics
		Induction
		Marine vessel transport of people and equipment
		Aerial surveillance and/or transport
		Equipment
		Ongoing shoreline assessment (via OSM as per below)
		Ongoing clean-up operations

STRATEGIES	TACTICS (What is planned to be done?)	TASKS (See Table 3-3 to Table 3-18 for guidance on how to complete tasks)
		Waste collection and transport
		Incident action planning
		Effectiveness guidance for response strategy
Oiled Wildlife Response	Wildlife first strike response	Activate WAOWRP
		Rapidly assess the situation
		Provide advice to the ICT in relation to the wildlife assets at risk
		Liaise with Oiled Wildlife Advisor
		Activate first strike response kits
	Mobilisation of wildlife resources	Personnel
		Equipment
Operational and Scientific Monitoring (OSM)	Operational Monitoring	Review initation criteria for Operational Monitoring Plans (refer to Section 9 of the Joint Industry OSM Framework) and activate OSM Services Provider via instructions in Part B of the OSM-BIP.

Table 3-2: Task checklist for OPP2 Wandoo Crude

OPP2 –Task checklist initial incident action plan (first 24-48 hours)			
	Timeframe	**Who**	**Completed**
Tasking checklist facility/on site			
Start and maintain personal log.	Immediately on spill detection	PIC Wandoo B	
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 two hours of spill detection	PIC Wandoo B	
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, DoT if the potential for a State response).	Within two hours of spill detection	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 three hours	Logistics Chief Perth ICT	

OPP2 –Task checklist initial incident action plan (first 24-48 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 three hours	Planning Chief Perth ICT	
Commission RPS to undertake real-time modelling to determine trajectory and fate of oil.	Within three 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 three hours	Planning Chief Perth ICT	
Activate Joint Industry Operational and Scientific Monitoring Services Supplementary Agreement by using instructions in Section 13 of the Operational and Scientific Monitoring Bridging Implementation Plan	Within four hours	Environment Unit leader and Planning Chief Perth ICT	
Complete Preliminary NEBA to identify indicative response options and protection priorities (based on Strategic NEBA in OSCP).	Within six hours	Environment Unit leader and Planning Chief Perth ICT	
Activate vessel based dispersant operations to conduct test spray run and ongoing dispersant operations	Within 12 hours	IC in consultation with Planning Chief Perth ICT	
Activate FWADC via AMOSC to conduct test spray run.	Within 12 hours	IC in consultation with Planning Chief Perth ICT	
Mobilise dispersant.	Within 12 hours	Logistics Chief in consultation with Planning Chief Perth ICT	
Undertake operational NEBA to determine if dispersant strategy will be implemented.	Within two hours of completion of test run	Environment Unit leader 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 12 hours	Logistics Chief in consultation with Planning Chief Perth ICT	

OPP2 –Task checklist initial incident action plan (first 24-48 hours)			
	Timeframe	**Who**	**Completed**
Identify relevant Tactical Response Plans for protection priorities and request from DTMI and Titleholder (based on Preliminary NEBA)	Within 12 hours	Environment Unit leader and Planning Chief Perth ICT	
Activate Oiled Wildlife Response WAOWRP and the VOGA Oiled Wildlife Commander (Wildlife Division Coordinator [WDC])	Within 12 hours	Planning Chief	
Monitor the response by scheduling and undertaking regular briefings/debriefings of ICT using the SMEACS format.	Every six 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 six hours or as necessary	Planning Chief Perth ICT	
Monitor OH&S performance through Section 9 of Part 6.	Ongoing	Safety Officer	
Activate OWR first strike response kits to be delivered to the most appropriate staging areas locations will be confirmed based on OSTM at the time of the spill and the initial NEBA.	Within 24 hours	Logistics Chief	
Mobilise 2 x OWR containers to be delivered to Dampier	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	

3.2.1 MES Strategy

Table 3-3: Monitoring, evaluation and surveillance

Task	Guidance
Visual observation from vessel or facility	
Provide an initial situational awareness to the PIC	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?
Ongoing situational awareness	As directed by Planning Chief, provide updates on what the spill looks like, area covered, presence of wildlife or other activities.
Deploy satellite tracking buoy	
Deploy unit – PIC	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. Additional units deployed every three days.
Access real-time data	Planning Chief accesses data from the Fastwave dashboard url: https://dashboard.fastview.com.au/ user: vermilion1 pass: cali6AF7662FK Instructions on how to use the portal are in the ICT Toolbox

Task	Guidance
Interpret data	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.
Oil spill trajectory modelling	
Activate RPS 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 in liaison with Logistics Chief activates the RPS contract for real time trajectory modelling: (1) Complete the modelling request form (editable .pdf request form provided). Please 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. Please 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, please 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.

Task	Guidance
Aerial observation	
Activate assets to fly as soon as possible in daylight hours only	Upon notification of a spill the Planning Chief requests the Logistics Chief to activate aviation contracts . Fixed wing aircraft (preferably over wing configuration) or helicopters to provide personnel with the means to observe and record details of oil on water. Request flight as soon as possible. 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 (48nm) based on S76 helicopter (@140 knots).
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. Secure trained aerial observers to quantify amount of oil on water and geographical spread from the resource list in the VOGA Emergency Response Logistics Management Plan (VOG-7000-RH-0008).
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.
Ongoing surveillance	Logistics Chief secure appropriate aircraft to undertaken aerial observation activities twice a day – morning and afternoon until advised otherwise by Planning Chief. The information collected during aerial observations must be relayed back to the ICT for analysis by the Situation and Environment Units.
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.

Task	Guidance
Situational awareness	
Collect real-time and predicted data to enter on status boards in ICT. Ongoing updates	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, websites; • Oil characteristics – properties of the oil spilled and predicted behaviour after weathering; • Predicted trajectory of oil based on modelling conducted for planning and verified by real time modelling; • Resources at risk of being oiled sourced from OSCP.
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, ground truth the OSTM, sourced from Landgate or via OSRL. Time to acquire images depends on availability of satellites over the spill site. Landgate to be activated by the VOGA User Representative Contacts (URCs) only.
Operational and Scientific Monitoring	
OSM	Refer to OSM-BIP and inititation criteria for Operational Monitoring Plans
Effectiveness guidance for response strategy	Information is available for the ICT: • of sufficient quality; • consistent in reporting; • regular; and • required to inform other response strategies.

Table 3-4: MES minimum resource requirements

Means/task	Outcomes	Minimum resources required for first 48 hours	Timeframe (on spill notification)	5 days	10 days	20 days
Visual observation from platform	Identify extent and direction of oil, visual characteristics. Ground truth OSTM.	1 x Observer.	Immediate.	1 x Observer.		
Visual observation from vessels	Identify extent and direction of oil, visual characteristics. Ground truth OSTM.	1 x Vessel. 2 x Observers.	Mobilise immediately	1 x Vessel. 2 x Observers.	1 x Vessel. 1 x Observer.	
Visual observation from aircraft	Identify extent and direction of oil, visual characteristics. Ground truth OSTM.	2 x Observers. 1 x Aircraft. 1 x Aerial support base.	Daylight only, two hours.	2 x Observers. 1 x Aircraft. 1 x Aerial support base.	2 x Observers. 1 x Aircraft. 1 x Aerial support base.	2 x Observers. 1 x Aircraft. 1 x Aerial support base.
Determination of surface and dispersed oil trajectory and fate	Identify the likely trajectory and fate of the spill and dispersed oil, timeframes for the oil (surface or dispersed) to interact with environmental sensitivities.	1 x Incident Command Team member with oil spill assessment training. Contract with technical provider.	Requested within three hours	1 x Incident Command Team member with oil spill assessment training. Contract with technical provider.		
Satellite imagery	High fidelity photographs using different spectrums to identify the trajectory of the oil, ground truth the OSTM.	Contract with technical provider or access to AMSA technical provider.	Requested within three hours	Contract with technical provider or access to AMSA technical provider.		

Means/task	Outcomes	Minimum resources required for first 48 hours	Timeframe (on spill notification)	5 days	10 days	20 days
Satellite tracking buoys	Identification of the leading edge/rear edge of the spill.	1 x satellite tracking buoy . Data site 'back end' to GIS system. Current contract with satellite provider.	Deployed within three hours.	2 x satellite tracking buoys. Data site 'back end' to GIS system. Current contract with satellite provider.		
Shoreline assessment (SCAT Teams)	Shorelines are assessed as to their level of hydrocarbon stranding, and priority for clean-up.	1 x Wildlife expert. 1 x Marine environmental specialist. 1 x Oil spill response.	72 hours on site	6 teams made up of: Wildlife experts. Marine environment specialists. Oil spill response specialists	6 teams made up of: Wildlife experts. Marine environment specialists. Oil spill response specialists	6 teams made up of: Wildlife experts. Marine environment specialists. Oil spill response. speciialsits

LEGEND:	Resources required	Resources possibly required	Resources unlikely to be required

3.2.2 Chemical Dispersant Application

3.2.2.1 Aerial Dispersant Operations

Table 3-5: Aerial dispersant application

Task	Guidance
Activate aircraft within 6 hours of the spill	Planning Chief to advise Logistics Chief to advise AMOSC to activate FWADC by calling AMSA RCC on **1800 641 792**. Request two air tractors Mobilise 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.
Mobilise dispersant to Karratha Airport within 6 hours of the spill	Planning Chief to confirm with Logistics Chief the volume of dispersant to be mobilised to Karratha Airport. Mobilise 10m^3 from available stockpiles. Mobilise a dispersant transfer pump to be able to transfer dispersant from IBCs to aircraft.
Set up operating post at Karratha Airport	Logistics Chief to liaise with Karratha Airport to set up a staging area for dispersant stockpile and transferring dispersant to aircraft. Managed by the Aerotech Liaison Officer (provided by AMOSC).
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.
Arrange for a spotter plane to accompany air tractor	Logistics Chief to secure 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 may be required to direct air tractors operating in separate areas. If one area of the slick is being treated by the four air tractors, then one spotter helicopter or plane will be used to direct spraying activities.
Arrange for trained AAC to be available for test spray run	AAC to communicate with pilot of air tractor to direct spray operations over the oil slick and to complete the Aerial Dispersant Monitoring Log (OSRL Handbook). Will need AACs for each area of operation if more than one spotter plane is being used.

Task	Guidance
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 CTAF also used/monitored; and • aircraft also have to have Marine Radios which can also be utilised.
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 50L per hectare with a swath width of 22m [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. 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 100m 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.
Monitoring dispersant effectiveness (OM4a: Surface dispersant effectiveness monitoring)	Refer to the OSM-BIP. The Joint Industry Operational Monitoring Plan (OM4a): Surface Chemical Dispersant Fate and Effectiveness Assessment will be used to guide surface dispersant effectiveness monitoring.
Complete NEBA to justify ongoing dispersant use	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.

Task	Guidance
Secure trained personnel to run dispersant operation	Dispersant application equipment and trained personnel are available from the AMOSC stockpile and Core Group; the AMSA National Plan stockpiles and NRT and the OSRL stockpiles and responders. Resourcing requirements for this strategy are outlined in VOGA Emergency Response Logistics Management Plan [VOG-7000-RH-0008] .
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 CTAF also used/monitored; and • aircraft also have to have Marine Radios which can also be utilised. As the owner of the FWADC, overall control will be via AMSA. Similarly, OSRL will be in overall control of their aircraft. Daily operations will be directed by the Operations Chief in consultation with AMSA, OSRL (if involved) and AMOSC. The Incident Commander remains in control of all incident response activities. Communications will be in accordance with the agreed communications plan. A JHA 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 CASA regulations. The Aerotech Liaison Officer is to confirm the serviceability and sign off aircraft sea survival equipment. This will be audited by AMSA 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 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).
Ongoing dispersant operations	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 50L per hectare with a swath width of 22m unless otherwise determined by test spray runs. The spray area will be determined by the movement of oil and as directed by the AAC in [insert spotter platform call sign]. When tasked, the spotter platform [insert helicopter or plane call sign, most likely to be CHC] will proceed to the target area and identify the target site. It will then call in [insert aircraft call sign(s) or aircraft type/Operator] and direct the dispersant attack. After spray is exhausted or endurance of aircraft is reached [insert Aircraft call sign(s)] will return for resupply.

Task	Guidance
	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; and • 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.
Volume of dispersant and number of aircraft required	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 planning purposes, application target volumes have been conservatively estimated based on oil spill modelling results and ITOPF Technical Information Paper 4. The number of days for the operation is based on the length of time that the oil remains dispersable.
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 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.

Task	Guidance
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. WA stockpiles will be accessed first while the need for interstate and international stockpiles is evaluated in the IAP process. All dispersants have been shown to be effective on Wandoo Crude. Stockpiles will need to be accessed for dispersant operations longer than five days or with more than one air tractor or if the OSRL aircraft is mobilised. Application rates may be varied if considered appropriate to ensure longevity of dispersant stockpiles.
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.
Effectiveness guidance for response strategy	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
Environmental Performance Standards	[OPEP-EPS-1.1] Conduct surface dispersant efficacy monitoring in accordance with the Vermilion Operational and Scientific Monitoring – Bridging Implementation Plan [VOG-1100-RG-0002] and OM4a: Surface Dispersant Effectiveness Monitoring (APPEA, 2021).

Table 3-6: Chemical dispersant minimum resource requirements aerial operations

Means/task	Outcomes	Minimum resources required for first 48 hours	Timeframe (on spill notification)	5 days	10 days	20 days
Air base support	Aircraft refuelling and dispersant loading facilities. Briefing facility for aviation operations teams.	Commercial air base close to Wandoo Platform, preferably Karratha Airport. Logistical support to sustain/ maintain aerial operations.	24 hours.	Commercial air base close to Wandoo Platform, preferably Karratha Airport. Logistical support to sustain/ maintain aerial operations.		
Dispersant stocks	Dispersant available at the air base for loading into the aircraft when needed over the period of the spill.	$10m^3$ within 36hrs	$10m^3$ within 36hrs	Up to $10m^3$ per day delivered by air tractor and/or OSRL aircraft.		
Spotter aircraft	For each sortie, a helicopter or fixed wing aircraft is able to accurately direct the air tractor pilot when apply dispersant.	2 x Trained spotters. 2 x Aerial platforms.	36 hours	2 x Trained spotters. 2 x Aerial platforms.		
Aerial application means	Dispersant rapidly applied to the thickest part of the slick at the rate of 1:20 (dispersant oil ratio).	2 x Air tractors ($3m^3$ capacity) – 2 sorties each within 36 hrs. Pilots for the same.	2 x Air tractors ($3m^3$ capacity) – 2 sorties each within 36 hrs. Pilots for the same	2 x Air tractors . Pilots for the same.		
Safety aircraft/ rescue vessels	For each sortie, a helicopter is available to be used for search and rescue.	Helicopter. Responding vessels.	36 hours	Helicopter. Responding vessels.		

3.2.2.2 *Marine Dispersant Operations*

Table 3-7: Marine dispersant application

Task	Guidance
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.	
Identify marine operating base	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 ER Logistics Management Plan for contractor details)
Source vessel	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 ER Logistics Management Plan for contractor details)
Dispersant stocks	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. Consult the OSR Capability Review [VOG-7000-RH-0009] for additional dispersant calculation and stockpile information.
Dispersant spray system	Logistics Chief to source an afedo dispersant spray system (Refer to ER Logistics Management Plan 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.
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.

Task	Guidance
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 100m 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 OSM-BIP. The Joint Industry Operational Monitoring Plan (OM4a): Surface Chemical Dispersant Fate and Effectiveness Assessment will be used to guide surface dispersant effectiveness monitoring.
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.
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.

Task	Guidance
Effectiveness guidance for response strategy	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 Dispersant 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

Table 3-8: Chemical dispersant minimum resource requirements marine operations

Means/ task	Outcomes	Minimum resources required for first 48 hours	Timeframe (on spill notification)	5 days	10 days	20 days
Marine operating base	Marine operating base that can accommodate vessel and crews is close to the response site.	Wharf space. Loading areas. Forward operating area.	36 hours.	Wharf space. Loading areas. Forward operating area.		
Dispersant stocks	Dispersant available at the marine base for loading when needed	2 m^3	2 m^3 available in 36 hours	2 m^3		
Marine delivery	Logistics to locate dispersant vessel and the dispersant spray system to mount a response for up to five days at sea.	2 x Work vessels suitable for the NWS. Crew and master for same.	1 x work vessel deployed to spill site 36 hours 2 x within 48 hrs	Available vessels suitable for the NWS. Crew and master for the same.		
Dispersant spray system	A system that can effectively and efficiently apply dispersant from IBCs on deck.	1 x Afedo spray set and ancillaries. 2 PAX to operate the same	1 x Afedo set within 36 hours on site.	1 x Afedo spray sets & ancillaries per vessel. 2 PAX to		

Means/ task	Outcomes	Minimum resources required for first 48 hours	Timeframe (on spill notification)	5 days	10 days	20 days
				operate the same		
Spotter aircraft	A helicopter or fixed wing is able to accurately direct the vessel operator where the oil is.	2 x Trained spotters. 1 x Aerial platforms. Pilot for same.	1 x within 36 hours on site.	2 x Trained spotters. 2 x Aerial platforms. Pilots for same.		

LEGEND: Resources required | Resources possibly required | Resources unlikely to be required

3.2.3 Mechanical Dispersion Strategy

Table 3-9: Mechanical dispersion operations

Task	Guidance
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 20m.
Secure offshore work vessel	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); and • 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.

Task	Guidance
Secure spotter aircraft	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.
Deploy vessels	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.
Develop waste management plan	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.
Incident action planning	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.
Effectiveness guidance for response strategy	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 3-10: Mechanical dispersion minimum resource requirements

Means/task	Outcomes	Minimum resources required for first 48 hours	Timeframe (on spill notification)	5 days	10 days	20 days
Vessel	Prop wash the spilled hydrocarbons. Enhancement of weathering process such as natural dispersion and dilution of oil into the water column.	Opportunistic offshore support vessel.	N/A	Opportunistic offshore support vessel/s.		
Fire hose	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.	Working fire monitor/spray system. Crew to operate.	N/A.	Working fire monitor/spray system. Crew to operate.		

LEGEND:	Resources required	Resources possibly required	Resources unlikely to be required

3.2.4 Containment and Recovery Strategy

Table 3-11: Containment and recovery operations

<table>
<tr><th>Task</th><th>Guidance</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>BER is a limiting factor of effective containment and recovery operations. An estimation of the resources required and potential volume of oil able to be recovered for Category A and C spills is provided in the OSR Capability Review [VOG-7000-RH-0009].
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>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 two offshore work vessels or a vessel from AMSNOR based in Dampier. 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 skimmers (i.e. GT-185 and Desmi 250), as well as temporary waste storage.</td></tr>
</table>

Task	Guidance
	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 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. Ongoing response efforts may require the mobilisation of equipment from interstate stockpiles. Specifications regarding the type of booms, skimmers and waste storage required are described in the OSR Capability Review [VOG-7000-RH-0009].
Mobilise trained equipment operators	Logistics Chief to source people with experience and training operating equipment from marine vessels from: • AMSNOR • AMOSC core group members • AMSA NRT • WA DTMI State Response Team. Logistics Chief to ensure that personnel forms and information is completed and forwarded to the Finance Chief for cost tracking. This equipment will only be deployed and retrieved by trained personnel such as those available through AMSNOR, the AMOSC Core Group, AMSA NRT, DTMI State Response Team or OSRL. Standard Operating Procedures are available in the AMSA OSR OH&S Manual.
Spotter plane to direct operations	Logistics Chief to activate a helicopter or fixed wing 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.

Task	Guidance
Secure trained personnel	This equipment will only be deployed and retrieved by trained personnel such as those available through AMSNOR, the AMOSC Core Group, AMSA NRT DTMI State Response Team or OSRL. Standard Operating Procedures are available in the AMSA OSR OH&S Manual.
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.
Develop waste storage and transport plan	Logistics Chief in consultation with Planning Chief activates temporary waste storage capacity held by Toll (IBCs through ToxFree) 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.
Incident action planning	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.
Effectiveness guidance for response strategy	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.

Task	Guidance
	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 3-12: Containment and recovery minimum resource requirements

Means/task	Outcomes	Minimum resources required for first 48 hours	Timeframe (on spill notification)	5 days	10 days	20 days
Two vessel booming tasking (U sweep or V sweep) and/or NOFI current buster						
Marine operating base	Marine operating base that can accommodate vessel and crews is close to the response site.	Wharf space. Loading areas. Forward operating area.	48 hours.	Wharf space. Loading areas. Forward operating area.		
Booming systems	A system that can effectively and efficiently corral oil offshore.	3 x 400m ro-booms (or similar). NOFI current buster	48 hours to marine operating base	3 x 400m ro-booms (or similar). NOFI current buster		
Recovery systems	High-capacity skimmers that can recover both fresh and weathered crudes.	3 x Active weir skimmer recovery systems or similar.	48 hours to marine operating base	3 x Active weir skimmer recovery systems or similar.		
Waste storage	50m^3 of on-board or towable storage	Varying capacities of IBCs, totalling 50m^3, or other suitable combined storage, e.g. towable storage barges.	48 hours to marine operating base	Varying capacities of IBCs, totalling 50m^3, or other suitable combined storage, e.g. towable storage barges.		

Means/task	Outcomes	Minimum resources required for first 48 hours	Timeframe (on spill notification)	5 days	10 days	20 days
Spotter aircraft	A fixed wing or helo is able to accurately direct the vessel operator where the oil is.	1 x Trained spotter. 1 x Aerial platform. Pilot for the same.	48 hours	1 x Trained spotter. 1 x Aerial platform. Pilot for the same.		
Marine delivery	Vessels that can store up to 50m^3 of oil/water waste, skimmer system and 4 tonnes bollard pull. Vessel to lead the boom operation, 4 tonne bollard pull.	3 x Work vessels suitable for the NWS. Crew (7 for boom deployment and recovery, oil storage and transfer management) and master for the same.	48 hours on site	Available vessels suitable for the NWS. Crew (7 for boom deployment and recovery, oil storage and transfer management) and master for the same.		
Single vessel side sweep operation and/or NOFI current buster						
Marine operating base	Marine operating base that can accommodate vessel and crews is close to the response site.	Wharf space. Loading areas. Forward operating area.	48 hours.	Wharf space. Loading areas. Forward operating area.		
Booming systems	A system that can effectively and efficiently corral oil offshore.	Side sweep boom such as Troilboom solid buoyancy sweeping boom with outrigger and collection point. NOFI current buster 5 x Crew to operate the system.	48 hours to marine operating base	Side sweep boom such as Troilboom solid buoyancy sweeping boom with outrigger and collection point. NOFI current buster 5 x Crew to operate the system.		

Means/task	Outcomes	Minimum resources required for first 48 hours	Timeframe (on spill notification)	5 days	10 days	20 days
Recovery systems	High-capacity skimmers that can recover both fresh and weathered crudes.	1 x Active weir skimmer recovery system or similar, e.g. GT1852 x Crew to operate the system.	48 hours to marine operating base	1 x Active weir skimmer recovery system or similar, e.g. GT1852 x Crew to operate the system.		
Waste collection, storage and transport	50m^3 of on-board or towable storage	50m^3 IBCs, or on-board storage tanks, or towable storage barges.	48 hours to marine operating base	50m^3 IBCs, or on-board storage tanks, or towable storage barges.		
Spotter aircraft	A fixed wing or helo is able to accurately direct the vessel operator where the oil is.	1 x Trained spotter. 1 x Aerial platform. Pilots for the same.	48 hours on site	1 x Trained spotter. 1 x Aerial platform. Pilots for the same.		
Marine delivery	Vessel that can carry 50m^3 of oil/water waste, skimmer system, and effectively 4 tonnes bollard pull.	1 x Large work vessel and one tender or smaller work vessel to assist with recovery operations. Crew and master for same.	48 hours on site	1 x Large work vessel and one tender or smaller work vessel to assist with recovery operations. Crew and master for same.		

LEGEND:	Resources required	Resources possibly required	Resources unlikely to be required

3.2.5 Protection and Deflection Strategy

Table 3-13: Protection and deflection operations

Task	Guidance
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 Tactical Response Plans from other titleholders for priority shorelines

Task	Guidance
Determine and source resources required and booming configuration	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 of available Tactical Response Plans as guidance. Logistics Chief to source booms and skimmers (if being used to recover oil) from AMOSC stockpiles and the AMSA National Plan stockpiles. 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. 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 the DoT State Response Team. 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.
Induction	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.
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.
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

Task	Guidance
	• hazardous wildlife.
Incident action planning	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 protection and deflection operations.
Effectiveness guidance for response strategy	• 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 3-14: Protection and deflection minimum resource requirements

Means/task	Outcomes	Minimum resources required for first 48 hours	Timeframe (on spill notification)	5 days	10 days	20 days
Landside (based on one team, resources will need to be scaled up for additional teams)						
Marine vessels	Marine vessel(s) capable of carrying crew and spill equipment to remote islands. Capable of logistics support/accommodation for 10 POB, crew, accessing remote islands.	Aluminium catamarans and/or flat bottom boats.	48 hours on site	4 x Aluminium catamarans and/or flat bottom boats.	4 x Aluminium catamarans and/or flat bottom boats.	
Crew	Crew capable of securing booms.	1 x Trained operator/Team Leader. 4 x Labourers.	48 hours on site	4 x Trained operators/ Team Leaders. 16 x Labourers.	4 x Trained operators/ Team Leaders. 16 x Labourers.	
Booming systems	A system that can effectively and efficiently direct or prevent the movement of oil.	Various lengths of land/sea boom, shoreline protection booms, sorbent booms.	48 hours on site	Various lengths of land/sea boom, shoreline protection booms, sorbent booms.	Various lengths of land/sea boom, shoreline protection booms, sorbent booms.	
Marine support						

Means/task	Outcomes	Minimum resources required for first 48 hours	Timeframe (on spill notification)	5 days	10 days	20 days
Vessel	Vessel capable of assisting land-side crews to secure booms in waterways and in the shallow seas.	1 x Shallow draft work boat. Operational crew for same.	48 hours on site	4 x Shallow draft work boat. Operational crew for same.	4 x Shallow draft work boats. Operational crew for same.	
Crew	Crew capable of securing booms.	1 x Trained Operator/Team Leader. 2 x Labourers on-board.	48 hours on site	2 x Trained Operators/ Team Leaders. 4 x Labourers on-board.	2 x Trained Operators/ Team Leaders. 4 x Labourers on-board.	
Booming systems	A system that can effectively and efficiently direct or prevent the movement of oil.	Various lengths of land/sea boom, shoreline protection booms, sorbent booms. Crew to operate the system.	48 hours on site	Various lengths of land/sea boom, shoreline protection booms, sorbent booms. Crew to operate the system	Various lengths of land/sea boom, shoreline protection booms, sorbent booms. Crew to operate the system	

LEGEND:	Resources required	Resources possibly required	Resources unlikely to be required

3.2.6 Shoreline Clean-up Strategy

Table 3-15: Shoreline clean-up operations

Task	Guidance
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. *Generally manual removal of oil from shorelines is not feasible at concentrations less than 100g/m^2 and intervention is likely to result in a negative net environmental benefit.*	
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.
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, 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 SIMA 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.

Task	Guidance
	In undertaking this three-step process, VOGA contractors, employees and support agencies will work to effectively and efficiently clean shorelines where possible. A number of technical guidance notes exist for shoreline assessment and clean-up operations. These include the Environment Canada SCAT Guidelines (2007), the UK SCAT Manual (2004), and the WA DTMI Oiled Shoreline Field Book.
Deploy shoreline clean-up teams	Deploy 6 shoreline clean up teams by Day 4 to priority coastline sections verified by the OM6 SCAT survey, SIMA and OSTM analyses. One trained shoreline team leader and ten shoreline clean up workers per team.
Logistics	Logistics Chief activate resources in Logistics Management Plan [VOG-7000-RH-0008]. 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.
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.
Equipment	Cleaning equipment, decontamination set. The type and amount of equipment required for shoreline clean-up will depend on the technique used) and operational constraints such as access to the shoreline and weather conditions. Equipment held in the State stockpiles (DTMI) is suitable for shoreline clean-up activities as well as the equipment held in AMOSC and AMSA stockpiles. Additional resources can be accessed from OSRL.
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

Task	Guidance
	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.
Waste collection and transport	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.
Incident action planning	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.
Effectiveness guidance for response strategy	• 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.
Environmental Performance Standards	[OPEP-EPS-2.1] Methods and techniques employed for shoreline clean-up operations will be based on the information provided by the SCAT teams and in consultation with DTMI representatives. [OPEP-EPS-2.2] All shoreline clean-up sites will be zoned and marked before clean-up operations commence to minimise secondary contamination and minimise the mixing of clean and oiled sediment and shoreline substrates. [OPEP-EPS-2.3] Shoreline clean-up sites will be appropriately mapped with clear restricted zones for sensitive habitat areas and no access zones for vehicle and personnel movement. Zoning will consider sensitive vegetation, bird nesting/ roosting areas and turtle nesting habitat.

Table 3-16: Shoreline clean-up minimum resource requirements

Means/ task	Outcomes	Minimum resources required for first 48 hours	Timeframe (on spill notification)	5 days	10 days	20 days
Induction	Shoreline teams are informed of how to minimise damage to flora and avoid encounters with fauna.	1 x Trainer.	72 hours on site	1 x Trainer.		
Manual shoreline clean-up activities	Floating oil close to shore collected and pooled bulk oil removed. Stranded oil removed. Cleanup of light oil contamination (polishing phase).	6 team leaders and 60 clean-up workers (66 people) sourced and mobilised to forward operating base.	3 shoreline clean-up teams (30 workers and 3 team leaders) mobilised and on site for induction within 72 hours	6 shoreline clean-up teams on site (66 people – 1 trained team leader, 10 workers per team).		6 shoreline clean-up teams on site (66 people – 1 trained team leader, 10 workers per team).
Logistics	Crews are safe, fed, in contact with other parts of the response and watered.	Mobilisation of PPE, food, water, shelter, communications network.	72 hours on site.	PPE, food, water, shelter, communications network. Amenities for 88 pax.		PPE, food, water, shelter, communications network. Amenities for 1,100 pax.
Marine vessels	Marine vessel(s) capable of carrying crew and spill equipment to remote islands.	Marine vessels.	72 hours on site	6 x Marine vessels to support transport of personnel, equipment and ammenities. 3 x marine vessels capable of accomodating shoreline. clean-up teams working at priority island locations.		6 x Marine vessels to support transport of personnel, equipment and ammenities. 3 x marine vessels capable of accomodating shoreline. clean-up teams working at priority island locations.
Equipment	Cleaning equipment and decontamination set selected according to	20 x shoreline clean-up kits made up of shovels, plastic bags, rakes, buckets, wheelbarrows.	72 hours on site	40 x shoreline clean-up kits made up of shovels, plastic bags (20kg		40 x shoreline clean-up kits made up of shovels, plastic bags (20kg capacity), rakes,

Means/ task	Outcomes	Minimum resources required for first 48 hours	Timeframe (on spill notification)	5 days	10 days	20 days
	suitablity for clean-up task and shoreline type.	Decon kit.		capacity), rakes, buckets, wheelbarrows and PPE. 2 x decontamination stations (1 per operational zone) 3 x skid steers. 6 x 4WD vehicles (1 per team leader).		buckets, wheelbarrows and PPE. 2 x decontamination stations (1 per operational zone) 3 x skid steers. 6 x 4WD vehicles (1 per team leader).
Booming systems	A system that can effectively and efficiently direct or prevent the movement of oil.	Various lengths of land/sea boom, shoreline protection booms, sorbent booms. Crew to operate the system.	48 hours on site.	Various lengths of land/sea boom, shoreline protection booms, sorbent booms. Crew to operate the system.		Various lengths of land/sea boom, shoreline protection booms, sorbent booms. Crew to operate the system.
Waste collection, storage and transport	Short and long term waste collection.	Temporary waste storage capability activated.	48 hours to marine operating base	Temporary waste storage on site and longer term waste storage options.		Temporary waste storage on site and longer term waste storage options.

LEGEND:	Resources required	Resources possibly required	Resources unlikely to be required

3.2.7 Oiled Wildlife Response

Table 3-17: Oiled Wildlife Response

Task	Guidance
Activate WAOWRP	Call the DBCA State Duty Officer on telephone **(08) 9219 9108.** The DBCA State Duty Officer will notify an 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.
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 to the wildlife assets at risk	Wildlife Division Coordinator to undertake. Use WAOWRP to identify wildlife assets at risk, cross reference with wildlife information contained in NEBA..
Liaise with Oiled Wildlife Advisor	Wildlife Division Coordinator to liaise with OWA.
Activate first strike response kits	Wildlife Division Coordinator and OWA discuss get approval from IC. First strike kits are portable and contain equipment to allow stabilisation of wildlife before triage and possible treatment at an oiled wildlife facility.
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. Depending on OSM-BIP activations this task could be undertaken by teams implementing OM5 – Marine Fauna Surveillance.
Develop wildlife sub-plan for the IAP based on WAOWRP procedures.	Transition to response cycle and procedures in WAOWRP for OWR activities based on the spill scenario.
Environmental Performance Standards	[OPEP-EPS-3.1] 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 3-18: OWR minimum resources

Means/task	Outcomes	Minimum resources required for first 48 hours	Timeframe (on spill notification)	5 days	10 days	20 days
Wildlife first strike response	WAOWRP is activated.	N/A – activation task only	Within 24 hours	N/A – activation task only	N/A – activation task only	N/A – activation task only
	OWA and Wildlife Division Coordinator are activated and assigned to the ICT.	1 x OWA. 1 x OWR Division Coordinator.	Once WAOWRP is activated.	N/A – activation task only	N/A – activation task only	N/A – activation task only
Mobilisation of resources	First strike response kits are mobilised to staging areas	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.	Within 48 hours.	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.	2 x OWR containers from Dampier (AMSA) and Fremantle (AMOSC).	Within 48 hours.	2 x OWR containers	N/A – containers deployed	N/A – containers deployed
Wildlife reconnaissance	Situational awareness regarding wildlife that has been oiled and wildlife present within the path of the spill trajectory is gained.	1 x aerial observation over extent of predicted trajectory requires 1 x aircraft.	Concurrently with MES and SCAT tasks. Wildlife specific reconnaissance within 48 hours.	Aerial based survey: 1 x aerial observation over extent of predicted trajectory requires 1 x aircraft Boat based survey: 1 x small vessel (<12m length) 1 x boat driver; 2 x crew Shoreline survey: 2 x Quad motorbike or 4WD vehicle; 4 x survey crew.		
IAP wildlife sub-plan development	Future OWR activities arrangement developed based on the spill scenario.	1 x OWR Advisor; 1 x OWR Planning officer; 1 x OWR Division Coordinator.	Within 48 hours.	To be determined according to WAOWRP procedures.		

LEGEND:	Resources required	Resources possibly required	Resources unlikely to be required

4 Termination and Recovery

4.1 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 clean-up 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 termination criteria are met then the response strategy ceases. Table 4-1 presents termination criteria that can be used in the spill response planning process (IAP process). Shoreline clean-up termination criteria are explained in more detail separately because of the complexity that maybe present in a shoreline response (Table 4-2).

Table 4-1: Termination criteria

OSR strategy	Termination criteria for each OSR strategy
Monitoring, evaluation and surveillance	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 10g/m^2 surface oil, 100ppb entrained oil and 50ppb dissolved aromatic hydrocarbons. When MES undertaken to evaluate effectiveness of response strategies is no longer required.
Chemical dispersion	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) or • hazard controls put in place are not achievable.
Containment and recover	Weir skimmers are recovering <10% hydrocarbon by volume, oleophilic skimmers are recovering <50% hydrocarbon by volume, entrapment in booms is no longer effective, or the observed trajectory of the oil indicates that it is heading away from sensitive receptors.
Mechanical dispersion	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.
Protect and deflect	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.
Shoreline clean-up	Termination criteria for shoreline clean-up activities is site dependant and will be based on scientific advice that suggests further clean-up activities are unlikely to materially decrease lasting hydrocarbon impacts on environmental sensitivities. Termination points are likely to be selected based on the general clean-up objectives, which are to: • minimise exposure hazards for human health; • speed recovery of impacted areas if possible; and • reduce the threat of additional or prolonged natural resource impacts. Table 4-2 provides some examples of how shoreline clean-up termination points can be described. WA shorelines are within the jurisdiction of the WA State Government, the decision to cease shoreline clean-up will be made with advice from the WA DTMI to take into account the State ESC position. Shoreline clean-up activities will cease if a safe working environment is not present for responders.
Oiled Wildlife	Termination criteria for oiled wildlfie response is dependent on the incident and will be based on the termination criteria descirbed in the WAOWRP.

4.1.1 Shoreline Termination Criteria

Due to the site and spill specific nature of shoreline clean-up, 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 clean-up are likely to be selected based on the general clean-up 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 clean-up strategies and end points that do not cause more harm to the environment than good (Oil Spill Response, 2011).

Ideally, clean-up efforts will return the resource to its baseline condition without suffering further impact or affecting other resources. Aggressive and inappropriate clean-up techniques can make matters worse. Less intrusive methods or natural recovery are often preferable. The best clean-up 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 clean-up, 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 clean-up:

- Guide the Operations Section in conducting specific clean-up methods to minimise adverse environmental impact (best management practices)
- Provide the Operations Section with environmental and safety constraints on conducting clean-up activities in specific habitats
- Develop spill-specific clean-up objectives, guidelines and termination points. This will require input from the State ESC because the DTMI is the Controlling Agency and Jurisdictional Authority for OSR in State waters. Examples for shoreline clean-up that may be used as the basis for developing the spill-specific clean-up termination points with the State ESC are described in Table 4-2
- Identify time-critical and degree-of-use issues to be combined with clean-up 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 4-2: Shoreline clean-up 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 areas, wildlife, or human health	• This termination point is used where sheening persists after clean-up efforts become ineffective, or on sensitive habitats where further clean-up 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 clean-up 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 clean-up 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.

4.2 Stakeholder Engagement in Termination

Community and stakeholder 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.

4.3 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.

5 ICT Arrangements

5.1 ICT Personnel

Arrangements and plan for full scale activation of ICT resources is provided in Table 5-1. 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, Planning Chief is responsible for reviewing and adjusting the activation plan in Table 5-1.

Key assumptions of the activation plan are:

- The ICT will run for 14-16 hours a day for up to 10 days before transitioning to a sustainable model as defined by the planning team.
- 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 has current competence training in PMAOMIR418 and oil spill response to undertake their role.
  - the Planning/Logistics/Operations Sections Chiefs has 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 5-1 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 an oil spill event is leveraged off the detailed planning in OPP 2, 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 as per Table 5-1. 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 onsite 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:

- 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 Officers
- 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 5-1 through their response structure; this includes WA DTMI.

Table 5-2 provides a minimum resource and competency requirements by source to enable the resource plan in Table 5-1 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 Table 5-2. Should situations arise where Table 5-2 cannot be achieved a 'recordable' incident will be raised and will trigger review of operational activities to manage changes in risk profile.

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 (EPG) and AMSA for the release of designated personnel for oil spill response 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.

5.2 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 break out 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 will be located as close as possible to the spill site, the City of Karratha Local Emergency Management Committee will be engaged to assist in locating a suitable site.

In addition, depending on spill size a forward operating post may be established. The most likely location will be at the supply base near the Port of Dampier. VOGA have arrangements in place with TOLL to provide forward base and logistical services in Dampier in the event of an oil spill.

5.3 ICT Resources and Activation Plan

Table 5-1 ICT Resources and activation plan

ICT Team	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	1	2	2
IC	Incident Commander	Maintain control responsibilities for the incident response Provide professional oil spill response command to the IMT Approve IAP and where required engage State Maritime Environmental Emergency Coordinator/ DoT 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	1	1	2	2
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 stakeholders 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	1	2	2
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

ICT Team	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	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, performance standards and objectives of the VOGA Wandoo Field OSCP.	Full competence overlaps between day-to-day role and response role	PMAOMIR322 + OSR Training	AMOSC Staff	Within 24 hours	1	1	1	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	10	10	10
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	1	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	1	2	2
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

ICT Team	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 (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	1	1	2	2
Planning	Environment Unit (Lead)	Manage scientific monitoring activities and any required oiled wildlife response. Conducts nett 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 yrs. experience in environmental management; PMAOMIR322 or IMO 2; Unit - Nil (as per contract)	EUL – VOGA local or consultant	EUL - within 24 hours	1	1	1	2	2
Planning	Environment Unit	Manage scientific monitoring activities and any required oiled wildlife response. Conducts nett 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	Contracted in expertise	Bachelor's degree in environmental management/ science; > 5 yrs. experience in environmental management	Contractor/Consultants	Within 48 hours	0	3	5	5	5
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	1	2	2

ICT Team	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	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	1	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 meal times 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	2	2	2
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	2	2	2
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	2	2	2
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	2	2	2
Operations	Operations Chief	Implement appropriate oil spill response 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 DoT 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	1	2	2

ICT Team	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	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	8
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	1	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	1	2	2	4	4
Operations	Waste Management Unit	Work with State Control Agency to support oil spill waste management (DTMI & DER)	Full competence overlaps between day-to-day role and response role	Nil	AMOSC Core Group	Within 48 hours	0	0	2	2	2
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	1	2	2
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	0	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 5-2 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**	**4**	**8**	**8**	**8**	**1**	**3**	**7**	**14**	**14**					
As directed by DTMI						0	4	8	8	8	-	-	-	-	-					
Aviation Unit						-	-	-	-	-	1	2	2	4	4					
Marine Unit						-	-	-	-	-	0	0	4	8	8					
Shoreline Unit						-	-	-	-	-	0	1	1	2	2					
AMOSC Staff (total)	**1**	**2**	**3**	**4**	**4**						**1**	**1**	**2**	**2**	**2**					
Liaison Officer (Industry)	1	1	1	2	2						1	1	2	2	2					
Wildlife Unit	0	1	2	2	2															
Consultants (total)	**0**	**5**	**9**	**9**	**9**															
Environment Unit	0	3	5	5	5															
Monitoring Coordination Team	0	2	4	4	4															
Contractor (total)	**0**	**3**	**7**	**8**	**8**															
Communications Unit	0	1	2	2	2															
Consultation Unit	0	1	1	2	2															
Public Information Officer	0	1	2	2	2															
Waste Management Unit	0	0	2	2	2															
Labour Hire (total)	**0**	**0**	**10**	**10**	**10**															
Administration Unit	0	0	10	10	10															
VOGA Local (total)											**7**	**11**	**11**	**17**	**17**	**1**	**1**	**1**	**2**	**2**
As directed by DTMI											0	3	3	3	3	-	-	-	-	-
Environment Unit Lead											1	1	1	2	2	-	-	-	-	-
Incident Commander											-	-	-	-	-	1	1	1	2	2
Logistics Chief											1	1	1	2	2	-	-	-	-	-
Operations Chief											1	1	1	2	2	-	-	-	-	-
Planning Chief											1	1	1	2	2	-	-	-	-	-
Safety Officer											1	1	1	2	2	-	-	-	-	-
Stakeholder Liaison Officer											1	1	1	2	2	-	-	-	-	-
Situation Unit (Day)											1	2	2	2	2	-	-	-	-	-
VOGA Local, Contractors (total)	**1**	**7**	**13**	**14**	**14**															
Administration Unit	1	2	4	4	4															
Communications Unit	0	1	1	2	2															
Procurement Unit	0	1	2	2	2															
Resource Unit	0	1	2	2	2															
Services Unit	0	1	2	2	2															
Transport Unit	0	1	2	2	2															

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
VOGA Local, VOGA International (total)	**2**	**2**	**2**	**4**	**4**															
Finance Chief	1	1	1	2	2															
Finance Unit	1	1	1	2	2															
OSRL or AMOSC- Situation Unit (Night)	-	-	-	-	-	-	-	-	-	-	**0**	**2**	**2**	**2**	**2**	-	-	-	-	-
Grand Total	**4**	**19**	**44**	**49**	**49**	**0**	**4**	**8**	**8**	**8**	**9**	**15**	**21**	**35**	**33**	**1**	**1**	**1**	**2**	**2**

PART 6: Support Plans

6 Waste Management

6.1 Waste Management Strategy

The purpose of the strategy is to ensure during an oil spill response, 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].

6.2 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 one are:

- Assessment and decision making - determine the likely volume and types of waste likely to be collected
- Regulatory approvals - apply for DWER licence to operate temporary waste storage facility
- Refer to MEER WA Incident Management Plan: Marine Oil Pollution for guidance on waste management approval processes and management
- 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.

6.3 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 OSR Capability Review [VOG-7000-RH-0009]
- Decanting waste water 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 (refer to Section 7.5)
- 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)
- AMSA management and disposal of oily waste guidance note number 2017-06-NP-GUI15.

6.4 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.

As the temporary waste storage and treatment facilities will trigger the Category 61 thresholds within the *Environment Protection Act 1986*, a licence to operate will be required from the DWER for any storage or treatment of wastes. As Works Approvals and licences can only be prescribed to specific premises, and suitable premises may not be determined until a spill has eventuated, obtaining these formal approvals is not possible in advance.

Specific regulatory approvals required or potentially required are listed in Table 6-1.

Table 6-1: 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 lay-down area	DWER	1. Design of temporary lay-down area prepared for consultation with DWER, DTMI and DBCA. 2. VOGA apply for temporary license at time of incident. 3. Required works commence. 4. Application received, and advertised in prescribed manner. 5. DWER issue operating license 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.

6.5 Waste Practices

Waste will generally be associated from two clean-up locations:

- At sea response operations
- Shorelines.

Table 6-2 presents a summary of the type of waste generated from these two activaties.

Table 6-2: Summary of waste generated

Clean Up 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 - 20kg bags, drums, plastic sheeting etc. • PPE • Responders waste for habitation

Shoreline clean-up and containment and recovery are likely to develop significant volumes of waste. However, particularly for shoreline clean-up, 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 clean-up 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.

To reduce and manage the waste volumes during an incident, VOGA will follow, where appropriate and feasible, the work practices contained in Table 6-3.

Table 6-3: Waste minimisation work practices

Oil spill strategy	Waste minimisation work practice
Minimisation	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 and the AMSA Management and Disposal of Oil Spill Debris. • http://oilspillresponseproject.org/sites/default/files/uploads/JIP-17-Decanting.pdf • https://www.amsa.gov.au/sites/default/files/2017-06-np-gui015-management-disposal-oil-spill-debris.pdf Offshore and onshore – where practical access pre-impact and remove all flatsom 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.
Segregation	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.
At sea containment and recovery	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

Oil spill strategy	Waste minimisation work practice
	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.
Shoreline clean-up	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 clean-up of shorelines rather than multiple clean-ups. By applying this practice the bulking factor can be halved, however this practice can only be applied where SIMA process supports this. Waste storage on-site – utilising areas of natural containment. This practice can help even out surges in generation/collection of waste. 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.

6.6 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.

6.6.1 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.

6.6.2 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.

6.6.3 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.

6.6.4 Solid Wastes

While oil-contaminated sand, rocks and debris from mechanical and manual clean-up 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 clean-up 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 pick-up.

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.

6.6.5 Oily Organics

In conjunction with oil-contaminated sand, rocks and debris from mechanical and manual clean-up 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.

6.6.6 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 clean-up 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.

6.6.7 Oil Spill Equipment Clean-up

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. Re-useable equipment will be placed in skips and transported to the boom maintenance area for cleaning.

6.7 Waste Assessment

An assessment of waste estimates for containment and recovery and shoreline clean-up assumptions have guided VOGA to establish upper maximum waste volumes which have been planned for within this OSCP. 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.

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.

Waste recovery from open water and onshore will take a few 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.

7 Stakeholder Engagement

7.1 Stakeholders

Stakeholder 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 land owners 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.

7.2 Stakeholder Engagement Strategy

7.2.1 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 stakeholder 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 the stakeholders 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.

7.2.2 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.

7.2.3 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.

7.2.4 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
- Provide 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
- Provide information to media and engage influencers as required.

7.2.5 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.

The OSM BIP includes an appropriate tool for reporting and communicating the state of the environment to relevant stakeholders via environmental report cards. Environmental report cards are designed to provide a readily interpretable summary of the state of a range of environmental variables. They summarise environmental and biodiversity monitoring information, allowing trends in condition (states of the environment) to be easily identified. They inform incident response decisions based on changes to trend and condition and provide a clear consensus for management decisions.

Environmental report cards provide several positive reporting outcomes:

- Provide a template or structure for summarising and communicating trends in biodiversity and environmental values
- Communicate trends in values to managers and regulators in a simple, easy to interpret format
- Indicate the effectiveness of incident responses
- Allow a consensus interpretation of the data
- Provide an indication of the quality or reliability of the data.

7.2.6 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.

7.2.7 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, NGOs
  - 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.

7.2.8 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.

8 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.

Vermilion has developed the Operational and Scientific Monitoring Bridging Implementation Plan (OSM-BIP) (7715-650-ERP-0002) 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. 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 Facility Environment Plan [WPA-7000-YH-0007] (**Error! Reference source not found.**) and the Well Construction Environment Plan [WPA-7000-YH-0001].

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 8-1 lists the plans that are relevant to Vermilion's Wandoo Facility and Well Construction activities. Vermilion confirms that it has reviewed the aims and objectives of these relevant OMPs and SMPs, and determined that they are appropriate to meet the monitoring requirements of this activity, addressing potential impacts, risks and response 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 8-1: Joint Industry OSM Plans relevant to Wandoo Facility and Well Construction

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 Clean-up 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	✓

9 Health and Safety

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

Key resources providing OSR support are provided with OH&S information (including SDSs) 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 JHA to identify hazards, the risk rating associated with hazards and mitigation measures to ensure a safe work environment.

10 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. It is maintained as live document based on the resources identified and the Contractor Scope of Works in the OSR Capability Review [VOG-7000-RH-0009].

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 10-1: Structure of VOGA logistics planning

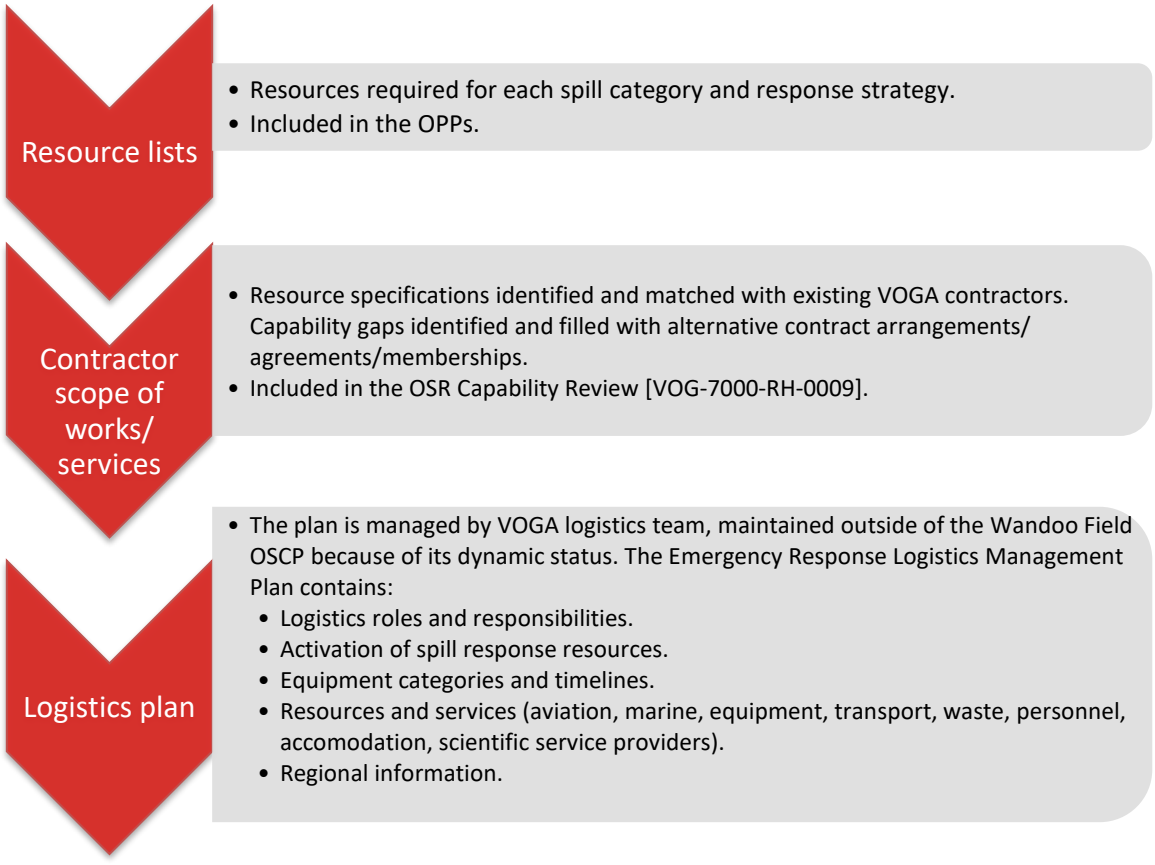


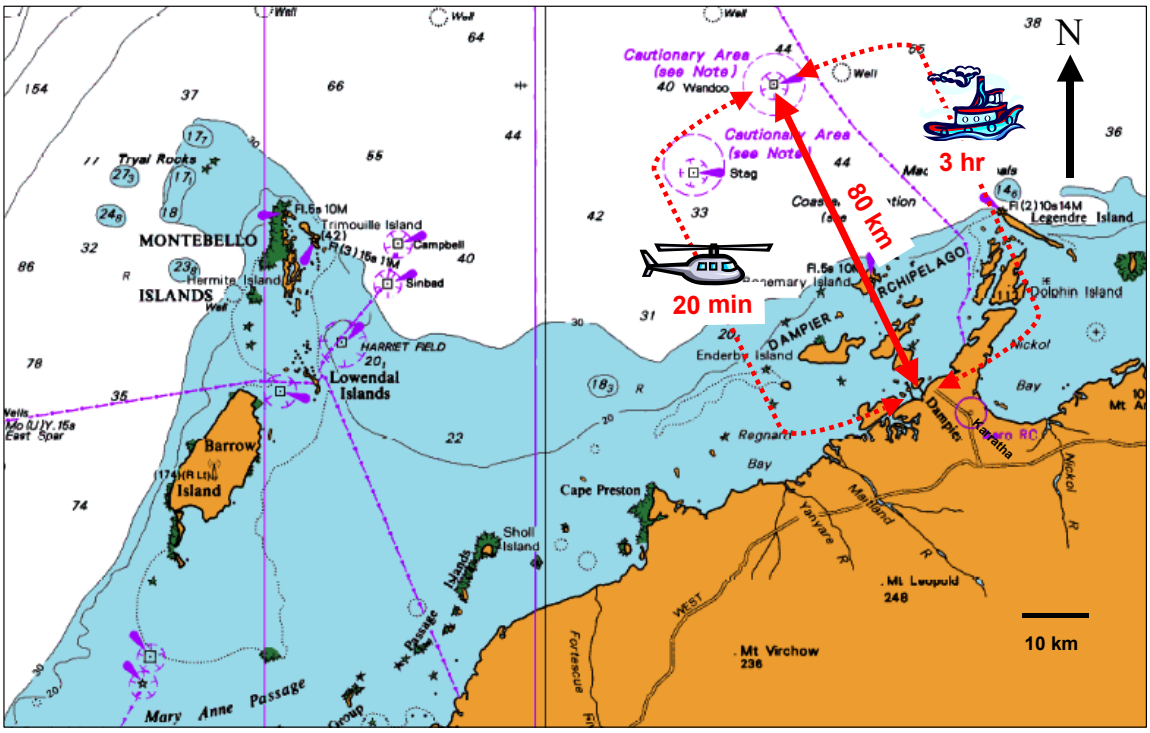
Table 10-1 provides approximate travel times by air and sea as well as distance in nautical miles between the Wandoo facilities and neighbouring locations. This information can be used to inform the aerial surveillance and aerial dispersant operations of travel times, distances and be used to estimate endurance out on site. Figure 10-2 depicts these travel times and distance on an image of a navigation chart.

Table 10-1: 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

Flying time based on S76 helicopter (@ 140 knots)

Figure 10-2: Distance and travel time to Wandoo facilities from Dampier



11 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 incident action plan will be implemented at a specific location. In contrast to the broader OSCP 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 Pilbra region released by WA DTMI (reference DOT307215, date Oct 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 (refer to Table 11-1). Each listed titleholder has indicated agreement to provision of the relevant TRPs upon request by VOGA at the time of an incident.

Table 11-1 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

12 References

AMSA (2013). Technical Guidelines for the Preparation of Marine Pollution Contingency Plans for Marine and Coastal Facilities. http://www.amsa.gov.au/forms-and-publications/Publications/AMSA413_Contingency_Planning_Guidelines.pdf

AMSA National Plan for Maritime Environmental Emergencies (National Plan).

Australian Emergency Management Institute (2012). Managing Exercises Handbook 3. Commonwealth Attorney General's Department.

Australian Fire and Emergency Service Authorities Council Limited (2013). AIIMS version 4. AFAC East Melbourne, Australia.

Australian Marine Oil Spill Plan (AMOS Plan), Australian Marine Oil Spill Centre.

Department of Conservation and Land Management (CALM). (1990). Dampier Archipelago Nature Reserves Management Plan 1990-2000, Management Plan No 18, Accessed 1 August 2012, www.dec.wa.gov.au/pdf/nature/management/dampier_archipelago.pdf.

Department of Environment and Conservation (DEC). (2007). Management Plan for the Montebello/Barrow Islands Marine Conservation Reserves 2007-2017, Management Plan No 55, Accessed 23 July 2012, https://www.dec.wa.gov.au/content/view/6973/2516/.

Department of Transport (DoT). Oil Spill Contingency Plan. Department of Transport, State Government of Western Australia.

Ecotox (2012). Ecotox Services of Australia, Toxicity Assessment of a Crude Oil from the Wandoo Platform 2012, Test Report, July 2012.

Emergency Management Act (2005) and regulations. State Government of Western Australia.

Environmental Protection and Biodiversity Conservation Act 1999 (EPBC Act). Commonwealth of Australia.

EPA (2011). EPA's Toxicity Testing of Dispersants, United States Environmental Protection Agency, USA, Viewed Online (29th November 2012) <http://www.epa.gov/bpspill/dispersants-testing.html#phase2>.

European Maritime Safety Agency (2010). *Manual on the Applicability of Oil Spill Dispersants*. Report accessed from http://www.google.com.au/url?sa=t&rct=j&q=&esrc=s&frm=1&source=web&cd=1&ved=0CCoQFjAA&url=http%3A%2F%2Fwww.emsa.europa.eu%2Fopr-documents%2Fdownload%2F1166%2F719%2F23.html&ei=xEAxU-TwIImqhAfeg4DACQ&usg=AFQjCNHuQMYjjAgMek-3m1Izn8RCG5D_Ug&bvm=bv.63587204,d.ZG4

ExxonMobil (2008). Oil Spill Dispersant Guidelines. Report accessed from http://www.crrc.unh.edu/sites/crrc.unh.edu/files/exxonmobil_dispersant_guidelines_2008.pdf

Fingas, M.F. (2000). *A Review of Literature Related to Oil Spill Dispersants Especially Relevant to Alaska.* Report prepared for the Prince William Sound Regional Citizens' Advisory Council. Prince William Sound Regional Citizens' Advisory Council, Anchorage, Alaska

Fingas, M.F. (2008). *A Review of Literature Related to Oil Spill Dispersants Especially Relevant to Alaska 2002-2008*. Prepared for Prince William Sound Regional Citizens Advisory Council Anchorage Alaska, Environment Canada.

Fingas, M.F. (2013). The Basics of Oil Spill Clean-up. CRC Press. Florida, United States of America.

IPIECA. (2015). A Guide to Oiled Shoreline Clean-up Techniques: Good practice guidelines for incident management and emergency response personnel.

International Convention for the Prevention of Pollution from Ships, 1973, International Maritime Organisation.

International Convention on Oil Pollution Preparedness Response and Cooperation 1990 (OPRC 1990). International Maritime Organisation.

International Tanker Owners Pollution Fund (ITOPF). (2013). Containment and Recovery http://www.itopf.com/spill-response/clean-up-and-response/containment-and-recovery/ accessed 28th February 2014.

Intertek Geotech (2012). An Assessment of Dispersion Efficacy on a Crude Oil: Professional Opinion. Prepared for Vermillion Oil and Gas Australia Pty Ltd.

NAS (2005). Understanding Oil Spill Dispersants: Efficacy and Effects. National Research Council of the National Academies, Washington DC.

Offshore Petroleum and Greenhouse Gas Storage Act 2006 and regulations (OPGGSA). Commonwealth of Australia.

Oil Spill Response (2011). Shoreline Operations Field Guide: A guide to operational and monitoring requirements for shoreline clean-up operations. Series number 8, December 2011.

Polaris Applied Science Inc. (2009). Guidelines and strategies for oil spill waste management in Arctic regions. Report prepared for Joint Secretariat Inuvialuit Renewable Resources Committees.

Pollution of Waters by Oil and Noxious Substances Act 1987 (POWBONS). State Government of Western Australia.

Port of Dampier Oil Spill Contingency Plan, Port of Dampier Corporation.

APASA (2012). Environmental Sensitivities Summary Wandoo B Production Facility, Unpublished report for Vermilion Oil & Gas Australia.

Source Control Contingency Plan (WNB-3000-PD-0007), Vermillion Oil & Gas Australia.

The Arctic SCAT Manual: A Field Guide to the Documentation of Oiled Shorelines in Arctic Environments. Environment Canada, Edmonton, AB, Canada. By Jon Moore Coastal Assessment, Liaison & Monitoring for UK Maritime & Coastguard Agency April 2007.

The UK SCAT Manual: Shoreline Clean-up Assessment Technique: A Field Guide to the Documentation of Oiled Shorelines in the UK. Adapted and reproduced from Owens, E.H. and Sergy, G.A. 2004.

VOGA's Personnel Selection, Placement and Competency Assurance Manual (VOG-1000-MN-0004).

Wandoo Facility ERP (VOG-2000-RD-0017), Vermillion Oil & Gas Australia.

Wandoo Field EP (WPA-7000-YH-0007), Vermillion Oil & Gas Australia.

Wandoo Well Construction EP (WPA-7000-YH-0001), Vermillion Oil & Gas Australia.

Western Australian Marine Oil Pollution Emergency Management Plan (WestPlan-MOP). Department of Transport, State Government of Western Australia.

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/m³	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**

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:		

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OPERATIONAL AND SCIENTIFIC MONITORING – BRIDGING IMPLEMENTATION PLAN

VOG-1100-RG-0002

(formerly titled Wandoo Field Operational and Scientific Monitoring Plan [WAN-2000-RD-0001.03])

Revision	Date	Originator	Checker	Approver
1	25/02/2026	Mandy Walker	Namek Jivan	Barry Goodin
		Oil Spill Response Coordinator	HSE Manager	Engineering Manager

Revision History

Revision	Date	Description	Originator	Checker	Approver
0	28/02/2025	Issued for Use	MW	SS	NB
1	25/02/2026	Updates for Well Construction and Wandoo Field Environment Plans	MW	NJ	BG

Distribution List

No.	Location	Title (if applicable)
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 Facility Environment Plan [WPA-7000-YH-0007] and the Well Construction Environment Plan [WPA-7000-YH-0001]	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).
Wandoo Field Oil Spill Contingency Plan (OSCP) [WAN-2000-RD-0001.01]	Provides the planning and preparedness elements of oil spill response for Vermilion's Wandoo Field and Well Construction activities. It includes detail on the Vermilion incident management process, approach to response planning, an overview of response strategies and performance management aspects.
Wandoo Field Oil Pollution Emergency Plan (OPEP) [WAN-2000-RD-0001.02]	Provides notification and activation requirements, detailed implementation guidance for individual response strategies and spill response support plans.
Vermilion Oil and Gas Australia Oil Spill Response Capability	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
Review [VOG-7000-RH-0009]	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 Facility Environment Plan [WPA-7000-YH-0007] and the Well Construction Environment Plan [WPA-7000-YH-0001]. 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 Facility Environment Plan [WPA-7000-YH-0007] and the Well Construction Environment Plan [WPA-7000-YH-0001] only. OSM requirements for new or revised Vermilion activities will be managed via a separate activity-specific OSM-BIP, or Vermilion will demonstrate via the EP that the activities OSM monitoring priorities and capability can be met by this OSM-BIP.

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

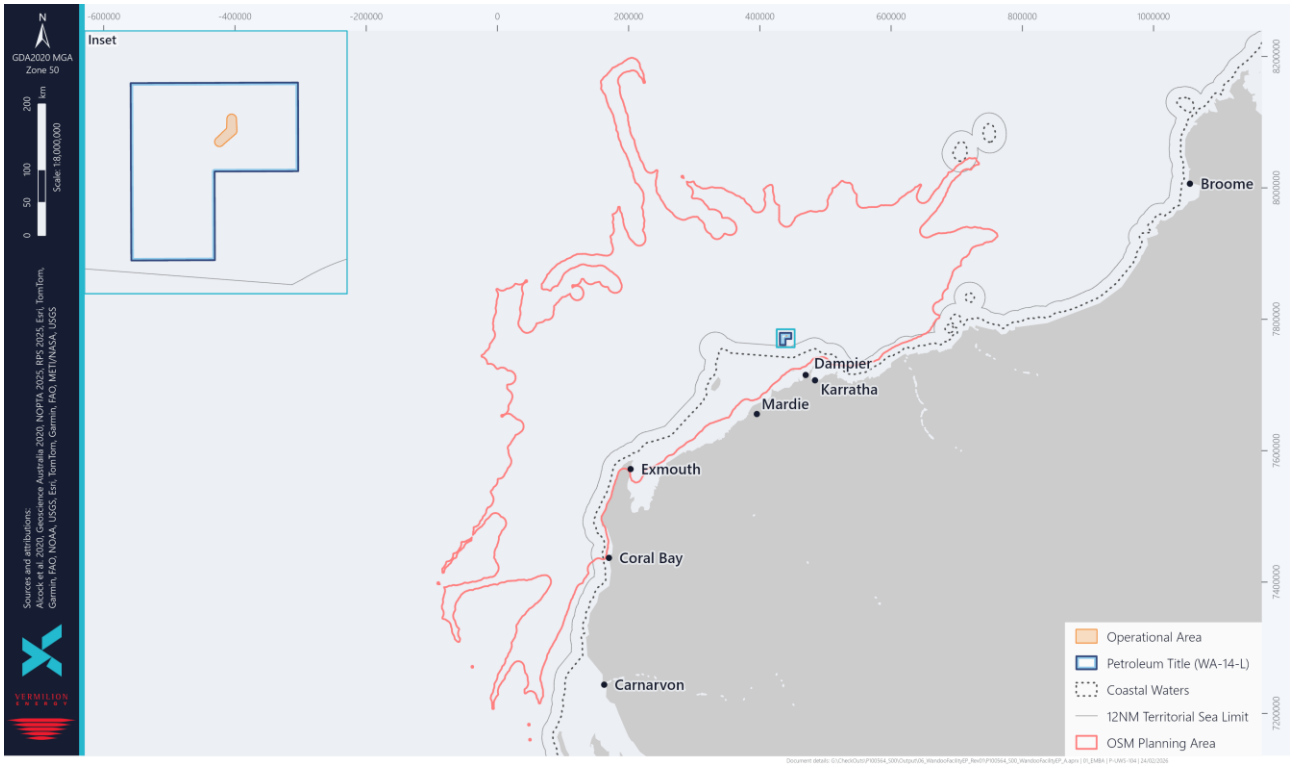
This OSM-BIP provides monitoring guidance and arrangements for Vermilion's activities referred to in Table 2-1. An OSM Planning Area has been prepared to represent these activities and the resultant geographical extent of this OSM-BIP (Figure 2-1). The OSM Planning Area is aligned to the Environment that May be Affected (referred to in the EPs) 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
- 100 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 all of Vermilion's activities listed in Table 2-1.

For a description of the environment within each EMBA/OSM Planning Area, refer to the activity-specific EPs listed in Table 2-1. 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 OSCP (Section 7.8.3.1).

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 Wandoo activities to identify these priority receptors.

Table 2-1 presents the 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.

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 3.6.9 of the Wandoo Well Construction EP [WPA-7000-YH-0001] and Section 4.6.9 of the Wandoo Facility EP [WPA-7000-YH-0007] describe all KEFs within the OSM Planning Area.

A number of KEFs are within 100 km of Vermilion's Operational Areas, so are at a higher risk of contact with hydrocarbons, including:

- Ancient coastline at 125 m depth contour (60 km NW)
- Glomar Shoals (45 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 3.4.3 of the Wandoo Well Construction EP [WPA-7000-YH-0001] and Section 4.4.3 of the Wandoo Facility EP [WPA-7000-YH-0007]. 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 8-1 and Table 4-3 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: Worst-case spill scenarios used to determine the planning area for operational and scientific monitoring

Environment Plan/OPEP	Hydrocarbon Type	Scenario	Release Duration	Volume (m^3)	Receptors predicted by stochastic modelling to be contacted ≥5 % probability within 14 days				
					Receptor	Floating	Shoreline	Entrained	Dissolved
Wandoo Facility Environment Plan [WPA-7000-YH-0007] and Wandoo Field Oil Spill Contingency Plan [WAN-2000-RD-0001]	Marine Diesel Oil (MDO)	Spill from Shaft 2	12 hours	2,200	Montebello AMP*	X	NA	Y	Y
					Montebello Islands MP	X	X	Y	X
					WA11.West (318) - Barrow Island and Montebello Islands (A) (Montebello Islands)	X	Y	X	X
					Gascoyne AMP*	X	NA	Y	X
					Muiron Islands MMA	X	X	Y	X
					WA11.West (329) - Locker Point - Baresand Point (Muiron Islands)	X	X	Y	X
					Ningaloo MP*	X	NA	Y	X
					Barrow Island MP	X	X	Y	X
					Lowendal Islands NR	X	X	Y	X
					Dailey Shoal*	X	NA	Y	X
					Glomar Shoal*	X	NA	Y	X
					Montebello Shoals*	X	NA	Y	X
					Ningaloo Reef*	X	NA	Y	X
					North West Reef*	X	NA	Y	X
					Otway Reef*	X	NA	Y	X
					Outrim Patches*	X	NA	Y	X
					Penguin Bank*	X	NA	Y	X
					Poivre Reef*	X	NA	Y	X

Environment Plan/OPEP	Hydrocarbon Type	Scenario	Release Duration	Volume (m^3)	Receptors predicted by stochastic modelling to be contacted ≥5 % probability within 14 days				
					Receptor	Floating	Shoreline	Entrained	Dissolved
					Rankin Bank*	X	NA	Y	X
					Ripple Shoals*	X	NA	Y	X
					Rosily Shoals*	X	NA	Y	X
					Tryal Rocks*	X	NA	Y	X
	Wandoo Crude	Loss of crude from export system	1 hour	300	Gascoyne AMP*	X	NA	Y	X
					Montebello AMP*	X	NA	Y	X
					WA11.West (318 & 319) - Barrow Island and Montebello Islands (A) (Montebello Islands)	X	Y	X	X
					Muiron Islands MMA	X	X	Y	X
					WA11.West (321) - Barrow Island and Montebello Islands (D) (Barrow Island)	X	Y	X	X
					Barrow Island MP	X	X	Y	X
					WA11.West (329) - Locker Point - Baresand Point (Muiron Islands)	X	Y	X	X
					WA11.West (328) - Hope Point - Locker Point (F) (Fly Island)	X	Y	X	X
					WA11.West (324) - Yardie Landing - Weld Island coast S (B) (Airlie Island)	X	X	Y	X
					Montebello Islands MP	X	X	Y	X
					Ningaloo MP*	X	NA	Y	X
					Montebello Shoals*	X	NA	Y	X

Environment Plan/OPEP	Hydrocarbon Type	Scenario	Release Duration	Volume (m^3)	Receptors predicted by stochastic modelling to be contacted ≥5 % probability within 14 days				
					Receptor	Floating	Shoreline	Entrained	Dissolved
					Outtrim Patches*	X	NA	Y	X
					Penguin Bank*	X	NA	Y	X
					Tryal Rocks*	X	NA	Y	X
Wandoo Well Construction Environment Plan [WPA-7000-YH-0001] and Wandoo Field Oil Spill Contingency Plan [WAN-2000-RD-0001]	MDO	Vessel collision	6 hours	300	WA11.West (318) - Barrow Island and Montebello Islands (A) (Montebello Islands)	X	Y	X	X
					Montebello AMP*	X	NA	Y	Y
					Gascoyne AMP*	X	NA	Y	X
					Montebello MP	X	X	Y	X
					Ningaloo MP*	X	X	Y	X
					Barrow Island MP	X	X	Y	X
					Lowendal Islands NR	X	X	Y	X
					Dailey Shoal*	X	X	Y	X
					Montebello Shoals*	X	X	Y	X
					Outtrim Patches*	X	X	Y	X
					Penguin Bank*	X	X	Y	X
					Poivre Reef*	X	X	Y	X
					Tryal Rocks*	X	X	Y	X

Legend	
NA	Not applicable
X	Not contacted by this hydrocarbon phase
*	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

Section 3 Baseline Information

Vermilion has access to a number of different baseline data sources that are relevant to the high-value receptors in the EMBA. These include the Vermilion protected matters data (including habitat/fauna information) and the following external data sources:

3.1 Data.gov.au

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

3.2 Australian Ocean Data Network

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

3.3 Western Australian Oil Spill Response Atlas

The Western Australian Oil Spill Response Atlas (OSRA) is a spatial database of environmental, logistical and oil spill response data. Using a geographical information system (GIS) platform, OSRA displays datasets collated from a range of custodians allowing decision makers to visualise environmental sensitivities and response considerations in a selected location. Oil spill trajectory modelling (OSTM) can be overlaid to assist in determining protection priorities, establishing suitable response strategies and identifying available resources for both contingency and incident planning. OSRA is managed by the Oil Spill Response Coordination unit within the DTMI Marine Safety 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. Knowing the extent, quality and suitability of existing baseline data is important in helping to prioritise the scientific monitoring response, as priority should be given to those locations and sensitive receptors where there is no or insufficient baseline.

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).

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 (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 and should be given a higher monitoring priority. 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:

Background historical information on the presence, distribution, seasonality, and if applicable, the reproductive state of the receptor (as outlined in

   a. Appendix C: Background Information for Key Sensitivities 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, 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.

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+
Montebello AMP*										
Gascoyne AMP*										
Barrow Island	Barrow Island Port	Barrow Island Port		Double Island	Flatback turtle					
					Green and hawksbill turtles					
					Sea snakes					
Ningaloo (State MP)					Turtles	Whale sharks				
					Sea snakes					
Lowendal Islands (Nature Reserve)			Mangroves at Varanus Isl.	Seabirds	Turtles at Varanus Isl.					
				Shorebirds	Sea snakes Turtles elsewhere					
Muiron Islands					Turtles					
					Sea snakes					
Montebello Islands				Wedge-tailed shearwater						

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+
				at Ah Chong Is						
Rankin Bank* and Glomar Shoals*			NA	NA						
Reefs Shoals and Banks (RSB)*			NA							

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

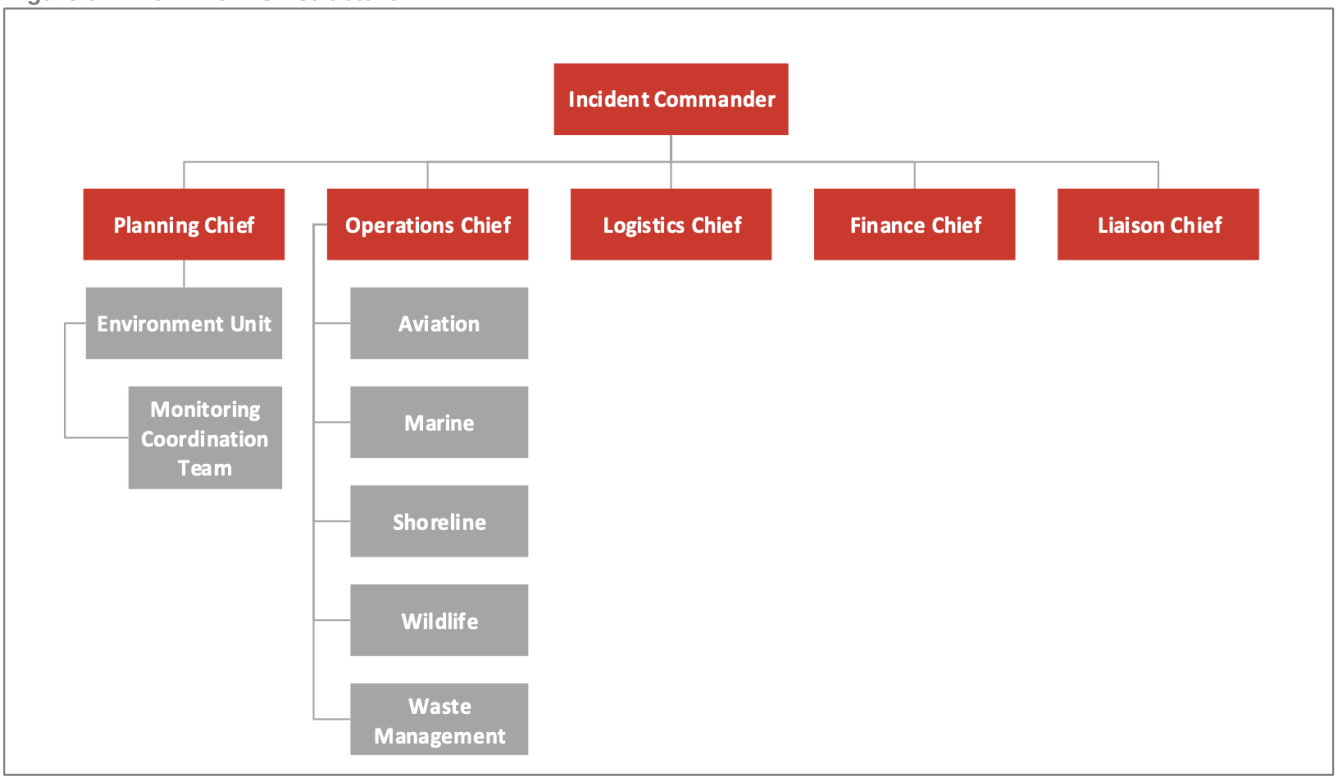
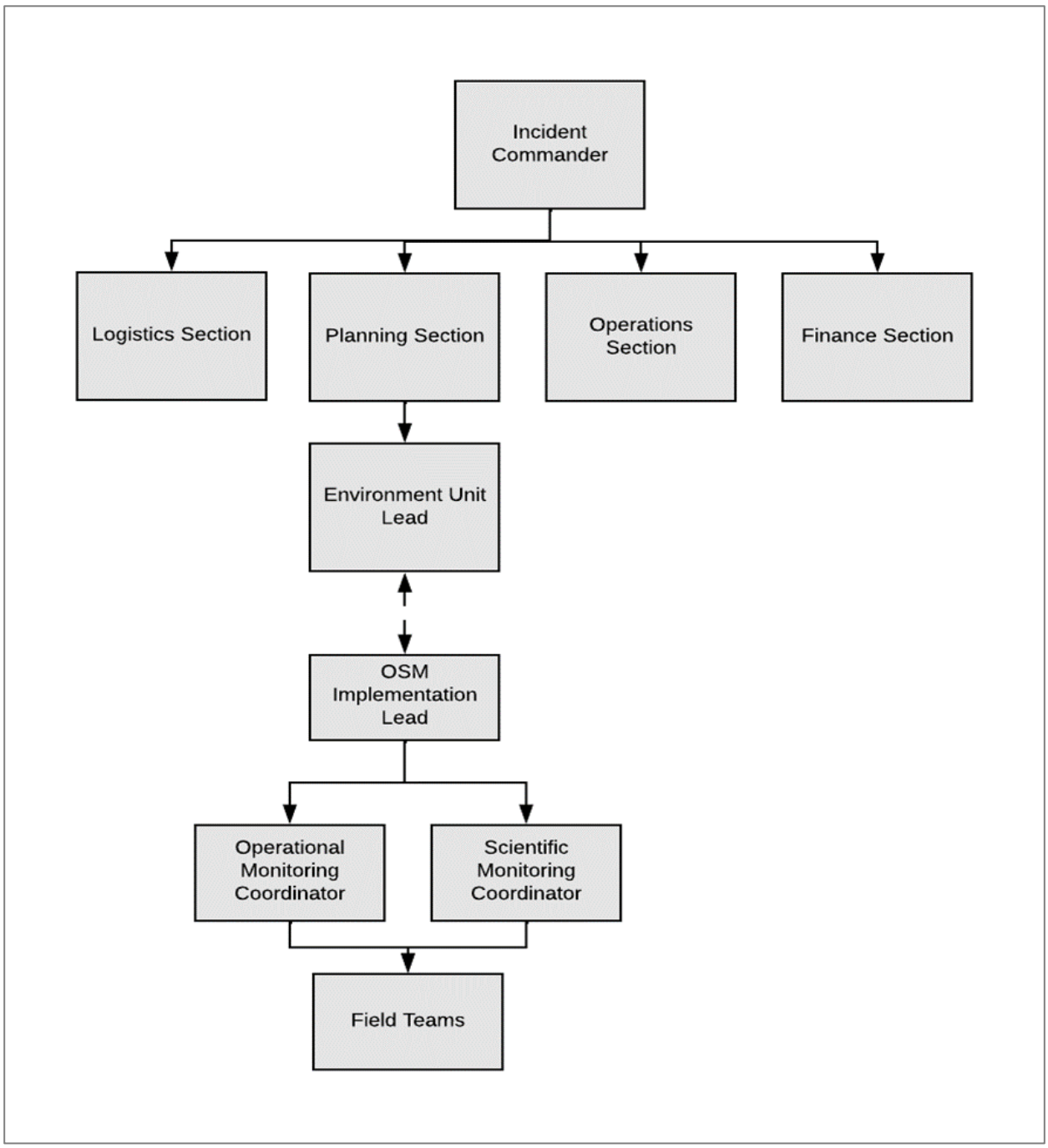


Figure 5-2: Vermilion ICT structure with OSM team



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 Vermilion Spill Response Capability Review [VOG-7000-RH-0009] details the response capability statements for all response strategies. The Wandoo Field Oil Pollution Emergency Plan (OPEP) [WAN-2000-RD-0001.02] 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 3-4 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 scenarios most likely to require the greatest initial and on-going capability were selected from those informing the OSM Planning Area. 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 300 m^3 release of Wandoo Crude from the export system over 1 hour and the 2,200 m^3 MDO release from Wandoo B Shaft 2 were 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 and time taken to collect samples for each SMP.

The monitoring units presented in Table 8-1 also include KEFs, BIAs and 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
Southern Pilbara	Southern Pilbara – Islands and Shoreline

Monitoring Unit	Receptors within Monitoring Unit
	(including Serrurier Island, Bessieres Island, Round Island) Muiron Islands Muiron Islands MP* Brewis Reef* Fairway Reef* Outtrim Patches* Rosily Shoals* Marine turtle BIAs Pygmy blue whale (distribution) BIA Humpback whale (migration) BIA Seabird and shorebird BIAs Dugong (breeding) BIA
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
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

8.2 Worst-case OSM Resourcing Requirements

OSM resourcing requirements were determined using stochastic modelling. Deterministic modelling was not undertaken, as the existing response capability arrangements (refer Section 9 and Section 10) provide sufficient capacity to meet or exceed the resourcing requirements for all receptors forecast to be contacted by floating, shoreline and/or dissolved hydrocarbons (at >5% probability) by stochastic modelling within the initial two weeks of the worst-case OSM spill scenarios. It should be noted since stochastic results have been used, not all Units will be contacted by a single spill, therefore the resource estimates provided are conservative.

Based on the stochastic modelling results for Scenario 1 (2,200 m^3 MDO spill at Wandoo B shaft 2) (Table 8-2), it is anticipated that teams would be required for up to 5 monitoring units (Montebello Unit, Southern Pilbara Unit and Offshore Environs Unit) with a Unit also dedicated to Control Sites and in some cases, the spill site within the first 14 days of a spill (Table 8-6 and Table 8-7).

Similarly, the stochastic modelling results for scenario 2 (300 m³ Wandoo Crude spill from the Export System) (Table 8-3) indicate that teams would be required for 5 monitoring units (Montebello Unit, Southern Pilbara Unit and Barrow Unit) with a Unit also dedicated to Control Sites and in some cases, the spill site within the first 14 days of a spill (Table 8-6 and Table 8-7).

Scenario 3 (300 m^3 MDO spill from the vessel collision) stochastic modelling results (Table 8-4) predict that teams would be required for one monitoring unit (Montebello Unit) with a Unit also dedicated to Control Sites and in some cases, the spill site within the first 14 days of a spill (Table 8-6 and Table 8-7).

The resources required to assist the ICT in the coordination and management of OSM are outlined in Table 8-5. Whilst the resources required to commence operational and scientific monitoring components during weeks 1–2 are presented in Table 8-6 and Table 8-7 respectively.

Table 8-6 and Table 8-7 are based on the requirement for baseline review provided in Section 2.2, the implementation schedule outlined in Table 7-1, and the stochastic modelling results (Table 8-2, Table 8-3 and Table 8-4).

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 8-6 and Table 8-7 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); and
- 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 - stochastic modelling results at >5% probability – 2,200 m³ spill of MDO over 12 hours (RPS, 2025)

Receptor	Total probability (%) shoreline oil accumulation ≥10 g/m²	Minimum arrival time shoreline oil accumulation ≥10 g/m² (days:hours)	Total contact probability (%) floating oil ≥1 g/m²	Minimum arrival time floating oil ≥1 g/m² (days:hours)	Probability (%) of dissolved hydrocarbon exposure at ≥ 10 ppb	Minimum arrival time dissolved exposure at ≥ 10 ppb (days:hours)	Probability (%) entrained oil at ≥ 10 ppb	Minimum arrival time entrained ≥10 ppb (days:hours)
Montebello AMP*	NA	NA	NC	NC	8.991	1 days, 0 hours	51.948	20 hours
Montebello Islands MP	NC	NC	NC	NC	NC	NC	36.63	2 days, 12 hours
Gascoyne AMP*	NA	NA	NC	NC	NC	NC	23.643	9 days, 21 hours
Muiron Islands MMA	NC	NC	NC	NC	NC	NC	25.308	8 days, 10 hours
Ningaloo MP*	NA	NA	NC	NC	NC	NC	25.308	9 days, 7 hours
Barrow Island MP	NC	NC	NC	NC	NC	NC	22.311	3 days, 19 hours
Lowendal Islands NR	NC	NC	NC	NC	NC	NC	8.658	5 days, 12 hours
WA10 (122) - Vlamingh Head - North West Cape	NC	NC	NC	NC	NC	NC	16.317	9 days, 19 hours
WA10 (123) - Low Point - Vlamingh Head (A)	NC	NC	NC	NC	NC	NC	19.98	9 days, 23 hours
WA10 (124) - Low Point - Vlamingh Head (B)	0.3	15 days, 22 hours	NC	NC	NC	NC	15.651	12 days, 9 hours
WA11.West (318) - Barrow Island and Montebello Islands (A) (Montebello Islands)	8.991	3 days, 22 hours	NC	NC	2.3	3 days, 23 hours	26.64	3 days, 3 hours

Receptor	Total probability (%) shoreline oil accumulation ≥10 g/m²	Minimum arrival time shoreline oil accumulation ≥10 g/m² (days:hours)	Total contact probability (%) floating oil ≥1 g/m²	Minimum arrival time floating oil ≥1 g/m² (days:hours)	Probability (%) of dissolved hydrocarbon exposure at ≥ 10 ppb	Minimum arrival time dissolved exposure at ≥ 10 ppb (days:hours)	Probability (%) entrained oil at ≥ 10 ppb	Minimum arrival time entrained ≥10 ppb (days:hours)
WA11.West (319) - Barrow Island and Montebello Islands (B) (Montebello Islands)	1.65	5 days, 23 hours	NC	NC	NC	NC	11.322	3 days, 19 hours
WA11.West (320) - Barrow Island and Montebello Islands (C) (Barrow Island)	NC	NC	NC	NC	NC	NC	7.992	5 days, 1 hours
WA11.West (321) - Barrow Island and Montebello Islands (D) (Barrow Island)	0.3	8 days, 18 hours	NC	NC	NC	NC	18.981	4 days, 22 hours
WA11.West (324) - Yardie Landing - Weld Island coast S (B) (Airlie Island)	NC	NC	NC	NC	NC	NC	23.31	5 days, 18 hours
WA11.West (325) - Coolgra Point W - Yardie Landing (C) (Thevenard Island)	NC	NC	NC	NC	NC	NC	17.316	6 days, 17 hours
WA11.West (326) - Baresand Point - Entrance Point E (Serrurier Island, Bessieres Island, Round Island)	1.3	10 days, 13 hours	NC	NC	NC	NC	26.307	6 days, 6 hours
WA11.West (327) - Hope Point - Locker Point (E) (Observation Island)	NC	NC	NC	NC	NC	NC	12.321	8 days, 20 hours
WA11.West (329) - Locker Point - Baresand Point (Muiron Islands)	5.661	10 days, 8 hours	NC	NC	NC	NC	26.307	8 days, 4 hours

Receptor	Total probability (%) shoreline oil accumulation ≥10 g/m²	Minimum arrival time shoreline oil accumulation ≥10 g/m² (days:hours)	Total contact probability (%) floating oil ≥1 g/m²	Minimum arrival time floating oil ≥1 g/m² (days:hours)	Probability (%) of dissolved hydrocarbon exposure at ≥ 10 ppb	Minimum arrival time dissolved exposure at ≥ 10 ppb (days:hours)	Probability (%) entrained oil at ≥ 10 ppb	Minimum arrival time entrained ≥10 ppb (days:hours)
Glomar Shoal*	NA	NA	NC	NC	NC	NC	15.984	4 days, 8 hours
Montebello Shoals*	NA	NA	NC	NC	NC	NC	23.31	3 days, 9 hours
Ningaloo Reef*	NA	NA	NC	NC	NC	NC	9.99	11 days, 8 hours
North West Reef*	NA	NA	NC	NC	NC	NC	8.325	10 days, 7 hours
Otway Reef*	NA	NA	NC	NC	NC	NC	6.66	8 days, 22 hours
Outtrim Patches*	NA	NA	NC	NC	NC	NC	22.311	8 days, 16 hours
Penguin Bank*	NA	NA	NC	NC	NC	NC	20.646	5 days, 20 hours
Poivre Reef*	NA	NA	NC	NC	NC	NC	10.656	5 days, 18 hours
Rankin Bank*	NA	NA	NC	NC	NC	NC	13.653	11 days, 3 hours
Ripple Shoals*	NA	NA	NC	NC	NC	NC	2.664	12 days, 2 hours
Rosily Shoals*	NA	NA	NC	NC	NC	NC	17.316	6 days, 11 hours
Tryal Rocks*	NA	NA	NC	NC	NC	NC	43.956	2 days, 3 hours

Receptor	Total probability (%) shoreline oil accumulation ≥10 g/m²	Minimum arrival time shoreline oil accumulation ≥10 g/m² (days:hours)	Total contact probability (%) floating oil ≥1 g/m²	Minimum arrival time floating oil ≥1 g/m² (days:hours)	Probability (%) of dissolved hydrocarbon exposure at ≥ 10 ppb	Minimum arrival time dissolved exposure at ≥ 10 ppb (days:hours)	Probability (%) entrained oil at ≥ 10 ppb	Minimum arrival time entrained ≥10 ppb (days:hours)
Dailey Shoal*	NA	NA	NC	NC	NC	NC	16.65	8 days, 18 hours
Hood Reef*	NA	NA	NC	NC	NC	NC	8.325	8 days, 20 hours

Table 8-3: Scenario 2 - stochastic modelling results at >5% probability – 300 m³ spill of Wandoo Crude over 1 hour (RPS, 2025)

Receptor	Total probability (%) shoreline oil accumulation ≥10 g/m²	Minimum arrival time shoreline oil accumulation ≥10 g/m² (days:hours)	Total contact probability (%) floating oil ≥1 g/m²	Minimum arrival time floating oil ≥1 g/m² (days:hours)	Probability (%) of dissolved hydrocarbon exposure at ≥ 10 ppb	Minimum arrival time dissolved exposure at ≥ 10 ppb (days:hours)	Probability (%) entrained oil at ≥ 10 ppb	Minimum arrival time entrained ≥ 10 ppb (days:hours)
Gascoyne AMP*	NA	NA	0.3	8 days, 5 hours	NC	NC	6.993	7 days, 22 hours
Montebello AMP*	NA	NA	2.3	1 day, 13 hours	NC	NC	43.623	18 hours
Muiron Islands MMA	NC	NC	NC	NC	NC	NC	6.993	6 days, 17 hours
Barrow Island MP	NC	NC	NC	NC	NC	NC	8.325	3 days, 21 hours
WA11.West (318) - Barrow Island and Montebello Islands (A) (Montebello Islands)	21.645	2 days, 20 hours	NC	NC	NC	NC	11.988	3 days, 14 hours
WA11.West (319) - Barrow Island and	8.3	4 days, 16 hours	NC	NC	NC	NC	2.6	4 days, 2 hours

Receptor	Total probability (%) shoreline oil accumulation ≥10 g/m²	Minimum arrival time shoreline oil accumulation ≥10 g/m² (days:hours)	Total contact probability (%) floating oil ≥1 g/m²	Minimum arrival time floating oil ≥1 g/m² (days:hours)	Probability (%) of dissolved hydrocarbon exposure at ≥ 10 ppb	Minimum arrival time dissolved exposure at ≥ 10 ppb (days:hours)	Probability (%) entrained oil at ≥ 10 ppb	Minimum arrival time entrained ≥ 10 ppb (days:hours)
Montebello Islands (B) (Montebello Islands)								
WA11.West (321) - Barrow Island and Montebello Islands (D) (Barrow Island)	7.326	8 days, 9 hours	NC	NC	NC	NC	7.992	4 days, 18 hours
WA11.West (324) - Yardie Landing - Weld Island coast S (B) (Airlie Island)	3.6	11 days, 9 hours	NC	NC	NC	NC	7.659	5 days, 17 hours
WA11.West (326) - Baresand Point - Entrance Point E (Serrurier Island, Bessieres Island, Round Island)	21.312	6 days, 5 hours	NC	NC	NC	NC	7.992	6 days, 22 hours
WA11.West (328) - Hope Point - Locker Point (F) (Fly Island)	0.9	17 days, 16 hours	NC	NC	NC	NC	NC	NC
WA11.West (329) - Locker Point - Baresand Point (Muiron Islands)	15.318	9 days, 2 hours	NC	NC	NC	NC	7.992	6 days, 13 hours
Montebello Islands MP	NC	NC	NC	NC	NC	NC	20.979	2 days, 4 hours
Ningaloo MP*	NA	NA	0.3	7 days, 14 hours	NC	NC	7.326	7 days, 0 hours
Montebello Shoals*	NA	NA	NC	NC	NC	NC	9.324	3 days, 15 hours

Receptor	Total probability (%) shoreline oil accumulation ≥10 g/m²	Minimum arrival time shoreline oil accumulation ≥10 g/m² (days:hours)	Total contact probability (%) floating oil ≥1 g/m²	Minimum arrival time floating oil ≥1 g/m² (days:hours)	Probability (%) of dissolved hydrocarbon exposure at ≥ 10 ppb	Minimum arrival time dissolved exposure at ≥ 10 ppb (days:hours)	Probability (%) entrained oil at ≥ 10 ppb	Minimum arrival time entrained ≥ 10 ppb (days:hours)
Outtrim Patches*	NA	NA	NC	NC	NC	NC	5.328	9 days, 13 hours
Penguin Bank*	NA	NA	NC	NC	NC	NC	5.994	6 days, 1 hours
Tryal Rocks*	NA	NA	0.3	2 days, 5 hours	NC	NC	26.307	1 days, 19 hours

Table 8-4: Scenario 3 - stochastic modelling results at >5% probability – 300 m³ spill of MDO over 6 hours (RPS, 2024)

Receptor	Total probability (%) shoreline oil accumulation ≥10 g/m²	Minimum arrival time shoreline oil accumulation ≥10 g/m² (days:hours)	Total contact probability (%) floating oil ≥1 g/m²	Minimum arrival time floating oil ≥1 g/m² (days:hours)	Probability (%) of dissolved hydrocarbon exposure at ≥ 10 ppb	Minimum arrival time dissolved exposure at ≥ 10 ppb (days:hours)	Probability (%) entrained oil at ≥ 10 ppb	Minimum arrival time entrained ≥ 10 ppb (days:hours)
WA11.West (318) - Barrow Island and Montebello Islands (A) (Montebello Islands)	15	3 days, 19 hours	NC	NC	NC	NC	NC	NC
Montebello AMP*	NA	NA	NC	NC	7	1 day, 3 hours	54	22 hours
Gascoyne AMP*	NA	NA	NC	NC	NC	NC	13	9 days, 12 hours
Montebello MP	NA	NA	NC	NC	1	3 days, 7 hours	37	2 days, 9 hours
Ningaloo MP*	NA	NA	NC	NC	NC	NC	13	9 days, 10 hours
Barrow Island MP	NC	NC	NC	NC	NC	NC	13	3 days, 14 hours

Receptor	Total probability (%) shoreline oil accumulation ≥10 g/m²	Minimum arrival time shoreline oil accumulation ≥10 g/m² (days:hours)	Total contact probability (%) floating oil ≥1 g/m²	Minimum arrival time floating oil ≥1 g/m² (days:hours)	Probability (%) of dissolved hydrocarbon exposure at ≥ 10 ppb	Minimum arrival time dissolved exposure at ≥ 10 ppb (days:hours)	Probability (%) entrained oil at ≥ 10 ppb	Minimum arrival time entrained ≥ 10 ppb (days:hours)
Lowendal Islands NR	NC	NC	NC	NC	NC	NC	7	6 days, 17 hours
Dailey Shoal*	NA	NA	NC	NC	NC	NC	5	8 days, 18 hours
Montebello Shoals*	NA	NA	NC	NC	NC	NC	22	3 days, 9 hours
Outtrim Patches*	NA	NA	NC	NC	NC	NC	10	8 days, 17 hours
Penguin Bank*	NA	NA	NC	NC	NC	NC	6	6 days, 12 hours
Poivre Reef*	NA	NA	NC	NC	NC	NC	7	5 days, 19 hours
Tryal Rocks*	NA	NA	NC	NC	NC	NC	23	2 days, 3 hours

Table 8-5: 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 8-6: Resources required for implementing operational monitoring plans

OMP	Week 1 (total)#	Week 2 (total)#	Arrangement
OM1: Hydrocarbon characterisation*^	**Scenario 1 (2,200 m^3 MDO)** 1 team (spill site and surrounds) 1 team Montebello Unit 1 team Offshore Environs Unit **Total 3 teams**	**Scenario 1 (2,200 m^3 MDO)** 1 team (spill site and surrounds) 1 team Montebello Unit 1 team Southern Pilbara Unit 1 team Offshore Environs Unit **Total 4 teams**	OSRL OSM Supplementary Service Agreement Marine contractors Laboratory arrangement
	Scenario 2 (300 m^3 Wandoo Crude) 1 team (spill site and surrounds) 1 team Montebello Unit 1 team Southern Pilbara Unit **Total 3 teams**	**Scenario 2 (300 m^3 Wandoo Crude)** 1 team (spill site and surrounds) 1 team Montebello Unit 1 team Barrow Unit 1 team Southern Pilbara Unit **Total 4 teams**	
	Scenario 3 (300 m^3 MDO) 1 team (spill site and surrounds) 1 team Montebello Unit **Total 2 teams**	**Scenario 3 (300 m^3 MDO)** 1 team (spill site and surrounds) 1 team Montebello Unit **Total 2 teams**	
OMP2: Water quality assessment*	Refer to OMP: Hydrocarbon properties and weathering behaviour at sea resourcing (all sites)		OSRL OSM Supplementary Service Agreement Marine contractors

OMP	Week 1 (total)#	Week 2 (total)#	Arrangement
OMP3: Sediment quality 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	**Scenario 2 (300 m^3 Wandoo Crude)** 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^	**All scenarios** 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
OMP6: Shoreline clean-up assessment	Detail on resources required for SCAT are presented in Table 3-4 of the OPEP and Vermilion Oil and Gas Australia Oil Spill Response Capability Review [VOG-7000-RH-0009].		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 OMP: Hydrocarbon properties and weathering behaviour at sea, OMP: Surface chemical dispersant effectiveness and fate, OMP: Water quality assessment and OMP: Sediment quality assessment*

 # Specific 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 8-7: Resources required for implementing scientific monitoring plans

SMP	Week 1 (total)[#]	Week 2 (total)[#+]	Arrangement
SM1: Water quality impact assessment*^	**Scenario 1 (2,200 m³ MDO)** 1 team (spill site and surrounds) 1 team Montebello Unit 1 team Offshore Environs Unit 1 team Control Sites **Total 4 teams**	**Scenario 1 (2,200 m³ MDO)** 1 team (spill site and surrounds) 1 team Montebello Unit 1 team Southern Pilbara Unit 1 team Offshore Environs Unit 1 team Control Sites **Total 5 teams**	OSRL OSM Supplementary Service Agreement Marine contractors Laboratory arrangement
	Scenario 2 (300 m³ Wandoo Crude) 1 team (spill site and surrounds) 1 team Montebello Unit 1 team Southern Pilbara Unit 1 team Control Sites **Total 4 teams**	**Scenario 2 (300 m³ Wandoo Crude)** 1 team (spill site and surrounds) 1 team Montebello Unit 1 team Barrow Unit 1 team Southern Pilbara Unit 1 team Control Sites **Total 5 teams**	
	Scenario 3 (300 m³ MDO) 1 team (spill site and surrounds) 1 team Montebello Unit 1 team Control Sites **Total 3 teams**	**Scenario 3 (300 m³ MDO)** 1 team (spill site and surrounds) 1 team Montebello Unit 1 team Control Sites **Total 3 teams**	
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	**Scenario 1 (2,200 m³ MDO)** 1 team (spill site and surrounds) 1 team Montebello Unit 1 team Control Sites **Total 3 teams**	**Scenario 1 (2,200 m³ MDO)** 1 team (spill site and surrounds) 1 team Montebello Unit 1 team Southern Pilbara Unit 1 team Control Sites	OSRL OSM Supplementary Service Agreement Marine contractors Laboratory arrangement

SMP	Week 1 (total)[#]	Week 2 (total)[#+]	Arrangement
		Total 4 teams	
	Scenario 2 (300 m³ Wandoo Crude) 1 team (spill site and surrounds) 1 team Montebello Unit 1 team Southern Pilbara Unit 1 team Control Sites **Total 4 teams**	**Scenario 2 (300 m³ Wandoo Crude)** 1 team (spill site and surrounds) 1 team Montebello Unit 1 team Barrow Unit 1 team Southern Pilbara Unit 1 team Control Sites **Total 5 teams**	
	Scenario 3 (300 m³ MDO) 1 team (spill site and surrounds) 1 team Montebello Unit 1 team Control Sites **Total 3 teams**	**Scenario 3 (300 m³ MDO)** 1 team (spill site and surrounds) 1 team Montebello Unit 1 team Control Sites **Total 3 teams**	
SM4: Seabirds and shorebirds^	**Scenario 1 (2,200 m³ MDO)** 1 team to conduct initial aerial surveys for Montebello Unit **Total 1 aerial team** 1 team to conduct vessel-based surveys for Montebello Unit 1 team control site(s) (surveys would include all fauna [birds, reptiles, cetaceans, dugong and whale shark]) **Total 2 vessel-based teams** 1 team to conduct ground-based surveys for Montebello Unit 1 team control site(s)	**Scenario 1 (2,200 m³ MDO)** 1 team to conduct initial aerial surveys for Montebello Unit and Southern Pilbara Unit **Total 1 aerial team** 1 team to conduct vessel-based surveys for Montebello Unit 1 team Southern Pilbara 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 ground-based surveys for Montebello Unit	OSRL OSM Supplementary Service Agreement Marine contractors Aviation contractors Laboratory arrangement

SMP	Week 1 (total)[#]	Week 2 (total)[#+]	Arrangement
	(1 experienced ornithologists per team) **Total 2 ground-based teams**	1 team Southern Pilbara Unit 1 team control site(s) (1 experienced ornithologists per team) **Total 3 ground-based teams**	
	Scenario 2 (300 m^3 Wandoo Crude) 1 team to conduct initial aerial surveys for Montebello Unit and Southern Pilbara Units **Total 1 aerial team** 1 team to conduct vessel-based surveys for Montebello Unit 1 team control site(s) (surveys would include all fauna [birds, reptiles, cetaceans, dugong and whale shark]) **Total 2 vessel-based teams** 1 team to conduct ground-based surveys for Montebello Unit 1 team control site(s) (1 experienced ornithologists per team) **Total 2 ground-based teams**	**Scenario 2 (300 m^3 Wandoo Crude)** 1 team to conduct initial aerial surveys for Montebello Unit and Southern Pilbara Unit 1 team to conduct aerial surveys for Southern Pilbara and Barrow Units **Total 2 aerial teams** 1 team to conduct vessel-based surveys for Montebello Unit 1 team Southern Pilbara 1 team Barrow Unit 1 team control site(s) (surveys would include all fauna [birds, reptiles, cetaceans, dugong and whale shark]) **Total 4 vessel-based teams** 1 team to conduct ground-based surveys for Montebello Unit 1 team Southern Pilbara Unit 1 team Barrow Unit 1 team control site(s) (1 experienced ornithologists per team) **Total 4 ground-based teams**	

SMP	Week 1 (total)[#]	Week 2 (total)[#+]	Arrangement
	Scenario 3 (300 m^3 MDO) 1 team to conduct initial aerial surveys for Montebello Unit **Total 1 aerial team** 1 team to conduct vessel-based surveys for Montebello Unit 1 team control site(s) (surveys would include all fauna [birds, reptiles, cetaceans, dugong and whale shark]) **Total 2 vessel-based teams** 1 team to conduct ground-based surveys for Montebello Unit 1 team control site(s) (1 experienced ornithologists per team) **Total 2 ground-based teams**	**Scenario 3 (300 m^3 MDO)** 1 team to conduct initial aerial surveys for Montebello Unit **Total 1 aerial team** 1 team to conduct vessel-based surveys for Montebello Unit 1 team control site(s) (surveys would include all fauna [birds, reptiles, cetaceans, dugong and whale shark]) **Total 2 vessel-based teams** 1 team to conduct ground-based surveys for Montebello Unit 1 team control site(s) (1 experienced ornithologists per team) **Total 2 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

SMP	Week 1 (total)[#]	Week 2 (total)[#+]	Arrangement
SM6: Benthic habitat assessment	**Scenario 1 (2,200 m^3 MDO)** 1 team (spill site and surrounds) 1 team Montebello Unit 1 team Offshore Environs Unit 1 team Control Sites **Total 4 teams**	**Scenario 1 (2,200 m^3 MDO)** 1 team (spill site and surrounds) 1 team Montebello Unit 1 team Southern Pilbara Unit 1 team Offshore Environs Unit 1 team Control Sites **Total 5 teams**	OSRL OSM Supplementary Service Agreement Marine contractors Laboratory arrangement
	Scenario 2 (300 m^3 Wandoo Crude) 1 team (spill site and surrounds) 1 team Montebello Unit 1 team Southern Pilbara Unit 1 team Control Sites **Total 4 teams**	**Scenario 2 (300 m^3 Wandoo Crude)** 1 team (spill site and surrounds) 1 team Montebello Unit 1 team Barrow Unit 1 team Southern Pilbara Unit 1 team Control Sites **Total 5 teams**	
	Scenario 3 (300 m^3 MDO) 1 team (spill site and surrounds) 1 team Montebello Unit 1 team Control Sites **Total 3 teams**	**Scenario 3 (300 m^3 MDO)** 1 team (spill site and surrounds) 1 team Montebello Unit 1 team Control Sites **Total 3 teams**	
SM7: Marine fish and elasmobranch assemblages assessment	**Scenario 1 (2,200 m^3 MDO)** 1 team (spill site and surrounds) 1 team Montebello Unit 1 team Offshore Environs Unit 1 team Control Sites **Total 4 teams**	**Scenario 1 (2,200 m^3 MDO)** 1 team (spill site and surrounds) 1 team Montebello Unit 1 team Southern Pilbara Unit 1 team Offshore Environs Unit 1 team Control Sites **Total 5 teams**	OSRL OSM Supplementary Service Agreement Marine contractors Laboratory arrangement
	Scenario 2 (300 m^3 Wandoo Crude) 1 team (spill site and surrounds) 1 team Montebello Unit	**Scenario 2 (300 m^3 Wandoo Crude)** 1 team (spill site and surrounds) 1 team Montebello Unit	

SMP	Week 1 (total)[#]	Week 2 (total)[#+]	Arrangement
	1 team Southern Pilbara Unit 1 team Control Sites **Total 4 teams**	1 team Barrow Unit 1 team Southern Pilbara Unit 1 team Control Sites **Total 5 teams**	
	Scenario 3 (300 m^3 MDO) 1 team (spill site and surrounds) 1 team Montebello Unit 1 team Control Sites **Total 3 teams**	**Scenario 3 (300 m^3 MDO)** 1 team (spill site and surrounds) 1 team Montebello Unit 1 team Control Sites **Total 3 teams**	
SM8: Fisheries impact assessment	**Any scenario** Total 2 teams to cover all relevant Commonwealth and State fisheries.	**Any scenario** Total 2 teams to cover all relevant Commonwealth and State fisheries.	OSRL OSM Supplementary Service Agreement Marine contractors Laboratory arrangement
SM9: Heritage features assessment	**Any scenario** 1 team	**Any scenario** 1 team	OSRL OSM Supplementary Service Agreement Marine contractors Laboratory arrangement
SM10: Social impact assessment	**Any scenario** 1 team	**Any scenario** 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[1]
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[2]
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.

[1] Defined as Annual OSM Services in OSM Supplementary Service Agreement

[2] 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 8-6 and Table 8-7) 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 Oil Spill Response Capability Review [VOG-7000-RH-0009].

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*	4 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	6 teams (Refer to Table 3-4 of the OPEP)	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+	5 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	5 teams	6 teams	-	-	6 teams
SM4: Seabirds and shorebirds+	2 aerial teams 4 vessel teams (surveys would include all fauna [birds, reptiles, cetaceans, dugong and whale shark]) 4 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	5 teams	6 teams	-	-	7 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	5 teams	6 teams	-	-	7 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 Wandoo Field OSCP Document 2 Oil Pollution Emergency Plan [WAN-2000-RD-0001.02] titled activation of oil pollution emergency plan: activation and notification flowcharts, provide 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[3] 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. [4]	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	☐

[3] 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.

[4] 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**Error! Reference source not found.** and Table 4-3 are to be u sed 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: Background Information for Key Sensitivities 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=2ahUKEwi08LDJc-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[5]	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; evaluate impact of spill and response activities on fauna	Planning Section for use in IAP; Oiled Wildlife Unit/Division to help in developing Wildlife Response Sub-plan	• Understanding of species, populations and geographical locations at greatest risk from spill impacts. ICT can use this information to help qualify locations with highest level of protection priority (e.g. dugong nursery area is at risk of high contact therefore

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

OMP	Data generated[5]	ICT Section requiring data	How data may be used by ICT
			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.

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

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

Environmental Performance Standard	Confirmation that EPS is being met
(OPEP-EPS-1.1) - Conduct surface dispersant efficacy monitoring in accordance with the Vermilion Operational and Scientific Monitoring – Bridging Implementation Plan [VOG-1100-RG-0002] and OM4a: Surface Dispersant Effectiveness Monitoring (APPEA, 2021)	OM4a: Surface dispersant effectiveness monitoring will involve monitoring and assessing the effectiveness of surface dispersant application to help inform the ICT
(OPEP-EPS-2.1)- Methods and techniques employed for shoreline clean-up operations will be based on the information provided by the SCAT teams and in consultation with DTMI representatives	Results of OM6: Shoreline Clean-up Assessment will continuously be used to inform Shoreline Clean-up operations
[OPEP-EPS-2.2] All shoreline clean-up sites will be zoned and marked before clean-up operations commence to minimise secondary contamination and minimise the mixing of clean and oiled sediment and shoreline substrates. [OPEP-EPS-2.3] Shoreline clean-up sites will be appropriately mapped with clear restricted zones for sensitive habitat areas and no access zones for vehicle and personnel movement. Zoning will consider sensitive vegetation, bird nesting/ roosting areas and turtle nesting habitat.	Implementation of OM6: Shoreline Clean-up Assessment will involve assessment teams mapping zones in sensitive habitat areas
(OPEP-EPS-3.1) - 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	Implementation of OM5: Rapid Marine Fauna Assessment will involve a rapid assessment of fauna including species, populations, habitats and geographical locations at greatest risk from potential spill impacts. This information will help inform the ICT of locations requiring wildlife response activities.

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.

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 OSCP and 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 5.15) 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 activity 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 5.15.5) 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 12-1outlines the guidance to be followed during mobilisation. In addition, the EP (Section 5.15.5) 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 5.15.5) 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 5.15.5) 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 5.15.5) 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 5.15.5) 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 (Table 3-2 and 3-4) 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 8) 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															
Gascoyne AMP	✓	✓	✓	-	✓	✓	✓	-	⊙	⊙	⊙	✓	✓	✓	✓
Montebello AMP	✓	✓	✓	-	✓	✓	✓	-	⊙	⊙	⊙	✓	✓	✓	✓
Shorelines															
WA10 (122) - Vlamingh Head - North West Cape	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
WA10 (123) - Low Point - Vlamingh Head (A)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
WA10 (124) - Low Point - Vlamingh Head (B)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
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 (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)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

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 (327) - Hope Point - Locker Point (E) (Observation 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)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Lowendal Islands NR	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Montebello Islands MP	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
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	-	✓	✓	-	✓	✓	✓	-	✓	⊙	✓	✓	✓	-	-
Continental Slope Demersal Fish Communities	-	✓	✓	-	✓	✓	✓	-	⊙	⊙	⊙	✓	✓	-	-
Commonwealth waters adjacent to Ningaloo Reef	-	✓	✓	-	✓	✓	✓	-	✓	⊙	✓	✓	✓	-	-
Exmouth Plateau	-	✓	✓	-	✓	✓	✓	-	⊙	⊙	⊙	✓	⊙	-	-

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
Glomar Shoals	-	✓	✓	-	✓	✓	✓	-	⊙	⊙	⊙	✓	✓	-	-
Mermaid Reef and Commonwealth waters surrounding Rowley Shoals	-	✓	✓	-	✓	✓	✓	-	⊙	⊙	⊙	✓	✓	-	-
BIAs															
Whale shark BIA	-	✓	-	-	✓	✓	-	-	-	-	✓	-	-	-	✓
Pygmy blue whale BIA	-	✓	-	-	✓	✓	-	-	-	-	✓	-	-	-	-
Dugong BIA	-	✓	-	-	✓	✓	-	-	-	-	✓	✓	-	-	-
Humpback whale BIA	-	✓	-	-	✓	✓	-	-	-	-	✓	-	-	-	-
Southern right whale BIA	-	✓	-	-	✓	✓	-	-	-	-	✓	-	-	-	-
Flatback turtle BIAs	-	✓	-	✓	✓	✓	✓	-	-	✓	-	✓	-	-	-
Green turtle BIAs	-	✓	-	✓	✓	✓	✓	-	-	✓	-	✓	-	-	-
Hawksbill turtle BIAs	-	✓	-	✓	✓	✓	✓	-	-	✓	-	✓	-	-	-
Loggerhead turtle BIAs	-	✓	-	✓	✓	✓	✓	-	-	✓	-	✓	-	-	-
Fairy tern BIA	-	✓	-	✓	✓	✓	✓	-	✓	-	-	-	-	-	-
Lesser crested tern BIA	-	✓	-	✓	✓	✓	✓	-	✓	-	-	-	-	-	-
Lesser Frigatebird BIA	-	✓	-	✓	✓	✓	✓	-	✓	-	-	-	-	-	-
Roseate tern BIA	-	✓	-	✓	✓	✓	✓	-	✓	-	-	-	-	-	-
Wedge-tailed shearwater BIA	-	✓	-	✓	✓	✓	✓	-	✓	-	-	-	-	-	-
Brown Booby BIA	-	✓	-	✓	✓	✓	✓	-	✓	-	-	-	-	-	-
White-tailed tropicbird BIA	-	✓	-	✓	✓	✓	✓	-	✓	-	-	-	-	-	-
Little Tern BIA	-	✓	-	✓	✓	✓	✓	-	✓	-	-	-	-	-	-
Key															
✓	It is highly likely that the initiation criteria would be met for the relevant OMP/SMP														

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 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). Nesting area for seabirds.	The highest abundances of shorebirds are associated with the extensive tidal mudflats of the south-eastern and southern coasts, such as Bandicoot Bay.	Migratory shorebird abundances increase on the island as the birds arrive from the north during September to December. The abundances of some migratory shorebirds continue to increase in January and February, suggesting local movements of birds from the mainland to Barrow Island. Abundances decrease as the migratory species leave the region to return north at the end of summer.
	Turtles	Green (*Chelonia mydas*), flatback (*Natator depressus*), hawksbill (*Eretmochelys imbricata*), loggerhead (*Caretta caretta*) and leatherback (*Dermochelys coriacea*) turtles (DEC 2006).	Flatbacks nest on sandy beaches on the mid-eastern coast (DEC 2006). Green turtles predominantly use exposed sandy beaches on the west coast (DEC 2006). Substantial mating populations of green turtles are found in the waters of north-western Barrow Island (DEC 2006). Green turtle can be found year-round feeding on algae-covered rocky intertidal and subtidal platforms off the west coast (DEC 2006). Feeding grounds for hawksbill turtles have been identified to the south of the Barrow Shoals (DEC 2006).	Flatback: breeding/nesting season October – January. Hatching season: February – March. Green turtle: mating aggregations may commence from October with peak nesting from December to January, however, nesting does occur year-round (Moro and MacAulay 2010). Hawksbill: The peak season for nesting is between October and November, with less frequent nesting during December and January round (Moro and MacAulay 2010).

Receptor	Receptor	Background	Key locations	Seasonality
	Cetaceans	Whale species that may occasionally visit include the humpback whale (*Megaptera novaeangliae*), short-finned pilot whale (*Globicephala macrorhynchus*), false killer whale (*Pseudorca crassidens*), killer whale (*Orcinus orca*), minke whale (*Balaenoptera acutorostrata*), Bryde's whale (*Balaenoptera edeni*), sei whale (*Balaenoptera borealis*), pygmy blue whale (*Balaenoptera musculus brevicauda*), fin whale (*Balaenoptera physalus*), melon-headed whale (*Peponocephala electra*), sperm whale (*Physeter macrocephalus*) and the blue whale (*Balaenoptera musculus musculus*). Of these, only the humpback whale is a regular visitor to the area (DEC 2006). Bottlenose dolphins (*Tursiops truncatus*) and humpback dolphins (*Sousa sahulensis*) have resident populations within the shallow waters of the inner Rowley Shelf, including the Barrow Island area (DEC 2006). Spinner dolphins (*Stenella longirostris*), common dolphins (*Delphinius delphis*), and striped dolphins (*Stenella caeruleoalba*) are abundant in the waters around Barrow Island (DEC 2006).	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).	-
	Dugong	Dugong (*Dugong dugon*) significant sightings (Bancroft et al. 2000)	-	-
	Mangroves	Restricted areas of stunted *Avicennia marina* occurring in narrow fringing strips in embayments (DEC 2006).	Mattress Point, south of the Chevron camp, near the airstrip, at Stokes Point and near Pelican Island on the western side of Bandicoot Bay (DEC 2006).	-
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).

Receptor	Receptor	Background	Key locations	Seasonality
				Wedge-tailed shearwater (*Ardenna pacifica*) and Bridled tern (*Onychoprion anaethetus*) nest in Summer (Nicholson 2002). Silver gull (*Larus novaehollandiae*) nests in summer and Autumn (Nicholson 2002). Crested tern (*Thalasseus bergii*), Lesser crested tern (*Thalasseus bengalensis*) and Roseate tern (*Sterna dougallii*) nest in Autumn (Nicholson 2002).
	Turtles	Green (*Chelonia mydas*), flatback (*Natator depressus*), hawksbill (*Eretmochelys imbricata*), loggerhead (*Caretta caretta*) and leatherback (*Dermochelys coriacea*) turtles (DEC 2006).	All beaches on Beacon, Bridled, Varanus, Abutilon, Parakeelya Islands Significant hawksbill nesting on Varanus Island (DSEWPC 2012a). Hawksbill foraging around the Lowendal Island group (DSEWPC 2012a).	Hawksbill nesting in spring and early summer (peak October) with a 20 km internesting buffer. Flatback nesting peak late December – early January with a 20 km internesting buffer (DSEWPC 2012a).
	Cetaceans	Whale species that may occasionally visit include the humpback whale (*Megaptera novaeangliae*), short-finned pilot whale (*Globicephala macrorhynchus*), false killer whale (*Pseudorca crassidens*), killer whale (*Orcinus orca*), minke whale (*Balaenoptera acutorostrata*), Bryde's whale (Balaenoptera edeni), sei whale (*Balaenoptera borealis*), pygmy blue whale (*Balaenoptera musculus brevicauda*), fin whale (*Balaenoptera physalus*), melon-headed whale (*Peponocephala electra*), sperm whale (*Physeter macrocephalus*) and the blue whale (*Balaenoptera musculus musculus*). Of these, only the humpback whale is a regular visitor to the area (DEC 2006).	-	-
	Dugong	The seagrass beds around the Lowendal Islands are thought to provide a valuable food source for dugong (*Dugong dugon*)	-	-

Receptor	Receptor	Background	Key locations	Seasonality
		(DEC 2006).		
	Mangroves	Mangroves occupy less than 0.1% of the coastline (DEC 2006).	-	-
Montebello Islands	Birds	Twenty-six species of seabirds and waders, including migratory waders, are known in the Montebello Islands Marine Area. Migratory and threatened seabirds – Significant nesting, foraging and resting areas (Burbidge et al. 2000). At least 61 islands in the Montebello group are used by nesting seabirds (DEC 2006). Waterbirds- Historically moderately common: pied cormorant (*Phalacrocarax varius*), Australian pelican (*Pelecanus conspicillatus*), Historically common: eastern reef egret (*Egretta sacra*), osprey (*Pandion haliaetus*) Shorebirds- Historically moderately common: whimbrel (*Numenius phaeopus*), greenshank (*Tringa nebularia*), common sandpiper (*Actitis hypoleucos*), ruddy turnstone (*Arenaria interpres*), red-necked stint (*Calidris ruficollis*) Historically common: bar-tailed godwit (*Limosa lappanica*), grey-tailed tattler (*Heteroscelus brevipes*), beach stone-curlew (*Esacus neglectus*), pied oystercatcher (*Haematopus ostralegus*), sooty oystercatcher (*Haematos fuliginosus*) Burbidge et al. 2000).	Wedge-tailed shearwater (*Puffinus pacificus*) significant breeding historically reported on Ah Chong, Gossypium, Brooke, Flag, Gardenia and South East Islands. Silver gull (*Larus novaehollandiae*) breeding historically reported on Brooke and South East. Caspian tern (*Sterna caspia*) common breeding resident historically on Ah Chong, Alpha, Bluebell, Dandelion, Flag, Foxglove, Islet to south of Hermite, Ivy, Kunzea, Marri Islands, Primrose, Renewal and Trimouille. Roseate tern (*Sterna dougallii*) significant historical breeding historically reported on Dahlia, Dandelion, Pimelia, Myoporum, Gannet, Fig Islands and Bloodwood. Fairy tern (*Sterna nereis*) historical breeding on Fairy Tern Island and Hibbertia. Crested tern (*Sterna bergii*) significant historical breeding on Daisy, Epsilon and Flag Burbidge et al. 2000)..	Wedge-tailed shearwater and bridled tern nest in summer (Nicholson 2002). Silver gull nest in summer and Autumn (Nicholson 2002). Caspian tern nest in autumn and winter (Nicholson 2002). Crested tern, lesser crested tern, roseate tern and sooty tern nest in Autumn (Nicholson 2002). Fairy tern nest in winter and spring (Nicholson 2002).
	Turtle	Loggerhead (*Caretta caretta*) and green (*Chelonia mydas*) (*significant rookeries*); hawksbill (*Eretmochelys imbracata*), flatback (*Natator depressus*) turtles (Burbidge et al. 2000) Flatback are common in the waters surrounding the Montebello Islands (Burbidge et al. 2000) and nesting occurs for the following species (Commonwealth of Australia 2017):	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)

Receptor	Receptor	Background	Key locations	Seasonality
		• Green turtle • Flatback • Hawksbill		Hawksbill- major nesting occurs all year (peak Oct-Jan)
	Cetaceans	Whale species that may occasionally visit include the humpback whale (*Megaptera novaeangliae*), short-finned pilot whale (*Globicephala macrorhynchus*), false killer whale (*Pseudorca crassidens*), killer whale (*Orcinus orca*), minke whale (*Balaenoptera acutorostrata*), Bryde's whale (*Balaenoptera edeni*), sei whale (*Balaenoptera borealis*), pygmy blue whale (*Balaenoptera musculus brevicauda*), fin whale (*Balaenoptera physalus*), melon-headed whale (*Peponocephala electra*), sperm whale (*Physeter macrocephalus*) and the blue whale (*Balaenoptera musculus musculus*). (DEC 2006). Pygmy blue whale (*Balaenoptera musculus brevicauda*) and humpback whale (*Megaptera novaeangliae*) migration area Humpback dolphins (*Sousa sahulensis*) thought to be present year-round in the area (Raudino et al. 2018)	An area of sheltered water to the west of Trimouille Island is used as a resting area for female humpback whales and their young calves during their southerly migration (DEC 2006).	-
	Dugong	Dugong (*Dugong dugon*) significant sightings (Bancroft et al. 2000)	-	-
Muiron Islands	Birds	Nesting area for seabirds Wedge-tailed shearwater (*Ardenna pacifica*) nesting colony, birds forage at sea in large aggregations. Crested tern (*Thalasseus bergii*) nesting colony (Department of Parks and Wildlife 2014) Identified as an internationally important shorebird area (Weller et al. 2020).	-	Wedge-tailed shearwater are believed to stay in the area year-round, but undertake significant flights away from the islands around May. Returning around June, they nest in burrows on both islands spending several months preparing and re-excavating the burrows. At about 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).

Receptor	Receptor	Background	Key locations	Seasonality
	Turtle	Major loggerhead turtle (*Caretta caretta*) nesting site, significant green turtle (*Chelonia mydas*) nesting site, low density hawksbill turtle (*Eretmochelys imbricata*) nesting site, occasional flatback turtle (*Natator depressus*) presence	-	Loggerhead turtle peak nesting: November to January (Waayers 2010). Green turtle peak nesting December to January (Waayers 2010).
Ningaloo Coast World Heritage Area	Mangroves	Mangroves are not extensive.	On the east side of the Cape Range peninsula, a fringing mangal of Avicennia marina occurs to the south of Cape Murat, between Bundegi Reef and Exmouth. On the west side of the Peninsula, mangals occur at Mangrove Bay (*A. marina, Rhizophora stylosa and Bruguiera exaristata*), Low Point (*Avicennia marina*) and Yardie Creek (*A. marina and R. stylosa*)	-
	Manta rays	-	-	Ningaloo Reef is considered an important area for Manta Rays in autumn and winter (Preen et al. 1997).
	Whale sharks	Whale Sharks aggregate in the waters of the Ningaloo Marine Park, frequently close to the Ningaloo Reef front. The aggregations coincides with the period when the Leeuwin Current is strongest. (Sleeman et al. 2010). The whale sharks that visit Ningaloo are mostly immature males (Sequerira et al. 2016).	-	Peak visibility April to July (noting that whale sharks may be present throughout the year)
	Turtle	Four species of turtle nest in Ningaloo: Green turtle (*Chelonia mydas*), Flatback turtle (*Natator depressus*), Hawksbill turtle (*Eretmochelys imbricata*), Loggerhead turtle (*Caretta caretta*)	The most concentrated area of green turtle nesting is along the northern beaches and Muiron Islands, while loggerhead nesting is concentrated along beaches further south (Bungelup, Jane's Bay, Gnaraloo) and	Main nesting: Hawksbill July-Mar Green Sept-Mar Flatback Sept-Mar Loggerhead Sept-Mar

Receptor	Receptor	Background	Key locations	Seasonality
			on South Muiron Island (Whiting 2016)	
	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).	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 seabirds and waders to breed, rest and feed (Shire of Exmouth et al. 1999).	Significant seabird rookeries include Cape Farquhar, Pelican Point, Point Maud and Winderabandi Point (Shore of Exmouth et al. 1999).	Juvenile shorebirds can be found year-round. Adults shorebirds usually between August and April.

Receptor	Receptor	Background	Key locations	Seasonality
Southern Islands Coast (Southern Pilbara shoreline, Onslow area coastline)	Sediment	The Department of Environment and Conservation (DEC) investigated background contaminants in Sediments of the Pilbara in 2005 (DEC 2006). Sediment samples were collected from coastal waters at Port Hedland, Dampier Archipelago, Onslow, Ashburton River Mouth and Exmouth Gulf. Samples were analysed for TBT, PAHs, TPH, BTEXN, organochlorin pesticides, PCBs, total metals and metalloids. Background sediment quality was found to be high. Total arsenic were found in high concentrations in one site off Onslow (considered natural and likely to be related to geology of the region.	-	-
	Mangroves	Mangroves in the area form small but sometimes complex communities in embayments and on the sheltered shores of many offshore islands.	Juvenile green turtles are known to forage on mangroves and have been recorded in both Urala Creek North and Urala Creek South (AECOM 2022).	-
	Turtle	Recovery Plan for Marine Turtles in Australia 2017-2027 (Commonwealth of Australia 2017) has listed critical nesting habitat in this area for Green turtle (*Chelonia mydas*), Flatback turtle (*Natator depressus*), Hawksbill turtle (*Eretmochelys imbricata*) and Loggerhead turtle (*Caretta caretta*). Flatback BIA for nesting and internesting (DCCEEW 2023). Internesting BIA for green and loggerhead turtle (DCCEEW 2023).	Thevenard Island is an important nesting area (Commonwealth of Australia 2017).	Nesting and hatching takes place between October and April. Flatback turtle nesting in the Ashburton area occurs between October and February, with peak nesting activity in December (Imbricata 2013).
	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):	-	-

Receptor	Receptor	Background	Key locations	Seasonality
		Humpback whale: migration and resting. Pygmy blue whale: distribution.		
	Birds	Key species (O2 Marine 2021): Australian fairy tern (*Sternula nereis*), bar-tailed godwit- critically endangered (*Limosa lapponica menzbieri*), curlew sandpiper – critically endangered (*Calidris ferruginea*), eastern curlew- critically endangered (*Numenius madagascariensis*) Breeding and foraging BIA of Wedge-tailed shearwater (DCCEEW 2023).	-	Juvenile shorebirds can be found year-round. Adults shorebirds usually between August and April.

References

360 Environmental (2017). Learmonth Habitat Surveys. Report prepared for Subsea 7. 31pp

AECOM (2022) Marine Fauna Impact Assessment Ashburton Salt Project. Doc No. 60597242_3

Allen, S.J., Cagnazzi, D.D., Hodgson, A.J., Loneragan, N.R. and Bejder, L. 2012. Tropical inshore dolphins of north-western Australia: Unknown populations in a rapidly changing region. Pacific Conservation Biology 18, 56–63.

Australian Marine Parks (date unknown). Roebuck Marine Park. Australian Marine Parks. https://parksaustralia.gov.au/marine/parks/north-west/roebuck/

Bancroft K.P., Davidson J.A., and Looker O. (2000). Marine wildlife distribution in the proposed Montebello/Barrow Islands and Dampier Archipelago/Cape Preston marine conservation reserves. Report: MRI/PI/MBI&DAR-44/2000. August 2000. (Marine Conservation Branch, Department of Conservation and Land Management, 47 Henry St., Fremantle, Western Australia, 6160). Unpublished report.

BMT (2020). Learmonth Benthic Habitat Survey. Report to MBS Environmental for Subsea 7 Learmonth Pipeline Fabrication Facility. 8pp.

Burbidge A, Blyth JD, Fuller, PJ, Kendrick, PG, Stanley, FJ, Smith, LA. (2000). The terrestrial vertebrate fauna of the Montebello Islands, Western Australia. CALM Science 3(2): 95-107.

Commonwealth of Australia (2016) Wetlands and migratory shorebirds fact sheet. https://www.dcceew.gov.au/sites/default/files/documents/factsheet-wetlands-migratory-shorebirds.pdf

Commonwealth of Australia (2017) Recovery Plan for Marine Turtles in Australia 2017-2027

Department of Climate Change, Energy, the Environment and Water (DCCEEW) (2023). National Conservation Values Atlas. Accessed January 5 2024.

Department of Environment and Conservation (DEC) (2006) Background quality of the marine sediments of the Pilbara coast. DEC, Marine Technical Report Series, No. MTR 1.

Department of Environment and Conservation (DEC) (2006). Management Plan for the Montebello/Barrow Islands Marine Conservation Reserves, 2007–2017. Management Plan No. 55. Department of Conservation and Environment, Perth, Western Australia.

Department of Environment and Conservation (DEC) (2010). Cape Range National Park Management Plan No 65 2010. No. 65. Department of Environment and Conservation, Western Australia. Available at: www.dpaw.wa.gov.au/images/documents/parks/ management-plans/decarchive/cape-range-2010-print- and-web.pdf

Department of Parks and Wildlife (DPaW) (2015) Ningaloo Coast Spring News. Available at: https://library.dbca.wa.gov.au/static/Journals/080954/080954-2015.09.pdf

Department of Sustainability, Environment, Water, Population and Communities (DSEWPC) (2012a) Marine bioregional plan for the North-west Marine Region.

Department of the Environment and Energy (DoEE). (2017). Recovery Plan for Marine Turtles in Australia 2017- 2027. Commonwealth of Australia 2017.

Double, M.C., Andrews-Goff, V., Jenner, K.C.S., Jenner, M.N., Laverick, S.M., Branch, T.A. and Gales, N.J. 2014. Migratory movements of pygmy blue whales (Balaenoptera musculus brevicauda) between Australia and Indonesia as revealed by satellite telemetry. PLOS ONE 9.

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.

Hanf, D. (2015). Species distribution modelling of western Pilbara inshore dolphins. Masters Thesis. Murdoch University. 130pp.

Haughey, R., Hunt, T., Hanf, D., Rankin, R. W., and Parra, G. J. (2020). Photographic capture-recapture analysis reveals a large population of Indo-Pacific bottlenose dolphins (Tursiops aduncus) with low site fidelity off the North West Cape, Western Australia. Frontiers in Marine Science 6. https://doi.org/10.3389/fmars.2019.00781.

Imbricata (2013). Wheatstone Project Technical Baseline Report: Marine Turtle Baseline Studies and Lighting Assessment in the Ashburton Area, Western Australia (2013). Unpublished report prepared for Chevron Australia.

Irvine, L.G., Thums, M., Hanson, C.E., McMahon, C.R. and Hindell, M.A. 2018. Evidence for a widely expanded humpback whale calving range along the Western Australian coast. Marine Mammal Science 34,294–310.

Jefferson, T.A. and Rosenbaum, H.C. 2014. Taxonomic revision of the humpback dolphins (Sousa spp.), and description of a new species from Australia. Marine Mammal Science 30, 1494–1541.

Lavers JL, Humphreys-Williams E, Crameri NJ, Bond AL (2020) Trace ekement concentrations feathers from three seabird species breeding in the Timor Sea. Marine Pollution Bulletin 151. 110876

Moro D and MacAuley (2010). A guide to the reptiles of Barrow Island. Chevron Australia. ISBN: 9780987112026.

Nicholson LW (2002). Breeding strategies and community structure in an assemblage of tropical seabirds on the Lowendal Islands, Western Australia. Unpublished PhD Thesis, Murdoch University, Perth, Western Australia.

O2 Marine (2021). Marine fauna desktop study: Desktop study for Mineral Resources: https://www.epa.wa.gov.au/sites/default/files/Referral_Documentation/CMS18094%20-%20Appendix%20K%20-%20Marine~%20Project%20-%20Onslow%20Iron%20Pty%20Ltd.PDF

Pendoley Environmental. (2019). Perdaman Urea project: Marine Fauna Desktop Assessment. Prepared for Cardni Inc.

Pitman, R., Totterdell, J., Fearnbach, H., Ballance, L., Durban, J.W. and Kemps, H. 2014. Whale killers: Prevalence and ecological implications of killer whale predation on humpback whale calves off Western Australia. Marine Mammal Science 31, 629–657.

Raudino, H.C., Hunt, T.N. and Waples, K.A. Records of Australian humpback dolphins (Sousa sahulensis) from an offshore island group in Western Australia. Mar Biodivers Rec 11, 14 (2018). https://doi.org/10.1186/s41200-018-0147-0

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

Shire of Exmouth, Department of Conservation and Land Management, and National Parks and Nature Conservation Authority (1999). Jurabi and Bundegi Coastal Parks and Muiron Islands Management Plan 1999-2009. Perth W.A.

Sleeman, J.C., Meekan, M.G., Fitzpatrick, B.J., Steinberg, C.R., Ancel, R. and Bradshaw, C.J.A. 2010. Oceanographic and atmospheric phenomena influence the abundance of whale sharks at Ningaloo Reef, Western Australia. Journal of Experimental Marine Biology and Ecology 382, 77–81.

Sutton A.L. and Shaw J.L. (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.

Thums, M., C. Ferreira, L., Jenner, C., Jenner, M., Harris, D., Davenport, A., Andrews-Goff, V., Double, M., Möller, L., Attard, C. R., Bilgmann, K., G. Thomson, P., and McCauley, R. (2022). Pygmy blue whale movement, distribution and important areas in the Eastern Indian Ocean. Global Ecology and Conservation, 35, e02054. https://doi.org/10.1016/j.gecco.2022.e02054

Waayers D (2010). A holistic approach to planning for wildlife tourism: a case study of marine turtle tourism and conservation in the Ningaloo Region, Western Australia. Unpublished PhD Thesis, Murdoch University, Perth, Western Australia.

Weller, D., Kidd, L., Lee, C., Klose, S., Jaensch, R. and 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.

Whiting, S., Tucker, T., Pendoley, K., Mitchell, N., Bentley, B., Berry, O., FitzSimmons, N. (2018). Final Report of Project 1.2.2 prepared for the Kimberley Marine Research Program, Western Australian Marine Science Institution, Perth, Western Australia, 146 pp.

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 area
	Chevron (2022) MEQMP Compliance report and data (ABU221200858)	Chevron	Barrow Island
	Chevron (2022) Wheatstone Platform Environmental Monitoring Program – draft report. 60672341 Wheatstone 5 Yearly Monitoring Technical Report- Rev A	Chevron	Wheatstone Platform
	Chevron (2018) Wheatstone Platform Waste Water Discharges Model Verification Report (ABU190601699)	Chevron	Wheatstone Platform
	Chevron (2022) Gorgon Backfill Fields Benthic Survey 2022 (ABU230100068)	Chevron	Gorgon Backfill Fields
	Pilbara Ports Authority (2019) Marine Environmental Quality Program	Pilbara Ports Authority	Dampier Dampier Archipelago Port Hedland
	O2 Marine (2020) Mardie Project- Marine Water Quality. Prepared for Mardie Minerals Pty Ltd. Report Number R190056	O2 Marine	Mardie
	Port of Broome- Ongoing Marine Monitoring Program. By O2 Marine for Kimberley Ports Authority	Kimberley Ports Authority	Broome Kimberley
	Proposed Browse to North West Shelf Project, Appendix D.1: Browse to NWS Project Trunkline Route Surveys (2019) Environmental Survey Report. Neptune Document J11200-1-RR-006	Advisian/Neptune	Kimberley Marine Park Continental Slope Demersal Fish KEF Agro-Rowley Terrace Marine Park

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
	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
	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**

Receptor	Existing baseline monitoring	Source / Data Custodian	Spatial extent
	Proposed Browse to North West Shelf Project, Appendix D.1: Browse to NWS Project Trunkline Route Surveys (2019) Environmental Survey Report. Neptune Document J11200-1-RR-006	Advisian/Neptune	Kimberley Marine Park Continental Slope Demersal Fish KEF Agro-Rowley Terrace Marine Park Ancient Coastline at 125 m Depth Contour KEF
Intertidal and coastal habitats	Chevron (2019) Wheatstone LNG Project Mangrove Monitoring Program 2019 (ABU200800053)	Chevron	Onslow
	DBCA (long-term monitoring) Ningaloo Reef Program	DBCA	Ningaloo
	360 Environmental (2017) Learmonth Habitat Surveys. Prepared for Subsea 7	Subsea 7	Exmouth Gulf
	Woodside (ongoing unpublished data) Chemical and Ecological Monitoring of Mermaid Sound	Woodside	Burrup Peninsula Dampier
	AECOM (2022) Assessment of Benthic Communities and Habitats Ashburton Salt Project. Prepared for K + S Australian Pty Ltd. Doc No. 60692048_4.	K + S Australian Pty Ltd	Ashburton Onslow area
	Reef R and Lovelock C (2019). Characteristics of landward expansion of mangrove forests with sea level rise. Geophysical Research Abstracts 21(1), 1.	Monash University	Exmouth Gulf
	DBCA (2019) Ecological monitoring in the Shark Bay marine reserves, DBCA, Perth.	DBCA	Shark Bay
	Sutton AL and Shaw LL (2020) A snapshot of Marine Research in Shark Bay (Gathaagudu): Literature Review and Metadata Collection (1949-2020). West Australian Marine Science Institution, 180.	WAMSI	Shark Bay
	Sutton AL and Shaw JL (2021) Cumulative Pressures on the Distinctive Values of Exmouth Gulf. First draft report to the Department of Water and Environmental Regulation by the Western Australian Marine Science Institution, Perth, Western Australia. 272 pages.	WAMSI	Exmouth Gulf

Receptor	Existing baseline monitoring	Source / Data Custodian	Spatial extent
	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
Benthic habitat	Chevron (2019) Jansz-Io Subsea Compression Benthic Video Footage Review (G7-NT-REPX0000239)	Chevron	Jansz-Io Field
	Chevron (2022) WHS Platform Environmental Monitoring Program – DRAFT REPORT 60672341, Wheatstone Platform 5 Yearly Monitoring Technical Report-Rev A	Chevron	Wheatstone Platform

Receptor	Existing baseline monitoring	Source / Data Custodian	Spatial extent
	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
	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

Receptor	Existing baseline monitoring	Source / Data Custodian	Spatial extent
			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
	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

Receptor	Existing baseline monitoring	Source / Data Custodian	Spatial extent
			Delambre Island
	Thompson DP, Babcock RC, Evans RD, Feng M, Moustaka M, Orr M, Slawinski D, Wilson S, Hoey A (2021) Coral larval recruitment in north-western Australia predicted by regional and local conditions. Marine Environmental Research 168: 105318	CSIRO	Dampier Archipelago Regnard Island Eaglehawk Island Dockrell Reef Enderby Island Goodwyn Island Malus Island Conzinc Island Gidley Island Hammersley Shoal Legendre Island Delambre Island
	Adam A., Thomas L, Underwood J, Gilmour J, Richards Z (2022) Population connectivity and genetic offset in the spawning coral *Acropora digitifera* in Western Australia. Molecular Ecology.	Curtin University	Ashmore Reef Lalang-garram Marine Park Reefs Beagle Reef Adele Island 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

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

Receptor	Existing baseline monitoring	Source / Data Custodian	Spatial extent
			Darwin Harbour Arafura Arnhem Marmion Rottnest Island Geographe Bay
	Ningaloo Outlook	CSIRO	Ningaloo Coast World Heritage Area
	Gilmour JP, Cook KL, Ryan NM, Puotinen ML, Green, RH, Shedrawi G, Hobbs J-P A, Thompson, DP, Badcock, R, Buckee J, Foster T, Richards ZT, Wilson SK, Barnes PB, Coutts TB, Radford BT, Piggott CH, Depczynski M, Evans SN, Schoepf V, Evans RD, Halford AR, Nutt CD, Bancroft KP, Heyward AJ, Oades D (2019) The state of Western Australia's coral reefs. Coral Reefs https://doi.org/10.1007/s00338-019-01795-8	AIMS	Western Australia Cocos Keeling Islands Ashmore Reef Scott Reef Rowley Shoals Montebello Islands Group Barrow Island Ningaloo Reef Shark Bay
	Lincoln G, Mathews D, Oades D with the Balanggarra, Bardi Jawi, Dambimangari, Karajarri, Mayala, Nyangumarta, Nyul Nyul, Wunambal Gaambera 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	Kimberley

Receptor	Existing baseline monitoring	Source / Data Custodian	Spatial extent
		Western Science Partners	
	Heyward A, Miller K, Fromont J, Keesing J, Parnum I (EDS.) (2018). Kimberley Benthic Biodiversity Synthesis Report of Project 1.1.1 prepared for the Kimberley Marine Research Program, Western Australian Marine Science Institution, Perth, Western Australia, 57pp.	WAMSI AIMS	Kimberley Camden Sound Bonaparte Archipelago Eclipse Archipelago Lalang-garram Marine Park Reefs
	Port of Broome- Ongoing Marine Monitoring Program. By O2 Marine for Kimberley Ports Authority	Kimberley Ports Authority	Broome Kimberley
	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

Receptor	Existing baseline monitoring	Source / Data Custodian	Spatial extent
			Roebuck Bay
Marine fish and elasmobranchs	Chevron (2019) Jansz-Io Subsea Compression Benthic Video Footage Review (G7-NT-REPX0000239)	Chevron	Jansz-Io field
	Chevron (2021) Wheatstone Sawfish Progress Report	Chevron	Onslow area
	Chevron (2022) Gorgon Backfill Fields Benthic Survey 2022 (ABU230100068)	Chevron	Gorgon Backfill Fields
	DBCA (long-term monitoring) Ningaloo Reef Program	DBCA	Ningaloo
	Wahab MAA, Radford B, Cappo M, Colquhoun J, Stowar M, Depczynski M, Miller K, Heyward A (2018) Biodiversity and spatial patterns of benthic habitat and associated demersal fish communities at two tropical submerged reef ecosystems Coral Reefs, 37, 327-343, 10.1007/s00338-017-1655-9	AIMS	Glomar Shoal Rankin Bank
	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

Receptor	Existing baseline monitoring	Source / Data Custodian	Spatial extent
	McLean D and Birt M. (2021) Enhanced ROV survey of tropical fish and benthic communities associated with shallow oil and gas platforms. Research Square	AIMS	Varanus Island
	McLean DL, Vaughan BI, Malseed BE, Taylor MD (2020) Fish-habitat associations on a subsea pipeline within an Australian Marine Park, Marine Environmental Research 123, 104813	AIMS	Montebello Australian Marine Park
	Sutton AL and Shaw LL (2020) A snapshot of Marine Research in Shark Bay (Gathaagudu): Literature Review and Metadata Collection (1949-2020). West Australian Marine Science Institution, 180.	WAMSI	Shark Bay
	Sutton AL and Shaw JL (2021) Cumulative Pressures on the Distinctive Values of Exmouth Gulf. First draft report to the Department of Water and Environmental Regulation by the Western Australian Marine Science Institution, Perth, Western Australia. 272 pages.	WAMSI	Exmouth Gulf
	DBCA (2023), Biodiversity and Conservation Science Annual Report 2022–23, Department of Biodiversity, Conservation and Attractions, Perth. Benefits of marine parks for marine fishes in a changing climate (SP 2021-040)	DBCA	WA State Marine Parks
	DBCA (2023), Biodiversity and Conservation Science Annual Report 2022–23, Department of Biodiversity, Conservation and Attractions, Perth. Do marine reserves adequately represent high diversity cryptobenthic fish assemblages in a changing climate? (SP 2019-031)	DBCA	Ningaloo
	National Reef Monitoring Network	The IMOS National Reef Monitoring Network sub-Facility	Houtman Abrolhos Islands Ningaloo Coast World Heritage Area Exmouth Gulf Dampier Archipelago Island Group Barrow Island Montebello Islands Group Ashmore Reef Cartier Island Darwin Harbour

Receptor	Existing baseline monitoring	Source / Data Custodian	Spatial extent
			Arafura Arnhem Marmion Rottnest Island Geographe Bay
	Lear KO, Ebner BC, Fazeldean T, Bateman RL, Morgan DL (2024) Effects of coastal development on sawfish movements and the need for marine animal crossing solutions. Conservation Biology, e14263. https://doi.org/10.1111/cobi.14263	Murdoch University	Onslow area
	Feutry P, Laird A, Davies CL, Devloo-Delva F, Fry G, Johnson G, Gunasekara RM, Marthick J, Kyne PM (2021) Population structure of Narrow Sawfish *Anoxypristis cuspidata* across northern Australia. Report to the National Environmental Science Program Marine Biodiversity Hub. CSIRO, Charles Darwin University, and NPF Industry Pty Ltd.	CSIRO	Kimberley Northern Territory coastline
	Heupel M, Simpfendorfer C, Chin A, Appleyard S, Barton D, Green M, Johnson G, McAuley R and White W (2020) Examination of connectivity of hammerhead sharks in northern Australia. Report to the National Environmental Science Program, Marine Biodiversity Hub. Australian Institute of Marine Science.	AIMS	Exmouth Gulf Broome
	Morgan DL, Lear KO, Dobinson E, Gleiss AC, Fazeldean T, Pillans RD, Beatty SJ and Whitty JM (2021) Seasonal use of a macrotidal estuary by the endangered dwarf sawfish, *Pristis clavata*. Aquatic Conservation Marine and Freshwater Ecosystems 31(8):2164–2177. doi: 10.1002/aqc.3578	CSIRO	Kimberley Fitzroy River King Sound
	Port of Broome- Ongoing Marine Monitoring Program. By O2 Marine for Kimberley Ports Authority	Kimberley Ports Authority	Broome Kimberley
	West K, Travers MJ, Stat M, Harvey ES, Richards ZT, DiBattista JD, Newman SJ, Harry A, Skepper CL, Heydenrych M, Bunce M (2021) Large-scale eDNA metabarcoding survey reveals marine biogeographic break and transitions over tropical north-western Australia. Divers Distrib. 27: 1942–1957. https://doi.org/10.1111/ddi.13228	Trace and Environmental DNA (TrDNA) Laboratory, Curtin University	Kimberley
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 (2022) Gorgon Gas Development – Marine Turtle Monitoring Program 2021/22: Barrow Island and Mundabullangana ABU220800133	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
Marine megafauna (whale shark, dugong and cetaceans)	Chevron (2019) Soundscape monitoring at JIC site (G1-NT-REPX0000361)	Chevron	Barrow Island
	Chevron (2023) Soundscape Monitoring at the JIC Site 2021-2023	Chevron	Barrow Island
	Raudino HC, Hunt TN, Waples KA (2018) Records of Australian humpback dolphins (*Sousa sahulensis*) from an offshore island group in Western Australia. Marine Biodiversity Records 11:14	DBCA	Montebello Islands
	Raudino HC, Douglas CR, Waples KA (2018) How many dolphins live near a coastal development? Regional Studies in Marine Science 19: 25-32	DBCA	Onslow Area Thevenard Island
	Sprogis K and Parra G (2022) Coastal dolphin and marine megafauna in Exmouth Gulf, Western Australia: informing conservation management actions in an area under increasing human pressure. Wildlife Research, 50(6): 435-450	UWA	Exmouth Gulf
	Wild S, Krutzen M, Rankin M, Hoppitt W, Gerber L, Allen S (2019) Long-term decline in survival and reproduction of dolphins following a marine heatwave. Current Biology 29, R225-R240	University of Leeds	Shark Bay
	Thums M, Ferreira LC, Jenner C, Jenner M, Harris D, Davenport A, Andrews-Goff V, Double M, Moller L, Attard CRM, Bilgmann K, Thomson PG, McCauley R (2022) Pygmy blue whale movement, distribution and important areas in the Eastern Indian Ocean. Global Ecology and Conservation 35 e02054	AIMS	Western Australia
	ECOCEAN Whale Shark Photo-Identification Library	Ecocean	Ningaloo
	AIMS (2021) Individual haplotyping of whale sharks from seawater environmental DNA.	AIMS	Ningaloo
	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

Receptor	Existing baseline monitoring	Source / Data Custodian	Spatial extent
	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 Dampier Area Dampier Archipelago Karratha

Receptor	Existing baseline monitoring	Source / Data Custodian	Spatial extent
			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 Darwin Harbour Tiwi Islands Groote Archipelago

Receptor	Existing baseline monitoring	Source / Data Custodian	Spatial extent
	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 Yampi Sound Prince Regent River Cambridge Gulf

Receptor	Existing baseline monitoring	Source / Data Custodian	Spatial extent
			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
	Thums M, Jenner C, Waples K, Salgado Kent C and Meekan M (2018) Humpback whale use of the Kimberley; understanding and monitoring spatial distribution. Report of Proposal 1.2.1 prepared for the Kimberley Marine Research Program, Western Australian Marine Science Institution, Perth, Western Australia, 78pp. Tourism WA. Shire of Broome visitor factsheet. Three-year average 2015/2016/2017. Produced by Tourism WA – Strategy and Research.	AIMS WAMSI	Kimberley

Receptor	Existing baseline monitoring	Source / Data Custodian	Spatial extent
Seabirds and shorebirds	Chevron Env-Gor-Seabird Monitoring Report 2021/22 J01209 (ABU220500068)	Chevron	Ah Chong Island (Montebello group) Double Island North Double Island South Parakeelya Island Barrow Island Group
	Dunlop JN. and Greenwell C (2021) Seasonal movements and metapopulation structure of the Australian fairy tern in Western Australia. Pacific Conservation Biology, 27, 47-60	Conservation Council of Western Australia	Stewart Island Fortescue Island Mardie Island Regnard Island Scholl Island Shark Bay Exmouth Gulf Somerville Island Tent Island Hope Point Houtman Abrolhos Islands Ningaloo Coast
	Weller D, Kidd L, Lee C, Klose S, Jaensch R, Driessen J (2020) Directory of Important Habitat for Migratory Shorebirds in Australia. Prepared for Australian Government Department of Agriculture, Water and the Environment by BirdLife Australia, Melbourne	Birdlife Australia	Barrow Island Carnarvon Coral Bay Exmouth Gulf Houtman Abrolhos Islands Karratha

Receptor	Existing baseline monitoring	Source / Data Custodian	Spatial extent
			Ningaloo Onslow Area Port Hedland Adele Island Lacepede Islands 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

Receptor	Existing baseline monitoring	Source / Data Custodian	Spatial extent
	Woodside Case Study: Ningaloo Region Migratory Shorebirds of Exmouth Gulf (Birdlife)	Woodside Birdlife Australia	Exmouth Gulf Giralia Station
	DBCA shorebird surveys of Montebello Islands and Bedout Island in 2017 and 2018 mentioned in: Australian National Report to the 19th JAMBA, 13th CAMBA and 6th ROKAMBA Consultative Meetings, Commonwealth of Australia 2018	DBCA	Bedout Island Montebello Islands
	Roger DI, Scroggie MP, Hassell CJ (2020) Review of long-term shorebird monitoring in north Western Australia. Arthur Rylah Institute for Environmental Research. Technical Report Series No. 313. Prepared for DBCA	Arthur Rylah Institute DBCA	Roebuck Bay Eighty Mile Beach Bush Point
	Pendoley Environmental (2021) Varanus and Airlie Islands Shearwater Monitoring Annual Report 2020	Santos	Lowendal Islands Group Airlie Island 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	Roebuck Bay Eighty Mile Beach

Receptor	Existing baseline monitoring	Source / Data Custodian	Spatial extent
		Netherlands Institute for Sea Research Global Flyway Network Australasian Wader Studies Group	

Appendix E: OSM Services Provider Call Out Order Form

OSRL

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	

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.