APPENDIX F: OPERATIONAL AND SCIENTIFIC MONITORING PLAN

Eureka 3D MSS: OSM Bridging Implementation Plan

Revision	Date	Reason for issue	Reviewers	Approvers
A	16/03/2023	Internal Review		
B	09/08/2023	Internal Review		
0	06/12/2023	Issued for Use	RPS	RPS

Contents

Acronyms 3
Part A – Preparedness 5
1. Introduction 5
2. EMBA and Monitoring Priorities 7
3. Relevant Existing Baseline Information Sources 11
3.1 Australian Ocean Data Network 11
3.2 Western Australian Oil Spill Response Atlas 11
3.3 The Atlas of Living Australia 11
3.4 Index of Marine Surveys for Assessment 11
3.5 Other Sources 11
4. Baseline Data Review 12
5. OSM Organisational Structure 15
6. OSM Roles and Responsibilities 17
7. Mobilisation and Timing of OMP and SMP implementation 17
8. Resource Requirements 22
9. Capability Arrangements 26
9.1 Personnel Competencies 26
9.2 Equipment 26
9.3 Exercises 27
10. Capability Assessment 27
11. Review of Plan 30
Part B – Implementation 31
12. Activation Process 31
13. Monitoring Priorities 32
14. Protected Matters Requirements 33
15. Finalising Monitoring Design 33
16. Mobilisation 34
17. Permits and Access Requirements 35
18. Use of Data in Response Decision-making 39
18.1 Operational Monitoring to Inform Response Activities 39
18.2 Impacts from Response Activities 42
18.3 Operational Monitoring of Effectiveness of Control Measures and to Ensure EPS are Met 42
19. Data Management 42
20. Quality Assurance and Quality Control 42
21. Communication Protocols 42

21.1 OSM Services Provider/s 42
21.2 External Stakeholders 43
22. Stand Down Process 43
23. References 44
Appendix A Baseline data sources 46
Appendix B Protected Matters in the EMBA 50

List of Tables

Table 1-1: Key documents in Titleholder's environmental management framework 5
Table 2-1: Key Ecological Features in the EMBA 7
Table 2-2: Spill Modelling Results for MGO spill with a Probability of Contact >5% and <7 days (RPS, 2023) 9
Table 4-1: Assessment Criteria for Baseline Data Review 12
Table 4-2: Recommended Priority Monitoring Locations versus SMPs 14
Table 6-1: Roles and Responsibilities for OSM 17
Table 7-1: Indicative OMP and SMP Implementation Schedule for OSM Activities if Initiation Criteria are Met 18
Table 8-1: Resources Required for Key OSM Coordination Roles 22
Table 8-2: Resources Required for Implementing OMPs 22
Table 8-3: Resources Required for Implementing SMPs 23
Table 9-1: Worked Example – OSM Services Provider Standby and Implementation Services 26
Table 9-2: OSM equipment 27
Table 10-1: OSM Capability 28
Table 12-1: OSM Activation Process 31
Table 13-1: Checklist for Determining Monitoring Priorities 32
Table 14-1: Checklist for Inclusion of Protected Matters into Monitoring Designs 33
Table 15-1: Checklist for Finalising Monitoring Design 33
Table 16-1: Checklist for Mobilisation of Monitoring Teams 34
Table 17-1: Permits Required in EMBA 36
Table 18-1: Data Generated from Each OMP and How this May be used by IMT in Decision Making 40

List of Figures

Figure 1-1: Relationship between the OSM-BIP, OPEP and EP during a Spill Response 6
Figure 5-1: Pilot Energy IMT Structure 15
Figure 5-2: Pilot Energy IMT Structure with OSM Team 16

Acronyms

Abbreviation/Acronym	Definition
AFMA	Australian Fisheries Management Authority
AIMS	Australian Institute of Marine Science
AIIMS	Australasian Integrated Incident Management System
ALA	Atlas of Living Australia
AMSA	Australian Maritime Safety Authority
AODN	Australian Ocean Data Network
APPEA	Australian Petroleum Production and Exploration Association
BTEXN	Benzene, toluene, ethylbenzene, xylene and naphthalene
BIA	Biologically Important Areas
CoC	Chain of Custody
CSIRO	Commonwealth Scientific and Industrial Research Organisation
DBCA	Western Australian Department of Biodiversity Conservation and Attractions
DCCEEW	Department of Climate Change, Energy, the Environment and Water (Cwth)
DWER	Western Australian Department of Water and Environmental Regulation
DoT	Western Australian Department of Transport
DPIRD	Western Australian Department of Primary Industries and Resource Development
EMBA	Environment that may be Affected
EP	Environment Plan
EPBC Act	*Environment Protection and Biodiversity Protection Act 1999* (Cwth)
EUL	Environment Unit Lead
GIS	Geographic Information System
GPS	Global Positioning System
IAP	Incident Action Plan
ICS	Incident Command System
IMOS	Integrated Marine Observing System
IMSA	Index of Marine Surveys for Assessments
IMT	Incident Management Team
IMT Leader	Incident Management Team Leader. Equivalent to an Incident Controller or Incident Commander.
IPIECA	International Petroleum Industry Environmental Conservation Association
KEF	Key Ecological Feature
MMO	Marine Mammal Observer
MSS	Marine Seismic Survey
OMP	Operational Monitoring Plan
OPEP	Oil Pollution Emergency Plan
OPGGS (Env)	Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2009
OSM	Operational and Scientific Monitoring

Abbreviation/Acronym	Definition
OSM-BIP	Operational and Scientific Monitoring – Bridging Implementation Plan
OSRA	Oil Spill Response Atlas
OSTM	Oil Spill Trajectory Modelling
PAH	Polycyclic Aromatic Hydrocarbons
PPE	Personal Protective Equipment
QA/QC	Quality Assurance and Quality Control
SIMA	Spill Impact Mitigation Assessment
SMP	Scientific Monitoring Plan
UWA	University of Western Australia
WAMSI	Western Australian Marine Science Institution

Part A – Preparedness

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

1. Introduction

Pilot Energy 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 operational and scientific monitoring approach. The Joint Industry OSM Framework is available on the APPEA Environment Publications Webpage. Use of the Joint Industry OSM Framework requires each Titleholder to develop a Bridging Implementation Plan (OSM-BIP) (this plan) that fully describes how the Framework interfaces with Titleholders own activities, spill risks and internal management systems.

Table 1-1 describes key documents that form Pilot Energy's environmental management document framework.

Activation of OSM should follow the process listed in Part B: Section 12 Activation Process.

Table 1-1: Key documents in Titleholder's environmental management framework

Document	Description
Eureka 3D Marine Seismic Survey (MSS) Environment Plan (EP)	The Eureka 3D MSS EP describes the activity and the location, the environment, the risks to the environment as a result of the activity and the associated management controls. Of particular relevance to this plan, it identifies sensitive receptors, potential impacts from hydrocarbon spills and the environment that may be affected (EMBA)
Eureka 3D MSS Oil Pollution Emergency Plan (OPEP) (Appendix E)	The OPEP outlines preparedness and response arrangements for the worst-case credible spill scenario that may occur as a result of the Eureka 3D marine seismic survey. It describes the relevant spill management arrangements for the various jurisdictions within the Environment that May be Affected, the process for selecting response strategies and the appropriateness of available response strategies for each scenario. The plan also provides response implementation guidance for each response strategy.
Emergency Response Procedure (PE-05-PRO-003)	Outlines the actions to be taken in the event of an emergency situation occurring at Pilot Energy's operations. This includes the arrangements for the planning, development and communication of emergency preparedness/ response procedures for the effective management of emergencies at Pilot projects.
Incident Management Procedure (PE-07-PRO-001)	Outlines the requirements for incident management at Pilot Energy including responsibilities, response procedures, reporting, incident classification, investigation, notifiable incidents and record management.
Emergency Management Contacts Directory (or similar)	Provide a summary of what is included in this document. **Worked example**: This document contains all relevant contact and communications information to enable effective communication amongst the response personnel and external stakeholders, including relevant OSM contacts. State frequency it is updated

Figure 1-1 illustrates how the OSM-BIP, OPEP and EP relate to each other during a spill response. Operational and scientific monitoring should commence when the initiation criteria outlined in Tables 5-1 and 6-1 of the Joint Industry OSM Framework are met.

Note: the monitor and evaluate strategy in the Eureka 3D MSS OPEP(Appendix E – Section 6) includes a wide range of tactics, including oil spill trajectory modelling that is often included in

operational monitoring. Pilot Energy has retained spill modelling in the OPEP to ensure data inputs are managed by the Pilot Energy IMT and rapidly fed into the Common Operating Picture with other monitor and evaluate tactics during the initial stages of the spill.

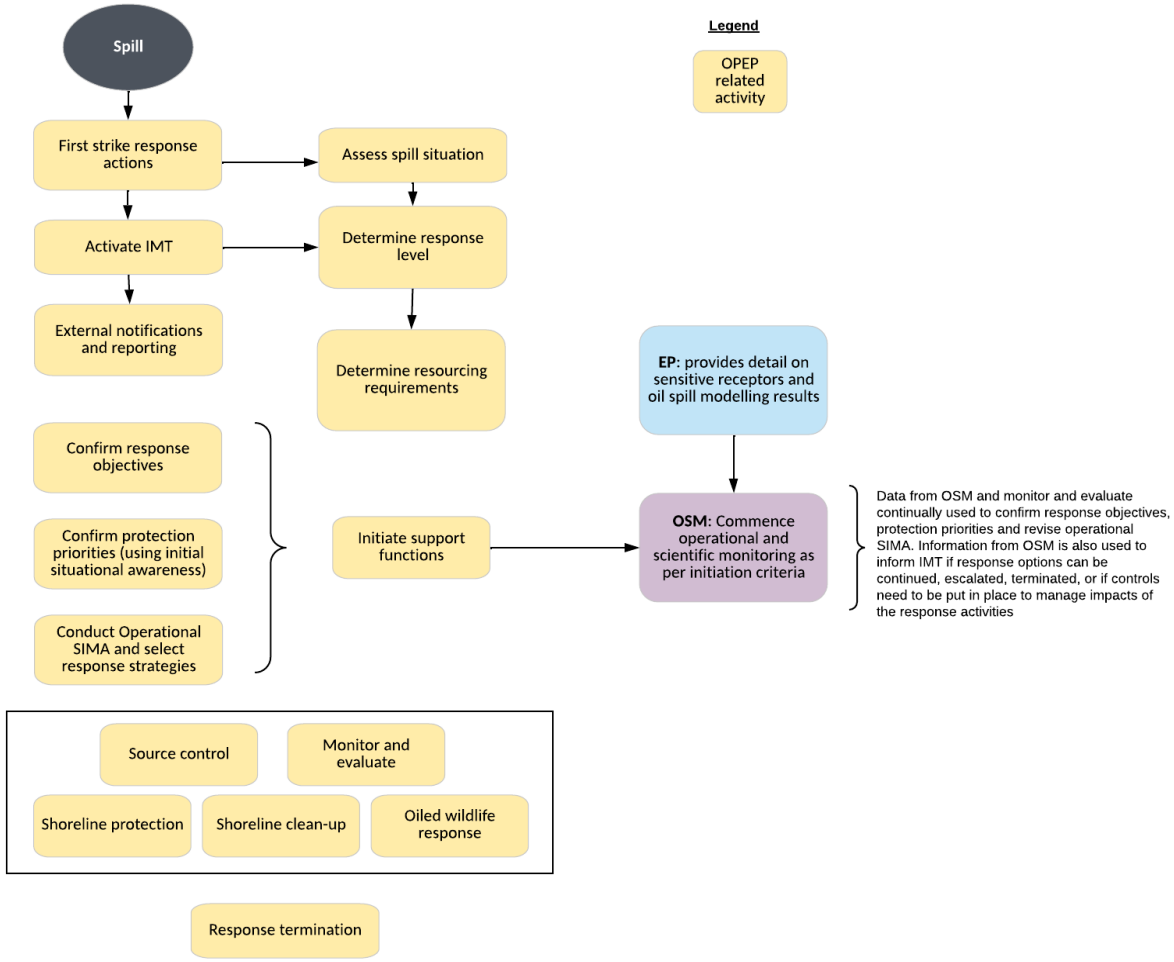


Figure 1-1: Relationship between the OSM-BIP, OPEP and EP during a Spill Response

2. EMBA and Monitoring Priorities

The EMBA is defined in the Eureka 3D MSS EP (Section 4) as the area potentially impacted by hydrocarbons from a spill event above impact concentration thresholds. The EMBA was determined using stochastic modelling results of oil spill trajectory modelling for a vessel spill in the south-east corner of the Operational Area (scenario 1) (RPS, 2023) from 100 simulations and applying the following thresholds:

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

Detailed information on the spill risks, modelling analysis of scenarios and response protection priorities is provided in the Eureka 3D MSS EP (Section 8.6) and Eureka 3D MSS OPEP (Appendix G – Section 3).

Monitoring priorities have been drawn from the stochastic modelling results (RPS, 2023). These priorities were identified through analysis of hydrocarbon spill modelling results against the location of key sensitive receptors with high conservation value; including habitat, species (e.g. State/Commonwealth protected areas, protected species), the sensitivity and/or recoverability of receptors to hydrocarbon impacts, and important socio-economic/heritage values. Monitoring priorities were identified as those sensitive receptors contacted by entrained hydrocarbons at the low threshold (≤10 ppb) and floating hydrocarbons at the low threshold (≤1 g/m^2) within 7 days at a probability > 5%, as listed in Table 2-2. Modelling did not predict any shoreline accumulation at the low threshold (≤10 g/m^2) at greater than 5% probability and at less than 7 days for the worst-case scenario.

In addition to these locations, there are receptors that are transient (i.e. cetaceans, seabirds) and others that are broadscale, such as managed fisheries with large spatial extents, Key Ecological Features (KEFs) and Biologically Important Areas (BIAs). These receptors are described in detail in the Eureka 3D MSS EP (Section 4). Table 2-1 lists the KEFs within the EMBA and describes how they may be affected by the MGO spill.

The monitoring protection priority areas identified (Table 2-2) and KEFs potentially contacted are listed for planning purposes and are based on stochastic modelling data. Therefore, it is unlikely that all of these receptors would be contacted, or contacted within 7 days, during a spill event. During a spill event, Pilot Energy 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: Key Ecological Features in the EMBA

Key Ecological Feature	Impact Description
Ancient coastline at 90-120 m depth contour	Benthic biodiversity and productivity occur where the ancient coastline forms a prominent escarpment (Department of Sustainability, Environment, Water, Population and Communities [DSEWPC] , 2012). Benthic receptors associated with this KEF would be at a low risk of exposure to hydrocarbons from a surface spill due to the depth of water they occur.
Commonwealth marine environment surrounding the Houtman Abrolhos Island	The Houtman Abrolhos Islands and surrounding reefs support a unique mix of temperate and tropical species. The Houtman Abrolhos Islands are the largest seabird breeding station in the eastern Indian Ocean. They support more than one million pairs of breeding seabirds, .and include a range of benthic habitats and associated fisheries resources (DSEWPC, 2012).

Key Ecological Feature	Impact Description
	Coral and fish surrounding the Houtman Abrolhos islands may be at risk from entrained hydrocarbons. Birds may be at exposed directly and indirectly to entrained hydrocarbons during foraging activities.
Commonwealth marine environment within and adjacent to the west coast inshore lagoons	These lagoons are important for benthic productivity, including macroalgae and seagrass communities, and breeding and nursery aggregations for many temperate and tropical marine species. (McClatchie *et al.,* 2006) The lagoons are dominated by seagrass and epiphytic algae, which provide habitat and food for many marine species (directly and indirectly). Seagrass meadows occur in more sheltered areas and in the inter-reef lagoons along exposed sections of the coast while emergent reefs and small islands create a diverse topography. This mix of sheltered and exposed environments forms a complex mosaic of habitats. The lagoons are also important areas for the recruitment of commercially and recreationally important fishery species, including western rock lobster. Extensive schools of migratory fish visit the area annually, including herring, garfish, tailor and Australian salmon (McClatchie *et al*., 2006). Exposure to hydrocarbons can be toxic to seagrasses and macroalgae. Fishes are most vulnerable to hydrocarbons during their embryonic, larval and juvenile life stages.
Western demersal slope and associated fish communities	The western continental slope provides important habitat for demersal fish communities. The Demersal slope and associated fish communities of the Central Western Province are recognised as a KEF for their high levels of biodiversity and endemism. Given demersal fish species are found at depths below 400 m they are at low risk of exposure to hydrocarbons from a surface spill.
Western rock lobster	The Western rock lobster is defined as a KEF due to its presumed ecological role as an important part of the food web on the west coast continental shelf. Impacts from a hydrocarbon spill will vary depending on the level of exposure and duration of exposure, life stage, and location (shallow versus deep water habitats). Larval life stages are likely the most vulnerable to the effects of hydrocarbons.
Perth Canyon and adjacent shelf break, and other west coast canyons	The Perth Canyon is the largest known undersea canyon in Australian waters (DSEWPaC 2012a). Deep ocean currents rise to the surface, creating upwelling zones which support larger aggregations of small fish, crustaceans and molluscs, as well as varying epibiota. The west coast canyons are believed to be associated with small periodic upwellings that locally increase productivity and attract aggregations of marine life (DSEWPaC 2012a). The high productivity of biota feeding other marine life would be vulnerable to the effects of hydrocarbons and disruptions in the foodchain.

Table 2-2: Spill Modelling Results for MGO spill with a Probability of Contact >5% and <7 days (RPS, 2023)

Priority Monitoring Areas	Key Sensitivities (specific to location)	Key Sensitivities (throughout area)	Probability (%) of contact of ≥10 ppb entrained hydrocarbon	Min. arrival time ≥10 ppb entrained hydrocarbon (days)	Probability (%) of contact of ≥1 g/m^2 floating hydrocarbon	Min. arrival time ≥1 g/m^2 floating hydrocarbon (days)
Clio Bank (submerged) (situated in the Abrolhos special purpose zone)	-	• Extensive meadows of seagrass that grow in shallow lagoons which provide an important nursery habitat for juvenile fish and western rock lobster (CALM, 2000) • Abalone occur on intertidal reefs • Macroalgal communities • Humpback whale and bottlenose dolphins (*Tursiops truncatus*) regularly seen in the area (CALM, 2000) • White shark foraging • Inshore islands between Cliff Head and Grey are important breeding areas for seabirds (Dunlop and Wooller, 1990; CALM, 2004) • Seabird foraging • Sea lion foraging • Cultural heritage- mainland areas have been identified as a significant area for Noongar people	14	6.8	<1	NC
Geelvink Channel Shoals (submerged) (situated between the Houtman Abrolhos Islands and the mainland between Horrocks and Geraldton)	• Humpback whale migration • Seabird foraging • Shipping channel to and from Geraldton		41	5.2	<1	NC
Cliff Head – White Point	-		12	0.5	<1	NC
Illawong – Cliff Head and Beagle Islands Nature Reserve	• Australian sea lion breeding on East Beagle Island (CALM, 2004)		44 (Beagle Islands Nature Reserve: 20)	0.1 (Beagle Islands Nature Reserve: 0.5)	13 (Beagle Islands Nature Reserve:1)	0.1 (Beagle Islands Nature Reserve:0.9)
Leeman - Coolimba	-		21	1.0	1	1.3
Green Head - Leeman	• Australian sea lion breeding on North Fisherman Island (CALM 2000)		20	1.5	<1	NC

Priority Monitoring Areas	Key Sensitivities (specific to location)	Key Sensitivities (throughout area)	Probability (%) of contact of ≥10 ppb entrained hydrocarbon	Min. arrival time ≥10 ppb entrained hydrocarbon (days)	Probability (%) of contact of ≥1 g/m^2 floating hydrocarbon	Min. arrival time ≥1 g/m^2 floating hydrocarbon (days)
	• Boullanger Island dunnart is only found on Boullanger Island (CALM, 2004) • Dibblers are found on Boullanger and Whitlock islands (CALM, 2004)	– The coast area between Greenhead and Jurien has the largest number of midden deposits in the south-west of WA (CALM, 2004) – Coast dunes in the Jurien Bay region were used as burial sites (CALM, 2004) • Several shipwrecks have been recorded between Cliff Head and Grey (CALM, 2004)				
Jurien Bay Marine Park	-		20	1.5	<1	NC
Booker Valley – Island Point*	• Dibblers are found on Boullanger and Whitlock islands (CALM, 2004)		13	2.7	<1	NC
Thirsty Point – Booker Valley*	• Australian sea lion breeding on Buller Island (CALM, 2004)		12	4.0	<1	NC
Grey – Thirsty Point*	-		11	4.9	<1	NC
North Tail Reef* (submerged)	-		9	3.1	<1	NC
Sand Knoll Ledge* (submerged)	-		6	6.0	<1	NC
Direction Bank (submerged) (situated in the Jurien special purpose zone)	-		18	3.8	<1	NC

** Locations within Jurien Bay Marine Park*

3. Relevant Existing Baseline Information Sources

Pilot Energy has access to a number of different baseline data sources that are relevant to the high value receptors in the EMBA. These include:

3.1 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).

Access is via the following link https://portal.aodn.org.au/search

3.2 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 Department of Transport (DoT) Marine Safety and is part funded through the National Plan for Maritime Environmental Emergencies and the Australian Maritime Safety Authority (AMSA).

Access is via the following link https://www.transport.wa.gov.au/imarine/oil-spill-response-and-planning-tools.asp

3.3 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).

Access is via the following link https://www.ala.org.au/

3.4 Index of Marine Surveys for 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.

Access via the following link
https://biocollect.ala.org.au/imsa#max%3D20%26sort%3DdateCreatedSort

3.5 Other Sources

Reports and peer reviewed journal articles were also accessed via research and journal databases such as PubMed and Google Scholar.

Species recovery plans for various protected species and ecological communities can be found in using this link: http://www.environment.gov.au/cgi-bin/sprat/public/publicshowallrps.pl

The Marine Bioregional Plan for the South-west Marine Region (DSEWPC, 2012) describes the marine environment and conservation values (protected species, protected places and key ecological features) of the South-west Marine Region, and can be accessed using this link: https://www.dcceew.gov.au/environment/marine/marine-bioregional-plans/south-west

The South-west Marine Parks Network Management Plan (Director of National Parks, 2018) describes the marine environment and conservation values (protected species, protected places and key ecological features) of the Australian Marine Parks in the South-west Marine Region, including the Abrolhos Marine Park and the Jurien Marine Park.

In addition, some receptors within the Jurien Bay Marine Park (State waters) are included in ongoing monitoring as part of the Department of Biodiversity Conservation and Attractions (DBCA) Marine Monitoring Program.

4. Baseline Data Review

Pilot Energy has compiled a list of available baseline data relevant to the high value receptors in the EMBA (Baseline data sources) and reviewed this information to assess the spatial and temporal relevance of this data and comparison of methods and parameters to those outlined in the Joint Industry SMPs. This review focused on priority monitoring locations with a minimum hydrocarbon contact timeframe of less than 7 days for the worst-case spill (Section 2).

The criteria used during the baseline data review is outlined in Table 4-1.

Table 4-1: 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 = 2015–2020	High = > 4 years	High = 4+ sampling trips per year	High	High
Medium = 2010–2014	Medium = 2–4 years	Medium = 2–3 sampling trips per year	Medium	Medium
Low = <2010	Low = <2 years	Low = one-off sampling trip	Low	Low

This assessment was then used to determine if the available baseline data could be used to detect change in receptors at priority monitoring locations in the event of a significant impact. Table 4-2 compares priority monitoring locations and receptors, and provides guidance on where post-spill, pre-impact monitoring should be prioritised.

The different categories are listed in Table 4-2 include:

- Not applicable (N/A) – this receptor and relevant SMP is not applicable to the priority monitoring location (i.e. shoreline habitat not present at submerged shoals);
- Survey – current monitoring/knowledge is considered sufficient (i.e. could be used to detect level of change in the event of a significant impact) and is considered a lower priority for post-spill, pre-impact data collection; and
- Priority survey – current monitoring/knowledge is not in place, not suitable or not practicable; and post-spill pre-impact baseline data collection should be prioritised.

It is noted that it is difficult to obtain absolute statistical proof of oil spill impacts, due to the variability (spatially and temporally) of the natural environment, the lack of experimental control due to the nature of spills and because suitable baseline data may not be available (Kirby et al., 2018). Alternative approaches exist for detecting impacts where post-spill, pre-impact monitoring may not be feasible. These include impact versus control design approaches and/or a gradient approach. The

Joint Industry OSM Framework provides guidance and considerations for survey designs to enable the acquisition of sufficiently powerful data during SMP implementation.

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

Table 4-2: Recommended Priority Monitoring Locations versus SMPs

Location	SMP									
	Water quality impact assessment	**Sediment quality impact assessment**	**Intertidal and coastal habitat assessment**	**Seabirds and shorebirds**	**Marine mega-fauna assessment – Pinnipeds**	**Marine mega-fauna assessment – whale sharks, dugong and cetaceans**	**Benthic habitat assessment**	**Marine fish and elasmobranch assemblages assessment**	**Fisheries impact assessment**	**Heritage and social impact assessment**
Jurien Bay Marine Park*	Priority survey	Priority survey	Priority survey	Priority survey	Survey	Priority survey	Survey	Survey	Survey	Priority survey (Locations to be determined in consultation with key stakeholders)
Cliff Head – White Point	Priority survey	Priority survey	Priority survey	Priority survey	Survey	Priority survey	Priority survey	Priority survey	Survey	
Illawong – Cliff Head	Priority survey	Priority survey	Priority survey	Priority survey	Survey	Priority survey	Priority survey	Priority survey	Survey	
Leeman - Coolimba	Priority survey	Priority survey	Priority survey	Priority survey	Survey	Priority survey	Priority survey	Priority survey	Survey	
Green Head - Leeman	Priority survey	Priority survey	Priority survey	Priority survey	Survey	Priority survey	Priority survey	Priority survey	Survey	
Beagle Islands Nature Reserve	Priority survey	Priority survey	Priority survey	Priority survey	Survey	Priority survey	Priority survey	Priority survey	Survey	
Clio Bank (submerged)	Priority survey	Priority survey	N/A	Priority survey	Priority survey	Priority survey	Priority survey	Priority survey	Survey	
Direction Bank (submerged)	Priority survey	Priority survey	N/A	Priority survey	Survey	Priority survey	Priority survey	Priority survey	Survey	
Geelvink Channel Shoal (submerged)	Priority survey	Priority survey	N/A	Priority survey	Priority survey	Priority survey	Priority survey	Priority survey	Survey	

** Including Booker Valley – Island Point; Thirsty Point – Booker Valley; Grey -Thirsty Point; North Tail Reef; Sand Knoll Ledge*

5. OSM Organisational Structure

The IMT structure for Pilot Energy is based on the IPIECA Good Practice Guidelines – Incident Management System for the Oil and Gas Industry (IPIECA, 2014). This system aligns with the international Incident Command System (ICS) and the Australasian Integrated Incident Management System (AIIMS). The Incident Management Team (IMT) will be responsible for coordinating OSM activities, which will be led by the Planning Section within the IMT, with support from each Section, in particular the Operations Section.

The Pilot Energy IMT structure is shown in Figure 5-1.

Figure 5-2 illustrates the structure of the OSM Management Team during the response phase. The IMT Leader is ultimately accountable for managing the response operation, which includes this plan. Depending on the scale of the event, individual people may perform multiple roles; similarly, multiple people may share the same role.

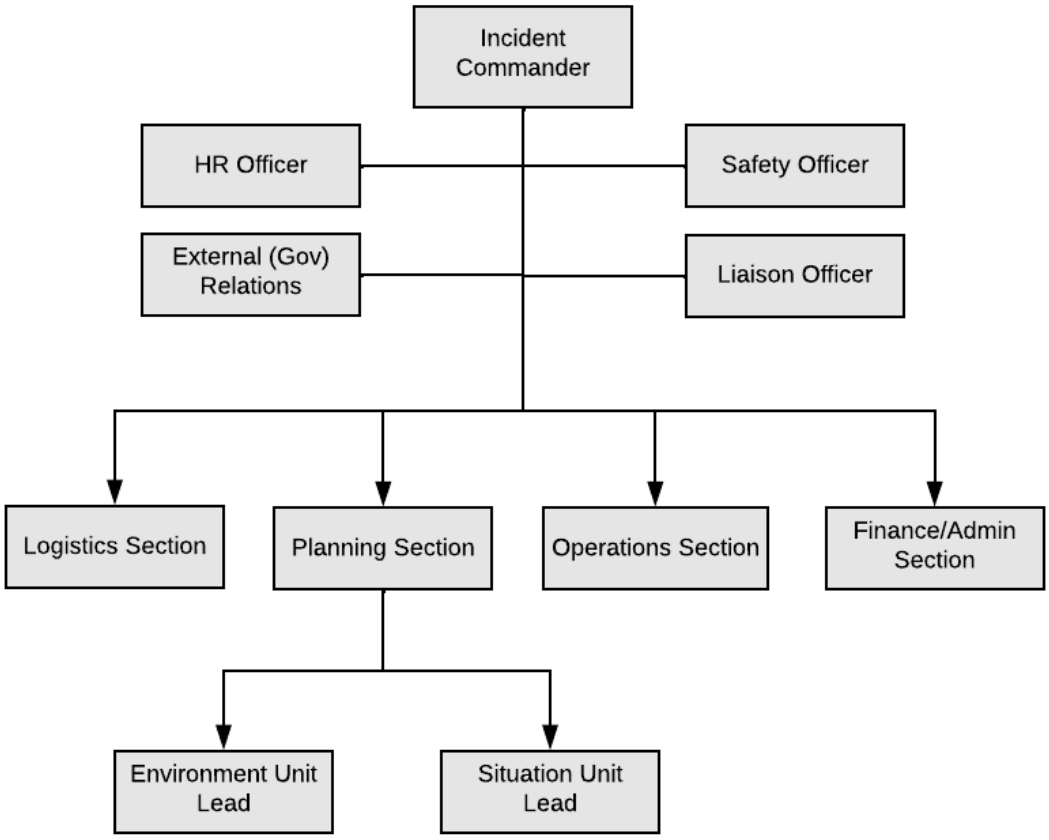


Figure 5-1: Pilot Energy IMT Structure

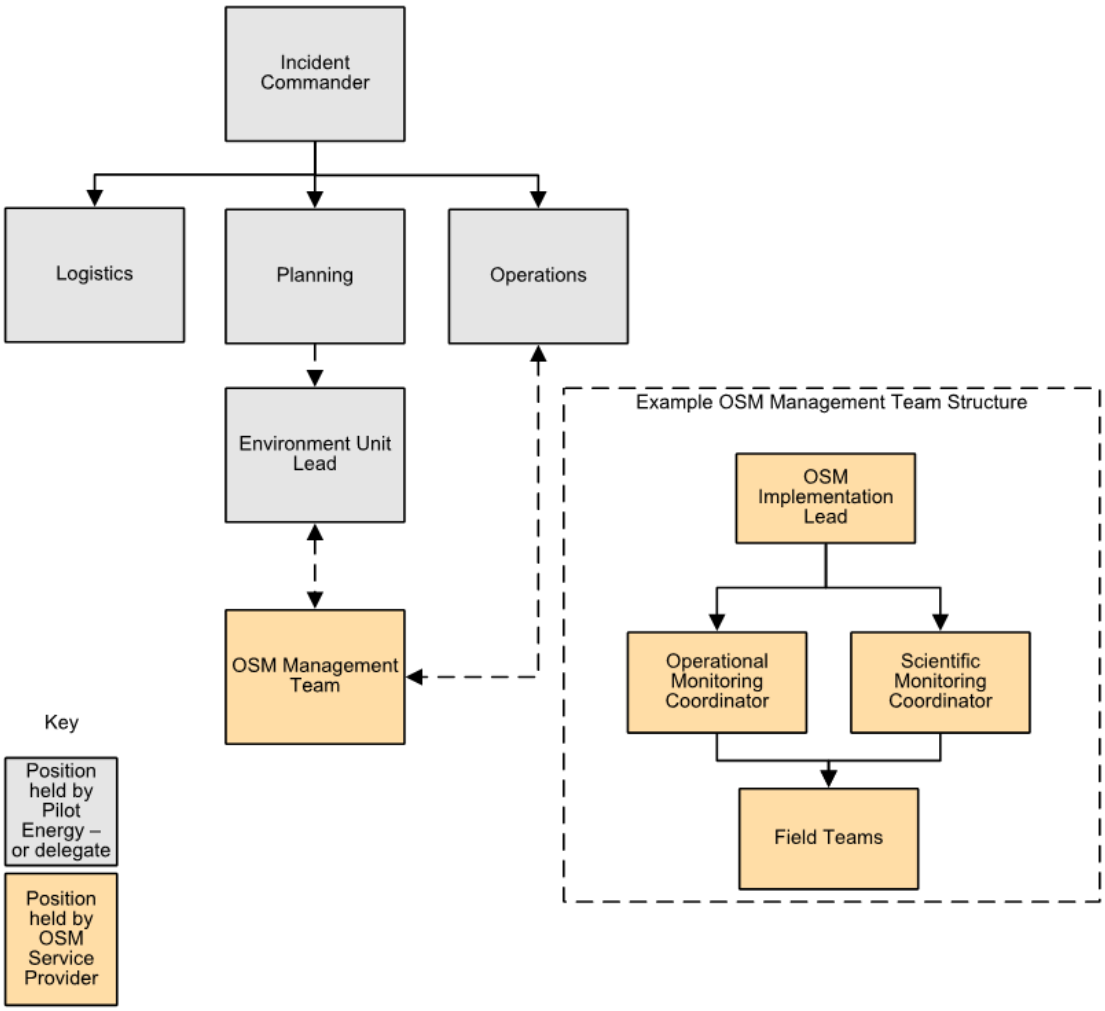


Figure 5-2: Pilot Energy IMT Structure with OSM Team

6. OSM Roles and Responsibilities

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

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

Table 6-1: Roles and Responsibilities for OSM

Role	Held by
Environment Unit Lead (EUL)	Environmental Consultants
Situation Unit Lead	Pilot Energy Planning Lead
OSM Implementation Lead	OSM Service Provider
Operational Monitoring Coordinator and Scientific Monitoring Coordinator	OSM Service Provider
OSM Field Operations Manager	OSM Service Provider
OSM Field Teams	OSM Service Provider

7. Mobilisation and Timing of OMP and SMP implementation

Table 7-1 provides an indicative implementation schedule for OMP and SMPs in the EMBA and adjacent waters. The locations listed are aligned to the initial monitoring priorities described in Section 2.

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 3-5 days of OSM activation	~5-7 days from OSM activation	>Two weeks from OSM activation
Spill site and surrounding waters	OM	• Activation of OMP Team Leads. • Finalise OMPs. • Commence activation and mobilisation of OM personnel.	• OMP: Hydrocarbon Properties And Weathering Behaviour, where resources are available (e.g. Supply Vessel with onboard sampling equipment). • OMP: Water Quality Assessment • OMP: Sediment Quality Assessment • OMP: Marine Fauna Assessment	-	As results from implemented OMPs are available, data are provided to relevant personnel in IMT (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.	• SMP: Water quality impact assessment • SMP: Sediment quality impact assessment • SMP: Marine fish and elasmobranch assemblages assessment • SMP: Marine mega-fauna assessment	Continue SMP monitoring until termination criteria are met
Sensitive receptors (including shorelines) where modelling shows contact within 72 hours (3 days) • Cliff Head – White Point (0.5 days)	OM	• Activation of OMP Team Leads. • Finalise OMPs. • Commence activation and mobilisation of OM personnel.	• OMP: Hydrocarbon properties and weathering behaviour at sea • OMP: Water quality assessment • OMP: Sediment quality assessment	-	As results from implemented OMPs are available, data are provided to relevant personnel in IMT (Situation Unit Lead) and used in the Incident Action Planning process for the next operational period. OMP is

Proximity to spill source	Monitoring type	0–48 hours from OSM activation	Within 3-5 days of OSM activation	~5-7 days from OSM activation	>Two weeks from OSM activation
• Illawong – Cliff Head (0.1 days) • Leeman – Coolimba (1.0 days) • Green Head – Leeman (1.5 days) • Beagle Islands Nature Reserve (0.5 days) • Booker Valley – Island Point (2.7 days)			• OMP: Shoreline clean-up assessment • OMP: Marine fauna assessment		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 requiring reactive baseline monitoring data to be obtained pre-impact.	• Implementation of reactive baseline data monitoring (if applicable). • Finalisation of the remaining SMPs (where individual SMP initiation criteria are met).	• SMP: Water quality impact assessment • SMP: Sediment quality impact assessment • SMP: Intertidal and coastal habitat assessment • SMP: Seabirds and shorebirds • SMP: Marine mega-fauna assessment • SMP: Benthic habitat assessment • SMP: Marine fish and elasmobranch assemblages assessment • SMP: Commercial and recreational fisheries impact assessment • SMP: Heritage and social impact assessment	Continue SMP monitoring until termination criteria are met
Sensitive receptors (including shorelines) where modelling shows contact >3 days	OM	-	• Activation of OMP Team Leads. • Finalise OMPs.	• OMP: Hydrocarbon properties and weathering behaviour at sea	As results from implemented OMPs are available, data are provided to relevant personnel in IMT

Proximity to spill source	Monitoring type	0–48 hours from OSM activation	Within 3-5 days of OSM activation	~5-7 days from OSM activation	>Two weeks from OSM activation
• Thirsty Point – Booker Valley (4.0 days) • Grey – Thirsty Point (4.9 days) • Direction Bank (3.8 days) • North Tail Reef (3.1 days)			• Commence activation and mobilisation of OM personnel.	• OMP: Water quality assessment • OMP: Sediment quality assessment • OMP: Shoreline clean-up assessment • OMP: Marine fauna assessment	(Situation Unit Lead) and used in the Incident Action Planning process for the next operational period. OMP is redesigned or reallocated according to the specifics of the actual spill until termination criteria are met
	SM	-	• Commence activation and mobilisation process • Activation of SMP Team Leads and finalisation of SMPs	• SMP: Water quality impact assessment • SMP: Sediment quality impact assessment • SMP: Marine mega-fauna assessment - reptiles • SMP: Marine fish and elasmobranch assemblages assessment • SMP: Intertidal and coastal habitat assessment • SMP: Seabirds and shorebirds • SMP: Benthic habitat assessment • SMP: Commercial and recreational fisheries impact assessment	Continue SMP monitoring until termination criteria are met

Proximity to spill source	Monitoring type	0–48 hours from OSM activation	Within 3-5 days of OSM activation	~5-7 days from OSM activation	>Two weeks from OSM activation
				• SMP: Heritage and social impact assessment	
Sensitive receptors (including shorelines) where modelling shows contact >3 days • Geelvink Channel Shoals (5.2 days) • Sand Knoll Ledge (6.0 days) • Clio Bank (6.8 days)	OM	-	• Activation of OMP Team Leads. • Finalise OMPs. • Commence activation and mobilisation of OM personnel.	• OMP: Hydrocarbon properties and weathering behaviour at sea • OMP: Water quality assessment • OMP: Sediment quality assessment • OMP: Marine fauna assessment	As results from implemented OMPs are available, data are provided to relevant personnel in IMT (Situation Unit Lead) and used in the Incident Action Planning process for the next operational period. OMP is redesigned or reallocated according to the specifics of the actual spill until termination criteria are met
	SM	-	• Commence activation and mobilisation process • Activation of SMP Team Leads and finalisation of SMPs	• SMP: Water quality impact assessment • SMP: Sediment quality impact assessment • SMP: Marine mega-fauna assessment • SMP: Marine fish and elasmobranch assemblages assessment • SMP: Seabirds and shorebirds • SMP: Benthic habitat assessment • SMP: Commercial and recreational	Continue SMP monitoring until termination criteria are met

Proximity to spill source	Monitoring type	0–48 hours from OSM activation	Within 3-5 days of OSM activation	~5-7 days from OSM activation	>Two weeks from OSM activation
				fisheries impact assessment • SMP: Heritage and social impact assessment	

8. Resource Requirements

The resources required to assist the IMT in the coordination and management of OSM are outlined in Table 8-1. The resources required to implement operational and scientific monitoring components are presented in Table 8-1 and Table 8-2 respectively, which is based on the monitoring priorities in Section 2 and implementation schedule outlined in Table 7-1. This assessment is based on the vessel-based MGO spill (320 m^3) as listed in Table 3-1 of the Eureka 3D MSS OPEP (Appendix E). It should be noted that a single spill will not contact all locations and receptors listed in Table 7-1.

Table 8-1: Resources Required for Key OSM Coordination Roles

Role	Resources Required	Arrangement
OSM Implementation Lead (OSM Monitoring Provider/s)	1 x Principal Scientist	OSM contractor
Operational Monitoring Coordinator and Scientific Monitoring Coordinator (OSM Service Provider/s)		
OSM Field Operations Manager (OSM Service Provider/s)	1 x Senior Scientist	

Table 8-2: Resources Required for Implementing OMPs

OMP	Resources Required	Arrangement
Hydrocarbon properties and weathering behaviour at sea)*	1 team (spill site and surrounds) 1 team (Cliff Head, Illawong, Leeman, Green Head, Beagle Islands, Booker Valley) 1 team (Thirsty Point, Grey, Direction Bank, North Tail Reef, Sand Knoll)	OSM contractor Marine contractors Laboratory arrangement

OMP	Resources Required	Arrangement
	1 team (Clio Bank, Geelvink Channel Shoals) Total 4 team leaders and 8 team members (3 personnel per team)	
Shoreline clean-up assessment	1 team (Cliff Head, Illawong, Leeman, Green Head, Beagle Islands, Booker Valley) 1 team (Thirsty Point, Grey) Total 2 team leaders and 4 team members (3 per team)	OSM contractor Marine contractors
Water quality assessment*	Refer to OMP: Hydrocarbon properties and weathering behaviour at sea resourcing* (all sites)	OSM contractor Marine contractors
Sediment quality assessment*	Refer to OMP: Hydrocarbon properties and weathering behaviour at sea resourcing* (all sites)	OSM contractor Marine contractors
Marine fauna assessment	1 team to conduct initial aerial surveys for all sites (2 observers per aircraft) Note: these resources may not be required if relevant scientific monitoring components initiation criteria have been triggered.	OSM contractor Marine contractors Aviation contractors

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

Table 8-3: Resources Required for Implementing SMPs

SMP	Resources Required	Arrangement
Water quality impact assessment	1 team (spill site and surrounds) 1 team (Cliff Head, Illawong, Leeman, Green Head, Beagle Islands, Booker Valley) 1 team (Thirsty Point, Grey, Direction Bank, North Tail Reef, Sand Knoll) 1 team (Clio Bank, Geelvink Channel Shoals) Total 4 team leaders and 8 team members (3 personnel per team) Note: can be performed by the same team as OMP: Water quality assessment. This SMP may replace OMP: Water quality assessment if the OMPs termination criteria are triggered	OSM contractor Marine contractors Laboratory arrangement
Sediment quality impact assessment	Refer to SMP: Water quality impact assessment* (all sites)	OSM contractor Marine contractors Laboratory arrangement

SMP	Resources Required	Arrangement
Intertidal and coastal habitat assessment	1 team (Cliff Head, Illawong, Leeman, Green Head, Beagle Islands, Booker Valley) 1 team (Thirsty Point, Grey) Total 2 team leaders and 2 team members (2 per team)	OSM contractor Marine contractors Laboratory arrangement
Seabirds and shorebirds	1 team (Cliff Head, Illawong, Leeman, Green Head, Beagle Islands, Booker Valley) 1 team (Thirsty Point, Grey, Direction Bank, North Tail Reef, Sand Knoll) 1 team (Clio Bank, Geelvink Channel Shoals) Total 3 team leaders and 3 team members (2 per team) Note: can initially be performed by the same team as OMP: Marine fauna assessment – seabirds and shorebirds. This SMP may replace OMP: Marine fauna assessment – seabirds and shorebirds if the OMPs termination criteria are triggered	OSM contractor Marine contractors Laboratory arrangement
Marine mega-fauna assessment • Pinnipeds • Reptiles • Cetaceans	1 team (spill site and surrounds) 1 team (Cliff Head, Illawong, Leeman, Green Head, Beagle Islands, Booker Valley) 1 team (Thirsty Point, Grey, Direction Bank, North Tail Reef, Sand Knoll) 1 team (Clio Bank, Geelvink Channel Shoals) Total 4 team leaders and 12 team members (4 per team) Note: Aerial surveillance aspects can initially be performed by the same team as the relevant OMP: Marine fauna assessment. This SMP may replace the relevant OMP: Marine fauna assessment if the OMPs termination criteria are triggered	OSM contractor Marine contractors Laboratory arrangement
Benthic habitat assessment	1 team (Cliff Head, Illawong, Leeman, Green Head, Beagle Islands, Booker Valley) 1 team (Thirsty Point, Grey, Direction Bank, North Tail Reef, Sand Knoll) 1 team (Clio Bank, Geelvink Channel Shoals) Total 3 team leaders and 6 team members (3 per team)	OSM contractor Marine contractors Laboratory arrangement
Marine fish and elasmobranch assemblages assessment	1 team (spill site and surrounds) 1 team (Cliff Head, Illawong, Leeman, Green Head, Beagle Islands, Booker Valley) 1 team (Thirsty Point, Grey, Direction Bank, North Tail Reef, Sand Knoll) 1 team (Clio Bank, Geelvink Channel Shoals) Total 4 team leaders and 8 team members (3 per team) Note: can initially be performed by the same team as OMP: Marine fauna assessment – fish. This SMP may replace OMP: Marine fauna assessment – fish if the OMPs termination criteria are triggered	OSM contractor Marine contractors Laboratory arrangement

SMP	Resources Required	Arrangement
Fisheries impact assessment	1 team (Commonwealth fisheries with the potential to be impacted/are being impacted (e.g. Western Deepwater Trawl Fishery) Total 1 team leaders and 2 team members (3 per team) Note: can initially be performed by the same team as OMP: Marine fauna assessment – fish. This SMP may replace OMP: Marine fauna assessment – fish if the OMPs termination criteria are triggered	OSM contractor Marine contractors Laboratory arrangement
Heritage features assessment	1 team Total 1 team leader and 2 team members (3 per team)	OSM contractor Marine contractors Laboratory arrangement
Social impact assessment	1 team Total 1 team leader and 2 team members (3 per team)	OSM contractor

9. Capability Arrangements

Pilot Energy will engage an OSM Services Provider, providing standby OSM response and implementation services, prior to pre-mobilisation of the activity. Details of OSM services are provided in Table 9-1.

The OSM Services Provider is contracted to provide Pilot Energy with a Standby Capability and Competency Report at the commencement of the MSS, which details personnel requirements for OMPs/SMPs, numbers of available personnel and competencies for service provider and sub-contracted personnel.

Personnel listed on the report will be contactable via mobile phone during this period and accessible to a nearby port (i.e. Port Denison-Dongara or Fremantle) within 48 hours of Pilot Energy's initial activation of OSM Services.

Table 9-1: Worked Example – OSM Services Provider Standby and Implementation Services

Standby	Implementation
24/7 monitoring support accessed through 24 hour call out number	Provision of an OSM Implementation Lead to the Pilot Energy IMT within 12 hours of notification
Provision of a suitably trained personnel, which includes support from the service provider and its sub-contractors and suppliers	Provision of a first-strike scientific team within 24 hours of notification, available in Perth and ready to deploy
Report on personnel and equipment availability, prior to the commencement of the MSS	Development of scientific response and sampling plans (based on modelled hydrocarbon spill scenario)
Access to service providers network of scientific and engineering consulting expertise	Provision of a second-strike scientific team within 72 hours of notification, ready to deploy
Access to service providers local network of terrestrial consultants, laboratories and field service providers	Priority access to service providers staff and equipment

9.1 Personnel Competencies

Pilot Energy's OSM Service Contract specifies the competency requirements for key OSM personnel.

In addition and where practicable, Pilot Energy will engage its consultants in the initial stages of the monitoring program to help activate and mobilise monitoring teams, and finalise monitoring designs.

9.2 Equipment

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

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

Availability of field equipment will be listed in the OSM Services Provider's Standby Capability and Competency Report.

Table 9-2: OSM equipment

Equipment type	Source
Desktop equipment (e.g. Oil Spill Response Atlas, GIS)	Coordinated through OSM Service Provider
In-field specialised monitoring equipment (e.g. fluorometers, sample bottles, ROVs)	Coordinated through the OSM Services Provider's standby OSM response and implementation services
Logistical equipment (e.g. in-field accommodation, vessels, aircraft)	Marine contracts, aviation contracts.

9.3 Exercises

Testing of key service provider arrangements would be done as a standalone desktop test prior to the mobilisation of the activity, and would assess the capability and availability of resources by the service provider against the performance requirements. More information of exercise and testing arrangements is provided in Section 10 of the Eureka 3D MSS EP.

10. Capability Assessment

Table 10-1 demonstrates Pilot Energy's capability to implement each OMP and SMP, including an assessment of each monitoring plan, identification of likely monitoring platforms, major supporting infrastructure (e.g. offshore accommodation), reactive baseline monitoring requirements (Section 4.0), initial survey arrangements (e.g. aerial followed up with ground reconnaissance) and ability to combine with other monitoring plans. The personnel outlined is only relevant if the spill hits all receptors identified in table 8.3 at a high volume and threshold. Given the size and type of spill it is improbable that all personnel identified would be required and therefore activated.

Note that OMP: Surface chemical dispersant effectiveness and fate assessment and OMP: Subsea dispersant injection monitoring are not included in Table 10-1 as they have not been selected as suitable response strategies in the OPEP (Appendix E – Section 3.4).

Table 10-1: OSM Capability

Component	Total Personnel Required (Weeks 1–2) [1]	Personnel available via OSM Service Provider Standby Contract	Total Personnel Available
OSM Personnel embedded in IMT	1 OSM Implementation Lead (given nature/scale this person can also fill the role of OM and SM Coordinator) 1 Field Operations Manager	1 OSM Implementation Lead/ OM Monitoring Coordinator / SM Coordinator 1 Field Operations Manager	1 OSM Implementation Lead/ OM Monitoring Coordinator / SM Coordinator 1 Field Operations Manager
OMPs			
Hydrocarbon properties and weathering behaviour at sea*	4 team leaders 8 team members	4 team leaders 8 team members	4 team leaders 8 team members
Shoreline clean-up assessment	2 team leaders 4 team members	2 team leaders 4 team members	2 team leaders 4 team members
Water quality assessment*	Refer to OMP: Hydrocarbon properties and weathering behaviour at sea		
Sediment quality assessment*	Refer to OMP: Hydrocarbon properties and weathering behaviour at sea		
Marine fauna assessment	1 aerial team (including 1 Marine Mammal Observer (MMO) and 1 Aerial survey observer)	1 aerial team (including 1 Marine Mammal Observer (MMO) and 1 Aerial survey observer)	1 aerial team (including 1 Marine Mammal Observer (MMO) and 1 Aerial survey observer)
SMPs			
Water quality impact assessment	Note: can initially be performed by the same team as OMP: Water quality assessment. This SMP may replace OMP: Water quality assessment if the OMPs termination criteria are triggered		
Sediment quality impact assessment	Refer to SMP: Water quality impact assessment* (all sites)		

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

Component	Total Personnel Required (Weeks 1–2) [1]	Personnel available via OSM Service Provider Standby Contract	Total Personnel Available
Intertidal and coastal habitat assessment	2 team leaders 2 team members	2 team leaders 2 team members	2 team leaders 2 team members
Seabirds and shorebirds	Note: can initially be performed by the same team as OMP: Marine fauna assessment – seabirds and shorebirds. This SMP may replace OMP: Marine fauna assessment – seabirds and shorebirds if the OMPs termination criteria are triggered		
Marine mega-fauna assessment	4 team leaders 12 team members	4 team leaders 12 team members	4 team leaders 12 team members
Benthic habitat assessment	3 team leaders 6 team members	3 team leaders 6 team members	3 team leaders 6 team members
Marine fish and elasmobranch assemblages assessment	4 team leaders 8 team members	4 team leaders 8 team members	4 team leaders 8 team members
Fisheries impact assessment	1 team leader 2 team members	1 team leader 2 team members	1 team leader 2 team members
Heritage features assessment	1 team leader 2 team members (including either ROV operator or marine diver/s)	1 team leader 2 team members (including either ROV operator or marine diver/s)	1 team leaders 2 team members (including either ROV operator or marine diver/s)
Social impact assessment	1 team leader 2 team members	N/A	1 team leader 2 team members

** Initial co-mobilisation between OMP: Hydrocarbon properties and weathering behaviour at sea and OMP: Water quality assessment and OMP: Sediment quality assessment*

11. Review of Plan

This document will be reviewed in the pre-mobilisation preoaration for the 3D MSS. Should any major changes have occurred this document will be revised. 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 service provider/s);
- 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. EPBC Act protected maters requirements);

The extent of changes made to this OSM Bridging Implementation Plan and resultant requirements for regulatory resubmission will be informed by the relevant Commonwealth regulations, i.e. the OPGGS (Env) Regulations.

Part B – Implementation

12. Activation Process

Pilot Energy's IMT Environment Unit Leader is responsible for activating OSM components, subject to approval from the IMT Leader. Table 12-1 outlines Pilot Energy's OSM activation process.

Table 12-1: OSM Activation Process

Responsibility	Task	Timeframe	Complete
Environment Unit Leader (Pilot Energy/ Environmental Consultants)	Review initiation criteria of OMPs and SMPs during the preparation of the initial Incident Action Plan (IAPs) and subsequent IAPs; and if any criteria are met, activate relevant OMPs and SMPs	Within 4 hours of spill notification	❑
	Obtain approval from Incident Commander Leader to initiate OSM	Within 4 hours of spill notification	❑
	Contact OSM Services Provider and notify on-call officer of incident, requesting provision of OSM Implementation Lead to the IMT	Within 4 hours of spill notification	❑
	Provide monitor and evaluate data (e.g. aerial surveillance, fate and weathering modelling, tracking buoy data) to OSM Services Provider	Within 1 hour of data being received by IMT	❑
	Liaise directly with OSM Services Provider to confirm which OMPs and SMPs are to be fully activated	Within 3 hours of monitor and evaluate data being received from IMT	❑
	Provide purchase order to OSM Services Provider (cross reference OSM Standby Services Scope of Work)	Within 72 hours of initial notification to OSM Services Provider	❑
	Record tasks in Personal Log	At time of completion of task	❑
OSM Services Provider	On-call officer to notify Service Provider Manager of activation and contact OSM Implementation Lead and Scientific Logistics Coordinator	Within 8 hours of notification being made to OSM Services Provider	❑
	Send OSM Implementation Lead and Scientific Logistics Coordinator to IMT	Within 12 hours of notification being made to OSM Services Provider	❑
	Liaise directly with EUL to confirm which OMPs and SMPs are to be fully activated	Within 4 hours of monitor and evaluate data being received from IMT	❑
	Confirm availability of initial personnel and equipment resources	Within 5 hours of monitor and evaluate data being received from IMT	❑

13. Monitoring Priorities

As described in Section 2, the available spill trajectory modelling has been analysed to understand the likely initial monitoring priorities for its activities in the EMBA. In addition, Table 4-2 lists comparability of available baseline data for receptors, to assist in identifying where post-spill, pre-impact monitoring should be prioritised.

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

Table 13-1: Checklist for Determining Monitoring Priorities

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

14. Protected Matters Requirements

Table 14-1 provides a checklist to ensure monitoring personnel consider EPBC Act Protected Matters (MNES) and other protected matters requirements in the finalisation of OMPs and SMPs.

Appendix B outlines the management plans, recovery plans and conservation advice statements relevant for the protected matters within the EMBA that are likely to be relevant to the final design of the OMPs and SMPs. Appendix B also includes relevant priority monitoring 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
OSM Services Provider with input from EUL	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/wildlife conservation plan/conservation advice/management plan in Appendix B and determine if there have been any updates to the relevant conservation threats/actions. Integrate relevant considerations into the final monitoring design for affected OMPs and SMPs	❑
	Review restrictions on marine mammal buffer distances in SMP: Marine mega-fauna and ensure this is included in all relevant response and monitoring IAPs (e.g. Shoreline Protection Plan, Shoreline Clean-up Plan, OSM Plan), so that response and monitoring field teams maintain required buffer distances from fauna during operations	❑

15. Finalising Monitoring Design

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

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

Table 15-1: Checklist for Finalising Monitoring Design

Responsibility	Task	Timeframe	Complete
OSM Services Provider	Confirm survey objectives, sampling technique, for each initiated OMP and SMP	Within 48 hours of initial monitoring priorities being confirmed by IMT	❑
	Determine suitable sampling frequency	Within 48 hours of initial monitoring priorities being confirmed by IMT	❑
	Finalise standard operating procedures	Within 48 hours of initial monitoring priorities being confirmed by IMT	❑
	Scientific monitoring: • Establish benchmarks and guidelines to be used • Confirm indicator species	Within 96 hours of initial monitoring priorities being confirmed by IMT	❑

Responsibility	Task	Timeframe	Complete
	• Confirm parameters and metrics		

16. Mobilisation

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

The OSM Services Provider will be required to coordinate the availability of personnel and equipment for all monitoring programs. Pilot Energy is responsible for flights, accommodation and victualing for field personnel. Pilot Energy 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 Environment Unit Leader	Confirm availability of all monitoring personnel (noting required competencies in Section 11.3 of the Joint Industry OSM Framework and individual OMPs/SMPs)	❑
	Allocate number of teams, personnel, equipment and supporting resource requirements	❑
	Undertake HAZIDs as required and consolidate/review field documentation including safety plans, emergency response plans, and daily field reports	❑
	Develop site-specific health and safety plans which is compliant with health safety and environment systems (including call in timing and procedures)	❑
	Conduct pre-mobilisation meeting with monitoring team/s on survey objectives, logistics, safety issues, reporting requirements and data management collection requirements	❑
	Determine data management delivery needs of the IMT/EMT and process requirements, including data transfer approach and frequency/timing	❑
	Confirm data formats and metadata requirements with personnel receiving data	❑
	Logistics	
	Confirm flights, accommodation, and car hire arrangements are in place	❑
	Develop field survey schedules, detailing staff rotation	❑
	Equipment	
	Confirm survey platform (vessel, vehicle, aircraft) has been secured to survey or access survey sites and ensure it is equipped with appropriate fridge and freezer space for transportation of samples (and carcasses if collecting)	❑
	Ensure vessels have correct fit-out specifications (e.g. winches, GPS, satellite, hi-ab, 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	❑

Responsibility	Task	Complete
	Liaise with NATA-accredited laboratories to confirm availability, limits of detection, sampling holding times, transportation, obtain sample analysis quotes and arrange provision of appropriate sample containers, Chain of Custody (CoC) forms and 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 QA/QC checked and pre-loaded into navigation software/positioning system	❑
	Check field laptops, ensuring they have batteries (including spares), power cable, and are functional	❑
	Check if a first aid kit or specialist Personal Protective Equipment (PPE) is required	❑
	Confirm arrangements for freight to mobilisation port is in place	❑

17. Permits and Access Requirements

Permit and access requirements apply to marine parks, marine and terrestrial reserves, restricted heritage areas, operational areas of industrial sites, defence locations, certain fauna and managed fisheries. Table 17-1 lists relevant protected areas within the EMBA and the jurisdictional authority to be contacted to obtain the necessary permit or access permission.

The OSM Services Provider is responsible for submitting access and permit applications to all relevant Jurisdictional Authorities to conduct monitoring for OMPs and SMPs.

Table 17-1: Permits Required in EMBA

Receptor	Location	Jurisdictional Authority	Relevant information on permits
Permits for monitoring fauna	N/A	DCCEEW State government department with jurisdiction for fauna	Any interactions involving nationally listed threatened fauna may require approval from DCCEEW (http://www.environment.gov.au/biodiversity/threatened/permits) WA- appropriate permits can be found at: https://www.dpaw.wa.gov.au/plants-and-animals/licences-and-authorities?showall=&start=4
State Marine Protected Areas; Fish Habitat Protection Areas	• Jurien Bay Marine Park • Essex Rocks Nature Reserve • Buller, Whittell and Green Islands Nature Reserve • Cervantes Islands Nature Reserve • Beagle Islands Nature Reserve • Marmion Marine Park • Lipfert, Milligan, Etc Islands Nature Reserve • Sandland Island Nature Reserve • Ronsard Rocks Nature Reserve • Outer Rocks Nature Reserve • Fisherman Islands Nature Reserve	State government department with jurisdiction for parks and wildlife (DBCA) State government department with jurisdiction for fisheries (DPIRD)	No specific permitting requirements exist for monitoring in WA marine protected areas, but OSM Service Providers should contact DBCA and DPIRD prior to finalising monitoring design in protected areas. DBCA has a Marine Science Program for WA's Marine Protected Areas to undertake marine reaserach and monitoring that should be taken into account. Additional information is available at: https://www.dpaw.wa.gov.au/management/marine , https://www.dpaw.wa.gov.au/management/marine/marine-parks-and-reserves and https://www.fish.wa.gov.au/Sustainability-and-Environment/Aquatic-Biodiversity/Marine-Protected-Areas/Pages/default.aspx

Receptor	Location	Jurisdictional Authority	Relevant information on permits
	• Lancelin Island Lagoon Fish Habitat Protection • Abrolhos Islands Fish Habitat Protection		
Australian (Commonwealth) Marine Parks	• Abrolhos • Perth Canyon • Two Ricks • Jurien • South-west Corner	Director of National Parks Parks Australia	Permit and licence application information for Marine Protected Areas (including monitoring) can be found at: https://onlineservices.environment.gov.au/parks/australian-marine-parks and https://onlineservices.environment.gov.au/parks/australian-marine-parks/permits Additional information on permitting requirements in Australian Marine Parks can be obtained through Parks Australia via email marineparks@environment.gov.au or phone 1800 069 352 Information on permits to access biological resources in Commonwealth areas can be found at: http://www.environment.gov.au/topics/science-and-research/australias-biological-resources/access-biological-resources-commonwealth
Commonwealth Managed Fisheries	• Western Deepwater Trawl Fishery	Australian Fishing Management Authority (AFMA)	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	Sites are located throughout EMBA	State government department with jurisdiction for indigenous heritage	Entry access permits to Aboriginal Lands in WA: https://www.wa.gov.au/service/aboriginal-affairs/aboriginal-heritage-conservation/apply-permit-access-or-travel-through-aboriginal-land Aboriginal heritage sites in WA: https://www.wa.gov.au/service/aboriginal-affairs/aboriginal-cultural-heritage/search-aboriginal-sites-or-heritage-places
Lancelin Defence Training Area	Lancelin	Department of Defence	Unexploded Ordanances (mapping information): https://www.defence.gov.au/UXO/default.asp Maritime military firing practice and exercise areas: https://www.hydro.gov.au/factsheets/FS_Navigation-Firing_Practice_and_Exercise_Areas.pdf
Industry (e.g. operational zone of offshore oil or gas platform)	• Triangle Energy Pty Ltd WA-31-L (29° 27’ 00.4” S 114° 52’ 12.1” E)	Operating company	Petroleum safety zones (up to 500 m from outer edge of well or equipment) – https://www.nopsema.gov.au/safety/safety-zones/

Receptor	Location	Jurisdictional Authority	Relevant information on permits
Shipwrecks	• Batavia Shipwreck Site	State/ or Commonwealth government department with jurisdiction for maritime cultural heritage/ archaeology	Underwater heritage protected zones (Commonwealth): www.environment.gov.au/heritage/underwater-heritage/protected-zones

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). The Team Lead will be responsible for communicating data back to the OSM Management Team (led by the OSM Services Provider) via field reporting forms, debriefs and reports. Laboratory analysis reports should also be directed to the OSM Management Team.

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

Once data is analysed and checked by the Field Team Lead, it will be provided to the IMT Situation Unit Lead, who will then distribute the data from each monitoring component to the relevant IMT Unit and/or Section. Table 18-1 provides guidance on the type of data generated from each OMP, which IMT Section/Unit requires the data and how the data may be used during a response.

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 Spill Impact Mitigation Assessment (SIMA), which would be included in the IAP for the current or next operating period.

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

Table 18-1: Data Generated from Each OMP and How this May be used by IMT in Decision Making

Operational Monitoring Plan	Data generated[2]	IMT Section requiring data	How data may be used by IMT
Hydrocarbon properties and weathering behaviour at sea	Hydrocarbon physical characteristics (e.g. viscosity, asphaltene content, fingerprinting, weathering ratios of hydrocarbon chains)	Planning Section to aid in response option selection / modification	Changes to the hydrocarbon properties will affect the window of opportunity for particular responses and the associated logistical requirements of these responses, such as use of chemical dispersants, recovery and pumping equipment suitability, hydrocarbon storage and hydrocarbon disposal requirements
Shoreline clean-up assessment	Assessment of shoreline character; assessment of shoreline oiling; recommendations for response activities; post-treatment surveys	Planning Section to aid in IAP development and response option selection / modification	Confirmation of shoreline character, habitats and fauna present which may influence selection of response tactics (e.g. no mechanical recovery if seabirds are known to be nesting); Oil deposition and/or removal rate for a shoreline sector will help determine effectiveness of relevant tactics (e.g. shoreline protection and/or clean-up operations); Assessment teams provide ground truthing of sites that are not possible via satellite imagery, therefore the IMT can rely on the recommendations of Assessment Teams (e.g. flagging access issues, suitable tactics, likely resourcing needs)
Water quality assessment	Distribution of oil in water column and change in hydrocarbon concentrations (e.g. total recoverable hydrocarbons; benzene, toluene, ethylbenzene, xylene and naphthalene [BTEXN], Polycyclic Aromatic Hydrocarbons [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 SIMA.
Sediment quality assessment	Distribution of oil in sediment and change in hydrocarbon concentrations (e.g. Total recoverable hydrocarbons, BTEXN, 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

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

Operational Monitoring Plan	Data generated[2]	IMT Section requiring data	How data may be used by IMT
Marine fauna assessment • Pinnipeds • Cetaceans (observational only) • Seabirds and shorebirds • Fish	Rapid assessment of presence and distribution of marine fauna; evaluate impact of spill and response activities on fauna	Planning Section for use in IAP; Oiled Wildlife Unit/Division to help in developing Wildlife Response Sub-plan	Understanding of species, populations and geographical locations at greatest risk from spill impacts. IMT can use this information to help qualify locations with highest level of protection priority (e.g. factoring in seasonality of receptors); understanding the impacts of spill response activities can help IMT to modify or terminate activities if they are assessed as creating more harm than the oil alone (e.g. large shoreline clean-up teams and staging areas may disturb shorebird nesting resulting in adults abandoning chicks)

18.2 Impacts from Response Activities

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

When finalising monitoring designs, the OSM Implementation Lead shall review Table 10-4 of the Joint Industry OSM Framework 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

The EPS relevant to spill response and OSM are included in the Eureka 3D MSS OPEP (Appendix E). When finalising monitoring designs, the OSM Implementation Lead and Environment Unit Lead (or delegate) shall review the Environmental Performance Standards listed in the Eureka 3D MSS OPEP (Appendix E) and integrate checks into the monitoring design that will help determine if relevant Environmental Performance Standards are being met.

19. Data Management

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

20. Quality Assurance and Quality Control

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

21. Communication Protocols

21.1 OSM Services Provider/s

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

The following communication protocols must be observed:

- During the preparedness phase (pre-spill) and during activation (prior to deployment) will be between a Pilot Energy Representative (or delegate) and the OSM Services Provider Lead respectively.
- During implementation (post deployment), primary communication occurs via two pathways:
  - Pilot Energy Representative and the OSM Services Provider Lead for contractual, management, scientific and general direction matters; and
  - Pilot Energy's IMT and the OSM Services Provider's Field Operations Manager for on-site matters.
- All OSM operational decisions should be logged in an OSM decision log by key personnel, including but not limited to the OSM Services Provider Implementation Lead, OSM Field

Operations Manager, Operational Monitoring Coordinator, Scientific Monitoring Coordinator and Field Team Leads.

- All OSM tasks, actions and requirements should be documented in an IAP during the response phase of the spill.
- The IMT Incident Commander/IMT Leader will keep the IMT Section Chiefs briefed of the OSM status as required.
- All correspondence (copies of emails and records of phone calls) between Pilot Energy and the OSM Services Provider during a response should be recorded and kept on file.
- All communication received by OSM Services Provider not in line with these protocols should be reported to the nominated Pilot Energy Representative who will seek guidance on the accuracy of the information received.
- Unless related to safety (e.g. evacuation), any direction or instruction received by the OSM Services Provider outside of these protocols should be confirmed via the nominated Pilot Energy Representative prior to implementation.

During the post-response phase all communications shall be between a nominated Pilot Energy Representative and the OSM Services Provider OSM Implementation Lead.

21.2 External Stakeholders

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

Pilot Energy IMT will be the focal point for external engagement during the response operation .A focal point for post response communications will be assigned.

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 Authority 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, the OSM Services Provider will run a lessons-learnt meeting between Pilot Energy, all monitoring providers and other relevant stakeholders. It is the responsibility of Pilot Energy 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.

23. References

AIMS (2016). WAMSI 1 - Node 4.2.2a - Establishment of indicators for ecosystem based fisheries management - Benthic assemblages. Unpublished report prepared for WAMSI.

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.

Bellchambers LM. and Pember MB. (2014). Assessing the ecological impact of the western rock lobster fishery in fished and unfished areas FRDC Project 2008/013. Fisheries Research Report No. 254. Department of Fisheries, Western Australia. 108pp.

Campbell R. (2005). Historical distribution and abundance of the Australian sea lion (Neophoca cinerea) on the west coast of Western Australia, Fisheries Research Report No. 148, Department of Fisheries, Western Australia, 42 p

Caputi N, Kangas M, Chandrapavan A, Hart A, Feng M, Marin M and de Lestang S (2019) Factors Affecting the Recovery of Invertebrate Stocks From the 2011 Western Australian Extreme Marine Heatwave. Front. Mar. Sci. 6:484

Davidson, JA, Bancroft, KP. (2000) Broadscale habitat map and biological data of the major benthic habitats between Cervantes and Wedge Island in the proposed Jurien Bay Marine Conservation Reserve. Data Report: MRI/MW/JB-40/2000. February 2000. Marine Conservation Branch, Department of Conservation and Land Management, Fremantle, Western Australia. (Unpublished report).

Department of Climate Change, Energy, the Environment and Water (DCCEEW) (2020) Wildlife Conservation Plan for Seabirds, Commonwealth of Australia, Canberra

DCCEEW (2022) Draft National Recovery Plan for the Southern Right Whale (*Eubalaena australis*). Commonwealth of Australia, Canberra.

Department of Conservation and Land Management (CALM) (1992) Marmion Marine Park Management Plan 1992-2002 No. 23

CALM (2000) Jurien Bay Marine Park Management Plan. Management Plan No 49, CALM, Perth, WA

CALM (2004) Turquoise Coast Island Nature Reserves Management Plan No 50, CALM, Perth, WA

Department of the Environment (DoE) (2014), Recovery Plan for the Grey Nurse Shark (*Carcharias taurus*) 2014. Commonwealth of Australia.

DoE (2015a) Conservation Management Plan for the Blue Whale—A Recovery Plan under the *Environment Protection and Biodiversity Conservation Act 1999*. Commonwealth of Australia.

DoE (2015b) Wildlife Conservation Plan for Migratory Shorebirds, Commonwealth of Australia.

Department of Environment and Conservation (2007) Background quality of the marine sediments off the Western Australian mid west coast. Department of Environment and Conservation. Marine Technical

Department of Environment and Conservation (2011). Interim Recovery Plan 2011-2016 for Sedgelands in Holocene dune swales. Interim Recovery Plan No. 314. Department of Environment and Conservation, Perth

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

Department of Sustainability, Environment. Water, Population and Communities (DSEWPC) (2011). Approved Conservation Advice for Sternula nereis nereis (Fairy Tern). Commonwealth of Australia

DSEWPC (2012) Marine bioregional plan for the South-west Marine Region. Commonwealth of Australia

DSEWPC (2013a). Recovery Plan for the Australian Sea Lion (Neophoca cinerea). Commonwealth of Australia.

DSEWPC (2013b). Recovery Plan for the White Shark (Carcharodon carcharias). Commonwealth of Australia.

Director of National Parks (2018) South-west Marine Parks Network Management Plan 2018. Director of National Parks, Canberra.

Dunlop, J. N. & Wooller, R. D. (1990). The breeding seabirds of south-western Australia: trends in species, populations and colonies. Corella 14:107-112.

Dunlop, JN. (2009) The population dynamics of tropical seabirds establishing frontier colonies on islands off south-western Australia. Marine Ornithology 37: 99-105.

Fairclough DV, Potter IC, Lek E, Bivoltsis AK, Babcock RC. (2011). The fish communities and main fish populations of the Jurien Bay Marine Park

Giraldo-Ospina A, Kendrick GA, Hovey RK. (2020) Depth moderates loss of marine foundation species after an extreme marine heatwave: could deep temperate reefs act as a refuge? Proc. R. Soc. B287

Goldsworthy SD, Shaughnessy PD, Mackay AI, Bailleul F, Holman D, Lowther AD, Page B, Waples K, Raudino H, Bryars S, Anderson T. (2021). Assessment of the status and trends in abundance of a coastal pinniped, the Australian seal lion Neophoca cinerea. Endangered Species Research, 44: 421-437.

Goldsworthy DS, Saunders BJ, Parker JRC, Harvey ES (2020) Spatial assemblage structure of shallow-water reef fish in Southwest Australia. Mar Ecol Prog Ser 649:125-140.

Harrison SA. (2006). The influence of seabird-derived nutrients on island ecosystems in the oligotrophic marine waters of south-western Australia.

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.

Klonowski WM., Fearns P, Lynch MJ. (2007) Retrieving key benthic cover types and bathymetry from hyperspectral imagery, Journal of Applied Remote Sensing 1(1), 011505

McAlpine KW, Wenziker KJ, Apte SC, Masini RJ. (2005) Background concentrations of selected toxicants in the coastal waters of the Jurien Bay Marine Park. Department of Environment, Perth, WA, Technical Series 119.

McClatchie, S., Middleton, J., Pattiaratchi, C., Currie, D., Kendrick, G. (2006). The South-west Marine Region: Ecosystems and Key Species Groups. Department of the Environment and Water Resources

Möller, L.M., Attard, C.R.M., Bilgmann, K. et al. (2020) Movements and behaviour of blue whales satellite tagged in an Australian upwelling system. Sci Rep 10, 21165

Mulders YR, Wernberg T (2020) Fifteen years in a global warming hotspot: changes in subtidal mobile invertebrate communities. Mar Ecol Prog Ser 656:227-238.

Ross CL, French B, Lester EK, Wilson SK, Day PB, Taylor MD, Barrett N. (2021). Coral Communities on Marginal High-Latitude Reefs in West Australian Marine Parks. Diversity, 13, 554.

RPS (2023) Eureka 3D Marine Seismic Survey Oil Spill Risk Modelling Rev 0 (MAW1243J.000)

Rule MJ, Bancroft KP, Kendrick AJ. (2012) Baseline and quality of the Jurien Bay Marine Park: a benchmark for warm temperate Western Australia. Conservation Science Western Australia, 8 (2): 241-249

Sanderson PG (2000) A comparison of reef-protected environments in Western Australia: The central west and Ningaloo coasts. Earth Surface Processes and Landforms 25, 397–419.

Stat M, John J, DiBattista JD, Newman SJ, Bunce M. and Harvey ES. (2019), Combined use of eDNA metabarcoding and video surveillance for the assessment of fish biodiversity. Conservation Biology, 33: 196-205.

Threatened Species Scientific Committee (TSSC) (2015a). Conservation Advice *Balaenoptera borealis* (sei whale). TSSC, Canberra.

TSSC (2015b). Approved Conservation Advice for *Megaptera novaeangliae* (humpback whale). TSSC, Canberra

TSSC (2016). Conservation Advice Calidris canutus Red knot. TSSC, Canberra

Wernberg, T. (2021). Marine Heatwave Drives Collapse of Kelp Forests in Western Australia. In: Canadell, J.G., Jackson, R.B. (eds) Ecosystem Collapse and Climate Change. Ecological Studies, vol 241. Springer, Cham.

Appendix A Baseline data sources

Table A-1: Baseline Data Sources

Receptor	Existing baseline monitoring	Source / Data Custodian	Spatial extent
Water and sediment quality	McAlpine, K. W., Wenziker, K. J., Apte, S. C., Masini, R. J. (2005) Background concentrations of selected toxicants in the coastal waters of the Jurien Bay Marine Park. Department of Environment, Perth, WA, Technical Series 119.	DWER (Link to report)	Jurien Bay Marine Park
	Department of Environment and Conservation (2007) Background quality of the marine sediments off the Western Australian mid west coast. Department of Environment and Conservation. Marine Technical	DWER (Link to report)	Jurien Bay Marine Park, Cliff Head, Champion Bay, Horrocks, Geraldton
	Rule, M. J., Bancroft, K. P., Kendrick, A. J. (2012) Baseline and quality of the Jurien Bay Marine Park: a benchmark for warm temperate Western Australia Conservation Science Western Australia, 8 (2): 241-249	DBCA (Link to report)	Jurien Bay Marine Park (Fisherman Islands, Hill River, Nambung Bay)
	Giraldo-Ospina A, Kendrick GA, Hovey RK. (2020) Depth moderates loss of marine foundation species after an extreme marine heatwave: could deep temperate reefs act as a refuge? Proc. R. Soc. B287: 20200709.http://dx.doi.org/10.1098/rspb.2020.0709	UWA (Link to report)	Jurien Bay and other areas in WA

Receptor	Existing baseline monitoring	Source / Data Custodian	Spatial extent
Benthic communities and fish assemblages	Sanderson PG (2000) A comparison of reef-protected environments in Western Australia: The central west and Ningaloo coasts. Earth Surface Processes and Landforms 25, 397–419.	Sanderson PG, UWA	Jurien Bay and other areas in WA
	Davidson, J. A., Bancroft, K. P. (2000) Broadscale habitat map and biological data of the major benthic habitats between Cervantes and Wedge Island in the proposed Jurien Bay Marine Conservation Reserve. Data Report: MRI/MW/JB-40/2000. February 2000. Marine Conservation Branch, Department of Conservation and Land Management, Fremantle, Western Australia. (Unpublished report).	DBCA (Link to report)	Cervantes to Wedge Island
	Klonowski, W.M., Fearns, P., Lynch, M. J. (2007) Retrieving key benthic cover types and bathymetry from hyperspectral imagery, Journal of Applied Remote Sensing 1(1), 011505	Curtin University	Jurien Bay Marine Park
	AIMS (2016). WAMSI 1 - Node 4.2.2a - Establishment of indicators for ecosystem based fisheries management - Benthic assemblages. Unpublished report prepared for WAMSI.	AIMS (Link to metadata)	Jurien Bay and other areas in WA
	Fairclough, D. V., Potter, I. C., Lek, E., Bivoltsis, A. K., Babcock, R. C. (2011). The fish communities and main fish populations of the Jurien Bay Marine Park	Murdoch University (Link to report)	Jurien Bay Marine Park
	Bellchambers, L.M. and Pember, M. B. 2014. Assessing the ecological impact of the western rock lobster fishery in fished and unfished areas FRDC Project 2008/013. Fisheries Research Report No. 254. Department of Fisheries, Western Australia. 108pp.	Fisheries Research Division (Link to report)	Jurien and Leeman
	Stat, M., John, J., DiBattista, J.D., Newman, S.J., Bunce, M. and Harvey, E.S. (2019), Combined use of eDNA metabarcoding and video surveillance for the assessment of fish biodiversity. Conservation Biology, 33: 196-205. https://doi.org/10.1111/cobi.13183	Macquarie University (Link to report)	Jurien Bay Marine Park
	Giraldo-Ospina A, Kendrick GA, Hovey RK. 2020 Depth moderates loss of marine foundation species after an extreme marine heatwave: could deep temperate reefs act as a refuge? Proc. R. Soc. B287: 20200709.http://dx.doi.org/10.1098/rspb.2020.0709	UWA (Link to report)	Jurien Bay and other areas in WA
	Goldsworthy DS, Saunders BJ, Parker JRC, Harvey ES (2020) Spatial assemblage structure of shallow-water reef fish in Southwest Australia. Mar Ecol Prog Ser 649:125-140. https://doi.org/10.3354/meps13445	Curtin University	Jurien Bay and other areas in WA
	Mulders YR, Wernberg T (2020) Fifteen years in a global warming hotspot: changes in subtidal mobile invertebrate communities. Mar Ecol Prog Ser 656:227-238.	UWA (Link to report)	Jurien Bay and other areas in WA

Receptor	Existing baseline monitoring	Source / Data Custodian	Spatial extent
	Wernberg, T. (2021). Marine Heatwave Drives Collapse of Kelp Forests in Western Australia. In: Canadell, J.G., Jackson, R.B. (eds) Ecosystem Collapse and Climate Change. Ecological Studies, vol 241. Springer, Cham. https://doi.org/10.1007/978-3-030-71330-0_12	UWA	Jurien Bay and other areas in WA
	Ross, C.L.; French, B.;Lester, E.K.;Wilson, S.K.; Day, P.B.;Taylor, M.D.; Barrett, N. (2021). Coral Communities on Marginal High-Latitude Reefs in West Australian Marine Parks. Diversity, 13, 554. https://doi.org/ 10.3390/d13110554	DBCA (Link to reference)	Jurien Bay Marine Park and other areas in WA
Seabirds and shorebirds	Dunlop, J. N. & Wooller, R. D. (1990). The breeding seabirds of south-western Australia: trends in species, populations and colonies. Corella 14:107-112.	(Link to reference)	Inshore Islands from Dongara to Mandurah and other areas in WA
	Dunlop, JN. (2009) The population dynamics of tropical seabirds establishing frontier colonies on islands off south-western Australia. Marine Ornithology 37: 99-105.	(Link to reference)	North Fisherman Island, Green Islets and other areas in WA
	Harrison, S. A. (2006). The influence of seabird-derived nutrients on island ecosystems in the oligotrophic marine waters of south-western Australia. https://ro.ecu.edu.au/theses/68	Edith Cowan University (Link to reference)	Favourite Island, Boullanger Island, Whitlock Island, North and South Cervantes Island and other areas in WA
Marine mammals	Campbell, R. 2005. Historical distribution and abundance of the Australian sea lion (*Neophoca cinerea*) on the west coast of Western Australia, Fisheries Research Report No. 148, Department of Fisheries, Western Australia, 42 p	Department of Fisheries (Link to reference)	Jurien Bay (North Fisherman Island, Beagle Island, Buller Island) and other locations in WA
	Möller, L.M., Attard, C.R.M., Bilgmann, K. et al. (2020) Movements and behaviour of blue whales satellite tagged in an Australian upwelling system. Sci Rep 10, 21165. https://doi.org/10.1038/s41598-020-78143-2	Flinders University (Link to reference)	WA coastline
	Goldsworthy, S. D. , Shaughnessy, P. D., Mackay, A. I., Bailleul, F., Holman, D., Lowther, A. D., Page, B., Waples, K., Raudino, H., Bryars, S., Anderson, T. (2021). Assessment of the status and trends in abundance of a coastal pinniped, the Australian seal lion *Neophoca cinerea*. Endangered Species Research, 44: 421-437.	Goldsworth, S. D, University of Adelaide (Link to reference)	Jurien Bay (North Fisherman Island, Beagle Island, Buller Island) and other locations in WA and SA
Commercial fisheries	Caputi N, Kangas M, Chandrapavan A, Hart A, Feng M, Marin M and de Lestang S (2019) Factors Affecting the Recovery of Invertebrate Stocks From the 2011 Western Australian Extreme Marine Heatwave. Front. Mar. Sci. 6:484. doi: 10.3389/fmars.2019.00484	DPIRD (Link to reference)	Jurien region and others

Receptor	Existing baseline monitoring	Source / Data Custodian	Spatial extent
	Commercial Fisheries data collected by WA Department of Fisheries (WA DoF) and Australian Fishing Management Authority (AFMA)	WA Department of Fisheries / Australian Fishing Management Authority	Australia wide

Appendix B Protected Matters in the EMBA

Receptor	Recovery plan / wildlife conservation plan / conservation advice / management plan (date issued)	Relevant threats and conservation actions	Relevant OMPs and SMPs	Relevant priority monitoring locations (quickest modelled time to contact[3])
Mammals **(refer to Section 4 of EP for additional description of key receptors)**				
Southern right whale	Draft National Recovery Plan for the Southern Right Whale (*Eubalaena australis*) (DCCEEW, 2022)	• Relevant threats: anthropogenic underwater noise, vessel collision • Relevant management actions: Minimise vessel strike and assess and address anthropogenic noise.	• OMP: Marine fauna assessment – Cetaceans • SMP: Marine mega-fauna assessment – Whale sharks, dugongs and cetaceans	• 0.04 days to migration BIA
Sei whale	Approved Conservation Advice *Balaenoptera borealis* (sei whale) (TSSC, 2015a)	• Relevant threats: pollution, vessel disturbance • Relevant management actions: report vessel strikes		-
Humpback whale	Approved Conservation Advice for *Megaptera novaeangliae* (humpback whale) (TSSC, 2015b)	• Relevant threats: habitat degradation, vessel disturbance or strike. • Relevant management actions: Minimise vessel collisions.		• 0.04 days to migration BIA
Blue whale	Conservation Management Plan for the Blue Whale 2015 to 2025 (DoE, 2015a)	• Relevant threats: habitat degradation, vessel disturbance or strike. • Relevant management actions: Minimise vessel collisions and report vessel strikes		• 5.2 days to foraging IA

[3] Unless otherwise noted, all results are entrained hydrocarbon timeframes to contact.

Receptor	Recovery plan / wildlife conservation plan / conservation advice / management plan (date issued)	Relevant threats and conservation actions	Relevant OMPs and SMPs	Relevant priority monitoring locations (quickest modelled time to contact[3])
Australian Sea Lion	Recovery Plan for the Australian Sea Lion (*Neophoca cinerea*) (DSEWPC, 2013a)	• Relevant threats: habitat degradation, boating activities and aircraft can cause disturbance, human presence at sensitive sites • Relevant management actions: mitigation to prevent undue disturbance	• OMP: marine fauna assessment - Pinnipeds	• Illawong – Cliff Head (Australian sea lion breeding on East Beagle Island): 0.1 days • Green Head – Leeman (Australian sea lion breeding on North Fisherman Island): 1.5 days • Thirsty Point – Booker Valley (Australian sea lion breeding on Buller Island) • 0.4 days to Foraging areas
Reptiles **(refer to Section 4 of EP for additional description of key receptors)**				
Loggerhead turtle, green turtle, leatherback turtle, hawksbill turtle, flatback turtle	Recovery Plan for Marine Turtles in Australia (DoEE, 2017)	• Relevant threats: chemical and terrestrial discharge, light pollution, vessel disturbance, habitat modification • Relevant management actions from recovery plan: **Chemical and terrestrial discharge**	• OMP: Marine fauna assessment – Reptiles • SMP: Marine mega-fauna assessment – Reptiles	N/A (presence associated with foraging [no breeding sites])

Receptor	Recovery plan / wildlife conservation plan / conservation advice / management plan (date issued)	Relevant threats and conservation actions	Relevant OMPs and SMPs	Relevant priority monitoring locations (quickest modelled time to contact[3])
		– Ensure spill risk strategies and response programs adequately include management for marine turtles and their habitats, particularly in reference to 'slow to recover habitats', e.g. nesting habitat, seagrass meadows or coral reefs. – Quantify the impacts of decreased water quality on stock viability. – Quantify the accumulation and effects of anthropogenic toxins in marine turtles, their foraging habitats and subsequent stock viability.		
***Sharks and rays* (refer to Section 4 of EP for additional description of key receptors)**				
White shark	Recovery Plan for the White Shark (*Carcharodon carcharias*) (DSEWPC, 2013b)	• Relevant threats: habitat modification. • Relevant management objectives: Continue to identify and protect habitat critical to the survival of the white shark and minimise the impact of threatening processes within these areas	• OMP: Marine fauna assessment – Fish • SMP: Marine mega-fauna assessment – Marine fish and elasmobranch assemblages assessment	• 0.04 day to foraging BIA
Scalloped hammerhead	No recovery plan in place	-		-
Grey nurse shark	Recovery Plan for the Grey Nurse Shark (*Carcharias taurus*) (DoE, 2014)	• Relevant threats: pollution		-

Receptor	Recovery plan / wildlife conservation plan / conservation advice / management plan (date issued)	Relevant threats and conservation actions	Relevant OMPs and SMPs	Relevant priority monitoring locations (quickest modelled time to contact[3])
Seabirds and Migratory Shorebirds **(refer to Section 4 of EP for additional description of key receptors)**				
Marine and migratory seabirds	Wildlife Conservation Plan for Seabirds (DoE, 2020)	• Relevant threat/s: shipping, marine debris, light pollution	• OMP: Shoreline clean-up assessment • OMP: Marine fauna assessment – Seabirds and shorebirds • SMP: Seabirds and shorebirds	-
Red knot, knot	Wildlife Conservation Plan for Migratory Shorebirds (Commonwealth of Australia, 2015b) Approved Conservation Advice for *Calidris canutus* (red knot) (TSSC, 2016)	• Relevant threat/s: damage to nesting habitat, pollution • Relevant management actions: manage disturbance at important sites which are subject to anthropogenic disturbance when red knot are present – e.g. discourage or prohibit vehicle access, implement temporary site closures	• OMP: Shoreline clean-up assessment • OMP: Marine fauna assessment – Seabirds and shorebirds • SMP: Seabirds and shorebirds	-
Great knot	Wildlife Conservation Plan for Migratory Shorebirds (Commonwealth of Australia, 2015b)	• Relevant threats: habitat modification, acute pollution, anthropogenic disturbance • No relevant management actions identified		-
Northern Siberian bar-tailed godwit, Russkoye bar-tailed godwit	Wildlife Conservation Plan for Migratory Shorebirds (Commonwealth of Australia, 2015b)	• Relevant threats: habitat modification, acute pollution, anthropogenic disturbance • No relevant management actions identified		-
Curlew Sandpiper	-	-		-

Receptor	Recovery plan / wildlife conservation plan / conservation advice / management plan (date issued)	Relevant threats and conservation actions	Relevant OMPs and SMPs	Relevant priority monitoring locations (quickest modelled time to contact[3])
Lesser sand plover	Wildlife Conservation Plan for Migratory Shorebirds (Commonwealth of Australia, 2015b)	• Relevant threats: habitat modification, acute pollution, anthropogenic disturbance • No relevant management actions identified		-
Australian lesser noddy	-	-		• 7.3 days to foraging BIA
Great sand plover	Wildlife Conservation Plan for Migratory Shorebirds (Commonwealth of Australia, 2015b)	• Relevant threats: habitat modification, acute pollution, anthropogenic disturbance • No relevant management actions identified		-
Australian fairy tern	National Recovery Plan for the Australian fairy tern (*Sternula nereis nereis*) (Commonwealth of Australia, 2020)	• Relevant threats: habitat degradation and loss of breeding habitat, disturbance • Relevant management actions: reduce, or eliminate threats at breeding, non-breeding and foraging sites		• 1.5 days Jurien Bay Marine Park (breeding known to occur) • 0.4 days to foraging BIA
Threatened Ecological Communities **(refer to Section 4 of EP for additional description of key receptors for each location)**				
Sedgelands in Holocene dune swales of the southern Swan Coastal Plain	Sedgelands in Holocene Dune Swales Recovery Plan, (DEC, 2011)	• Relevant threats : Clearing (shoreline clean-up and/or shoreline based monitoring activities) • Relevant management actions: Protect and conserve remaining areas of the ecological community	• OMP: Shoreline clean-up assessment • SMP: Intertidal and Coastal Habitat Assessment	-

Receptor	Recovery plan / wildlife conservation plan / conservation advice / management plan (date issued)	Relevant threats and conservation actions	Relevant OMPs and SMPs	Relevant priority monitoring locations (quickest modelled time to contact[3])
Australian Marine Parks **(refer to Section 4 of EP for additional description of key receptors for each location)**				
Abrolhos MP	South-west Marine Parks Network Management Plan 2018 (Director of National Parks, 2018)	• Relevant management actions: Park protection and management—timely and appropriate preventative and restorative actions to protect natural, cultural and heritage values from impacts	• OMP: Water quality assessment • OMP: Sediment quality assessment • OMP: Marine fauna assessment – Seabirds and shorebirds • Cetaceans • Pinnipeds • OMP: Marine fauna assessment - fish • SMP: Water quality impact assessment • SMP: Sediment quality impact assessment • SMP: Seabirds and shorebirds • SMP: Marine mega-fauna assessment – Whale sharks, cetaceans and dugongs Pinnipeds • SMP: Benthic habitat assessment • SMP: Marine fish and elasmobranch	• 3.8 days
Perth Canyon MP				• 12.0 days
Two Rocks MP				• 11.9 days
Jurien MP				• 1.8 days
South-west Corner MP				• 27.8 days

Receptor	Recovery plan / wildlife conservation plan / conservation advice / management plan (date issued)	Relevant threats and conservation actions	Relevant OMPs and SMPs	Relevant priority monitoring locations (quickest modelled time to contact[3])
			assemblages assessment • SMP: Commercial and recreational fisheries impact assessment • SMP: Heritage and social impact assessment	
Western Australian Marine Parks **(refer to Section 4 of EP for additional description of key receptors for each location)**				
Essex Rocks Nature Reserve[4]	Jurien Bay Marine Park Management Plan 2005-2015 No. 49 (CALM, 2005)	• Relevant management issues: oil spills, damage to seagrass habitats by indiscriminate mooring and anchoring • Relevant management actions: ensure the values of the park are fed into predictive models for oil spills, apply appropriate anchoring controls	• OMP: Water quality assessment • OMP: Sediment quality assessment • OMP: Shoreline clean-up assessment • OMP: Marine fauna assessment – Seabirds and shorebirds Cetaceans Pinnipeds • OMP: Marine fauna assessment - fish • SMP: Water quality impact assessment	-
Buller, Whittell and Green Islands Nature Reserve[5]	Jurien Bay Marine Park Management Plan 2005-2015 No. 49 (CALM, 2005)	• Relevant management issues: oil spills, damage to seagrass habitats by indiscriminate mooring and anchoring • Relevant management actions: ensure the values of the park are fed into predictive models for oil spills, apply appropriate anchoring controls		-

[4] Within Jurien Bay Marine Park

[5] Within Jurien Bay Marine Park

Receptor	Recovery plan / wildlife conservation plan / conservation advice / management plan (date issued)	Relevant threats and conservation actions	Relevant OMPs and SMPs	Relevant priority monitoring locations (quickest modelled time to contact[3])
Abrolhos Islands Fish Habitat Protection	N/A	-	• SMP: Sediment quality impact assessment • SMP: Intertidal and Coastal Habitat Assessment • SMP: Seabirds and shorebirds • SMP: Marine mega-fauna assessment – Whale sharks, cetaceans and dugongs Pinnipeds • SMP: Benthic habitat assessment • SMP: Marine fish and elasmobranch assemblages assessment • SMP: Commercial and recreational fisheries impact assessment • SMP: Heritage and social impact assessment	-
Cervantes Islands Nature Reserve[6]	Jurien Bay Marine Park Management Plan 2005-2015 No. 49 (CALM, 2005)	• Relevant management issues: oil spills, damage to seagrass habitats by indiscriminate mooring and anchoring • Relevant management actions: ensure the values of the park are fed into predictive models for oil spills, apply appropriate anchoring controls		-
Jurien Bay Marine Park	Jurien Bay Marine Park Management Plan 2005-2015 No. 49 (CALM, 2005)	• Relevant management issues: oil spills, damage to seagrass habitats by indiscriminate mooring and anchoring • Relevant management actions: ensure the values of the park are fed into predictive models for oil spills, apply appropriate anchoring controls		• 1.5 days
Beagle Islands Nature Reserve	N/A	-		• 0.5 days
Marmion Marine Park	Marmion Marine Park Management Plan 1992-2002 No. 23 (CALM, 1992)	• Relevant management issues: oil spills, damage to reef habitats by indiscriminate mooring and anchoring • Relevant management actions: ensure the values of the park are fed into predictive models		• 20.0 days

[6] Within Jurien Bay Marine Park

Receptor	Recovery plan / wildlife conservation plan / conservation advice / management plan (date issued)	Relevant threats and conservation actions	Relevant OMPs and SMPs	Relevant priority monitoring locations (quickest modelled time to contact[3])
		for oil spills, apply appropriate anchoring controls		
Lancelin Island Lagoon Fish Habitat Protection	N/A	-		-
Lipfert, Milligan, Etc Islands Nature Reserve[7]	Jurien Bay Marine Park Management Plan 2005-2015 No. 49 (CALM, 2005)	• Relevant management issues: oil spills, damage to seagrass habitats by indiscriminate mooring and anchoring • Relevant management actions: ensure the values of the park are fed into predictive models for oil spills, apply appropriate anchoring controls		-
Sandland Island Nature Reserve[8]	Jurien Bay Marine Park Management Plan 2005-2015 No. 49 (CALM, 2005)	• Relevant management issues: oil spills, damage to seagrass habitats by indiscriminate mooring and anchoring • Relevant management actions: ensure the values of the park are fed into predictive models for oil spills, apply appropriate anchoring controls		-
Ronsard Rocks Nature Reserve[9]	Jurien Bay Marine Park Management Plan 2005-2015 No. 49 (CALM, 2005)	• Relevant management issues: oil spills, damage to seagrass habitats by indiscriminate mooring and anchoring		-

[7] Within Jurien Bay Marine Park

[8] Within Jurien Bay Marine Park

[9] Within Jurien Bay Marine Park

Receptor	Recovery plan / wildlife conservation plan / conservation advice / management plan (date issued)	Relevant threats and conservation actions	Relevant OMPs and SMPs	Relevant priority monitoring locations (quickest modelled time to contact[3])
		• Relevant management actions: ensure the values of the park are fed into predictive models for oil spills, apply appropriate anchoring controls		
Outer Rocks Nature Reserve	N/A	-		-
Fisherman Islands Nature Reserve[10]	Jurien Bay Marine Park Management Plan 2005-2015 No. 49 (CALM, 2005)	• Relevant management issues: oil spills, damage to seagrass habitats by indiscriminate mooring and anchoring • Relevant management actions: ensure the values of the park are fed into predictive models for oil spills, apply appropriate anchoring controls		-
Commonwealth Heritage Places **(refer to Section XX of EP for additional description of key receptors for each location)**				
Lancelin Defence Training Area	N/A	-	• OMP: Water quality assessment • OMP: Sediment quality assessment • MP: Water quality impact assessment • SMP: Sediment quality impact assessment	-

[10] Within Jurien Bay Marine Park

Receptor	Recovery plan / wildlife conservation plan / conservation advice / management plan (date issued)	Relevant threats and conservation actions	Relevant OMPs and SMPs	Relevant priority monitoring locations (quickest modelled time to contact[3])
National Heritage Places **(refer to Section XX of EP for additional description of key receptors for each location)**				
Batavia Shipwreck Site	N/A	-	• OMP: Water quality assessment • OMP: Sediment quality assessment • SMP: Water quality impact assessment • SMP: Sediment quality impact assessment • SMP: Heritage and social impact assessment • SMP: Benthic habitat assessment	-