Stag Field Operational and Scientific Monitoring: Bridging Implementation Plan

GF-70-PLN-F-00003

Rev 0

Facility:	**GF - Stag Field**
Review Interval:	**30 Months**
Safety Critical:	**No**

Approval				
Rev	**Date**	**Owner**	**Reviewer**	**Approver**
		Environment Lead	**Emergency Response Lead**	**HSE Manager - Perth**
0	24-Nov-23	J. Van Rensburg	M. Wyatt	R. Brazier

UNCONTROLLED WHEN PRINTED

Please refer to the Jadestone Energy MIS for the latest revision.

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REVISION HISTORY

Revision	Date	Author / Editor	Amendment
A	24.11.23	BlueSands	Issued to NOPSEMA
0	10.10.24	BlueSands	Issued to NOPSEMA

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DEFINITIONS

Term	Definition
AEP	Australian Energy Producers (formerly Australian Petroleum Production and Exploration Association [APPEA]; from 13 September 2023)
AIIMS	Australasian Inter-Service Incident Management System
ALA	Atlas of Living Australia
AMOSC	Australian Marine Oil Spill Centre
AMP	Australian Marine Park
AMSA	Australian Maritime Safety Authority
AODN	Australian Data Network
BACI	Before-After Control-Impact
BIP	Bridging Implementation Plan
BIA	Biologically Important Areas
BRUVS	Baited Remote Underwater Video Stations
BTEXN	Benzene, Toluene, Ethylbenzene and Xylenes And Naphthalene
CoA	Commonwealth of Australia
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 (Cth)
DoT	Western Australian Department of Transport
DPIRD	Department of Primary Industries and Regional Development
DPLH	Department of Planning, Lands and Heritage
DWER	Department of Water and Environmental Regulation
EMBA	Environment that may be Affected
EMT	Emergency Management Team
EP	Environment Plan
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999 (Cth)
EPS	Environmental Performance Standard
ESC	Environmental Scientific Coordinator
FOB	Forward Operating Base
GIS	Geographic Information System
GPS	Geographic Positioning System
IAP	Incident Action Plan
ICS	Incident Command System
IMOS	Integrated Marine Observing System

Term	Definition
IMSA	Index of Marine Surveys for Assessment
IMT	Incident Management Team
IMT Leader	Incident Management Team Leader. Equivalent to an Incident Controller or Incident Commander.
KEF	Key Ecological Feature
MDO	Marine Diesel Oil
MGO	Marine Gas Oil
Monitoring Service Providers	The subcontracted specialist monitoring service providers subcontracted by OSRL to perform certain operational and scientific monitoring services
MSA	Master Service Agreement
NATA	National Association of Testing Authorities
OM	Operational Monitoring
OMP	Operational Monitoring Plan
OPEP	Oil Pollution Emergency Plan
OPGGS (E)	Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2009 Regulations
OSM	Operational and Scientific Monitoring
OSM Services Provider	The operational and scientific monitoring services to be provided by OSRL via the OSM Supplementary Service Agreement
OSRA	Oil Spill Response Atlas
OSRL	Oil Spill Response Limited
OSTM	Oil Spill Trajectory Modelling
PAH	Polycyclic aromatic hydrocarbons
PPE	Personal Protective Equipment
QA/QC	Quality Assurance and Quality Control
ROV	Remotely Operated Vehicle
SBRUVS	Stereo Baited Remote Underwater Video Stations
SIMA	Spill Impact Mitigation Assessment
SM	Scientific Monitoring
SMP	Scientific Monitoring Plan
TRH	Total Recoverable Hydrocarbons
TPH	Total Petroleum Hydrocarbons
WA	Western Australia
WA DoT	Western Australian Department of Transport
WAMSI	Western Australian Marine Science Institution

PART A – PREPAREDNESS

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

1. INTRODUCTION

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

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

Jadestone has elected to use the Joint Industry OSM Framework and supporting Operational Monitoring Plans (OMPs) and Scientific Monitoring Plans (SMPs) as the foundation of its OSM approach. The Joint Industry OSM Framework is available on the Australian Energy Producers Publications Webpage.

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

Table 1-1 describes key documents that form Jadestone's environmental management document framework, which are relevant to OSM.

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

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

Document	Description
Stag Field Operations EP (GF-70-PLN-I-00002) and future Stag Drilling EP (GF-70-PLN-I-00006)	The 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).
Stag Field Oil Pollution Emergency Plan (OPEP) (GF-70-PLN-I-00001)	This plan provides the activation and response process for the credible spill scenarios, including incident management, spill impact mitigation analysis (SIMA) process and detailed implementation guidance for individual response options. Of particular relevance to this plan, it identifies the credible spill scenarios and protection priorities.
Incident Management Contact List	Contains all internal contact and communications information to enable effective communication amongst response personnel. It also contains details of external Support Agencies, Service Providers and Government Agencies to be contacted as per the reporting requirements in Table 9-1 of the OPEP. It is regularly updated and accessed via the Jadestone IMT Portal.
Incident Management Team Response Plan (JS-70-PLN-F-00008)	Details procedures for responding to an emergency incident, including a hydrocarbon spill event. This plan contains details of the incident management structure, procedures for the activation of the IMT and the roles and responsibilities of the IMT.

2. EMBA AND LOCATIONS FOR BASELINE REVIEW

2.1 EMBA

The EMBA is defined in the Stag Operations EP (Section 3) and future drilling EPs as the area potentially impacted by hydrocarbons from a spill event above impact concentrations. The EMBA was determined using stochastic modelling results applying the following thresholds:

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

Of the credible spill scenarios identified in the Stag Operations EP (Section 7.4), scenarios 5 (250 m^3 MDO) and 6 (120 m^3 Stag Crude Oil) have been selected to represent worst-case spills from a response perspective, including operational and scientific monitoring, and have been used to inform the resourcing requirements for this OSM Bridging Implementation Plan (BIP). Modelling results for scenario 1 (86.5 m^3 Stag Crude Oil) predicted contact with the same receptors, however the modelling results showed slightly less shoreline accumulation and minimum timeframes to contact with receptors. Scenario 6 (120 m^3) was therefore selected as the worst-case credible scenario for Stag Crude Oil.

2.2 Locations Requiring a Baseline Review

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

Locations requiring a review of the baseline data available have been determined from the stochastic modelling results (RPS, 2020; RPS, 2023). Locations and associated receptors requiring a baseline review were identified as those sensitive receptors contacted by hydrocarbons at the low threshold for entrained (≥10 ppb), dissolved (≥10 ppb), floating (≥1 g/m^2), and shoreline contact (≥10 g/m^2), within 7.0 days (7 days was used to delineate the first-strike monitoring response) at a probability >5%, as listed in Table 2-1 and Table 2-2. Table 2-3 lists the key sensitivities associated with these locations.

First-strike monitoring priorities are subsequently identified as those locations and associated receptors predicted to be contacted within 7.0 days at a probability >5%, and where baseline data is either not available or not sufficient (as depicted in Table 4-2 and outlined in Section 4).

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 Stag Operations EP and any future Drilling EP and summarised in Table 2-3 and Appendix A.

Table 2-1: Spill modelling results – subsea release of Stag crude (March to August) due to a loss of pipeline integrity with a probability of contact >5% and <7 days (RPS, 2020)

Locations requiring a baseline review	Probability (%) of ≥1 g/m² floating	Min. arrival time ≥1 g/m² floating (days)	Probability (%) of ≥10 g/m² shoreline contact	Min. arrival time ≥10 g/m² shoreline contact (days)	Probability (%) of contact of ≥10 ppb entrained	Min. arrival time ≥10 ppb entrained (days)	Probability (%) of contact of ≥10 ppb dissolved
Montebello AMP	20	0.7	NA	NA	35	0.5	10
Montebello Islands	4	1.8	13	1.1	8	1.2	4

Table 2-2: Spill modelling results – vessel collision and release of MDO (April to October) with a probability of contact >5% and <7 days (RPS, 2023)

Locations requiring a baseline review	Probability (%) of ≥1 g/m² floating	Min. arrival time ≥1 g/m² floating (days)	Probability (%) of ≥10 g/m² shoreline contact	Min. arrival time ≥10 g/m² shoreline contact (days)	Probability (%) of contact of ≥10 ppb entrained	Min. arrival time ≥10 ppb entrained (days)	Probability (%) of contact of ≥10 ppb dissolved	Min. arrival time ≥10 ppb dissolved (days)
Montebello AMP	1	2.1	NA	NA	65	1	2	1
Montebello Islands	NC	NC	9	3	19	2	NC	NC
Montebello Shoals (within the Montebello AMP)	NC	NC	NA	NA	8	2	NC	NC
Tryal Rocks (intertidal coral reef within the Montebello AMP and site of the Trial shipwreck)	NC	NC	NA	NA	7	3	NC	NC

NA = not applicable as receptor is submerged

NC = no contact

Table 2-3: Key sensitivities for locations predicted to be contacted within 7 days at the low thresholds, at a probability greater than 5%, and requiring a baseline review

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

Location	Receptor	Background	Key locations	Seasonality
		Hawksbill (*Eretmochelys imbracata*)		Flatback- minor nesting occurs Oct-Mar (peak: Nov-Jan) Hawksbill- major nesting occurs all year (peak Oct-Jan)
	Cetaceans	Whale species that may occasionally visit include the humpback whale (*Megaptera novaeangliae*), short-finned pilot whale (*Globicephala macrorhynchus*), false killer whale (*Pseudorca crassidens*), killer whale (*Orcinus orca*), minke whale (*Balaenoptera acutorostrata*), Bryde's whale (*Balaenoptera edeni*), sei whale (*Balaenoptera borealis*), pygmy blue whale (*Balaenoptera musculus brevicauda*), fin whale (*Balaenoptera physalus*), melon-headed whale (*Peponocephala electra*), sperm whale (*Physeter macrocephalus*) and the blue whale (*Balaenoptera musculus musculus*). (DEC 2006). Pygmy blue whale (*Balaenoptera musculus brevicauda*) and humpback whale (*Megaptera novaeangliae*) migration area Humpback dolphins (*Sousa sahulensis*) thought to be present year round in the area (Raudino et al. 2018)	An area of sheltered water to the west of Trimouille Island is used as a resting area for female humpback whales and their young calves during their southerly migration (DEC 2006).	-
	Dugong	Dugong (*Dugong dugon*) significant sightings (Bancroft et al. 2000)	-	-
Tryal Rocks	The *Trial* shipwreck is Australia's earliest known shipwreck (1622).	-	-	-
At sea key sensitivities	Fisheries	Southern Bluefin Tuna Fishery West Skipjack Fishery Western Tuna and Billfish Fishery	-	-

Location	Receptor	Background	Key locations	Seasonality
	Whale shark	Whale shark (*Rhincodon typus*) BIA- foraging		
	Cetaceans	Pygmy blue whale (*Balaenoptera musculus brevicauda*) BIA- distribution Humpback whale (*Megaptera novaeangliae*) BIA- migration	-	Pygmy blue whales: April to June Humpback whales: June through to the end of October
	Dugong (*Dugong dugon*)	-	-	-

3. RELEVANT EXISTING BASELINE INFORMATION SOURCES

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

3.1 Data.gov.au

Data.gov.au is the central source of Australian open government data published by federal, state and local government agencies. In addition, it includes publicly-funded research data and datasets from private institutions that are in the public interest. Data WA provides information specific to Western Australia, with special information provided via the Shared Location Information Platform (SLIP) | Data WA.

3.2 Australian Ocean Data Network

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

3.3 Western Australian Oil Spill Response Atlas

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

3.4 The Atlas of Living Australia

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

3.5 Index of Marine Surveys Assessment

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

3.6 Other Sources

Other sources include:

- the WA Department of Biodiversity and Attractions (DBCA) Biodiversity and Conservation Science Annual Reports;
- Australian Institute for Marine Science (AIMS) Research Data Platform;
- WA State of Fisheries Report;

- eAtlas.org.au;
- North West Atlas;
- Western Australian Marine Science Institution;
- Geosciences Australia data and publications;
- Australian Marine Parks Science Atlas; and
- Birdlife Data Zone.

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

4. BASELINE DATA REVIEW AND IDENTIFICATION OF FIRST-STRIKE MONITORING PRIORITIES

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

The baseline data assessment includes the following steps:

1. **Identification of locations requiring a baseline review:** Receptor locations predicted to be contacted at the low thresholds within 7.0 days, at a probability greater than 5%, are identified (Table 2-1) and aligned with OMPs and SMPs.
2. **Collection of baseline data:** Environmental baseline monitoring data relevant to the locations and receptors is located (as per sources outlined in Section 3).
3. **Assessment of baseline data:** The relevance of each data source is assessed:
    a) For each data source obtained, a meta-analysis is performed to determine if the parameters and methods align with the key parameters and methods outlined in the Joint Industry SMPs (Table 4-1), the spatial extent of the data, the sampling effort/duration, and the temporal relevance is also noted. Table 4-2 outlines the overall assessment criteria used for each data source.
4. **Assessment of baseline data:** An annual evaluation of the adequacy (in terms of the likely ability to detect changes between pre-impact and post-impact conditions) of the collective baseline data for each location and associated receptors is undertaken. This evaluation takes into consideration the following:
    a) Background historical information on the presence, distribution, seasonality, and if applicable, the reproductive state of the receptor (as outlined in Table 2-3) is compared with the data available from monitoring within the last 5 years. Depending on the receptor and associated Joint Industry SMP, the following is considered:
        i) Does the data collectively cover the required spatial extent of the receptor within a location (taking into consideration any background historical information on the distribution of the receptor)?
        ii) Does the data collectively cover all the species/biological communities required for the relevant Joint Industry SMP and that may be present at the location?
5. **Assessment outcome:** Each location and associated receptor is then categorised as either 'First-Strike Monitoring Priority' or 'Lower Priority for First-Strike Monitoring', as outlined below, and summarised in Table 4-3:
    a) First-Strike Monitoring Priority - current baseline data is not in place, not suitable or not sufficient; and post-spill pre-impact baseline data collection should be prioritised; and
    b) Lower Priority for First-Strike Monitoring – collectively there is substantial baseline data or on-going monitoring from within the last 5 years. This data aligns with the key parameters and methodologies of the relevant Joint Industry SMP, encompasses the required species/biological communities, and covers the required spatial extent of the location. The current baseline data is therefore considered sufficient and could likely be used to detect a level of change in the event of a significant impact. Hence this receptor is considered a lower priority for post-spill, pre-impact data collection.

During an actual spill, the monitoring priorities will vary according to the spill event and it should be noted that the monitoring priorities provided in Table 4-3 are listed for planning and guidance purposes. Monitoring should focus on locations most at risk of consequences, such as in shallow waters, in sensitive habitats, and in areas with protected species. Consequently, shorelines and adjacent nearshore areas will generally take priority over reefs, shoals and banks, unless they are the main locations impacted by a spill event. The WA DoT protection priority rankings, determined as part of the Western Australian Marine Oil Pollution Risk Assessment, may also be consulted to provide further focus and prioritisation.

At the time of a spill, Jadestone will work with its OSM Services Provider, sub-contracted Monitoring Service Providers and key stakeholders in the initial stages of the spill to identify priority monitoring receptors and to assist in the finalisation of the monitoring design, ensuring that resources are allocated appropriately and according to the greatest risk of impact. This process is outlined in Section 13.It is noted that it is difficult to obtain absolute statistical proof of oil spill impacts, due to the variability (spatially and temporally) of the natural environment, the lack of experimental control due to the nature of spills and because suitable baseline data may not be available (Kirby *et al*. 2018). Alternative approaches exist for detecting impacts where post-spill, pre-impact monitoring may not be feasible. These include impact versus control design approaches and/or a gradient approach. The Joint Industry OSM Framework provides guidance and considerations for survey designs to enable the acquisition of sufficiently powerful data during SMP implementation.

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

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

SMP	Key parameter	Key methodology
Water quality impact assessment	At least one key parameter: • Total recoverable hydrocarbons (TRH); • Total petroleum hydrocarbons (TPH); • Benzene, toluene, ethylbenzene and xylenes and naphthalene (BTEXN); or • Polycyclic aromatic hydrocarbons (PAH)	In situ UV fluorometer and/or samples analysed at National Association of Testing Authorities (NATA) accredited lab using NATA accredited method
Sediment quality impact assessment	At least one key parameter: TRH, TPH, BTEXN, PAH, heavy metals	Sediment collected by corer/grab and samples analysed at NATA accredited lab using NATA accredited method
Intertidal and coastal habitat assessment	At least one key parameter: presence, diversity, distribution	Any of the following, as appropriate to the parameters: • Ground and vessel-based intertidal surveys (e.g. quadrats, transects, including video and still photography) • Remote sensing • Infauna sampling
Benthic habitat assessment	At least one key parameter: presence, diversity, distribution	Any of the following, as appropriate to the parameters: • Transects • Towed camera

SMP	Key parameter	Key methodology
		• Drop camera • Remotely Operated Vehicle (ROV) camera • Diver-based camera surveys • Remote sensing (coral & seagrass broad scale survey) • Sediment grab for infauna
Marine fish and elasmobranch assemblages assessment	At least one key parameter: species identification, abundance, habitat type	Any of the following, as appropriate to the parameters: • Baited remote underwater video stations (BRUVS) • Stereo Baited Remote Underwater Video Stations (SBRUVS) • ROV • Towed video survey
Fisheries impact assessment	At least one key parameter: Abundance, catch-rate, stock structure, size structure	Catch and effort for stock assessment
Marine megafauna - reptile	At least one key parameter: species identification, abundance / counts, key behaviour (foraging, mating, nesting, internesting)	As appropriate to the species and behaviour / life stage: • Nesting turtles: ground surveys • In water turtles: vessel and aerial surveys • Sea snakes: manta board and snorkel surveys • Estuarine crocodiles: vessel-based spotlight surveys at night
Marine megafauna- whale sharks, dugong and cetaceans	At least one key parameter: species identification, abundance / counts, key behaviour	Aerial or vessel surveys, acoustic monitoring
Seabirds and shorebirds	At least one key parameter: species present, abundance / counts, behaviour (resting, roosting, foraging, nesting)	Ground surveys and standardised methodology for counting birds

Table 4-2: Assessment criteria for environmental baseline data review

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

Table 4-3: Proposed first-strike monitoring locations versus SMPs

Location	SMP									
	Water quality impact assessment	**Sediment quality impact assessment**	**Intertidal and coastal habitat assessment**	**Seabirds and shorebirds**	**Marine megafauna assessment – reptiles**	**Marine megafauna assessment – whale sharks, dugong and cetaceans**	**Benthic habitat assessment**	**Marine fish and elasmobranch assemblages assessment**	**Fisheries impact assessment**	**Heritage and social impact assessment**
Montebello Islands and Montebello AMP (including Tryal Rocks)	First-strike monitoring priority	First-strike monitoring priority	First-strike monitoring priority	First-strike monitoring priority	First-strike monitoring priority	First-strike monitoring priority	First-strike monitoring priority	First-strike monitoring priority	Lower priority to first-strike monitoring (Locations to be determined in consultation with key stakeholders to reflect current fishing zones/effort)	First-strike monitoring priority (Locations to be determined in consultation with key stakeholders)

5. OSM ORGANISATIONAL STRUCTURE

The Jadestone incident response structure is based on the Australasian Inter-Service Incident Management System (AIIMS), which consists of a standard management hierarchy and procedures for managing incidents of any size. This system aligns with the international Incident Command System (ICS). 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.

Jadestone's IMT structure is shown in Figure 5-1. Where the WA DoT is the Control Agency, the IMT will be managed through coordinated command and Jadestone will still be expected to continue monitoring activities in State waters, with oversight from WA DoT.

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.

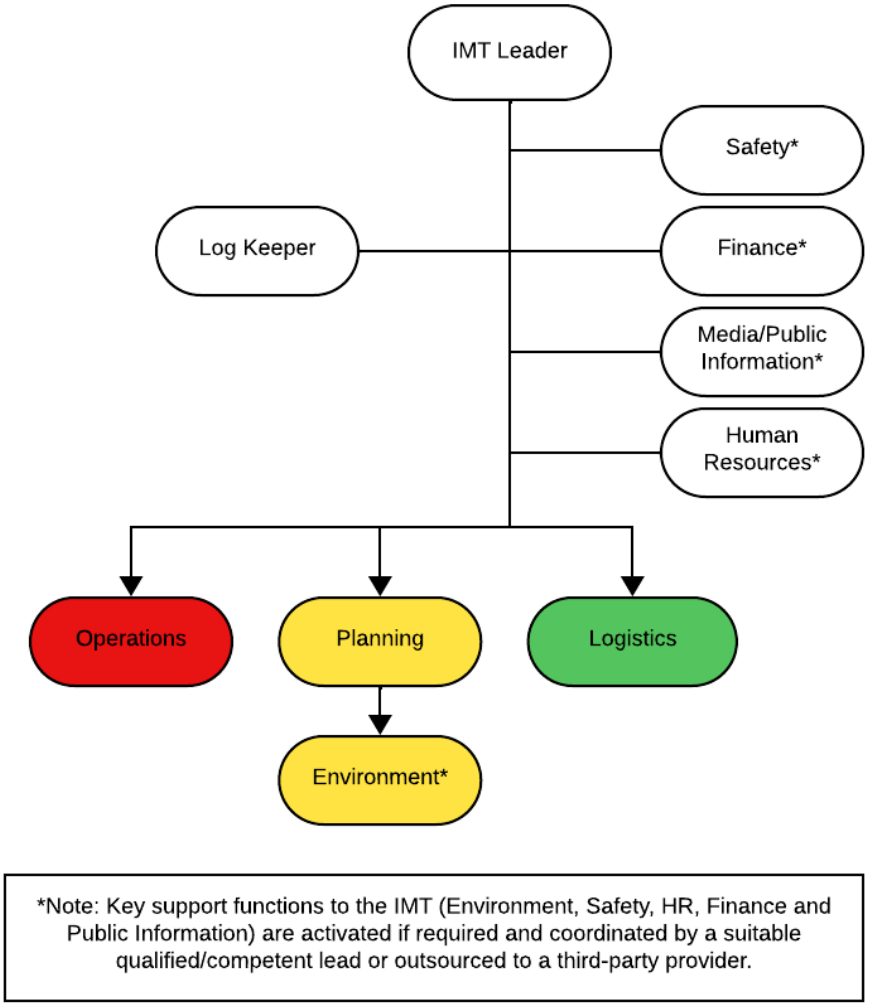

Figure 5-1: Jadestone IMT structure

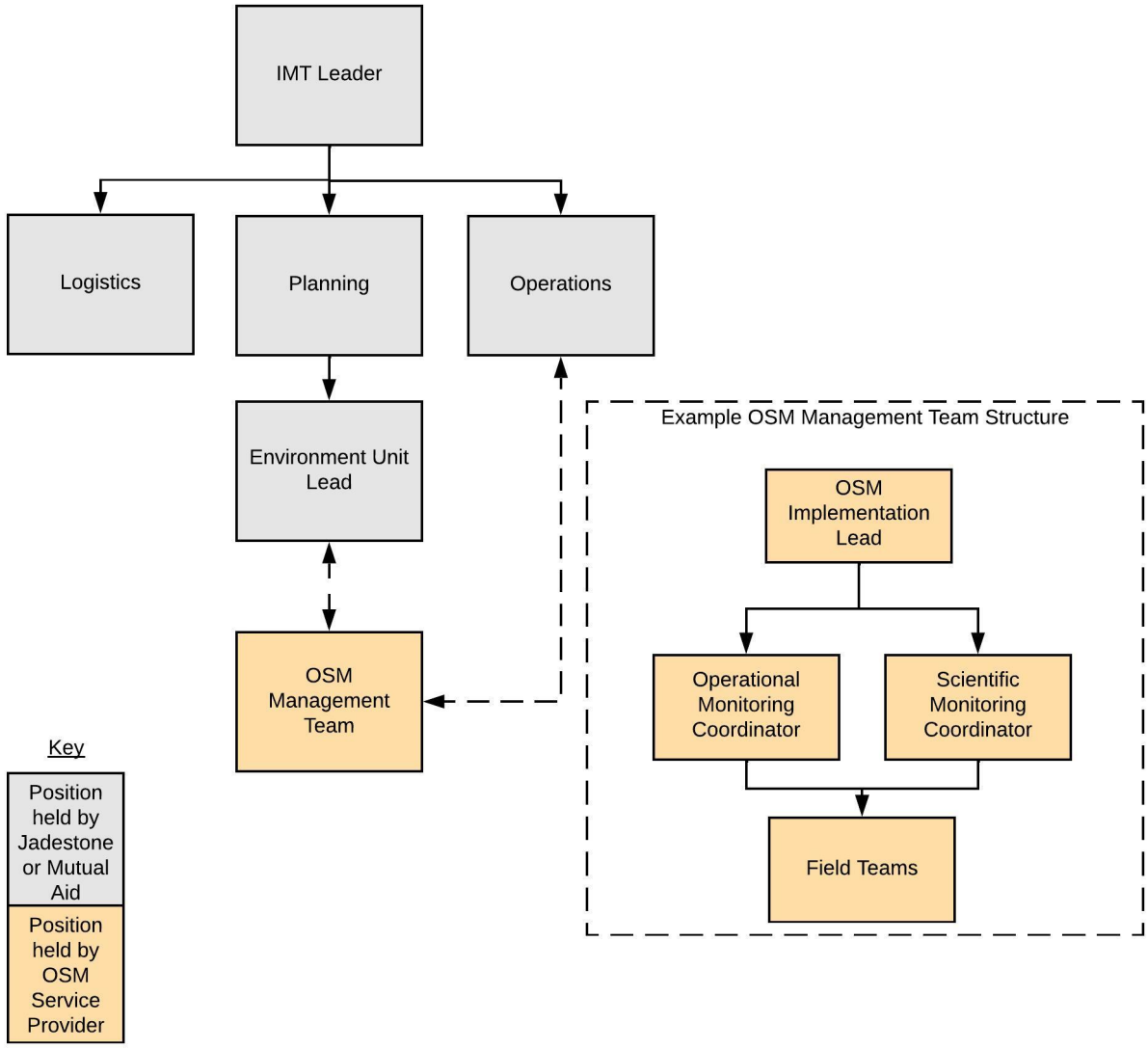

Figure 5-2: Jadestone IMT structure with OSM Team

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 key OSM roles held by Jadestone and the OSM Services Provider.

During the post-response phase, the Environment Unit Leader 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	Jadestone
OSM Implementation Lead	OSM Services Provider
Operational Monitoring Coordinator and/or Scientific Monitoring Coordinator	OSM Services Provider
OSM Field Operations Manager	OSM Services Provider
OSM Field Teams	OSM Services Provider

7. MOBILISATION AND TIMING OF OMP AND SMP IMPLEMENTATION

Table 7-1 provides an indicative implementation schedule for OMPs and SMPs in the EMBA and adjacent waters. 'Implementation' of an OMP/SMP is defined as being ready, at the point of staging or departure, to mobilise for monitoring. If the monitoring plan is desktop-based, implementation is defined as commencing the work (e.g. computer model inputs). The locations listed are aligned to the initial monitoring priorities described in Section 2.

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

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

Proximity to spill source	Monitoring type	0–48 hours from OSM activation	Within 72 hours of OSM activation	~5-7 days from OSM activation	>2 weeks from OSM activation
Spill site and surrounding waters	OM	• Activation of OMP Team Leads. • Finalise OMPs. • Commence activation and mobilisation of OM personnel.	Implement: • OMP: Hydrocarbon Properties and Weathering Behaviour, where resources are available (e.g. Stored at Stag Central Processing Facility). • OMP: Surface Chemical Dispersant Effectiveness and Fate Assessment • OMP: Water Quality Assessment • OMP: Sediment Quality Assessment • OMP: Marine Fauna Assessment • Continue to finalise OMPs. • Continue to activate and mobilise OM personnel.	Continued (as per on-going arrangements)	As results from implemented OMPs are available, data are provided to relevant personnel in IMT (e.g. Planning Section) 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.	Implement: • SMP: Water Quality Impact Assessment • SMP: Sediment Quality Impact Assessment • SMP: Benthic Habitat Assessment	Continue SMP monitoring until termination criteria are met

Proximity to spill source	Monitoring type	0–48 hours from OSM activation	Within 72 hours of OSM activation	~5-7 days from OSM activation	>2 weeks from OSM activation
				• SMP: Marine Fish and Elasmobranch Assemblages assessment • SMP: Marine Mega-fauna Assessment	
Sensitive receptors (including shorelines) where stochastic modelling shows contact within 72 hours (3 days) • Montebello Islands (1.1 days for shoreline contact of subsea release of Stag crude; 3 days for shoreline contact MDO vessel spill) • Montebello Marine Park (0.5 days for subsea release of Stag crude; 1 day for MDO vessel spill)	OM	• Activation of OMP Team Leads. • Finalise OMPs. • Commence activation and mobilisation of OM personnel.	Implement: • OMP: Hydrocarbon Properties and Weathering Behaviour • OMP: Water Quality Assessment • OMP: Sediment Quality Assessment • OMP: Shoreline clean-up assessment • OMP: Marine Fauna Assessment • Continue to finalise OMPs. • Continue to activate and mobilise OM personnel.	Continued (as per on-going arrangements)	As results from implemented OMPs are available, data are provided to relevant personnel in IMT (Planning Lead) and used in the Incident Action Planning process for the next operational period. OMP is redesigned or reallocated according to the specifics of the actual spill until termination criteria are met
	SM	• Activation of SMP Team Leads and finalisation of SMPs.	• Finalisation of the remaining SMPs (where individual SMP initiation criteria are met).	Implement: • SMP: Water Quality Impact Assessment • SMP: Sediment Quality Impact Assessment • SMP: Intertidal and Coastal Habitat Assessment	Continue SMP monitoring until termination criteria are met

Proximity to spill source	Monitoring type	0–48 hours from OSM activation	Within 72 hours of OSM activation	~5-7 days from OSM activation	>2 weeks from OSM activation
				• SMP: Seabirds and Shorebirds • SMP: Marine Mega-fauna Assessment- Reptiles • SMP: Marine Mega-fauna Assessment- cetaceans, whale sharks and dugong • SMP: Marine Fish and Elasmobranch Assemblages assessment • SMP: Commercial and recreational fisheries impact assessment • SMP: Heritage Assessment • SMP: Social Assessment	

8. RESOURCE REQUIREMENTS

Jadestone is a member of the OSRL OSM Supplementary Agreement, which provides OSM services for preparedness, activation, and monitoring (Section 9). This service can deploy scientific monitoring personnel within 5-7 days of notification (Table 9-1).

Based on stochastic modelling, only Montebello Islands may be affected before scientific monitoring can begin in the field. As a result, post-spill pre-impact monitoring for this location is unlikely to occur. Table 4-3 indicates a lack of existing baseline data for many of these locations. Given these circumstances, the scientific monitoring (SM) design for these locations will likely require either:

- An Impact versus Control Approach
- A Gradient Approach
- A combination of both approaches

Consequently, at the time of a spill, additional unaffected control locations will need to be identified and monitored for comparison.

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, including the resources required for monitoring unaffected control sites. This assessment is based on the subsea Stag crude spill scenario from the pipeline (120 m^3) and the vessel-based MDO spill scenario (250 m^3), as listed in Section 5.2.1 of the Stag Field OPEP (GF-70-PLN-I-00001).

Table 8-1: Resources required for key OSM coordination roles

Role	Resources required	Arrangement
OSM Implementation Lead (OSM Services Provider)	1 x OSM Implementation Lead	Oil Spill Response Limited (OSRL) OSM Supplementary Service Agreement
Operational Monitoring Coordinator and Scientific Monitoring Coordinator (OSM Services Provider)	1 x Operational Monitoring Coordinator 1 x Scientific Monitoring Coordinator	
OSM Field Operations Manager (OSM Services Provider)	1 x OSM Field Operations Manager	

Table 8-2: Resources required for initially implementing OMPs[#]

OMP	Resources Required (Week 1-2)	Arrangement
Hydrocarbon properties and weathering behaviour at sea*	1 team (spill site and surrounds) 1 team (Montebello Islands) Total 2 teams	OSRL OSM Supplementary Service Agreement Marine contractors Laboratory arrangements
Shoreline clean-up assessment	1-2 teams (Montebello Islands) Total 1-2 teams	AMOSC Master Services Agreement (MSA) and/or OSRL Service Level Agreement (SLA) Marine contractors
Surface chemical dispersant effectiveness and fate	1 team (for visual observations, which may be performed by trained aerial observers used during monitor and evaluate if trained in observation and verification of chemical dispersant effectiveness) For water quality observations, refer to OMP: Water quality assessment	OSRL OSM Supplementary Service Agreement AMOSC MSA Marine contractors
Water quality assessment*	Refer to OMP: Hydrocarbon properties and weathering behaviour at sea resourcing* (all sites)	OSRL OSM Supplementary Service Agreement Marine contractors
Sediment quality assessment*	Refer to OMP: Hydrocarbon properties and weathering behaviour at sea resourcing* (all sites)	OSRL OSM Supplementary Service Agreement Marine contractors
Marine fauna assessment	1 team to conduct initial aerial surveys for all sites (2 observers per aircraft) Note: Fauna related SMPs are likely to be initiated simultaneously or following aerial assessment with vessel and ground based fauna surveys carried out as part of the relevant fauna SMP.	OSRL OSM Supplementary Service Agreement Marine contractors Aviation contractors

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

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

Table 8-3: Resources required for initially implementing SMPs[#]

SMP	Resources Required (Week 1-2)	Arrangement
Water quality impact assessment	1 team (spill site and surrounds) 1 team (Montebello Islands) 1 team (control site) Total 3 teams Note: can initially be performed by the same team as OMP: Water quality assessment. This SMP may replace OMP: Water quality assessment if the OMPs termination criteria are triggered	OSRL OSM Supplementary Service Agreement Marine contractors Laboratory arrangement
Sediment quality impact assessment	Refer to SMP: Water quality impact assessment* (all sites)	OSRL OSM Supplementary Service Agreement Marine contractors Laboratory arrangement
Intertidal and coastal habitat assessment	1 team (Montebello Islands) 1 team (control site) Total 2 teams	OSRL OSM Supplementary Service Agreement Marine contractors Laboratory arrangement
Seabirds and shorebirds	1 team to conduct aerial surveys for all sites for all fauna (Can initially be performed by the same aerial team as OMP: Marine fauna assessment) 1 team to conduct vessel-based surveys for all impacted sites 1 team to conduct vessel-based survey at control site(s) Total 2 vessel-based teams (surveys would include all fauna [birds, reptiles, cetaceans, dugong and whale shark]) 1 team to conduct ground-based surveys at the Montebello Islands 1 team to conduct ground-based surveys at control site(s) Total 2 ground based teams (at least 1 experienced ornithologist per team)	OSRL OSM Supplementary Service Agreement Marine contractors Laboratory arrangement

SMP	Resources Required (Week 1-2)	Arrangement
	This SMP may replace the relevant OMP: Marine fauna assessment if the OMPs termination criteria are triggered	
Marine mega-fauna assessment -whale shark, dugong and cetaceans	Aerial surveys refer to SMP: Seabirds and shorebirds Vessel surveys refer to SMP: Seabird and shorebirds This SMP may replace the relevant OMP: Marine fauna assessment if the OMPs termination criteria are triggered	OSRL OSM Supplementary Service Agreement Marine contractors Laboratory arrangement
Marine mega-fauna assessment – reptile	Aerial surveys refer to SMP: Seabirds and shorebirds Vessel surveys refer to SMP: Seabird and shorebirds Ground based survey refer to SMP: Seabird and shorebirds (including 1 member experienced with ground turtle surveys) This SMP may replace the relevant OMP: Marine fauna assessment if the OMPs termination criteria are triggered	OSRL OSM Supplementary Service Agreement Marine contractors Laboratory arrangement
Benthic habitat assessment	1 team (all sites) 1 team (control sites) Total 2 teams	OSRL OSM Supplementary Service Agreement Marine contractors Laboratory arrangement
Marine fish and elasmobranch assemblages assessment	1 team (all sites) 1 team (control sites) Total 2 teams	OSRL OSM Supplementary Service Agreement Marine contractors Laboratory arrangement
Fisheries impact assessment	1 team	OSRL OSM Supplementary Service Agreement Marine contractors Laboratory arrangement
Heritage features assessment	1 team	OSRL OSM Supplementary Service Agreement Marine contractors Laboratory arrangement

SMP	Resources Required (Week 1-2)	Arrangement
Social impact assessment	1 team	OSRL OSM Supplementary Service Agreement

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

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

9. CAPABILITY ARRANGEMENTS

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

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

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

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

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

Preparedness[1]
24/7 Duty Manager accessed through 24 hr. hotline
Provision of suitably trained operational monitoring personnel
Monthly reports on personnel and equipment availability
Access to OSM Services Provider's sub-contracted Monitoring Service Providers
Access to OSM Services Provider's network of laboratories and equipment providers
Activation / Monitoring[2]
Provision of an OSM Services Lead and OSM Implementation Lead to the Jadestone IMT within 12 hours of notification
Provision of a first-strike monitoring team within 72 hours of notification, ready to deploy from a nominated port(s) or staging location (e.g. Forward Operating Base [FOB])
Assisting Jadestone in finalisation of monitoring plans
Provision of scientific monitoring personnel within 5-7 days of notification
Access to OSM Services Provider personnel and equipment

9.1 Personnel Competencies

The OSRL OSM Supplementary Service Agreement specifies the training and competency requirements for key OSM personnel consistent with the Joint Industry OSM Framework.

In addition and where practicable, Jadestone will engage its consultants in the initial stages of the monitoring program to help activate and mobilise monitoring teams and support the OSM Services Provider in the finalisation of monitoring designs.

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

[2] Defined as Response Services in OSM Supplementary Service Agreement

9.2 Equipment

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

In accordance with the OSRL OSM Supplementary Service Agreement, the OSM Services Provider will provide all specialised field monitoring equipment to implement individual OMPs and SMPs. Jadestone 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 key equipment will be listed in the OSM Services Provider's Equipment Register.

Table 9-2: OSM equipment

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

9.3 Exercises

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

In addition, Jadestone will conduct an annual notification test of the OSM Services Provider, outlined in the Incident Management Exercise and Testing Program (JS-70-PR-F-00001).

Table 9-3: Exercise types

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

10. CAPABILITY ASSESSMENT

Table 10-1 provides a comparison of Jadestone's worst-case capability requirements (as outlined in Table 8-2 and Table 8-3) with the OSRL OSM Supplementary Service Agreement capability to implement each OMP and SMP. Where there are synergies between OMPs and SMPs, the same personnel may implement multiple OMPs/SMPs simultaneously, as identified in Table 10-1. For example, personnel assigned to the OMP for Hydrocarbon Properties and Weathering Behaviour at Sea can also carry out the OMPs for Water Quality Assessment and Sediment Quality Assessment concurrently.

Table 10-1: OSM capability

Component	Total Personnel Required (Weeks 1–2) [3]	Personnel available via OSM Service Provider Contract	Personnel available via OSROs	Jadestone	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 1 OM Monitoring Coordinator 1 SM Coordinator 1 Field Operations Manager	N/A	N/A	1 OSM Implementation Lead 1 OM Monitoring Coordinator 1 SM Coordinator 1 Field Operations Manager
OMPs					
Hydrocarbon properties and weathering behaviour at sea*	2 teams	7 teams	N/A	N/A	7 teams
Shoreline clean-up assessment	2 teams	18 OSRL	60 + AMOSC Core Group 12 AMOSC staff trained in SCAT	N/A	60 + AMOSC Core Group 12 AMOSC staff 18 OSRL
Surface chemical dispersant effectiveness and fate (relevant only to a spill involving Stag crude)	Visual observations: 1 team For water quality assessment – refer to SMP: Water quality assessment	1 visual observation team	4 AMOSC Staff 2 AMOSC Core Group trained personnel	N/A	Visual observations: 1 team 4 AMOSC Staff 2 AMOSC Core Group trained personnel
Water quality assessment*	Refer to OMP: Hydrocarbon properties				

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

Component	Total Personnel Required (Weeks 1–2) [3]	Personnel available via OSM Service Provider Contract	Personnel available via OSROs	Jadestone	Total Personnel Available
	and weathering behaviour at sea				
Sediment quality assessment*	Refer to OMP: Hydrocarbon properties and weathering behaviour at sea				
Marine fauna assessment (reptiles, cetaceans, dugongs, seabirds and shorebirds, fish)	1 aerial team	2 teams	N/A	N/A	2 teams
SMPs					
Water quality impact assessment	3 teams Note: can initially be performed by the same team as OMP: Water quality assessment. This SMP may replace OMP: Water quality assessment if the OMPs termination criteria are triggered	7 teams	N/A	N/A	7 teams
Sediment quality impact assessment	Refer to SMP: Water quality impact assessment* (all sites)				
Intertidal and coastal habitat assessment	2 teams	6 teams	N/A	N/A	6 teams
Seabirds and shorebirds	1 aerial team (Can initially be performed by the same aerial team as	2 aerial teams	N/A	N/A	2 aerial teams

Component	Total Personnel Required (Weeks 1–2) [3]	Personnel available via OSM Service Provider Contract	Personnel available via OSROs	Jadestone	Total Personnel Available
	OMP: Marine fauna assessment)				
	2 vessel teams (surveys would include all fauna [birds, reptiles, cetaceans, dugong and whale shark])	6 vessel teams			6 vessel teams
	2 ground teams (including 2 experienced ornithologists)	6 ground-based teams			6 ground-based teams
Marine mega-fauna assessment – whale shark, dugong and cetaceans	Refer to SMP: seabirds and shorebirds				
Marine mega-fauna assessment – reptiles	Aerial and vessel - Refer to SMP: seabirds and shorebirds Ground surveys - Refer to SMP: seabirds and shorebirds (plus 1 team member per team experienced with ground turtle surveys)				
Benthic habitat assessment	2 teams	7 teams	N/A	N/A	7 teams

Component	Total Personnel Required (Weeks 1–2) [3]	Personnel available via OSM Service Provider Contract	Personnel available via OSROs	Jadestone	Total Personnel Available
Marine fish and elasmobranch assemblages assessment	2 teams	7 teams	N/A	N/A	7 teams
Fisheries impact assessment	1 team	2 teams	N/A	N/A	2 teams
Heritage features assessment	1 team	1 team	N/A	N/A	1 team
Social impact assessment	1 team	1 team	N/A	N/A	1 team

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

11. REVIEW OF PLAN

As part of the Environment Plan review cycle, this document will be reviewed annually and revised, if required, in accordance with Jadestone's Management of Change Procedure (JS-90-PR-G-00017). 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 providers)
- Changes to the activity that affect Operational and/or Scientific Monitoring coordination or capabilities (e.g. a significant increase in spill risk)
- Changes to legislative context related to Operational and/or Scientific Monitoring (e.g. *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) protected maters requirements)
- Following routine testing of the OSM if improvements or corrections are identified; or
- After a Level 2/3 spill incident.

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

PART B – IMPLEMENTATION

Section 2 of the Stag Field OPEP (GF-70-PLN-I-00001) provides detailed information on Control Agency responsibilities, and should be referred to when planning operational and scientific monitoring activities, particularly in WA State Waters and along WA shorelines. Where the WA DoT is the Control Agency, OMP: Shoreline Clean-up Assessment will be implemented under their direction, with resources provided by Jadestone.

In addition, Section 9 of the Stag Field OPEP (GF-70-PLN-I-00001) provides regulatory and stakeholder notification and reporting requirements. Whilst all notification and reporting will be performed by Jadestone IMT personnel, monitoring personnel should be aware of these requirements, and confirm all relevant notifications and reporting have been completed prior to undertaking monitoring activities.

12. MOBILISATION AND ACTIVATION PROCESS

Jadestone's IMT Planning Lead is responsible for activating OSM components, subject to approval from the IMT Leader. Table 12-1 outlines the Jadestone OSM activation process.

Table 12-1: OSM activation process

Responsibility	Task	Timeframe	Complete
Environment Unit Lead (Jadestone)	Review initiation criteria of OMPs and SMPs (provided in Table 9-1 (OMPs) and Table 9-2 (SMPs) of the Joint Industry Operational and Scientific Monitoring Framework) during the preparation of the initial Incident Action Plan (IAPs) and subsequent IAPs; and if any criteria are met, activate relevant OMPs and SMPs	Within 4 hours of spill notification	☐
	Obtain approval from IMT Leader to activate OSM Services Provider	Within 4 hours of spill notification	☐
	Contact OSM Services Provider and verbally notify their Duty Manager of the incident, requesting provision of OSM Implementation Lead to the IMT. Complete Call Off Order Form (Appendix D) and submit to OSM Services Provider[4] to confirm activation of OSM Services	Within 4 hours of spill notification	☐
	Provide monitor and evaluate data (e.g. aerial surveillance, fate and weathering modelling, tracking buoy data, current IAPs) to OSM Services Provider	Within 1 hour of data being received by IMT	☐
	Liaise directly with Jadestone's Logistics Lead to identify potential staging and departure location/s for monitoring activities. Provide this information to OSM Services Provider	Within 4-6 hours of spill notification	☐
	Record tasks in Personal Log	At time of completion of task	☐
Logistics Lead (Jadestone)	Commence arrangements for vessels, accommodation and transport to mobilise monitoring teams	Within 24 hours of spill notification	☐
OSM Services Provider	Duty Manager to activate relevant Sub-Contracted Monitoring Service Providers	Within 30 minutes of Call Off Order Form being received by OSM Services Provider	☐
	OSM personnel (OSM Implementation Lead and OM/SM Coordinators) requested by Jadestone (via Call Off Order Form) to be sent to Jadestone's IMT	Within 12 hours of notification being made to OSM Services Provider	☐
	Liaise directly with Environment Unit Lead to confirm which OMPs and SMPs are to be fully activated	Within 4 hours of monitor and evaluate data being received from IMT	☐

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

Responsibility	Task	Timeframe	Complete
	Confirm availability of initial personnel and equipment resources	Within 5 hours of monitor and evaluate data being received from IMT	☐

13. FIRST-STRIKE MONITORING PRIORITIES

As described in Section 2 and Section 4, the available stochastic spill trajectory modelling in conjunction with a desk top analysis has been analysed to understand the likely initial monitoring priorities for its activities in the EMBA. In addition, Table 4-3 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 4-3 are to be used for guidance when confirming monitoring priorities in consultation with key stakeholders and sub-contracted Monitoring Service Providers (including subject matter experts, where available) at the time of the spill. Table 13-1 provides a checklist to assist in the confirmation of monitoring priorities for individual spills.

Table 13-1: Checklist for determining monitoring priorities

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

Responsibility	Task	Timeframe	Complete
	Confirm the need for any additional reactive baseline monitoring data for SMPs and determine suitable locations, noting that suitable control or reference sites may be outside of the EMBA	Within 12 hours of monitor and evaluate data being received from IMT	☐
	Continually re-evaluate monitoring priorities in consultation with Environment Unit Lead and relevant key stakeholders throughout spill response 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 (Matters of Environmental Significance) and other protected matters requirements in the finalisation of OMPs and SMPs.

Appendix C 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.

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

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

15. FINALISING MONITORING DESIGN

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

Jadestone's checklist for finalising monitoring designs post-spill is provided in Table 15-1. The Environment Unit 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
Environment Unit Lead (Jadestone) and OSM Implementation Lead with input from OSM Services Provider	Confirm survey objectives, sampling technique, for each initiated OMP and SMP	Within 48 hours of initial monitoring priorities being confirmed by IMT	☐
	Determine suitable sampling frequency	Within 48 hours of initial monitoring priorities being confirmed by IMT	☐
	Finalise standard operating procedures	Within 48 hours of initial monitoring priorities being confirmed by IMT	☐
	Review Table 10-4 of the Joint Industry OSM Framework to ensure potential impacts from response activities are considered and incorporated into relevant OMP/SMP designs	Prior to the finalisation of monitoring designs	☐
	Liaise with Environment Unit Lead (Jadestone) to review the Environmental Performance Standards listed in the Stag Field OPEP (GF-70-PLN-I-00001) and integrate checks into the monitoring design that will help determine if relevant Environmental Performance Standards are being met	Prior to the finalisation of monitoring designs	☐
	Scientific monitoring: • Establish benchmarks and guidelines to be used • Confirm indicator species • Confirm parameters and metrics	Within 96 hours of initial monitoring priorities being confirmed by IMT	☐

16. MOBILISATION OF MONITORING TEAMS

When the monitoring design has been finalised for each OMP and SMP, the OSM Services Provider shall work in conjunction with Jadestone 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. Jadestone will be responsible for flights, accommodation and victualing for field personnel. Jadestone 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 Lead (Jadestone)	Confirm availability of all monitoring personnel (noting required competencies in Section 9.1 and individual OMPs/SMPs)	☐
	Allocate number of teams, personnel, equipment and supporting resource requirements	☐
	Undertake HAZIDs as required and consolidate/review field documentation including safety plans, emergency response plans, and daily field reports	☐
	Develop site-specific health and safety plans which are compliant with health safety and environment systems (including call in timing and procedures)	☐
	Conduct pre-mobilisation meeting with monitoring team/s on survey objectives, logistics, safety issues, reporting requirements and data management collection requirements	☐
	Determine data management delivery needs of the IMT and process requirements, including data transfer approach and frequency/timing	☐
	Confirm data formats and metadata requirements with personnel receiving data	☐
	Logistics	
	Confirm Jadestone Logistics have arranged flights, accommodation, and car hire arrangements are in place	☐
	Develop field survey schedules, detailing staff rotation	☐
	Equipment	
	Confirm Jadestone Logistics have arranged survey platforms (vessel, vehicle, aircraft) as required to survey or access survey sites and ensure they are equipped with appropriate fridge and freezer space for transportation of samples (and carcasses if collecting)	☐
	Confirm Jadestone Logistics have arranged vessels with correct fit-out specifications (e.g. winches, Geographic Positioning System (GPS,), satellite, deck crane, sufficient deck space, water supplies [fresh and/or salt], accommodation)	☐
	Confirm consumables (including personal protective equipment) have been purchased and will be delivered to required location	☐

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 Quality Assurance and Quality Control (QA/QC) checked and pre-loaded into navigation software/positioning system	☐
	Check field laptops, ensuring they have batteries (including spares), power cable, and are functional	☐
	Check if a first aid kit or specialist Personal Protective Equipment (PPE) is required	☐
	Confirm arrangements for freight to mobilisation port is in place	☐

17. PERMITS AND ACCESS REQUIREMENTS

Permit and access requirements apply to Marine Parks, Marine Protected Areas, restricted heritage areas, operational areas of industrial sites, defence locations, certain fauna and managed fisheries. 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 will work with Jadestone to request access and submit 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	Department of Climate Change, Energy, the Environment and Water (DCCEEW) Department of Biodiversity, Conservation and Attractions (DBCA)	Any interactions involving nationally listed threatened fauna may require approval from DCCEEW (http://www.environment.gov.au/biodiversity/threatened/permits) WA- appropriate permits can be found at: https://www.dbca.wa.gov.au/licences-and-permits/fauna
State Marine Protected Areas	• Montebello Islands Marine Park/Barrow Island Marine Park/Barrow Island Marine Management Area • Eighty-mile Beach Marine Park • Ningaloo Marine Park • Muiron Islands Marine Management Area • Rowley Shoals Marine Park	DBCA	No specific permitting requirements exist for monitoring in WA marine protected areas, but additional information is available at: https://www.dbca.wa.gov.au/management/marine-planning
Ramsar wetland	• Eighty-mile Beach	DCCEEW	Additional information on Ramsar wetlands and how they are protected as a matter of national environmental significance under the EPBC Act is available at: https://www.environment.gov.au/epbc/what-is-protected/wetlands
Australian (Commonwealth) Marine Parks	• Agro-Rowley Terrace Marine Park • Dampier Marine Park • Gascoyne Marine Park • Montebello Marine Park	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

Receptor	Location	Jurisdictional Authority	Relevant information on permits
	• Ningaloo Marine Park • Mermaid Reef Marine Park • Eighty Mile Beach Marine Park		Additional information on permitting requirements in Australian Marine Parks can be obtained through Parks Australia via email marineparks@environment.gov.au or phone 1800 069 352 Information on permits to access biological resources in Commonwealth areas can be found at: http://www.environment.gov.au/topics/science-and-research/australias-biological-resources/access-biological-resources-commonwealth
State/Territory Managed Fisheries	• Onslow Prawn Managed Fishery • Nickol Bay Prawn Managed fishery • Broome Prawn Managed Fishery • The Kimberley Gillnet and Barramundi Managed Fishery • Northern Demersal Scalefish Managed Fishery • Mackerel Managed Fishery • Pilbara Demersal Scalefish Fishery (Line, trap and Trawl) • Pearl Oyster Managed Fishery • Pilbara Developing Crab Fishery • Exmouth Gulf Prawn Fishery • Gascoyne Demersal Scale Fishery	Department of Primary Industries and Reginal Development (DPIRD)	No specific permitting requirements exist for WA Fisheries, but additional information is available at – https://www.fish.wa.gov.au/Fishing-and-Aquaculture/Pages/default.aspx

Receptor	Location	Jurisdictional Authority	Relevant information on permits
	• West Coast Rock Lobster Fishery • Beche-de-mer Managed Fishery • Marine Aquarium Fish Managed Fishery • Specimen Shell Fishery • West Coast Deep Sea Crustacean Managed Fishery		
Commonwealth Managed Fisheries	• North West Slope Trawl Fishery • Western Deepwater Trawl Fishery	Australian Fishing Management Authority	Commonwealth Managed Fisheries (scientific permit for research/monitoring in an Australian Fishing Zone) https://www.afma.gov.au/fisheries-services/fishing-rights-permits
Indigenous Cultural Heritage	Sites are located throughout EMBA (A search of the DPLH database indicates there are 109 Registered Aboriginal sites, 101 Other Heritage sites and 85 Heritage surveys within the EMBA)	Department of Planning, Lands and Heritage (DPLH)	Entry access permits to Aboriginal Lands in WA: https://www.wa.gov.au/service/aboriginal-affairs/aboriginal-heritage-conservation/apply-permit-access-or-travel-through-aboriginal-land Aboriginal heritage sites in WA: https://www.wa.gov.au/service/aboriginal-affairs/aboriginal-cultural-heritage/search-aboriginal-sites-or-heritage-places
Industry (e.g. operational zone of offshore oil or gas platform)	• Wandoo Production Platforms (~ 20km from the Stag Facility) (Vermilion) • Reindeer platform (~ 29 km from the Stag Facility) and associated gas pipelines (Santos)	Operating company	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	• Tryal shipwreck at Trial Rocks NW of the Montebello Islands	DCCEEW	Refer to the *Underwater Cultural Heritage Act* 2018 (Commonwealth): https://www.dcceew.gov.au/parks-heritage/heritage/underwater-heritage/underwater-cultural-heritage-act

18. USE OF DATA IN RESPONSE DECISION-MAKING

18.1 Operational Monitoring to Inform Response Activities

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

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

The OSM Implementation Lead is responsible for the interpretation and analysis of data. OM 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. SM 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, SM data will be analysed more thoroughly by the OSM Implementation Lead.

Once OM data is analysed and checked by the Field Team Lead, it will be provided to the Planning Section who will then distribute the data from each monitoring component to the relevant IMT Section. Table 18-2 provides guidance on the type of data generated from each OMP, which IMT Section requires the data and how the data may be used during a response. During a response, all SM data will also be provided to the Planning Section.

Analysed data will then be incorporated into the Common Operating Picture (managed by the Planning 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 Lead will be required to utilise the OM data to aid in decision making and determine if the response strategies can be commenced, continued, escalated, terminated, or if controls need to be put in place to manage impacts of the response activities. These decisions will be communicated to the broader IMT during regular situation debriefs.

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

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

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

OMP	Data generated[5]	IMT Section requiring data	How data may be used by IMT
Hydrocarbon properties and weathering behaviour at sea	Hydrocarbon physical characteristics (e.g. viscosity, asphaltene content, fingerprinting, weathering ratios of hydrocarbon chains)	Planning Section to aid in response option selection / modification	Changes to the hydrocarbon properties will affect the window of opportunity for particular responses and the associated logistical requirements of these responses, such as use of chemical dispersants, recovery and pumping equipment suitability, hydrocarbon storage and hydrocarbon disposal requirements
Shoreline clean-up assessment	Assessment of shoreline character; assessment of shoreline oiling; recommendations for response activities; post-treatment surveys	Planning Section to aid in IAP development and response option selection / modification	Confirmation of shoreline character, habitats and fauna present which may influence selection of response tactics (e.g. no mechanical recovery if turtles are known to be nesting); Oil deposition and/or removal rate for a shoreline sector will help determine effectiveness of relevant tactics (e.g. shoreline protection and/or clean-up operations); Assessment teams provide ground truthing of sites that are not possible via satellite imagery, therefore the IMT can rely on the recommendations of Assessment Teams (e.g. flagging access issues, suitable tactics, likely resourcing needs)
Surface chemical dispersant effectiveness and fate	Visual observations of dispersant efficacy; concentration of hydrocarbons in water column (see also water quality assessment);	Environment Unit for use in operational SIMA; Planning Section to aid in IAP development; Operations Section to confirm dispersant effectiveness for decision-making purposes in current operations period.	Determine the effectiveness of dispersant in removing oil from sea surface and how dispersed oil is being distributed through the water column. This information can be used in SIMA to help decide if dispersants are being effective at minimising oil reaching sensitive receptors (SIMA to evaluate any trade-offs between receptors)
Water quality assessment	Distribution of oil in water column and change in hydrocarbon concentrations (e.g. total recoverable hydrocarbons, BETEXN, PAH), physio-chemical parameters and dispersant detection	Planning 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.

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

OMP	Data generated[5]	IMT Section requiring data	How data may be used by IMT
Sediment quality assessment	Distribution of oil in sediment and change in hydrocarbon concentrations (e.g. Total recoverable hydrocarbons, BETEXN, PAH)	Planning Lead to validate surveillance and modelling data; Planning Section for use in IAP	Confirm spatial extent of spill; extent of spill can in turn influence location of other OMP and SMP monitoring components and sites
Marine fauna assessment • Reptiles • Cetaceans (observational only) • Dugongs • 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 Section/Division to help in developing Wildlife Response Sub-plan	Understanding of species, populations and geographical locations at greatest risk from spill impacts. IMT can use this information to help qualify locations with highest level of protection priority (e.g. dugong nursery area is at risk of high contact therefore dispersant use closest to spill source may be a preferred option); understanding the impacts of spill response activities can help IMT to modify or terminate activities if they are assessed as creating more harm than the oil alone (e.g. large shoreline clean-up teams and staging areas may disturb shorebird nesting resulting in adults abandoning chicks)

18.2 Impacts from Response Activities

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

When finalising monitoring designs, the OSM Implementation Lead shall review Table 10-4 of the Joint Industry OSM Framework and Stag Field OPEP (GF-70-PLN-I-00001) to ensure potential impacts from response activities are considered and any suitable mitigation actions are incorporated into relevant OMP/SMP designs.

18.3 Operational Monitoring of Effectiveness of Control Measures and to Ensure Environmental Performance Standards are Met

As stated in Table 15-1, when finalising monitoring designs, the OSM Implementation Lead and Environment Unit Lead (or delegate) shall review the Environmental Performance Standards (EPS') listed in the Stag Field OPEP (GF-70-PLN-I-00001) and integrate checks into the monitoring design that will help determine if relevant EPS' 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 Jadestone and the OSM Services Provider.

20. QUALITY ASSURANCE AND QUALITY CONTROL

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

21. COMMUNICATION PROTOCOLS

21.1 OSM Services Provider/s

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

The following communication protocols must be observed:

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

During the post-response phase all communications shall be between a nominated Jadestone representative and the OSM Services Provider.

21.2 External Stakeholders

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

Jadestone IMT Media / Public Information Officer will be the focal point for external engagement during the response operation.

Stakeholder communications post-response will be managed by Jadestone HSE Team.

22. STAND-DOWN PROCESS

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

After OMPs are terminated, the OM monitoring teams will be advised to stand down. Following this stage, Jadestone is responsible for coordinating a lessons-learnt meeting between the OSM Services Provider, sub-contracted Monitoring Service Providers and other relevant stakeholders. It is the responsibility of Jadestone to ensure that lessons learnt are communicated to the relevant stakeholder groups. The lessons discussed should include both positive actions to be reinforced and lessons for actions that could be improved in future standby or response campaigns. Table 22-1 provides a checklist to assist in terminating the OMPs and SMPs and the monitoring effort.

Table 22-1: Checklist for terminating monitoring components

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

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APPENDIX A KEY ECOLOGICAL FEATURES

Table A-1: Key Ecological Features in the EMBA

Key Ecological Feature	Impact Description
Ancient Coastline at 125 m Depth Contour (occurs in the Montebello AMP)	Parts of the ancient coastline, particularly where it exists as a rocky escarpment, are thought to provide biologically important habitats in areas otherwise dominated by soft sediments (DSEWPaC, 2012a). It is unlikely that this KEF will be actually contacted given the modelling results predicted that the maximum depth of entrained hydrocarbons above the 10 ppb threshold is 30 m and the maximum depth of dissolved hydrocarbons above 10 ppb is 50 m. Species (e.g. whales, turtles and whale sharks) may be in abundance above the feature and therefore susceptible to oiling.
Canyons linking the Cuvier Abyssal Plain and Cape Range Peninsula	The canyons are associated with upwelling as they channel deep water from the Cuvier Abyssal Plain up onto the slope. This nutrient-rich water interacts with the Leeuwin Current at the canyon heads (DSEWPaC, 2012a). Aggregations of whale sharks, manta rays, sea snakes, sharks, large predatory fish and seabirds are known to occur in this area and may be susceptible to oiling.
Continental Slope Demersal Fish Communities	The continental slope between Northwest Cape and the Montebello Trough has more than 500 fish species, which makes it the most diverse slope bioregion in Australia (Last *et al*. 2005). The demersal fish species occupy two distinct demersal community types associated with the upper slope (water depth of 225–500 m) and the mid slope (750–1000 m) (DSEWPaC, 2012a). Given the depth at which these fish communities reside it is unlikely they would be contacted by hydrocarbons from a subsea release.
Exmouth Plateau	The Exmouth Plateau is a regionally and nationally unique deep-sea plateau in tropical waters. It is likely to be an important area of biodiversity as it provides an extended area offshore for communities adapted to depths of around 1000 m (DSEWPaC, 2012a). Given the depth of the benthos, it is unlikely they would be contacted by hydrocarbon carbons from a subsea release.
Glomar Shoals*	The Glomar Shoals are regionally important for their high biological diversity and high localised productivity and range in depths of 33–77 m. It is an important area for a few commercial and recreational fish species such as Rankin cod, brown-stripped snapper, red emperor, crimson snapper, bream and yellow-spotted triggerfish, indicating that the shoals are likely to be an area of high productivity (DSEWPaC, 2012a). Entrained hydrocarbons from the MDO spill are predicted to reach the Glomar Shoals at the low threshold (10 ppb) (only) and with a maximum residence time of 1 day. Both entrained and dissolved hydrocarbons are predicted to reach the Glomar Shoals at the low threshold (only). Given the depth of the Glomar Shoals and occurrence of many fish species it is possible that hydrocarbons from a vessel spill (MDO) or subsea release (Stag crude) could result in transient impacts to the benthos and fish species in the vicinity.

**The Glomar Shoals are the only KEF contacted for the MDO spill scenario (The subsea Stag crude spill scenario contacts all KEFs listed in Table A-1.*

APPENDIX B BASELINE DATA SOURCES

Table B-1: Baseline data sources

Receptor	Existing baseline monitoring	Source / Data Custodian	Spatial extent
Benthic communities and fish assemblages	Advisian (2019) Montebello Marine Park Benthic Habitat Survey ROV Analysis of the Scarborough Pipeline Route. Prepared for Woodside	Woodside (Link to report)	Montebello Australian Marine Park
	Keesing JK (Ed.) (2019). Benthic habitats and biodiversity of the Dampier and Montebello Australian Marine Parks. Report for the Director of National Parks. CSIRO, Australia	Commonwealth Scientific and Industrial Research Organisation (CSIRO) (Link to report)	Dampier Marine Park Montebello Australian Marine Park
	Pitcher CR, Miller M, Morello E, Fry G, Strzelecki J, McLeod I, Slawinski D, Ellis N, Thomson D, Bearham D, Keesing J, Donovan A, Mortimer N, Babcock R, Fromont J, Gomez O, Hosie A, Hara A, Moore G, Morrison S, Kirkendale L, Whisson C, Richards Z, Bryce M, Marsh L, Naughton K, O'Loughlin M, O'Hara T, Boddington D, Huisman J (2016) Environmental Pressures: Regional Biodiversity — Pilbara Seabed Biodiversity Mapping & Characterisation. Final report, CSIRO Oceans & Atmosphere, Published Brisbane, March 2016, 62 pages	CSIRO (Link to report)	North Ningaloo Coast – World Heritage Area Barrow Island Montebello Islands Dampier Archipelago Islands
	Evans RD, Wilson SK, Field SN, Moore JAY (2014) Importance of macroalgal fields as coral reef fish nursery habitat in north-west Australia. Mar Biol 161, 599–607	Department of Biodiversity Conservation and Attractions (DBCA)- Marine Science	Barrow Island Lowendal Islands Montebello Islands
	Department Biodiversity, Conservation and Attractions (2018) Gorgon Dredge Offset Monitoring Evaluation and Reporting Project, Department of Biodiversity, Conservation and Attractions, Perth.	DBCA Marine Science (Link to report)	Barrow Island Lowendal Islands Montebello Islands
	Collins DL, Langlois TJ, Bond T, Holmes TH, Harvey ES, Fisher R and McLean DL (2017), A novel stereo-video method to investigate fish–habitat relationships. Methods Ecol Evol, 8: 116–125.	University of Western Australia (UWA) Oceans Institute (Link to article)	Muiron Islands Onslow area Thevenard Island Montebello Islands Rosemary Island

Receptor	Existing baseline monitoring	Source / Data Custodian	Spatial extent
	DiBattista J, Travers M, Moore G, Evans R, Newman S, Feng M, Moyle S, Gorton R, Saunders T, Berry O (2017), Seascape genomics reveals fine-scale patterns of dispersal for a reef fish along the ecologically divergent coast of Northwestern Australia, Molecular Ecology, vol 26, 6206–6223.	Western Australian Marine Science Institution (WAMSI)	Cape Preston Passage Island Montebello Islands Thevenard Island Ningaloo Coast World Heritage Area Shark Bay Kimberley IMCRA Bioregion Canning IMCRA Bioregion
	McLean DL, Vaughan BI, Malseed BE, Taylor MD (2020) Fish-habitat associations on a subsea pipeline within an Australian Marine Park, Marine Environmental Research 123, 104813	AIMS (Link to article)	Montebello Marine Park
	National Reef Monitoring	IMOS National Reef Monitoring Network (Link to site)	Houtman Abrolhos Islands Ningaloo Coast World Heritage Area Exmouth Gulf Dampier Archipelago Barrow Island Montebello Islands Ashmore Reef Cartier Island Darwin Harbour Arafura Arnhem Marmion Rottnest Island Geographe Bay
	DBCA Monitoring	DBCA Marine Science	Montebello Islands Barrow Island North Bunsen Channel (Montebello Islands)

Receptor	Existing baseline monitoring	Source / Data Custodian	Spatial extent
			Trimouille Island North West Island (Montebello Islands) Stephenson Channel (Montebello Islands) Ah Chong Island (Montebello group) Wonnich Reef Dugong Reef
	Gilmour JP, Cook KL, Ryan NM, Puotinen ML, Green, RH, Shedrawi G, Hobbs J-P A, Thompson, DP, Badcock, R, Buckee J, Foster T, Richards ZT, Wilson SK, Barnes PB, Coutts TB, Radford BT, Piggott CH, Depczynski M, Evans SN, Schoepf V, Evans RD, Halford AR, Nutt CD, Bancroft KP, Heyward AJ, Oades D (2019) The state of Western Australia's coral reefs. Coral Reefs https://doi.org/10.1007/s00338-019-01795-8	AIMS (Link to article)	Western Australia Cocos Keeling Islands Ashmore Reef Scott Reef Rowley Shoals Montebello Islands Barrow Island Ningaloo Reef Shark Bay
Marine reptiles	Keesing JK (Ed.) (2019). Benthic habitats and biodiversity of the Dampier and Montebello Australian Marine Parks. Report for the Director of National Parks. CSIRO, Australia	CSIRO (Link to report)	Dampier Marine Park Montebello Australian Marine Park
	Ferreira LC, Thums M, Fossette, S, Wilson P, Shimada T, Tucker A, Pendoley K, Waayers D, Guinea ML, Loewenthal G, King J, Speirs M, Rob D, Whiting S (2020) Multiple satellite tracking datasets inform green turtle conservation at a regional scale. Biodiversity Research; 27: 249–266.	Australian Institute of Marine Science (AIMS) (Link to article)	Rosemary Island Legendre Island Middle Passage Island Barrow Island Muiron Islands Ningaloo Coast World Heritage Area Montebello Islands Lacepede Islands

Receptor	Existing baseline monitoring	Source / Data Custodian	Spatial extent
			Maret Island Scott Reef"
	Commonwealth of Australia (2017) Recovery Plan for Marine Turtles in Australia 2017–2027.	Commonwealth of Australia (Link to management plan)	Australia wide
	Thums M, Udyawer V, Galaiduk R, Ferreira L, Streten C, Radford B (2021) Using Marine Turtles to Identify Habitat and Assess Connectivity of the North and North-West Marine Park Networks and Sea Country: Exploration Study of Data and Partnerships. Report prepared for Parks Australia. Australian Institute of Marine Science, Perth. 48pp.	AIMS (Link to article)	Miaboolya Beach Quobba Shark Bay Ningaloo Coast World Heritage Area Muiron Islands Barrow Island Great Sandy Island Eighty Mile Beach Scott Reef Kimberley Roebuck Bay Joseph Bonaparte Gulf Lalang-garram Marine Park Reefs Oceanic Shoals Thevenard Island Echo Beach Montebello Islands Group Camden Sound Horizontal Falls
	Fossette S, Ferreira L C, Whiting SD, King J, Pendoley K, Shimada T, Speirs M, Tucker A D, Wilson P, Thums M (2021). Movements and distribution of hawksbill turtles in the Eastern Indian Ocean. Global Ecology and Conservation, 29, e01713. https://doi.org/10.1016/j.gecco.2021.e01713	DBCA (Link to article)	Beacon Island Delambre Island Rosemary Island Varanus Island Montebello Islands

Receptor	Existing baseline monitoring	Source / Data Custodian	Spatial extent
Seabirds and shorebirds	Burbidge A, Blyth JD, Fuller PJ, Kendrick PG, Stanley FJ, Smith LA (2000). The terrestrial vertebrate fauna of the Montebello Islands, Western Australia. CALM Science 3(2): 95–107.	DBCA (Link to article)	Montebello Islands
	ENV-GOR-SEABIRD MONITORING REPORT 2021/22 J01209 (Chevron ABU230500068)	Chevron	Ah Chong Island (Montebello group) Double Island North Double Island South Parakeelya Island Barrow Island Group
	DBCA shorebird surveys of Montebello Islands and Bedout Island in 2017 and 2018 mentioned in: Australian National Report to the 19th JAMBA, 13th CAMBA and 6th ROKAMBA Consultative Meetings, Commonwealth of Australia 2018	DBCA (Link to report)	Montebello Islands Bedout Island
Marine mammals	Raudino HC, Hunt TN and Waples KA (2018) Records of Australian humpback dolphins (*Sousa sahulensis*) from an offshore island group in Western Australia. Mar Biodivers Rec 11, 14	DBCA Marine Science (Link to article)	Montebello Islands
Commercial fisheries	State of the Fisheries Report (Western Australia) DPIRD (2022)	DPIRD (Link to report)	Western Australia
	Ryan KL, Lai EKM, Smallwood CB (2022). Boat-based recreational fishing in Western Australia 2020/21. Fisheries Research Report No. 327 Department of Primary Industries and Regional Development, Western Australia. 221pp.	DPIRD (Link to report)	Western Australia

APPENDIX C PROTECTED MATTERS IN THE EMBA

Table C-1: Protected matters in the EMBA, relevant monitoring plans and priority sites

Species or group	Relevant Plan/ Conservation Advice	Relevant threats and conservation actions	Relevant OMPs and SMPs
Fish, sharks and rays			
Grey nurse shark (west coast population)	Recovery Plan for the Grey Nurse Shark (*Carcharias taurus*) (DoE 2014a) Threat Abatement Plan for the impacts of marine debris on the vertebrate wildlife of Australia's coasts and oceans (DoEE 2018)	Pollution and disease Ecosystem effects – habitat modification	• OMP: Marine fauna assessment – Fish • SMP: Marine mega-fauna assessment • SMP: Marine fish and elasmobranch assemblages assessment
Great white shark	Recovery plan for the White Shark (*Carcharodon carcharias*) (DSEWPaC 2013a)	Ecosystem effects as a result of habitat modification	
Dwarf sawfish	Approved Conservation Advice on *Pristis lavate* (dwarf sawfish) (DEWHA 2009) Sawfish and River Sharks Multispecies Recovery Plan (DoE 2015a)	Habitat degradation and modification	
Freshwater/ largetooth sawfish	Approved Conservation Advice for *Pristis pristis* (largetooth sawfish) (DoE 2014b) Sawfish and River Sharks Multispecies Recovery Plan (DoE 2015a)	Habitat degradation and modification	
Green sawfish	Approved Conservation Advice for *Pristis zijsron* (green sawfish) (DEWHA 2008a) Sawfish and River Sharks Multispecies Recovery Plan (DoE 2015a)	Habitat degradation and modification	
Whale shark	Approved Conservation Advice for *Rhincodon typus* (whale shark) (TSSC 2015a)	Boat strike from large vessels Habitat disruption from mineral exploration, production and transportation	
Scalloped Hammerhead	-	-	

Species or group	Relevant Plan/ Conservation Advice	Relevant threats and conservation actions	Relevant OMPs and SMPs
Southern bluefin tuna	-	-	
Little Gulper Shark	-	-	
Reef Manta Ray	-	-	
Giant Manta Ray	-	-	
Narrow sawfish	-	-	
Oceanic Whitetip Shark	-	-	
Blind gudgeon	Approved Conservation Advice for *Milyeringa veritas* (blind gudgeon) (DEWHA 2008b)	Habitat degradation and modification including pollution	
Blind cave eel	Approved Conservation Advice for *Ophisternon candidum* (Blind Cave Eel) (DEWHA 2008c)	Habitat degradation and modification including pollution	
Shortfin mako	-	-	
Longfin mako	-	-	
Porbeagle mackerel shark	-	-	
Marine mammals			
Sei Whale	Approved Conservation Advice for *Balaenoptera borealis* (sei whale) (TSSC 2015b) Threat Abatement Plan for the impacts of marine debris on the vertebrate wildlife of Australia's coasts and oceans (DoEE 2018)	Anthropogenic noise and acoustic disturbance	• OMP: Marine fauna assessment – Cetaceans • SMP: Marine mega-fauna assessment – Whale sharks, dugongs and cetaceans
		Habitat degradation including pollution (increasing port expansion and coastal development)	
		Pollution (persistent toxic pollutants)	
		Vessel strike	
Blue whale	Blue Whale Conservation Management Plan 2015–2025 (DoE 2015b)	Noise Interference	
		Habitat Modification	

Species or group	Relevant Plan/ Conservation Advice	Relevant threats and conservation actions	Relevant OMPs and SMPs
	Threat Abatement Plan for the impacts of marine debris on the vertebrate wildlife of Australia's coasts and oceans (DoEE 2018)	Vessel Disturbance/ strike	
Fin whale	Approved Conservation Advice for *Balaenoptera physalus* (fin whale) (TSSC 2015c) Threat Abatement Plan for the impacts of marine debris on the vertebrate wildlife of Australia's coasts and oceans (DoEE 2018)	Anthropogenic noise and acoustic disturbance	
		Habitat degradation including coastal development, port expansion and aquaculture	
		Pollution (persistent toxic pollutants)	
		Vessel strike	
Southern right whale	Conservation Management Plan for the Southern Right Whale 2011–2021 (DSEWPaC 2012b) Threat Abatement Plan for the impacts of marine debris on the vertebrate wildlife of Australia's coasts and oceans (DoEE 2018)	Entanglement/ marine debris	
		Vessel disturbance/ strike	
		Noise interference	
		Habitat modification	
Humpback whale	Threat Abatement Plan for the impacts of marine debris on the vertebrate wildlife of Australia's coasts and oceans (DoEE 2018)	Habitat degradation including coastal development and port expansion	
		Entanglement	
		Vessel disturbance and strike	
Bryde's whale	Threat Abatement Plan for the impacts of marine debris on the vertebrate wildlife of Australia's coasts and oceans (DoEE 2018)	Marine debris	
Killer whale			
Spotted bottlenose dolphin (Arafura/Timor Sea populations)			
Antarctic minke whale			
Sperm whale			

Species or group	Relevant Plan/ Conservation Advice	Relevant threats and conservation actions	Relevant OMPs and SMPs
Australian Snubfin Dolphin			
Australian Humpback Dolphin (also known as *Sousa chinensis*)			
Dugong			
Marine reptiles			
Short-nosed seasnake	Approved Conservation Advice on *Aipysurus apraefrontalis* (Short-nosed seasnake) (DSEWPaC 2011a)	Habitat degradation	• OMP: Marine fauna assessment – Reptiles • SMP: Marine mega-fauna assessment – Reptiles
Leaf-scaled seasnake	Approved Conservation Advice on *Aipysurus foliosquama* (Leaf-scaled seasnake) (DSEWPaC 2011b)	Degradation of reef habitat	
All marine turtles including: • Loggerhead Turtle • Green Turtle • Leatherback Turtle • Hawksbill Turtle • Flatback Turtle	Recovery plan for marine turtles in Australia 2017–2027 (DoEE 2017) National Light Pollution Guidelines for Wildlife including Marine Turtles, Seabirds and Migratory Shorebirds (DoEE 2020) Threat Abatement Plan for the impacts of marine debris on the vertebrate wildlife of Australia's coasts and oceans (DoEE 2018)	Light pollution	
		Habitat modification/ loss	
		Chemical and terrestrial discharge/ deteriorating water quality	
		Marine debris	
		Vessel disturbance/ strike	
		Noise interference	
Leatherback Turtle	Approved Conservation Advice on *Dermochelys coriacea* (DEWHA 2008d)	Vessel strike	
		Degradation of foraging areas	
Salt-water crocodile	-	-	
Birds			
All seabirds and migratory shorebirds	National Light Pollution Guidelines for Wildlife including Marine Turtles, Seabirds and Migratory Shorebirds (DoEE 2020)	Habitat modification	• OMP: Shoreline clean-up assessment
All seabirds	Wildlife Conservation Plan for Seabirds (CoA 2020a)	Light pollution	

Species or group	Relevant Plan/ Conservation Advice	Relevant threats and conservation actions	Relevant OMPs and SMPs
		Habitat loss and degradation from pollution	• OMP: Marine fauna assessment – Seabirds and shorebirds • SMP: Seabirds and shorebirds
Migratory species within the combined EMBA: • Red knot • Common sandpiper • Sharp-tailed sandpiper • Pectoral sandpiper • Great knot • Bar-tailed godwit • Lesser sand plover • Greater sand Plover • Ruddy turnstone • Sanderling • Red-necked stint • Long-toed stint • Double banded plover • Oriental plover • Swinhoe's snipe • Pin-tailed snipe • Oriental pratincole • Broad-billed sandpiper • Asian Dowitcher	Wildlife Conservation Plan for Migratory Shorebirds (CoA 2015)	Habitat loss and degradation	
		Pollution and Contaminants	

Species or group	Relevant Plan/ Conservation Advice	Relevant threats and conservation actions	Relevant OMPs and SMPs
• Black-tailed godwit • Little curlew • Whimbrel • Ruff • Pacific golden plover • Grey plover • Grey-tailed tattler • Wood sandpiper • Common greenshank • Marsh sandpiper • Common redshank • Terek sandpiper			
Red knot	Approved Conservation Advice for *Calidris canutus* (Red knot) (TSSC 2016a) Wildlife Conservation Plan for Migratory Shorebirds (CoA 2015)	Habitat loss and habitat degradation Pollution/contamination impacts	
Australian lesser noddy	Approved Conservation Advice for *Anous tenuirostris melanops* (Australian lesser noddy) (TSSC 2015i)	Habitat modification	
Curlew sandpiper	Approved Conservation Advice for *Calidris ferruginea* (Curlew Sandpiper) (DoE 2015c)	Habitat loss and degradation from pollution	
Great knot	Approved Conservation Advice for *Calidris tenuirostriss* (Great knot) (TSSC 2016e) Wildlife Conservation Plan for Migratory Shorebirds (CoA 2015)	Habitat loss and degradation from pollution	
Greater sand plover	Approved Conservation Advice for *Charadrius leschenaultii* (Greater sand plover) (TSSC 2016b) Wildlife Conservation Plan for Migratory Shorebirds (CoA 2015)	Habitat loss and habitat degradation Pollutant/ contaminant impacts	
Lesser sand plover		Habitat loss and habitat degradation	

Species or group	Relevant Plan/ Conservation Advice	Relevant threats and conservation actions	Relevant OMPs and SMPs
	Approved Conservation Advice for *Charadrius mongolus* (Lesser sand plover) (TSSC 2016d) Wildlife Conservation Plan for Migratory Shorebirds (CoA 2015)	Pollutant/ contaminant impacts	
Northern Siberian bar-tailed godwit	Approved Conservation Advice for *Limosa lapponica menzbieri* (Bar-tailed godwit (northern Siberian) (TSSC 2016c)	Habitat loss and habitat degradation	
		Pollutant/ contaminant impacts	
Southern giant petrel	National recovery plan for albatrosses and giant petrels 2022 (DCCEEW 2022) Threat Abatement Plan for the incidental catch (or bycatch) of seabirds during oceanic longline fishing operations (CoA 2018) Threat Abatement Plan for the impacts of marine debris on the vertebrate wildlife of Australia's coasts and oceans (DoEE 2018)	Marine pollution	
Northern giant petrel	National recovery plan for albatrosses and giant petrels 2022 (DCCEEW 2022) Threat Abatement Plan for the incidental catch (or bycatch) of seabirds during oceanic longline fishing operations (CoA 2018) Threat Abatement Plan for the impacts of marine debris on the vertebrate wildlife of Australia's coasts and oceans (DoEE 2018)	Marine pollution	
Eastern curlew	Approved Conservation Advice *for Numenius madagascariensis* (eastern curlew) (DoE 2015d)	Habitat loss and degradation from pollution	
Abbott's booby	Approved Conservation Advice for the Abbott's booby *Papasula abbotti* (TSSC 2020a)	Habitat loss, disturbance and modifications	
		Marine debris – plastics	
Christmas Island white-tailed tropicbird	Approved Conservation Advice for *Phaethon lepturus fulvus* white-tailed tropicbird (Christmas Island) (DoE 2014c)	None listed relevant to the Activity	
Soft-plumaged petrel	Approved Conservation Advice for *Pterodroma mollis* (soft-plumaged petrel) (TSSC 2015h)	None listed relevant to the Activity	
Australian painted snipe	Approved Conservation Advice on *Rostratula australis* (Australian painted snipe) (DSEWPaC 2013b)	None listed relevant to the Activity	
		Oil spills	

Species or group	Relevant Plan/ Conservation Advice	Relevant threats and conservation actions	Relevant OMPs and SMPs
		Marine plastics/ debris	
		Marine pollution	
Australian fairy tern	National Recovery plan for the Australian Fairy Tern (*Sternula nereis nereis*) (COA 2020b) Approved Conservation Advice on *Sternula nereis nereis* (fairy tern) (DSEWPaC 2011c)	Oil spills	
Shy albatross	Conservation Advice *Thalassarche cauta* Shy Albatross (TSSC 2020b) National recovery plan for albatrosses and giant petrels 2022 (DCCEEW 2022) Threat Abatement Plan for the incidental catch (or bycatch) of seabirds during oceanic longline fishing operations (CoA 2018) Threat Abatement Plan for the impacts of marine debris on the vertebrate wildlife of Australia's coasts and oceans (DoEE 2018)	Marine plastics/ debris	
		Marine pollution	
White-capped albatross	National recovery plan for albatrosses and giant petrels 2022 (DCCEEW 2022) Threat Abatement Plan for the incidental catch (or bycatch) of seabirds during oceanic longline fishing operations (CoA 2018) Threat Abatement Plan for the impacts of marine debris on the vertebrate wildlife of Australia's coasts and oceans (DoEE 2018)	Marine pollution	
		Marine debris	
Black-browed albatross	National recovery plan for albatrosses and giant petrels 2022 (DCCEEW 2022) Threat Abatement Plan for the incidental catch (or bycatch) of seabirds during oceanic longline fishing operations (CoA 2018) Threat Abatement Plan for the impacts of marine debris on the vertebrate wildlife of Australia's coasts and oceans (DoEE 2018)	Marine pollution	
		Marine debris	
Campbell albatross	National recovery plan for albatrosses and giant petrels 2022 (DCCEEW 2022)	Marine pollution	

Species or group	Relevant Plan/ Conservation Advice	Relevant threats and conservation actions	Relevant OMPs and SMPs
	Threat Abatement Plan for the incidental catch (or bycatch) of seabirds during oceanic longline fishing operations (CoA 2018)		
Flesh-footed Shearwater	Threat Abatement Plan for the incidental catch (or bycatch) of seabirds during oceanic longline fishing operations (CoA 2018) Threat Abatement Plan for the impacts of marine debris on the vertebrate wildlife of Australia's coasts and oceans (DoEE 2018)	Marine pollution	
Wedge-tailed Shearwater	Threat Abatement Plan for the incidental catch (or bycatch) of seabirds during oceanic longline fishing operations (CoA 2018) Threat Abatement Plan for the impacts of marine debris on the vertebrate wildlife of Australia's coasts and oceans (DoEE 2018)	Marine pollution	
Australian painted snipe	Threat Abatement Plan for the impacts of marine debris on the vertebrate wildlife of Australia's coasts and oceans (DoEE 2018)	Marine pollution	
Fork-tailed swift	-	-	
Brown Booby	Threat Abatement Plan for the impacts of marine debris on the vertebrate wildlife of Australia's coasts and oceans (DoEE 2018) Wildlife Conservation Plan for Seabirds (CoA 2020a)	Marine debris Light pollution Habitat loss and degradation from pollution	
Streaked shearwater			
Lesser frigatebird			
Common noddy			
Osprey			
Indian Yellow-nosed albatross			
Great frigatebird			
Caspian tern			
White-tailed tropicbird			
Red-tailed tropicbird			
Little tern			
Bridled tern			

Species or group	Relevant Plan/ Conservation Advice	Relevant threats and conservation actions	Relevant OMPs and SMPs
Roseate tern			
Masked booby			
Red- footed Booby			
Greater Crested Tern			
World Heritage Area (refer to EP for additional description of key receptors for each location)			
Ningaloo Coast Strategic Management Framework	• Major potential threats include: resource development. • Management consistent with the objectives and underlying principles of the Ningaloo Coast management system, including Ningaloo Marine Park (Commonwealth), WA Ningaloo Marine Park and Muiron Islands Marine Management Area, Cape Range National Park, unallocated Crown land, freehold owners and leaseholders, Learmonth Air Weapons Range Facility.	No relevant threats or management actions identified	• OMP: Water quality assessment • OMP: Sediment quality assessment • OMP: Shoreline clean-up assessment • OMP: Marine fauna assessment – Seabirds and shorebirds • SMP: Water quality impact assessment • SMP: Sediment quality impact assessment • SMP: Intertidal and Coastal Habitat Assessment • SMP: Seabirds and shorebirds • OMP: Marine fauna assessment – Dugongs • SMP: Marine mega-fauna assessment – Whale sharks, cetaceans and dugongs • SMP: Benthic habitat assessment • SMP: Marine fish and elasmobranch assemblages assessment
National Heritage Places (refer to Appendix B of EP for additional description of key receptors for each location)			
Ningaloo Coast	Refer to The Ningaloo Coast World Heritage Area	N/A	

Species or group	Relevant Plan/ Conservation Advice	Relevant threats and conservation actions	Relevant OMPs and SMPs
Commonwealth Heritage Places (refer to EP for additional description of key receptors for each location)			
Mermaid Reef- Rowley Shoals	N/A	N/A	• OMP: Water quality assessment • OMP: Sediment quality assessment • OMP: Marine fauna assessment – Seabirds and shorebirds • SMP: Water quality impact assessment • SMP: Sediment quality impact assessment • SMP: Seabirds and shorebirds • OMP: Marine fauna assessment – Dugongs • SMP: Marine mega-fauna assessment – Whale sharks, cetaceans and dugongs • SMP: Benthic habitat assessment • SMP: Marine fish and elasmobranch assemblages assessment
Ningaloo Marine Area- Commonwealth Waters	N/A	N/A	
Ramsar Wetland Sites (refer to EP for additional description of key receptors for each location)			
Eighty-mile Beach	N/A	N/A	• OMP: Water quality assessment • OMP: Sediment quality assessment • OMP: Shoreline clean-up assessment • OMP: Marine fauna assessment – Seabirds and shorebirds • SMP: Water quality impact assessment • SMP: Sediment quality impact assessment

Species or group	Relevant Plan/ Conservation Advice	Relevant threats and conservation actions	Relevant OMPs and SMPs
			• SMP: Intertidal and Coastal Habitat Assessment • SMP: Seabirds and shorebirds • OMP: Marine fauna assessment – Dugongs • SMP: Marine mega-fauna assessment – Whale sharks, cetaceans and dugongs • SMP: Benthic habitat assessment • SMP: Marine fish and elasmobranch assemblages assessment
Australian Marine Parks (refer to EP for additional description of key receptors for each location)			
Argo-Rowley Terrace AMP	North-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: Shoreline clean-up assessment • OMP: Marine fauna assessment – Seabirds and shorebirds • SMP: Water quality impact assessment • SMP: Sediment quality impact assessment • SMP: Intertidal and Coastal Habitat Assessment • SMP: Seabirds and shorebirds • OMP: Marine fauna assessment – Dugongs • SMP: Marine mega-fauna assessment – Whale sharks, cetaceans and dugongs
Dampier AMP			
Eighty Mile Beach AMP			
Gascoyne AMP			
Mermaid Reef AMP			
Montebello AMP			
Ningaloo AMP			

Species or group	Relevant Plan/ Conservation Advice	Relevant threats and conservation actions	Relevant OMPs and SMPs
			• SMP: Benthic habitat assessment • SMP: Marine fish and elasmobranch assemblages assessment
State Marine Reserves (refer to EP for additional description of key receptors for each location)			
Montebello Islands Marine Park/Barrow Island Marine Park/Barrow Island Marine Management Area	Management Plan for the Montebello/Barrow Islands Marine Conservation Reserves 2007–2017 Management Plan No 55 (DEC 2007a)	• Relevant management issues: oil spills, physical disturbance to reefs, anchoring from vessels, boat strike (turtles/cetaceans), lighting (turtles) • 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 • SMP: Water quality impact assessment • SMP: Sediment quality impact assessment • SMP: Intertidal and Coastal Habitat Assessment • SMP: Seabirds and shorebirds • OMP: Marine fauna assessment – Dugongs • SMP: Marine mega-fauna assessment – Whale sharks, cetaceans and dugongs • SMP: Benthic habitat assessment • SMP: Marine fish and elasmobranch assemblages assessment
Eighty-mile Beach Marine Park	Eighty Mile Beach Marine Park management plan 80 2014–2024 (DPaW 2014)		
Ningaloo Marine Park Muiron Islands Marine Management Area	Management Plan for the Ningaloo Marine Park and Muiron Islands Marine Management Area 2005–2015, Management Plan No. 52 (CALM 2005)		
Rowley Shoals Marine Park	Rowley Shoals Marine Park Management Plan (2007) 2007–2017, Management Plan No. 56 (DEC 2007b)		

APPENDIX D OSM SERVICES PROVIDER CALL OFF ORDER FORM

Oil Spill Response

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

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

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

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

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

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

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

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

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

Invoice Address if available	
Purchase Order Number	

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

Signature:		Date / Time (UTC+8):		

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