Operational and Scientific Monitoring Bridging Implementation Plan

Beehive-1 Exploration Drilling

WA-488-P

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Rev 2

eog resources

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Front cover image: A mangrove-dominated coastline in northwest Western Australia (Photo credit: G. Pinzone, Aventus Consulting).

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ACRONYMS

Acronym	Definition
AGR	AGR Australia Pty Ltd
ALA	Atlas of Living Australia
AMOSC	Australian Marine Oil Spill Centre
API	American Petroleum Institute
APPEA	Australian Petroleum Production and Exploration Association
BIA	Biologically Important Areas
CoC	Chain of Custody
CSIRO	Commonwealth Scientific and Industrial Research Organisation

Acronym	Definition
DBCA	Western Australian Department of Biodiversity Conservation and Attractions
DIMT	Drilling Incident Management Team
DAWE	Commonwealth Department of Agriculture, Water and the Environment
DoT	Western Australian Department of Transport
EMBA	Environment that may be Affected
EOG	EOG Resources Australia Block WA-488 Pty Ltd
EP	Environment Plan
EP	Environment Plan
ERP	Emergency Response Plan
EUL	Environment Unit Lead
GIS	Geographic Information System
GPS	Geographic Positioning System
HSE	Health, Safety, and Environment
IAP	Incident Action Plan
IC	Incident Commander
ICS	Incident Command System
IMT	Incident Management Team
IMT Leader	Incident Management Team Leader. Equivalent to an Incident Controller or Incident Commander.
KEF	Key Ecological Feature
NEBA	Net Environmental Benefit Analysis
OMP	Operational Monitoring Plan
OMP	Operational Monitoring Plan
OPEP	Oil Pollution Emergency Plan
OPEP	Oil Pollution Emergency Plan
OPGGS(E)	Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2009
OSM	Operational and Scientific Monitoring
OSM	Operational and Scientific Monitoring
OSRA	Oil Spill Response Atlas
OSRL	Oil Spill Response Limited
OSTM	Oil Spill Trajectory Modelling
OWR	Oiled Wildlife Response
PPE	Personal Protective Equipment
QA/QC	Quality Assurance and Quality Control
SMP	Scientific Monitoring Plan
SMP	Scientific Monitoring Plan
SSDI	Subsea Dispersant Injection
SWIS	Subsea Well Intervention Services
UAV	Unmanned Aerial Vehicle

Part A – Preparedness

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

1 Introduction

EOG has elected to use the Joint Industry OSM Framework and supporting OMPs and SMPs as the foundation of its operational and scientific monitoring approach. The Joint Industry OSM Framework is available on the APPEA Environment Publications Webpage. Use of the Joint Industry OSM Framework requires EOG to develop a Bridging Implementation Plan (this plan) which fully describes how the Framework interfaces with EOG's activities, spill risks and internal management systems.

Table 1.1 describes key documents that form EOG's environmental management document framework.

Table 1.1 Key documents in EOG's environmental management framework

Document	Description
Beehive-1 Drilling Environment Plan (EP) (996161-2022-Beehive#1-Drilling-EP-Rev1)	This plan 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)
Beehive-1 Drilling Oil Pollution Emergency Plan (OPEP) (996161-2022-Beehive#1-Drilling-OPEP-Rev1)	This plan provides the activation and response process for the credible spill scenarios, including incident management, net environmental benefit (NEBA) process and detailed implementation guidance for individual response options. Of particular relevance to this plan, it identifies the credible spill scenarios and protection priorities
AGR Emergency Response Plan (ERP)	EOG has contracted AGR Australia Pty Ltd (AGR) to provide integrated operations project management services for the Beehive-1 Drilling Program, including emergency response and incident management support. AGR will supply the majority of the Drilling Incident Management Team (DIMT) and a Drilling Supervisor (DSV) onboard the MODU. The AGR ERP describes their organisational responsibilities, actions, reporting requirements and resources required to manage crises and emergencies.
Beehive-1 Drilling Bridging ERP	Overarching ERP to link the emergency response protocols of EOG, AGR, the MODU contractor and vessel contractor/s. Describes roles and responsibilities of the DIMT in response to an all hazards emergency, with the exception of OSM roles which are detailed in this plan. This plan will be developed at least 12 weeks prior to the activity commencing.
Emergency Management Contacts Directory (Appendix to the Beehive-1 Drilling Bridging ERP)	This document contains all relevant contact and communications information to enable effective communication amongst the response personnel and external stakeholders, including relevant OSM contacts. The Emergency Management Contacts Directory will be reviewed on a weekly basis and updated as required.

2 EMBA and Monitoring Priorities

The outer boundary of the environment that may be affected (EMBA) by a loss of well control (LOWC) event during the Beehive-1 drilling activity was determined using the combined stochastic results of oil spill trajectory modelling (RPS, 2021) from 100 simulations per season (summer, winter, transitional) and applying the following thresholds:

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

Monitoring priorities have been drawn from the protection priorities identified in the Beehive-1 Drilling OPEP. These priorities were identified through analysis of hydrocarbon spill modelling results against the location of key sensitive receptors with high conservation value; including habitat, species (e.g. State/Territory/Commonwealth protected areas, protected species), the sensitivity and/or recoverability of receptors to hydrocarbon impacts, and important socio-economic/heritage values.

Detailed information on the spill risks, modelling analysis of scenarios and protection priorities is provided in the Beehive-1 EP and OPEP. The following tables provide a summary of the locations, key receptors, and spill modelling results for the worst-case scenario from the Beehive-1 Drilling OPEP and EP. Table 2.1 presents the results for floating oil, including probability and time to contact at the low threshold, as described above. Table 2.2 presents the entrained oil results, understanding that 10 ppb aligns with the lowest trigger levels also described above.

Using oil spill trajectory modelling (OSTM) to help prioritise resources to implement monitoring programs, (including the collection of baseline data) can be useful. For example, sensitive locations with a high probability of rapid contact with an oil spill should be the priority of a monitoring program, compared to similar locations with a lower probability and longer time for contact following a spill, where time may permit the collection of reactive (post-spill but pre-contact) baseline data.

These results have been used to determine the priority monitoring locations and receptors within the EMBA. The priorities vary according to each spill scenario (i.e., season), although the summer scenario typically presents the worst-case time to contact and probabilities for floating oil and highest probabilities for entrained oil.

Table 2.1 Monitoring priorities based on floating oil[1]

Map sector	Location	Key sensitivities	Shoreline types	Summer		Transitional		Winter	
				Prob.	Min. time	Prob.	Min. time	Prob.	Min. time
Cox-Finniss				16	24.79	1	95.71	-	-
	Fog Bay (Finniss River)	Nationally Important Wetland (Finniss Floodplain and Fog Bay Systems) Largetooth sawfish pupping known to occur	Mangrove, rock, sand						
	Dundee Beach	Holiday park and accommodation Flatback turtle inter-nesting BIA Olive Ridley turtle inter-nesting BIA Largetooth sawfish likely to occur in wet season	Sand						
	Peron Island North	Flatback turtle inter-nesting BIA	Mangrove, rock, sand	19	17.38	2	91.71	-	-
	Peron Island South			6	22.71	-	-	-	-
Daly				35	15.33	-	-	1	80.5
	Daly River mouth	Nationally Important Wetland (Daly-Reynolds Floodplain-Estuary System) Flatback turtle inter-nesting BIA	Mangroves						
	Headland SW of Daly River	Estuary system	Mangroves, sand						
Thamarrurr				71	14.5	40	22.79	29	42.63
	Nemarluk estuaries	Estuary system	Mangroves, mudflats						
	Thamarrurr	Estuary system	Mangroves, mudflats, sand						
	Moyle River	Nationally Important Wetland (Moyle Floodplain and Hyland Bay System) Juvenile largetooth sawfish likely to occur in wet season	Mangroves, sand, mudflats						
	Dorcherty Island	Turtles	Mangroves, sand, mudflats	55	17.29	13	23.71	19	35.88
	River at Ditchi/Yelcher Beach (south of Wadeye)	Estuary system	Mangroves, sand						
	Kumbunbar Creek (and creek north of it)	Estuary system	Mangroves, mudflats						
	Whale Flat	Estuary system		33	21.54	22	29.79	13	54.75
	Emu Reefs	Reefs		59	6.96	8	65.04	11	31.46
Victoria-Daly				67	18.08	36	14.29	48	14.92
	Fitzmaurice River (and surrounds)	Estuary system	Mangroves, mudflats						
	Victoria River (and surrounds)	Estuary system	Mangroves, mudflats						
	Baines River (and surrounds)	Nationally Important Wetland (Legune Wetlands) Largetooth sawfish pupping known to occur	Mangroves, mudflats						
	Clump Island			25	18.13	15	31.46	5	65.08
	Quoin Island			33	18	29	27.75	29	41.33
	Turtle Point			37	23.5	16	29.33	27	14.92

[1] Prob. Probability (%) of floating oil contact at ≥ 1.0 g/m^2
Min. time Minimum time to floating oil contact (days) at ≥ 1.0 g/m^2

Map sector	Location	Key sensitivities	Shoreline types	Summer		Transitional		Winter	
				Prob.	Min. time	Prob.	Min. time	Prob.	Min. time
Wyndham-East Kimberley				70	14.92	77	14.5	93	9.46
	North Kimberley MP	King Shoals Sanctuary Zone/Cape Domett Special Purpose Zone		91	5.63	90	7.33	98	8.08
	Cambridge Gulf (mouth is 21 km wide)	West Kimberley National Heritage coast (west side of gulf) Flatback turtle inter-nesting BIA Largetooth sawfish pupping known to occur	Mangroves, mudflats, rocky (western side)						
	Cape Domett and Lacrosse Island (entrance to Cambridge Gulf)	Flatback turtle nesting BIA (all year, peak July-Sept)	Sand, mangroves, mudflats						
	Ord River Floodplain (northern area)	The West Kimberley National Heritage coast North Kimberley Marine Park Ramsar wetland Nationally Important Wetland (Ord Estuary System) Flatback turtle inter-nesting BIA	Mangroves, mudflats	12	28.71	13	46.08	8	47.33
	Drysdale River (east of Kalumburu, near northern tip of WA)	The West Kimberley National Heritage coast North Kimberley Marine Park Largetooth sawfish pupping likely to occur Indo-Pacific humpback dolphin BIA (foraging, significant habitat)	Mangroves, rock, sand						
	Berkley River	The West Kimberley National Heritage coast North Kimberley Marine Park Tourist lodge (landing strip here) Lesser crested tern breeding BIA	Sand, rock, mangroves						
	Sir Graham Moore Island (north of Kalumburu)	The West Kimberley National Heritage coast North Kimberley Marine Park Roseate tern breeding	Sand, rock, mangroves						
Mitchell River				70	14.92	77	14.5	93	9.46
	Cassini Island Holothuria Banks	The West Kimberley National Heritage coast North Kimberley Marine Park Green turtle nesting Green turtle inter-nesting BIA Indo-Pacific humpback dolphin BIA (foraging, significant habitat)	Rocky cliff, sand	40	19.29	53	13	61	17.38
	Islands west of Kalumburu, north of Mitchell River Tait Bank	The West Kimberley National Heritage coast North Kimberley Marine Park Roseate tern breeding Lesser frigatebird breeding (Mar-Sept)	Sand, rock, mangroves	29	37	38	29.17	33	19.88
	Bigge Island Robroy Reefs	The West Kimberley National Heritage coast North Kimberley Marine Park Indo-Pacific humpback dolphin BIA (calving, foraging) Lesser crested tern breeding BIA	Rock, mangroves, sand	10	64.5	12	39.13	3	50.33

Map sector	Location	Key sensitivities	Shoreline types	Summer		Transitional		Winter	
				Prob.	Min. time	Prob.	Min. time	Prob.	Min. time
Ashmore Reef/Cartier Island									
	Cartier Island	Australian Marine Park Green turtle inter-nesting BIA (all year, peak in Dec-Jan) Hawksbill turtle foraging BIA Lesser frigatebird breeding BIA (Mar-Sept) Red-footed booby breeding BIA Wedge-tailed shearwater breeding BIA White-tailed tropicbird breeding BIA Lesser sand-plovers Eastern reef egrets Ruddy turnstones Crested terns Bridled terns Roseate terns	Sand (surrounded by coral reef flats in lagoon)	-	-	-	-	2	66.75
	Ashmore Reef	Australian Marine Park Ramsar wetland Green turtle inter-nesting BIA (all year, peak in Dec-Jan) Hawksbill turtle foraging BIA Hawksbill turtle inter-nesting BIA Hawksbill turtle nesting BIA Roseate tern breeding Lesser frigatebird breeding (Mar-Sept) Greater frigatebird breeding Lesser crested tern breeding BIA Red-footed booby breeding BIA Wedge-tailed shearwater breeding BIA White-tailed tropicbird breeding BIA Common noddies (second largest colony in Australia) Sooty terns (largest colony in WA) Crested terns	Sand (surrounded by coral reef in lagoon)	-	-	-	-	1	80.79

Map sector	Location	Key sensitivities	Shoreline types	Summer		Transitional		Winter	
				Prob.	Min. time	Prob.	Min. time	Prob.	Min. time
Scott Reef/ Browse Island									
	Browse Island	Green turtle nesting Flatback turtle nesting Crested tern breeding BIA (western side) Eastern reef egrets Ruddy turnstones Sooty terns	Coral reef, sand	13	50.96	14	47.79	4	62.17
	Scott Reef NR	Green turtle inter-nesting BIA (genetically distinct breeding population) Hawksbill turtle inter-nesting BIA Hawksbill turtle nesting BIA Roseate terns Lesser frigatebirds Brown boobies Spinner dolphins	Coral reef	3	69.92	-	-	-	-
	Scott Reef North			2	63.67	-	-	-	-
	Scott Reef South			4	63.75	-	-	-	-

Table 2.2 Monitoring priorities based on entrained oil[2]

Map sector	Location	Key sensitivities	Shoreline types	Summer		Transitional		Winter	
				Max.	Prob,	Max.	Prob,	Max.	Prob,
Cox-Finniss				4,105	57	2,527	4	6	-
	Fog Bay (Finniss River)	Nationally Important Wetland (Finniss Floodplain and Fog Bay Systems) Largetooth sawfish pupping known to occur	Mangrove, rock, sand						
	Dundee Beach	Holiday park and accommodation Flatback turtle inter-nesting BIA Olive Ridley turtle inter-nesting BIA Largetooth sawfish likely to occur in wet season	Sand						
	Peron Island North	Flatback turtle inter-nesting BIA	Mangrove, rock, sand	3,934	59	1,333	5	10	1
	Peron Island South			2,769	58	1,261	4	6	-
Daly				5,442	73	3,227	23	739	21
	Daly River mouth	Nationally Important Wetland (Daly-Reynolds Floodplain-Estuary System) Flatback turtle inter-nesting BIA	Mangroves						
	Headland SW of Daly River	Estuary system	Mangroves, sand						
Thamarrurr				13,795	82	16,021	57	15,790	59
	Nemarluk estuaries	Estuary system	Mangroves, mudflats						
	Thamarrurr	Estuary system	Mangroves, mudflats, sand						
	Moyle River	Nationally Important Wetland (Moyle Floodplain and Hyland Bay System) Juvenile largetooth sawfish likely to occur in wet season	Mangroves, sand, mudflats						
	Dorcherty Island	Turtles	Mangroves, sand, mudflats	9,502	82	11,379	52	11,284	41
	River at Ditchi/Yelcher Beach (south of Wadeye)	Estuary system	Mangroves, sand						
	Kumbunbar Creek (and creek north of it)	Estuary system	Mangroves, mudflats						
	Whale Flat	Estuary system		4,419	74	4,431	47	4,196	52
	Emu Reefs	Reefs		9,285	84	6,442	53	4,607	34
Victoria-Daly				9,021	80	9,459	53	9,153	60
	Fitzmaurice River (and surrounds)	Estuary system	Mangroves, mudflats						
	Victoria River (and surrounds)	Estuary system	Mangroves, mudflats						
	Baines River (and surrounds)	Nationally Important Wetland (Legune Wetlands) Largetooth sawfish pupping known to occur	Mangroves, mudflats						
	Clump Island			9,454	75	9,459	48	7,823	56
	Quoin Island			9,021	75	8,841	49	8,554	58
	Turtle Point			3,687	77	3,766	51	4,962	60

[2] Prob. Probability (%) of instantaneous entrained oil exposure at ≥ 10 ppb
Max. Maximum instantaneous entrained oil exposure (ppb)

Map sector	Location	Key sensitivities	Shoreline types	Summer		Transitional		Winter	
				Max.	Prob,	Max.	Prob,	Max.	Prob,
Wyndham-East Kimberley				13,432	82	13,506	86	16,868	97
	North Kimberley MP			14,706	86	15,425	86	17,327	98
	Cambridge Gulf (mouth is 21 km wide)	West Kimberley National Heritage coast (west side of gulf) Flatback turtle inter-nesting BIA Largetooth sawfish pupping known to occur	Mangroves, mudflats, rocky (western side)						
	Cape Dommett and Lacrosse Island (entrance to Cambridge Gulf)	Flatback turtle nesting BIA (all year, peak July-Sept)	Sand, mangroves, mudflats						
	Ord River Floodplain (northern area)	The West Kimberley National Heritage coast North Kimberley Marine Park Ramsar wetland Nationally Important Wetland (Ord Estuary System) Flatback turtle inter-nesting BIA	Mangroves, mudflats	2,197	67	2,812	45	2,570	68
	Drysdale River (east of Kalumburu, near northern tip of WA)	The West Kimberley National Heritage coast North Kimberley Marine Park Largetooth sawfish pupping likely to occur Indo-Pacific humpback dolphin BIA (foraging, significant habitat)	Mangroves, rock, sand						
	Berkley River	The West Kimberley National Heritage coast North Kimberley Marine Park Tourist lodge (landing strip here) Lesser crested tern breeding BIA	Sand, rock, mangroves						
	Sir Graham Moore Island (north of Kalumburu)	The West Kimberley National Heritage coast North Kimberley Marine Park Roseate tern breeding	Sand, rock, mangroves						
Mitchell River				13,432	82	13,506	86	16,868	97
	Cassini Island Holothuria Banks	The West Kimberley National Heritage coast North Kimberley Marine Park Green turtle nesting Green turtle inter-nesting BIA Indo-Pacific humpback dolphin BIA (foraging, significant habitat)	Rocky cliff, sand	8,579	51	9,350	68	6,061	90
	Islands west of Kalumburu, north of Mitchell River Tait Bank	The West Kimberley National Heritage coast North Kimberley Marine Park Roseate tern breeding Lesser frigatebird breeding (Mar-Sept)	Sand, rock, mangroves	5,389	50	5,573	68	6,143	93
	Bigge Island Robroy Reefs	The West Kimberley National Heritage coast North Kimberley Marine Park Indo-Pacific humpback dolphin BIA (calving, foraging) Lesser crested tern breeding BIA	Rock, mangroves, sand	2,091	33	2,099	60	2,163	66
Ashmore Reef/Cartier Island									
	Cartier Island	Australian Marine Park Green turtle inter-nesting BIA (all year, peak in Dec-Jan) Hawksbill turtle foraging BIA Lesser frigatebird breeding BIA (Mar-Sept) Red-footed booby breeding BIA	Sand (surrounded by coral reef flats in lagoon)	-	-	2	-	266	31

Map sector	Location	Key sensitivities	Shoreline types	Summer		Transitional		Winter	
				Max.	Prob,	Max.	Prob,	Max.	Prob,
		Wedge-tailed shearwater breeding BIA White-tailed tropicbird breeding BIA Lesser sand-plovers Eastern reef egrets Ruddy turnstones Crested terns Bridled terns Roseate terns							
	Ashmore Reef	Australian Marine Park Ramsar wetland Green turtle inter-nesting BIA (all year, peak in Dec-Jan) Hawksbill turtle foraging BIA Hawksbill turtle inter-nesting BIA Hawksbill turtle nesting BIA Roseate tern breeding Lesser frigatebird breeding (Mar-Sept) Greater frigatebird breeding Lesser crested tern breeding BIA Red-footed booby breeding BIA Wedge-tailed shearwater breeding BIA White-tailed tropicbird breeding BIA Common noddies (second largest colony in Australia) Sooty terns (largest colony in WA) Crested terns	Sand (surrounded by coral reef in lagoon)	-	-	4	-	643	25
Scott Reef/ Browse Island									
	Browse Island	Green turtle nesting Flatback turtle nesting Crested tern breeding BIA (western side) Eastern reef egrets Ruddy turnstones Sooty terns	Coral reef, sand	3,042	24	1,542	52	954	45
	Scott Reef NR	Green turtle inter-nesting BIA (genetically distinct breeding population) Hawksbill turtle inter-nesting BIA Hawksbill turtle nesting BIA Roseate terns Lesser frigatebirds Brown boobies Spinner dolphins	Coral reef	628	13	189	5	175	15
	Scott Reef North			428	13	151	6	206	12
	Scott Reef South			688	13	238	6	196	17

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 (KEF) and Biologically Important Areas (BIAs). These receptors are described in detail in Appendix 5 of the Beehive-1 EP.

A number of broadscale KEFs not listed above include:

- Carbonate bank and terrace system of the Sahul Shelf;
- Pinnacles of the Bonaparte Basin;
- Carbonate bank and terrace system of Van Diemen Rise;
- Ancient Coastline at 125 m depth contour;
- Continental slope demersal fish communities;
- Glomar Shoals;
- Mermaid Reef and Commonwealth waters including Rowley Shoals;
- Ashmore Reef and Cartier Island and surrounding Commonwealth waters;
- Canyons linking the Argo Abyssal Plain with the Scott Plateau;
- Seringapatam Reef and Commonwealth waters in the Scott Reef complex;
- Shelf break and slope of the Arafura Shelf; and
- Tributary canyons of the Arafura Depression.

The relationship between exposure levels and degree of impact should be considered when finalising the monitoring design. It should be noted that the monitoring priorities provided in Table 2.1 and Table 2.2 are listed for planning purposes. EOG will work with its monitoring providers and key stakeholders in the initial stages of the spill regarding priority receptors and to assist in the finalisation of the monitoring design. This process is outlined in Section 13.

3 Relevant Existing Baseline Information Sources

EOG has compiled a preliminary list of baseline data relevant to the high value receptors in the EMBA (Appendix A: Baseline Data Sources). EOG also has access to a number of different baseline data sources that are relevant to the high value receptors in the EMBA, as listed in Section 7 of the Joint Industry OSM Framework. Table 3.1 provides links to these online resources.

Table 3.1 Existing baseline data sources

Data Source	Access
Industry-Government Environmental Metadata System (I-GEMS)	I-GEMS metadata can be accessed via the Index of Marine Surveys for Assessments (link)
Australian Ocean Data Network (AODN)	Access is via the following link: (link)
WA Oil Spill Response Atlas (WA OSRA)	Access is via the following link: (link)
The Atlas of Living Australia (ALA)	Access is via the following link: (link)

There are a number of receptors in the EMBA are covered by government management plans that identify the current condition of key receptors being managed for protection. Additionally, there are numerous protected species and an ecological community in the EMBA covered by species recovery plans. Appendix B lists these plans along with key information relevant to monitoring.

Further information on protected matters is provided in Section 14. More information on protected species can be found here: http://www.environment.gov.au/cgi-bin/sprat/public/publicshowallrps.pl

4 Baseline Data Review

EOG has compiled a preliminary list of baseline data relevant to the high value receptors in the EMBA (Appendix A: Baseline Data Sources). EOG has also engaged RPS AAP Consulting Pty Ltd (RPS) to conduct a detailed baseline analysis to identify additional data sources and to undertake a review to assess the spatial and temporal relevance of this data and comparison of methods and parameters to those outlined in the Joint Industry SMPs. Following this review, RPS will prepare a report (OSM Baseline Environmental Data Analysis) focusing on priority monitoring locations with a minimum hydrocarbon contact timeframe of less than seven days for the worst-case spill (refer back to modelling analysis Tables in Section 2).

Table 4.1 outlines the criteria to be used during the baseline data review.

Table 4.1 Assessment criteria for baseline data review

Year of most recent data capture	Duration of monitoring program	Frequency of data capture	Similarity of methods to Joint Industry SMP	Similarity of parameters to Joint Industry SMP
High = 2017–2022	High = > 4 years	High = 4+ sampling trips per year	High	High
Medium = 2011–2016	Medium = 2–4 years	Medium = 2–3 sampling trips per year	Medium	Medium
Low = <2011	Low = <2 years	Low = one-off sampling trip	Low	Low

This assessment will then be used to determine if the available baseline data could be used to detect change in receptors at priority monitoring locations in the event of a significant impact. RPS will then complete Table 4.2 which compares priority monitoring locations and receptors, and provides guidance on where post-spill, pre-impact monitoring should be prioritised.

The different categories listed in Table 4.2 include:

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

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

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

Table 4.2 Recommended priority monitoring locations versus SMPs[3]

Map sector/Location	SMP									
	Water quality	Sediment quality	Intertidal and coastal habitat	Seabirds and shorebirds	Reptiles	Whale sharks, dugong and cetaceans	Benthic habitat	Marine fish and elasmobranch assemblages	Fisheries	Heritage and social
Cox-Finniss									Priority survey (Locations to be determined in consultation with key stakeholders to reflect current fishing zones/effort)	Priority survey (Locations to be determined in consultation with key stakeholders)
Fog Bay (Finniss River)										
Dundee Beach										
Peron Island North										
Peron Island South										
Daly										
Daly River mouth										
Headland SW of Daly River										
Thamarrurr										
Nemarluk estuaries										
Thamarrurr										
Moyle River										
Dorcherty Island										
River at Ditchi/Yelcher (S of Wadeye)										
Kumbunbar Creek (and creek north of it)										
Whale Flat										
Emu Reefs										
Victoria-Daly										
Fitzmaurice River (and surrounds)										
Victoria River (and surrounds)										
Baines River (and surrounds)										
Clump Island										
Quoin Island										
Turtle Point										
Wyndham-East Kimberley										
North Kimberley MP										
Cambridge Gulf (mouth is 21 km wide)										
Cape Dommett and Lacrosse Island										
Ord River Floodplain (northern area)										
Drysdale River (east of Kalumburu)										
Berkley River										

[3] To be completed following RPS' completion of the OSM Baseline Environmental Data Analysis (Doc ID).

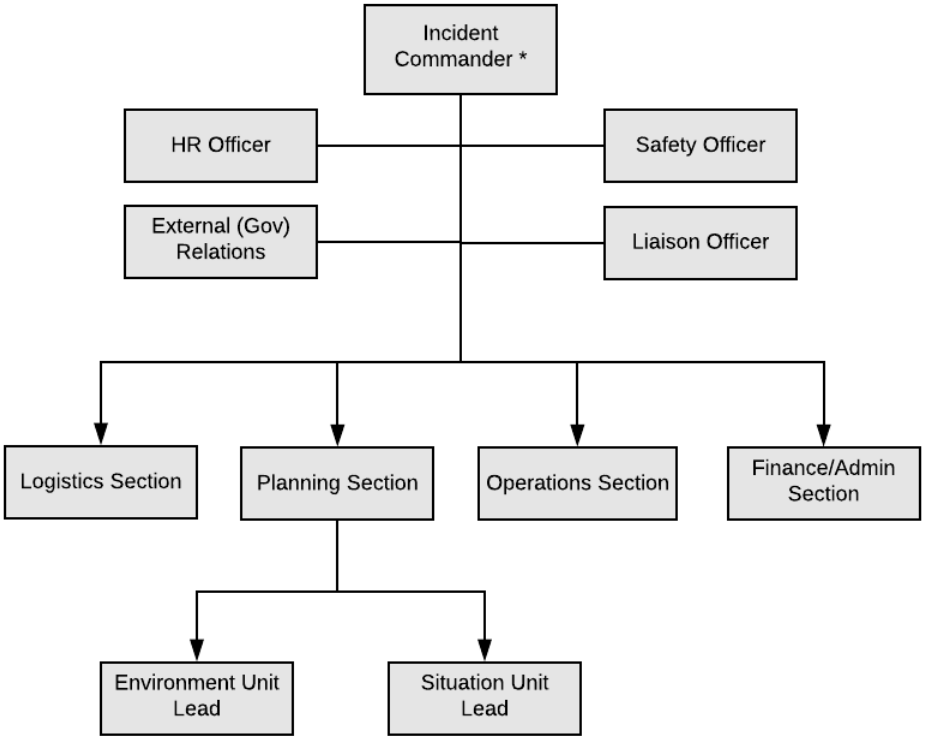
Map sector/Location	SMP									
	Water quality	Sediment quality	Intertidal and coastal habitat	Seabirds and shorebirds	Reptiles	Whale sharks, dugong and cetaceans	Benthic habitat	Marine fish and elasmobranch assemblages	Fisheries	Heritage and social
Sir Graham Moore Island										
Mitchell River										
Cassini Island										
Holothuria Banks										
Islands west of Kalumburu										
Tait Bank										
Bigge Island										
Robroy Reefs										
Ashmore Reef/Cartier Island										
Cartier Island										
Ashmore Reef										
Scott Reef/ Browse Island										
Browse Island										
Scott Reef NR										
Scott Reef North										
Scott Reef South										

5 OSM Organisational Structure

EOG uses the Incident Command System (ICS) to respond to incidents and therefore adopts the key roles and responsibilities used in this system, as described in the Beehive-1 Drilling EP and OPEP. The Drilling Incident Management Team (DIMT) will be responsible for coordinating OSM activities, which will be led by the Planning Section within the DIMT, with support from each Section, in particular the Operations Section.

Figure 5.1 shows EOG's DIMT structure. Where the WA DoT and/or the NT IMT is the Control Agency, the DIMT will be managed through coordinated command and EOG will still be expected to continue monitoring activities in WA and/or NT waters, with oversight from the WA DoT and/or the NT IMT.

Figure 5.2 illustrates the structure of the OSM Management Team during the response phase. The DIMT Incident Commander is ultimately accountable for managing the response operation, which includes this plan. Depending on the scale of the event, individual people may perform multiple roles; similarly, multiple people may share the same role.



* In Level 2 and 3 spills where the WA DoT and/or the NT IMT is activated as the Control Agency for WA and/or NT waters response, the DIMT will be managed through coordinated command (i.e., WA DoT and/or the NT IMT is Control Agency in WA and/or waters; EOG is Control Agency in Commonwealth waters)

Figure 5.1 EOG's DIMT Structure

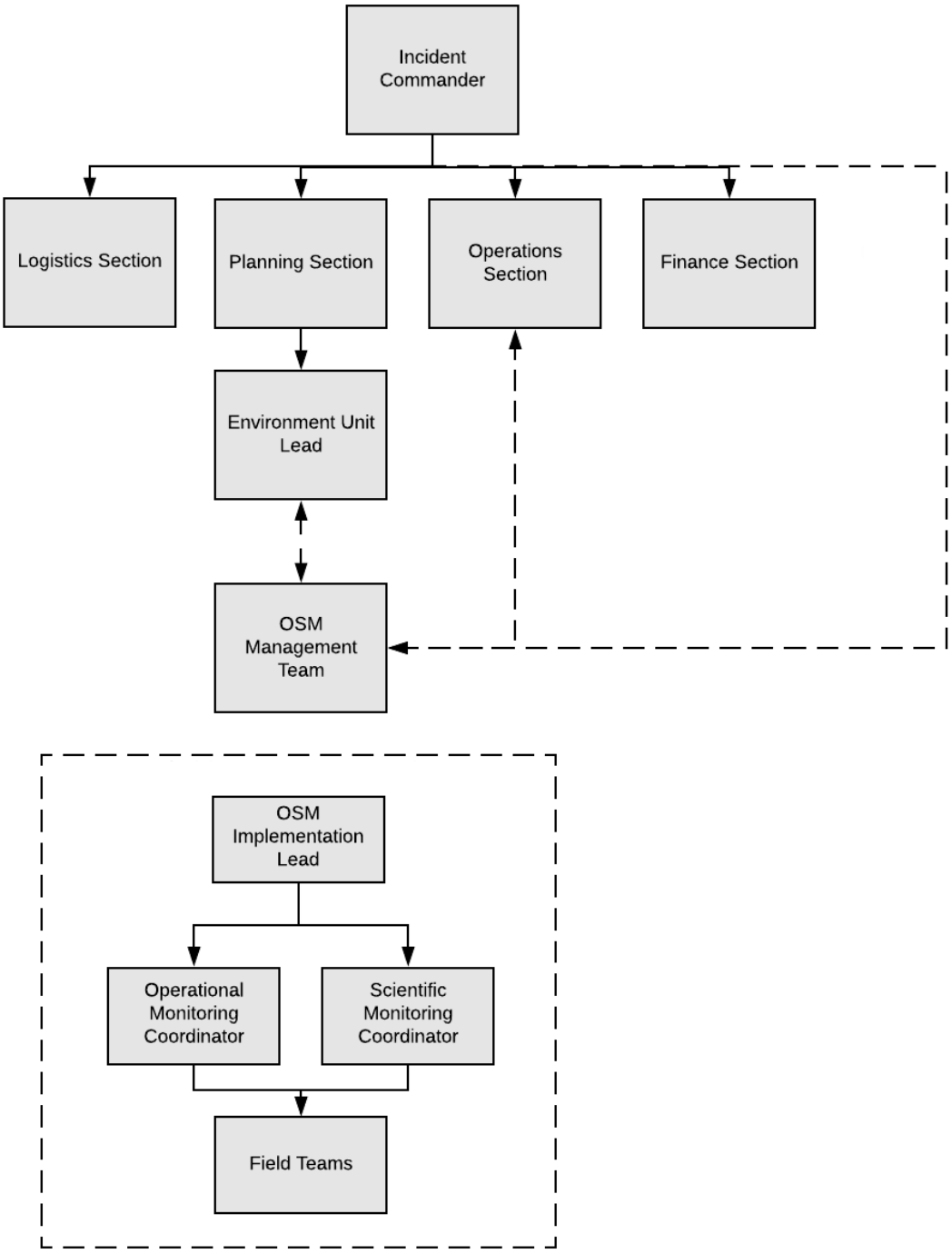


Figure 5.2 EOG's DIMT Structure with OSM Team

6 OSM Roles and Responsibilities

OSM roles and responsibilities are listed in Section 10.13.2 of the Joint Industry OSM Framework. Table 6.1 outlines the roles held by EOG and the OSM Services Provider.

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

Table 6.1 Roles and responsibilities for OSM

Role	Held by
Environment Unit Lead (EUL)	EOG's DIMT and/or Environmental Consultants (i.e., AGR/Aventus)
OSM Implementation Lead	OSM Service Provider
Operational Monitoring Coordinator and Scientific Monitoring Coordinator	OSM Service Provider
OSM Field Operations Manager	OSM Service Provider
OSM Field Teams	OSM Service Provider

7 Mobilisation and Timing of OMP and SMP implementation

Table 7.1 provides an indicative implementation schedule for OMP and SMPs in the EMBA and adjacent waters. The locations listed are aligned to the initial monitoring priorities described in Section 2.

Table 7.1 Indicative OMP and SMP implementation schedule for OSM activities if initiation criteria are met

Proximity to spill source	Monitoring type	0–6 hours from OSM activation	0–48 hours from OSM activation	Within 72 hours of OSM activation	~7 days from OSM activation	>Two weeks from OSM activation
Spill site and surrounding waters	OM	• OMP: Air quality modelling (responder health and safety)	• Activation of OMP Team Leads. • Finalise OMPs. • Commence activation and mobilisation of OM personnel.	• OMP: Hydrocarbon Properties and Weathering Behaviour, where resources are available (e.g., Supply Vessel with onboard sampling equipment). • Continue to finalise OMPs. • Continue to activate and mobilise OM personnel.	• OMP: Water Quality Assessment • OMP: Sediment Quality Assessment • OMP: Air Quality Modelling • OMP: Marine Fauna Assessment • OMP: Surface Chemical Dispersant Effectiveness	As results from implemented OMPs are available, data are provided to relevant personnel in DIMT (Situation Unit Lead) and used in the Incident Action Planning process for the next operational period. OMP is redesigned or reallocated according to the specifics of the actual spill.
	SM		• Commence activation and mobilisation process. • Activation of SMP Team Leads.	• Continue to activate and mobilise personnel. • Work on finalising SMPs.	• SMP: Water quality impact assessment • SMP: Sediment quality impact assessment • SMP: Marine fish and elasmobranch assemblages assessment	Continue SMP monitoring until termination criteria are met
Sensitive receptors: All locations listed in Table 2.1	OM		• Activation of OMP Team Leads. • Finalise OMPs. • Commence activation and mobilisation of OM personnel.	• OMP: Oil properties and weathering behaviour at sea • Continue to finalise OMPs. • Continue to activate and mobilise OM personnel.	• OMP: Water quality assessment • OMP: Sediment quality assessment OMP: Shoreline clean-up assessment • OMP: Marine fauna assessment • Reptiles	As results from implemented OMPs are available, data are provided to relevant personnel in DIMT (Situation Unit Lead) and used in the Incident Action Planning process for the next operational period. OMP is redesigned or

Proximity to spill source	Monitoring type	0–6 hours from OSM activation	0–48 hours from OSM activation	Within 72 hours of OSM activation	~7 days from OSM activation	>Two weeks from OSM activation
					• Cetaceans • Dugongs • Seabirds and shorebirds • Fish	reallocated according to the specifics of the actual spill until termination criteria are met
	SM		• Activation of SMP Team Leads and finalisation of SMPs requiring reactive baseline monitoring data to be obtained pre-impact.	• Implementation of reactive baseline data monitoring (if applicable). • Finalisation of the remaining SMPs (where individual SMP initiation criteria are met).	• Relevant SMPs are being implemented, where resources are deployed.	Continue SMP implementation.
Sensitive receptors: All other locations	OM			• Activation of OMP Team Leads. • Finalise OMPs. • Commence activation and mobilisation of OM personnel.	• Continue to finalise OMPs. • Continue to activate and mobilise OM personnel. • OMP: Oil properties and weathering behaviour at sea • OMP: Water quality assessment • OMP: Sediment quality assessment OMP: Shoreline clean-up assessment • OMP: Marine fauna assessment • Reptiles	As results from implemented OMPs are available, data are provided to relevant personnel in DIMT (Situation Unit Lead) and used in the Incident Action Planning process for the next operational period. OMP is redesigned or reallocated according to the specifics of the actual spill until termination criteria are met

Proximity to spill source	Monitoring type	0–6 hours from OSM activation	0–48 hours from OSM activation	Within 72 hours of OSM activation	~7 days from OSM activation	>Two weeks from OSM activation
					• Dugongs • Seabirds and shorebirds • Fish	
	SM			• Commence activation and mobilisation process • Activation of SMP Team Leads and finalisation of SMPs	• SMP: Water quality impact assessment • SMP: Sediment quality impact assessment • SMP: Marine mega-fauna assessment - reptiles • SMP: Marine fish and elasmobranch assemblages assessment • SMP: Intertidal and coastal habitat assessment • SMP: Seabirds and shorebirds • SMP: Benthic habitat assessment • SMP: Commercial and recreational fisheries impact assessment	Continue SMP monitoring until termination criteria are met

8 Resource Requirements

Table 8.1 outlines the resources required to assist the DIMT in the coordination and management of OSM. The resources required to implement operational and scientific monitoring components are presented in Table 8.2 and Table 8.3 respectively, which is based on the implementation schedule outlined in Table 7.1 and monitoring priorities in Section 2. This assessment is based on the worst-case deterministic analyses as presented in Table 10.9 of the modelling report (RPS 2021). It should be noted that Table 7.1 lists receptors and locations based on the cumulative outcomes of stochastic modelling whereas the resources presented in Table 8.2 and Table 8.3 are based on requirements for single deterministic spills. In the event of a spill, predictive modelling would be undertaken to determine particular areas which would require monitoring.

The resources described in Table 8.2 and Table 8.3 refer to active field teams; additional resources will be sourced to allow for rotation of field staff as part of fatigue management planning, and where necessary, to allow for natural attrition during a prolonged response. Additional equipment resources will be sourced and mobilised to ports of mobilisation to allow for wear and tear during survey operations.

Note that *OMP: Subsea dispersant injection monitoring* is not included in Table 8.2 as this has not been selected as a response strategy in the OPEP.

Table 8.1 Resources required for key OSM coordination roles

Role	Week 1 (total)	Week 2 (total)	Week 3 (total) onwards	Arrangement
OSM Implementation Lead (OSM Monitoring Provider)	2 x Principal Scientist	2 x Principal Scientist	2 x Principal Scientist	RPS AAP Consulting Pty Ltd (RPS) will be engaged under contract at least two weeks prior to mobilisation of the activity.
Operational Monitoring Coordinator and Scientific Monitoring Coordinator (OSM Service Provider)	1 x Principal Scientist	2 x Principal Scientist	2 x Principal Scientist	
OSM Field Operations Manager (OSM Service Provider)	1 x Senior Scientist	2 x Senior Scientist	2 x Senior Scientist	

Table 8.2 Resources required for implementing operational monitoring plans

OMP	Week 1 (total)	Week 2 (total)	Week 3 (total) onwards	Arrangement
Hydrocarbon properties and weathering behaviour at sea*	1 team (spill site and surrounds) 3 teams (other locations) Total 4 team leaders and 8 team members (3 per team)	1 team (spill site and surrounds) 5 teams (other locations) Total 6 team leaders and 12 team members (3 per team) Note: these resources may not be required or may transition to SM activities if relevant scientific monitoring components initiation criteria have been triggered.	1 team (spill site and surrounds) 5 teams (other locations) Total 6 team leaders and 12 team members (3 per team) Note: these resources may not be required or may transition to SM activities if relevant scientific monitoring components initiation criteria have been triggered.	RPS (includes provision of sampling equipment). ** Other arrangements as detailed in the Beehive-1 OPEP.
Shoreline clean-up assessment	5 teams Total 5 team leaders and 10 team members (3 per team)	10 teams Total 10 team leaders and 20 team members (3 per team)	15 teams Total 15 team leaders and 30 team members (3 per team)	RPS (includes provision of sampling equipment). ** AMOSC (AMOSPlan) OSRL Master Services Agreement

OMP	Week 1 (total)	Week 2 (total)	Week 3 (total) onwards	Arrangement
				State/Territory Response Teams and AMSA National Response Team. Other arrangements as detailed in the Beehive-1 OPEP.
Surface chemical dispersant effectiveness and fate	1 team leader 1 team member (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	1 team leader 1 team member (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 Additional team/s (various locations as required)	1 team leader 1 team member (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 Additional team/s (various locations as required)	RPS (includes provision of sampling equipment). ** AMOSC (AMOSPlan) OSRL Master Services Agreement Other arrangements as detailed in the Beehive-1 OPEP.
Water quality assessment*	Refer to OMP: Hydrocarbon properties and weathering behaviour at sea resourcing* (all sites)	Refer to OMP: Hydrocarbon properties and weathering behaviour at sea resourcing* (all sites)	Refer to OMP: Hydrocarbon properties and weathering behaviour at sea resourcing* (all sites) Additional teams, if required (dependent upon any modifications to sampling locations, frequency etc.)	RPS (includes provision of sampling equipment). ** Other arrangements as detailed in the Beehive-1 OPEP.
Sediment quality assessment*	Refer to OMP: Hydrocarbon properties and weathering behaviour at sea resourcing* (all sites)	Refer to OMP: Hydrocarbon properties and weathering behaviour at sea resourcing* (all sites)	Refer to OMP: Hydrocarbon properties and weathering behaviour at sea resourcing* (all sites)	RPS (includes provision of sampling equipment). ** Other arrangements as detailed in the Beehive-1 OPEP.

OMP	Week 1 (total)	Week 2 (total)	Week 3 (total) onwards	Arrangement
			Additional teams, if required (dependent upon any modifications to sampling locations, frequency etc.)	
Marine fauna assessment	1 team to conduct initial aerial surveys for spill site. Total 4 observers (2 observers per aircraft) Note: these resources may not be required or may transition to SM activities if relevant scientific monitoring components initiation criteria have been triggered.	If vessel-based surveys selected: 6 teams Total 6 team leaders and 12 team members (3 per team)	If vessel-based surveys selected: 6 teams Total 6 team leaders and 12 team members (3 per team)	RPS (includes provision of sampling equipment). ** Other arrangements as detailed in the Beehive-1 OPEP.
Air quality modelling (responder health and safety)	1 team (all sites)	1 team (all sites)	1 team (all sites)	RPS

** 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.*

*** Resource requirements will be demonstrated in a resource register, which will be finalised at least 2 weeks prior to mobilisation of the Beehive-1 drilling activity.*

Table 8.3 Resources required for implementing scientific monitoring plans

SMP	Week 1 (total)	Week 2 (total)	Week 3 (total) onwards	Arrangement
Water quality impact assessment	1 team (spill site and surrounds) 3 teams (other locations) Total 4 team leaders and 8 team members (3 per team) Note: can initially be performed by the same team as OMP: Water quality assessment. This SMP may replace OMP: Water quality assessment if the OMP termination criteria are triggered	1 team (spill site and surrounds) 5 teams (other locations) Total 6 team leaders and 12 team members (3 per team)	1 team (spill site and surrounds) 5 teams (other locations) Total 6 team leaders and 12 team members (3 per team)	RPS (includes provision of sampling equipment). ** Other arrangements as detailed in the Beehive-1 OPEP.
Sediment quality impact assessment	Refer to SMP: Water quality impact assessment* (all sites)	Refer to SMP: Water quality impact assessment* (all sites)	Refer to SMP: Water quality impact assessment* (all sites)	RPS (includes provision of sampling equipment). ** Other arrangements as detailed in the Beehive-1 OPEP.
Intertidal and coastal habitat assessment	5 teams Total 5 team leaders and 10 team members (3 per team)	10 teams Total 10 team leaders and 20 team members (3 per team)	15 teams Total 15 team leaders and 30 team members (3 per team)	RPS (includes provision of sampling equipment). ** Other arrangements as detailed in the Beehive-1 OPEP.
Seabirds and shorebirds	5 teams Total 5 team leaders and 5 team members (2 per team) Note: can initially be performed by the same team as OMP: Marine fauna assessment – seabirds and shorebirds. This SMP may replace OMP: Marine fauna assessment – seabirds and shorebirds if the OMP termination criteria are triggered	10 teams Total 10 team leaders and 10 team members (2 per team)	15 teams Total 15 team leaders and 15 team members (2 per team)	RPS (includes provision of sampling equipment). ** Other arrangements as detailed in the Beehive-1 OPEP.

SMP	Week 1 (total)	Week 2 (total)	Week 3 (total) onwards	Arrangement
Marine mega-fauna assessment • Reptiles • Whale sharks, dugongs and cetaceans	5 teams Total 5 team leaders and 10 team members (3 per team) Note: can initially be performed by the same team as the relevant OMP: Marine fauna assessment. This SMP may replace the relevant OMP: Marine fauna assessment if the OMP termination criteria are triggered	10 teams Total 10 team leaders and 20 team members (3 per team)	15 teams Total 15 team leaders and 30 team members (3 per team)	RPS (includes provision of sampling equipment). ** Other arrangements as detailed in the Beehive-1 OPEP.
Benthic habitat assessment	5 teams Total 5 team leaders and 10 team members (3 per team)	10 teams Total 10 team leaders and 20 team members (3 per team)	15 teams Total 15 team leaders and 30 team members (3 per team)	RPS (includes provision of sampling equipment). ** Other arrangements as detailed in the Beehive-1 OPEP.
Marine fish and elasmobranch assemblages assessment	5 teams Total 5 team leaders and 10 team members (3 per team) Note: can initially be performed by the same team as the relevant OMP: Marine fauna assessment. This SMP may replace the relevant OMP: Marine fauna assessment if the OMP termination criteria are triggered	10 teams Total 10 team leaders and 20 team members (3 per team)	15 teams Total 15 team leaders and 30 team members (3 per team)	RPS (includes provision of sampling equipment). ** Other arrangements as detailed in the Beehive-1 OPEP.
Fisheries impact assessment	2 teams (Commonwealth fisheries with the potential to be impacted/are being impacted (refer to Appendix 5 [Sections 5.6.1, 5.6.2 and 5.6.3] of the Beehive-1 Drilling EP for fisheries information)	3 teams (Commonwealth fisheries with the potential to be impacted/are being impacted (refer to Appendix 5 [Sections 5.6.1, 5.6.2 and 5.6.3] of the Beehive-1 Drilling EP for fisheries information)	4 teams (Commonwealth fisheries with the potential to be impacted/are being impacted (refer to Appendix 5 [Sections 5.6.1, 5.6.2 and 5.6.3] of the Beehive-1 Drilling EP for fisheries information)	RPS (includes provision of sampling equipment). ** Other arrangements as detailed in the Beehive-1 OPEP.

SMP	Week 1 (total)	Week 2 (total)	Week 3 (total) onwards	Arrangement
	Total 2 team leaders and 4 team members (3 per team) Note: can initially be performed by the same team as OMP: Marine fauna assessment – fish. This SMP may replace OMP: Marine fauna assessment – fish if the OMPs termination criteria are triggered	Total 3 team leaders and 6 team members (3 per team)	Total 4 team leaders and 8 team members (3 per team)	
Heritage features assessment	1 team Total 1 team leader and 2 team members (3 per team)	1 team Total 1 team leader and 2 team members (3 per team)	1 team Total 1 team leader and 2 team members (3 per team)	RPS (includes provision of sampling equipment). **
Social impact assessment	1 team Total 1 team leader and 2 team members (3 per team)	1 team Total 1 team leader and 2 team members (3 per team)	1 team Total 1 team leader and 2 team members (3 per team)	RPS (includes provision of sampling equipment). **

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

*** Resource requirements will be demonstrated in a resource register, which will be finalised at least 2 weeks prior to mobilisation of the Beehive-1 drilling activity.*

9 Capability Arrangements

EOG has contracted RPS AAP Consulting Pty Ltd (RPS) to provide standby OSM response and implementation services, which includes lead contract, logistics and reporting. As part of the scope of works, RPS will prepare a resource register to identify sources and contact details for sufficient equipment and suitably trained and experienced personnel commensurate with the nature and scale of the response. This resource register will be completed at least two weeks prior to the mobilisation of the Beehive-1 drilling activity. The register will identify the resource, the OSM it pertains to, and the contact details for the subcontractor/supplier. RPS will engage with potential subcontractors and mediate memoranda of understanding as appropriate.

Table 9.1 provides details of OSM services.

The OSM Services Provider will be contracted to provide EOG with a monthly Standby Capability and Competency Report, which details personnel requirements for OMPs/SMPs, numbers of available personnel and competencies for service provider and sub-contracted personnel.

Key personnel listed on the monthly update will be contactable via mobile phone during this period and accessible to Perth airport within 48 hours of EOG's initial activation of OSM Services.

Table 9.1 OSM services provider standby and implementation services

Standby	Implementation
24/7 monitoring support accessed through 24 hr. call out number	Provision of an OSM Implementation Lead to the EOG DIMT within 12 hours of notification
Provision of a suitably trained personnel, which includes support from RPS and its subcontractors and suppliers	Provision of a first-strike scientific team within 24 hours of notification, available in <location A> and ready to deploy
Monthly reports on personnel and equipment availability	Development of scientific response and sampling plans (based on modelled hydrocarbon spill scenario)
Access to RPS' global network of scientific and engineering consulting expertise	Provision of a second-strike scientific team within 72 hours of notification, available in Perth and ready to deploy
Access to RPS' local network of terrestrial consultants, laboratories and field service providers	Priority access to RPS' staff and equipment

9.1 Personnel Competencies

EOG's OSM Service Contract specifies the competency requirements for key OSM personnel as per Section 11.3 of the Joint Industry OSM Framework. In addition, and where practicable, EOG will engage its most qualified local environmental advisors in the initial stages of the monitoring program to help activate and mobilise monitoring teams and support the OSM Services Provider in the finalisation of monitoring designs.

9.2 Equipment

Equipment requirements are listed in the individual OMPs and SMPs. Table 9.2 lists a generalised breakdown of equipment types and the source.

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

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

Table 9.2 OSM equipment

Equipment type	Source
Desktop equipment (e.g., Oil Spill Response Atlas, GIS)	Coordinated through DIMT GIS Team
In-field specialised monitoring equipment (e.g., fluorometers, sample bottles, ROVs)	Coordinated through the OSM Services Provider's standby OSM response and implementation services
Logistical equipment (e.g., in-field accommodation, vessels, aircraft)	Refer to Section 6 of the Beehive-1 Drilling OPEP

9.3 Exercises

EOG maintains an OPEP Testing Schedule as detailed in Section 8.4 of the Beehive-1 Drilling OPEP to ensure its competency in responding to and managing major incidents, including oil spills. The OPEP Testing Schedule is reviewed and revised (if required) annually.

As part of this schedule, EOG conducts a number of different exercise types that may include a component of operational and scientific monitoring. Table 9.3 outlines these exercises.

Table 9.3 Exercise types

Exercise Type	Description	Frequency
Notification exercise	Test procedures to notify and activate the DIMT, oil spill response organisations, third party providers (including OSM contractors) and regulators	At least 6 weeks prior to the start of drilling
Desktop exercise	Normally involves interactive desktop discussions of a simulated scenario. OSM tabletop exercises may involve the following focus areas: • Test the time required to finalise monitoring design; • Test arrangements for delivery and use of data by DIMT in decision-making; or • Data exchange test with field (opportunistic when contractors in in the field)	As per Section 8.4 of the Beehive-1 Drilling OPEP
Incident Management Exercise	Involves DIMT activation to establish command, control, and coordination of a Level 2 or 3 incident. Can simulate several different aspects of an oil spill incident and may involve third parties. OSM activation may be included as component of this exercise.	As per Section 8.4 of the Beehive-1 Drilling OPEP

The purpose of this testing is to confirm that the response arrangements and capability in place is available when needed and function as intended. As part of the exercise process, EOG prepares a number of documents to ensure drills and exercises are well planned, conducted and evaluated. To support this, the following documents are used for Level 2–3 exercises:

- Exercise Scope Document – provides background context to the exercise, outlines the exercise need, aim, objectives, details of the scenario, participating groups and agencies, exercise deliverables and management structure. This document can be used to engage a third-party contractor to assist in conducting the exercise
- Exercise plan and instructions – provide instructions and 'play' (including any injects) for conducting the exercise
- Post exercise report – includes an after-action review of the exercise, evaluating how the exercise performed against meeting its aim and objectives.

EOG routinely undertakes post-exercise debriefings following Level 2–3 exercises and drills to identify opportunities for improvement and communicate lessons learned. Actions that are derived from drills and exercises including debriefs are documented in an action tracking system.

EOG will test its standby arrangements and activation process with its OSM contractors prior to the activity commencing, to ensure DIMT roles and key OSM Services Provider personnel are familiar with the activation process and to check the OSM Services Provider's Standby Capability and Competency Report.

EOG will incorporate OSM activation and planning into at least one desktop or incident management exercise prior to the activity commencing.

10 Capability Assessment

Table 10.1 demonstrates EOG's capability to implement each OMP and SMP, including an assessment of each monitoring plan, identification of likely monitoring platforms, major supporting infrastructure (e.g., offshore accommodation), reactive baseline monitoring requirements (Section 4), initial survey arrangements (e.g., aerial followed up with ground reconnaissance) and ability to combine with other monitoring plans.

Note that *OMP: Subsea dispersant injection monitoring* is not included in Table 10.1 as this has not been selected as a response strategy in the OPEP.

Table 10.1 OSM capability

Component	Total Personnel Required (Weeks 1–2) [4]	Personnel available via OSM Service Provider Standby Contract [5]	Personnel available via OSROs	Titleholder	Total Personnel Available [6]
OSM Personnel embedded in DIMT	2 OSM Implementation Lead 1 OM Monitoring Coordinator 1 SM Coordinator 2 Field Operations Manager	2 OSM Implementation Lead 3 OM Monitoring Coordinator 3 SM Coordinator 4 Field Operations Manager	N/A	1 OSM Implementation Lead (initial)	2 OSM Implementation Lead 3 OM Monitoring Coordinator 3 SM Coordinator 4 Field Operations Manager
OMPs					
Hydrocarbon properties and weathering behaviour at sea*	6 team leaders 12 team members	6 team leaders 12 team members	N/A	N/A	6 team leaders 12 team members
Shoreline clean-up assessment	10 team leaders 20 team members	10 team leaders 20 team members	13 team leaders (AMOSC) 12 team leaders (OSRL)	N/A	35 team leaders 20 team members
Surface chemical dispersant effectiveness and fate	Visual observations: 1 team leader 1 team member Water quality assessment – refer to SMP: Water quality assessment	Refer to OMP: Hydrocarbon properties and weathering behaviour at sea	Visual observations: 3 team leaders 4 team members	N/A	Visual observations: 3 team leaders 4 team members
Water quality assessment*	Refer to OMP: Hydrocarbon properties and weathering behaviour at sea				
Sediment quality assessment*	Refer to OMP: Hydrocarbon properties and weathering behaviour at sea				
Marine fauna assessment	1 aerial team (including 1 Marine Fauna Observer	16 MFOs 11 Aerial survey observers	N/A	N/A	16 MFOs 11 Aerial survey observers

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

[5] RPS will be engaged under contract at least two weeks prior to mobilisation of the activity.

[6] This column indicates the minimum number of personnel available. Resource requirements (including personnel) will be demonstrated in a Resource Register, which will be finalised at least 2 weeks prior to mobilisation of the Beehive-1 drilling activity. The Resource Register will include at least 30% more resources/personnel.

Component	Total Personnel Required (Weeks 1–2) [4]	Personnel available via OSM Service Provider Standby Contract [5]	Personnel available via OSROs	Titleholder	Total Personnel Available [6]
	(MFO) and 1 Aerial survey observer) 6 vessel teams (including 2 vessel-based survey trained MFOs, 1 experienced vessel survey observer per team)	21 vessel survey observers 6 experienced ornithologists 2 personnel with pathology or veterinary skills			21 vessel survey observers 6 experienced ornithologists 2 personnel with pathology or veterinary skills
Air quality modelling (responder health and safety)	1 Air Quality Specialist			1 Air Quality Specialist Specialists from TBA	1 Air Quality Specialist Specialists from TBA
SMPs					
Water quality impact assessment	Note: can initially be performed by the same team as OMP: Water quality assessment. This SMP may replace OMP: Water quality assessment if the OMPs termination criteria are triggered				
Sediment quality impact assessment	Refer to SMP: Water quality impact assessment* (all sites)				
Intertidal and coastal habitat assessment	10 team leaders 20 team members	12 team leaders 21 team members	N/A	N/A	12 team leaders 21 team members
Seabirds and shorebirds	Note: can initially be performed by the same team as OMP: Marine fauna assessment – seabirds and shorebirds. This SMP may replace OMP: Marine fauna assessment – seabirds and shorebirds if the OMPs termination criteria are triggered				
Marine mega-fauna assessment	Note: can initially be performed by the same team as OMP: Marine fauna assessment. This SMP may replace OMP: Marine fauna assessment if the OMPs termination criteria are triggered				
Benthic habitat assessment	10 team leaders 20 team members	12 team leaders 21 team members	N/A	N/A	12 team leaders 21 team members
Marine fish and elasmobranch assemblages assessment	3 team leaders 6 team members	2 senior marine scientists trained in fish identification and necropsy 9 scientists with fish survey and ROV/BRUV experience 7 team members	N/A	N/A	2 senior marine scientists trained in fish identification and necropsy 9 scientists with fish survey and ROV/BRUV experience 7 team members

Component	Total Personnel Required (Weeks 1–2) [4]	Personnel available via OSM Service Provider Standby Contract [5]	Personnel available via OSROs	Titleholder	Total Personnel Available [6]
Fisheries impact assessment	3 team leaders 6 team members	2 senior marine scientists trained in fish identification and necropsy 9 scientists with fish survey and ROV/BRUV experience 7 team members	N/A	N/A	2 senior marine scientists trained in fish identification and necropsy 9 scientists with fish survey and ROV/BRUV experience 7 team members
Heritage features assessment	1 team leader 2 team members (including either ROV operator or marine diver/s)	1 team leader 2 team members (including either ROV operator or marine diver/s)	N/A	N/A	1 team leaders 2 team members (including either ROV operator or marine diver/s)
Social impact assessment	1 team leader 2 team members	N/A	N/A	3–4 Social impact assessment specialists	3–4 Social impact assessment specialists

** 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 and revised, if required, in accordance with the Management of Change Procedure in EOG's Australian Projects HSE Management Plan. This could include changes required in response to one or more of the following:

- When major changes have occurred which affect Operational and/or Scientific Monitoring coordination or capabilities (e.g., change of service provider/s);
- Changes to the activity that affect Operational and/or Scientific Monitoring coordination or capabilities (e.g., a significant increase in spill risk);
- Changes to legislative context related to Operational and/or Scientific Monitoring (e.g., EPBC Act protected maters requirements);
- 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 OPGGS (E) Regulations.

Part B – Implementation

12 Activation Process

EOG's DIMT Environment Unit Leader (EUL) is responsible for activating OSM components, subject to approval from the Incident Commander. Table 12.1 outlines EOG's OSM activation process.

Table 12.1 OSM activation process

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

13 Monitoring Priorities

As described in Section 2, the available OSTM has been analysed to understand the likely initial monitoring priorities for its activities in the EMBA. In addition, Table 4.2 lists comparability of available baseline data for receptors, to assist in identifying where post-spill, pre-impact monitoring should be prioritised.

The monitoring priorities provided in Section 2 and Table 4.2 are to be used for guidance when confirming monitoring priorities in consultation with key stakeholders and monitoring service providers (including subject matter experts, where available) at the time of the spill. Table 13.1 provides a checklist to assist in the confirmation of monitoring priorities for individual spills.

Table 13.1 Checklist for determining monitoring priorities

Responsibility	Task	Timeframe	Complete
OSM Services Provider with input from EUL	Confirm monitoring locations for activated OMPs and SMPs based on: • Current monitor and evaluate data (i.e., situational awareness data, including predicted time to receptor impact, aerial/vessel surveillance observations, tracking buoy data, satellite data); • Nature of hydrocarbon spill (i.e., subsea blow out, surface release, hydrocarbon characteristics, volume, expected duration of release); • Seasonality and presence of receptors impacted or at risk of being impacted; • Current information on transient and broadscale receptors (surface and subsea); • Current operational considerations (e.g., weather, logistics); • Nature of hydrocarbon spill (i.e., subsea blow out, surface release, hydrocarbon characteristics, volume, expected duration of release); • Monitoring priorities identified in Section 2; and • Existing literature, baseline data, and monitoring programs.	Within 12 hours of monitor and evaluate data being received from DIMT	
	Evaluate monitoring priorities in consultation with key stakeholders, including the appointed State/Territory Environment and Science Coordinator	Within 12 hours of monitor and evaluate data being received from DIMT	
	Using the results of the baseline data analysis in Table 4.2 and the information above, determine priority locations for post-spill, pre-impact monitoring	Within 12 hours of monitor and evaluate data being received from DIMT	
	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 DIMT	
	Continually re-evaluate monitoring priorities in consultation with EUL and relevant key stakeholders throughout spill response	Ongoing	

14 Protected Matters Requirements

Table 14.1 provides a checklist to ensure monitoring personnel consider protected matters requirements in the finalisation of OMPs and SMPs.

Appendix B outlines the management plans, recovery plans and conservation advice statements relevant for the protected matters within the EMBA that are likely to be relevant to the final design of the OMPs and SMPs. Appendix B also includes relevant priority monitoring locations where these receptors are known to occur in order to expedite consideration of relevant information into finalised monitoring designs.

Table 14.1 Checklist for inclusion of protected matters into monitoring designs

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

15 Finalising Monitoring Design

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

Table 15.1 provides EOG's checklist for finalising monitoring designs post-spill. The OSM Implementation Lead will be responsible for approving the finalised monitoring design used in the OMPs and SMPs.

Table 15.1 Checklist for finalising monitoring design

Responsibility	Task	Timeframe	Complete
OSM Services Provider	Confirm survey objectives, sampling technique, for each initiated OMP and SMP	Within 48 hours of initial monitoring priorities being confirmed by DIMT	
	Determine suitable sampling frequency	Within 48 hours of initial monitoring priorities being confirmed by DIMT	
	Finalise standard operating procedures	Within 48 hours of initial monitoring priorities being confirmed by DIMT	
	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 DIMT	

16 Mobilisation

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

The OSM Services Provider will be required to coordinate the availability of personnel and equipment for all monitoring programs. EOG will be responsible for flights, accommodation and victualing for field personnel. EOG will also be required to procure all vessels, aerial platforms and vehicles for OMP and SMP implementation.

Table 16.1 provides a checklist for mobilising monitoring teams.

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

Table 16.1 Checklist for mobilisation of monitoring teams

Responsibility	Task	Complete
OSM Services Provider with input from Environment Unit Leader	Confirm availability of all monitoring personnel (noting required competencies in Section 9.1 and individual OMPs/SMPs)	
	Allocate number of teams, personnel, equipment and supporting resource requirements	
	Undertake HAZIDs as required and consolidate/review field documentation including safety plans, emergency response plans, and daily field reports	
	Develop site-specific health and safety plans which is compliant with health safety and environment systems (including call in timing and procedures)	
	Conduct pre-mobilisation meeting with monitoring team/s on survey objectives, logistics, safety issues, reporting requirements and data management collection requirements	
	Determine data management delivery needs of the DIMT and process requirements, including data transfer approach and frequency/timing	
	Confirm data formats and metadata requirements with personnel receiving data	
	Logistics	
	Confirm flights, accommodation, and car hire arrangements are in place	
	Develop field survey schedules, detailing staff rotation	
	Equipment	
	Arrange survey platform (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)	
	Ensure vessels have correct fit-out specifications (e.g., winches, GPS, satellite, HIAB, sufficient deck space, water supplies (fresh and/or salt), accommodation)	
	Confirm consumables (including personal protective equipment) have been purchased and will be delivered to required location	
	Liaise with NATA-accredited laboratories to confirm availability, limits of detection, sampling holding times, transportation, obtain sample analysis	

Responsibility	Task	Complete
	quotes and arrange provision of appropriate sample containers, Chain of Custody (CoC) forms and suitable storage options for all samples. Make arrangements for couriers (if necessary)	
	Confirm specialist equipment requirements and availability (including redundancy)	
	Check GPS units and digital cameras are working and that sufficient spare batteries and memory cards are available	
	Confirm sufficient equipment to allow integration of survey software and navigational systems (e.g., GPS, additional equipment and adaptors), and additional GPS units prepared	
	Confirm GPS survey positions (where available) have been QA/QC checked and pre-loaded into navigation software/positioning system	
	Check field laptops, ensuring they have batteries (including spares), power cable, and are functional	
	Check if a first aid kit or specialist 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 is responsible for submitting access and permit applications to all relevant Jurisdictional Authorities to conduct monitoring for OMPs and SMPs.

Table 17.1 Permits required in EMBA

Receptor	Location	Jurisdictional Authority	Relevant information on permits
Permits for monitoring fauna	N/A	State/Territory government department with jurisdiction for fauna Department of Agriculture, Water and the Environment	Any interactions involving nationally listed threatened fauna may require approval from DAWE (http://www.environment.gov.au/biodiversity/threatened/permits) WA- appropriate permits can be found at: https://www.dpaw.wa.gov.au/plants-and-animals/licences-and-authorities?showall=&start=4 NT- permits can be found at: https://nt.gov.au/environment/animals/wildlife-permits/permits-take-interfere-with-wildlife
State/Territory Marine Protected Areas; Fish Habitat Protection Areas	• Lalang-garram / Camden Sound • Lalang-garram/Horizontal Falls and North Lalang-garram • North Kimberley • Rowley Shoals • Montebello/Barrow Islands • Cobourg Marine Park	State/Territory government department with jurisdiction for parks and wildlife State/Territory government department with jurisdiction for fisheries	No specific permitting requirements exist for monitoring in WA marine protected areas, but additional information is available at: https://www.dpaw.wa.gov.au/management/marine , https://www.dpaw.wa.gov.au/management/marine/marine-parks-and-reserves and https://www.fish.wa.gov.au/Sustainability-and-Environment/Aquatic-Biodiversity/Marine-Protected-Areas/Pages/default.aspx No specific permitting requirements exist for monitoring in NT fish protection areas, but zones are described here: https://nt.gov.au/marine/recreational-fishing/when-and-where-to-fish/reef-fish-protection-areas
Ramsar wetland	• Ashmore Reef National Nature Reserve Ramsar site • Cobourg Peninsula Ramsar site • Ord River Floodplain Ramsar site • Kakadu National Park Ramsar site	DAWE	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	• Oceanic Shoals • Arafura	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
	• Arnhem • Agro-Rowley Terrace • Kimberley • Cartier Island • Mermaid Reef • Joseph Bonaparte Gulf • Montebello		Additional information on permitting requirements in AMPs 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	**WA** • Mackerel Managed Fisheries (MMF) • Northern Demersal Scalefish Managed Fishery • Pearl Oyster Managed Fishery • Abalone Managed Fishery • Kimberley Crab Managed Fishery (North Coast Crab Fishery) • Kimberly Prawn Managed Fishery • Kimberley Gillnet and Barramundi Managed Fishery • Broome Prawn Managed Fishery • Nickol Bay Prawn Managed Fishery	State/Territory government department with jurisdiction for fisheries	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 No specific permitting requirements exist for NT Fisheries, but additional information is available at –- https://dpir.nt.gov.au/fisheries

Receptor	Location	Jurisdictional Authority	Relevant information on permits
	• Onslow Prawn Managed Fishery • Specimen Shell Fishery • Marine Aquarium Fish Managed Fishery • Pilbara Demersal Scalefish Fishery • Pilbara Crab Managed Fishery • West Coast Deep Sea Crustacean Managed Fishery **NT** • Spanish Mackerel Fishery • Barramundi Fishery • Coastal line Fishery • Timor Reef Fishery • Offshore Net and Line Fishery • Demersal Fishery		
Commonwealth Managed Fisheries	• Western Tuna and Billfish Fishery • Western Skipjack Fishery • Southern Bluefin Tuna Fishery • North West Slope Trawl Fishery • Northern Prawn 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

Receptor	Location	Jurisdictional Authority	Relevant information on permits
	• Western Deepwater Trawl Fishery		
Indigenous Cultural Heritage	Sites are located throughout EMBA	State/Territory government department with jurisdiction for indigenous heritage	Entry access permits to Aboriginal Lands in WA: https://www.wa.gov.au/service/aboriginal-affairs/aboriginal-heritage-conservation/apply-permit-access-or-travel-through-aboriginal-land Aboriginal heritage sites in WA: https://www.wa.gov.au/service/aboriginal-affairs/aboriginal-cultural-heritage/search-aboriginal-sites-or-heritage-places Indigenous heritage information in NT: https://nt.gov.au/leisure/arts-culture-heritage/visit-a-cultural-or-heritage-site/indigenous-heritage-information
Defence/restricted military area	North Australian Exercise Area (NAXA) offshore training area and the Browse Basin and Northern Carnarvon Basin offshore air-to-air weapons ranges (maritime military zones) Yampi Sound Training Area, Bradshaw Field Training Area and Kangaroo Flats Training Area	Department of Defence	Unexploded Ordnances (mapping information): https://www.defence.gov.au/UXO/default.asp Maritime military firing practice and exercise areas: https://www.hydro.gov.au/factsheets/FS_Navigation-Firing_Practice_and_Exercise_Areas.pdf
Industry (e.g., operational zone of offshore oil or gas platform)	• Montara FPSO Facility (Jadestone) • Ichthys Facility (INPEX) • Blacktip Gas Field (ENI Australia) • Other operators in the EMBA include ENI Australia, Woodside Energy Limited, Melbana Energy, Neptune Energy	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
	Bonaparte Pty Ltd, Santos Ltd, BP Developments Australia Pty Ltd, Chevron Australia Pty Ltd and Kufpec		
Shipwrecks	• A number of unnamed Indonesian fishing vessels and the *Sinar Bonerate* are known to be in the vicinity of Ashmore Reef and Cartier Island • The *Unident* and *Selina* are known to be in the vicinity of Browse Island • There are 178 shipwrecks identified within the EMBA; 106 located in off the WA coast and 72 located off the NT coast.	State/Territory or Commonwealth government department with jurisdiction for maritime cultural heritage/ archaeology	Underwater heritage protected zones (Commonwealth): www.environment.gov.au/heritage/underwater-heritage/protected-zones NT protected zones: https://nt.gov.au/leisure/arts-culture-heritage/visit-a-cultural-or-heritage-site/maritime-heritage

18 Use of Data in Response Decision-making

18.1 Operational Monitoring to Inform Response Activities

The OSM Services Provider is responsible for the collection of data by field teams, which shall be QA/QC checked by the Field Team Lead in accordance with the requirements listed in the finalised OMPs and SMPs (where applicable). The Team Lead will be responsible for communicating data back to the OSM Management Team (led by the OSM Services Provider) via field reporting forms, debriefs and reports. Laboratory analysis reports should also be directed to the OSM Management Team.

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

Once data is analysed and checked by the Field Team Lead, it will be provided to the DIMT Situation Unit Lead, who will then distribute the data from each monitoring component to the relevant DIMT Unit and/or Section. Table 18.1 provides guidance on the type of data generated from each OMP, which DIMT Section/Unit requires the data and how the data may be used during a response. All SMP data received during a response will be received by the DIMT Situation Unit Lead and DIMT Environment Unit Lead simultaneously.

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

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

Note that *OMP: Subsea dispersant injection monitoring* is not included in Table 18.1 as this has not been selected as a response strategy in the OPEP.

Table 18.1 Data generated from each OMP and how this may be used by DIMT in decision-making

Operational Monitoring Plan	Data generated[7]	DIMT Section requiring data	How data may be used by DIMT
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 DIMT 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 NEBA; Planning Section to aid in IAP development; Operations Section to confirm dispersant effectiveness for decision-making purposes in current operations period.	Determine the effectiveness of dispersant in removing oil from sea surface and how dispersed oil is being distributed through the water column. This information can be used in NEBA to help decide if dispersants are being effective at treating high value receptors (NEBA 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	Situation Unit Lead to validate surveillance and modelling data; Planning Section for use in IAP	Confirm spatial extent of spill within the water column and verify spill modelling and surveillance data; extent of spill can in turn influence location of other OMP and SMP monitoring components and sites. Data can also influence ongoing use of dispersant through ongoing operational NEBA.

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

Operational Monitoring Plan	Data generated[7]	DIMT Section requiring data	How data may be used by DIMT
Sediment quality assessment	Distribution of oil in sediment and change in hydrocarbon concentrations (e.g. Total recoverable hydrocarbons, BETEXN, PAH)	Situation Unit Lead to validate surveillance and modelling data; Planning Section for use in IAP	Confirm spatial extent of spill; extent of spill can in turn influence location of other OMP and SMP monitoring components and sites
Marine fauna assessment • 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 Unit/Division to help in developing Wildlife Response Sub-plan	Understanding of species, populations and geographical locations at greatest risk from spill impacts. DIMT 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 DIMT to modify or terminate activities if they are assessed as creating more harm than the oil alone (e.g. large shoreline clean-up teams and staging areas may disturb shorebird nesting resulting in adults abandoning chicks)
Air quality modelling (responder health and safety)	Modelled outputs of airborne hydrocarbons, gases and chemicals and their predicted distribution	Operations Section to help determine safe zones in close vicinity of spill; Planning Section for use in IAP	Determine safe distances from spill source for response personnel; determine the presence and persistence of volatile organic compounds to know if response areas are safe for personnel

18.2 Impacts from Response Activities

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

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

18.3 Operational Monitoring of Effectiveness of Control Measures and to Ensure EPS are Met

When finalising monitoring designs, the OSM Implementation Lead and EUL (or delegate) shall review the Environmental Performance Standards (EPS) listed in the Beehive-1 Drilling EP and integrate checks into the monitoring design that will help determine if relevant EPS are being met. The EPS relevant to spill response and OSM are included in Section 8.8 of the Beehive-1 Drilling EP.

19 Data Management

Minimum standards for data management are provided in Section 10.11 of the Joint Industry OSM Framework.

20 Quality Assurance and Quality Control

Refer to Section 10.11 of the Joint Industry OSM Framework for QA/QC minimum standards.

21 Communication Protocols

21.1 OSM Services Provider/s

Communication protocols between EOG 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 EOG and its OSM Services Provider during the preparedness phase (pre-spill) and during activation (prior to deployment) will be between the Environment Unit Lead (EUL) (or delegate) and the OSM Services Provider Lead respectively.
- During implementation (post deployment), primary communication occurs via two pathways:
    1. EUL and the OSM Services Provider Lead for contractual, management, scientific and general direction matters; and
    2. EOG's On-Scene Commander and the OSM Services Provider's Field Operations Manager for on-site matters.
- All OSM operational decisions should be logged in an OSM decision log by key personnel.
- All OSM tasks, actions and requirements should be documented in an IAP during the response phase of the spill.
- The EOG EUL will keep the Operations Section Chief, Logistics Section Chief and Planning Section Chief briefed of the OSM status as required.
- All correspondence (copies of emails and records of phone calls) between EOG 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 EUL 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 EOG EUL or On-Scene Commander prior to implementation.

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

21.2 External Stakeholders

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

EOG's DIMT Public Information Officer and/or Liaison Officer (initially be will same individual) will be the focal point for external engagement during the response operation. Stakeholder communications post-response will be managed by EOG's External (Government) Relations 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 Authority relevant to the spill to terminate the response or a relevant SMP has been activated. SMPs will continue after the spill response has been terminated and until such time as their termination criteria are also reached. A list of criteria is provided in the OSM Framework.

After OMPs are terminated, the OMP monitoring teams will be advised to stand down. Following this stage, the OSM Services Provider will run a lessons-learnt meeting between EOG, all monitoring providers and other relevant stakeholders. It is the responsibility of EOG to ensure that lessons learnt are communicated to the relevant stakeholder groups. The lessons discussed should include both positive actions to be reinforced and lessons for actions that could be improved in future standby or response campaigns.

23 References

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DotE. 2015. Sawfish and River Sharks – Multispecies Recovery Plan.

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DSEWPaC. 2012. Species group report card – seabirds and migratory shorebirds. Supporting the marine bioregional plan for the North-west Marine Region. Prepared under the EPBC Act.

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Lalang-garram/Horizontal Falls and North Lalang- garram marine parks joint management plan

Management Plan for the Montebello/Barrow Islands Marine Conservation Reserves 2007–2017 Management Plan No 55

North Kimberley Marine Parks joint management plan

Rowley Shoals Marine Park Management Plan (2007) 2007-2017, Management Plan No. 56. DEC, Perth, WA

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TSSC. 2008. Approved Conservation Advice for Pristis zijsron (Green Sawfish).

TSSC. 2009. Commonwealth Conservation Advice on Pristis clavata (Dwarf Sawfish).

TSSC. 2011. Commonwealth Conservation Advice on *Aipysurus apraefrontalis* (Short-nosed Seasnake).

TSSC. 2011. Commonwealth Conservation Advice on *Aipysurus foliosquama* (Leaf-scaled Seasnake).

TSSC. 2014. Approved Conservation Advice for Glyphis garricki (northern river shark).

TSSC. 2014. Approved Conservation Advice for Glyphis glyphis (speartooth shark). Commonwealth of Australia

TSSC. 2015. Approved Conservation Advice for Anous tenuirostris melanops (Australian lesser noddy).

TSSC. 2015. Approved Conservation Advice for *Balaenoptera physalus* — Fin Whale.

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

TSSC. 2015. Approved Conservation Advice for Rhincodon typus (whale shark).

TSSC. 2015. *Balaenoptera borealis* (Sei Whale) Conservation Advice.

TSSC. 2015. Calidris ferruginea (Curlew Sandpiper) Approved Conservation Advice.

TSSC. 2015. Papasula abbotti — Abbott's Booby. Approved Conservation Advice.

TSSC. 2016. Calidris canutus (Red Knot) Approved Conservation Advice.

TSSC. 2016. Calidris tenuirostris (Great Knot) Approved Conservation Advice.

TSSC. 2016. Charadrius leschenaultii (Greater Sand Plover) Approved Conservation Advice.

TSSC. 2016. Charadrius mongolus (Lesser Sand Plover) Approved Conservation Advice.

TSSC. 2016. Limosa lapponica menzbieri — Northern Siberian Bar-tailed Godwit. Approved Conservation Advice.

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Appendix A Baseline Data Sources

Receptor	Existing baseline monitoring	Source / Data Custodian	Spatial extent
Water and sediment quality	Hydrocarbon abundance and distribution (including natural seeps) in the vicinity of the Prelude/Ichthys fields of the Browse Basin	CSIRO/AIMS (Link to report)	East Browse Basin
	McAlpine, KW, Sim, CB, Masini, RJ and Daly, T 2010, Baseline petroleum hydrocarbon content of marine water, shoreline sediment and intertidal biota at selected sites in the Kimberley bioregion, Western Australia. Marine Technical Report Series No. MTR3, Office of the Environmental Protection Authority (OEPA), Perth, Western Australia.	WA EPA (Link to report)	Kimberley bioregion (16 shoreline sites, mainland and islands, spanning 340 km)
	Browse Island habitat descriptions – Draft EIS Technical Appendices – Appendix 4 Ichthys Gas Field Development Project Studies of the Offshore Marine Environment (also described in Ecological studies of the Bonaparte Archipelago and Browse Basin – Cetacean survey – additional detail on a 2006 aerial survey in contained in this report)	INPEX (Link to report)	Browse Basin Region (Ichthys Field to Echuca Shoal)
	Montara Reports 'Control site water quality data' (Operational Monitoring Study O2 – Monitoring of Oil Character, Fate and Effects, Report 02 Water Quality and Monitoring of Oil Character, Fate and Effects, Report 03 Dispersant Treated Oil Distribution)	PTTEP (Link to report)	Broome to Darwin (Mainland) Islands – Browse, Ashmore, Cartier, Hibernia Reef
Shorelines and intertidal habitats	Browse Island habitat descriptions – Draft EIS Technical Appendices – Appendix 4 Ichthys Gas Field Development Project Studies of the Offshore Marine Environment	INPEX (Link to report)	Browse Island
	Montara Reports: Shoreline Ecological Assessment Aerial and Ground Surveys 7–19 November 2009 (Kimberley Coast)	PTTEP (Link to report)	Kimberley Coast
	Shoreline Assessment Ground Survey: An operational component of the Monitoring Plan for the Montara Well Release Timor Sea (Ashmore, Cartier and Hibernia Islands).	PTTEP (Link to report)	Ashmore, Cartier and Hibernia Islands
Benthic communities and fish assemblages	Scott Reef Research Project – Long-term monitoring of shallow water coral and fish communities at Scott Reef	AIMS (Link to reports)	Scott Reef (South Reef, North Reef and Seringapatam Reef)
	The composition and structure of shallow benthic reef communities in the Kimberley, north-west Australia	WA Museum (Link to report)	Kimberley Region
	Montara: Vulcan, Barracouta East and Goeree Shoals Survey 2013; Heyward et al 2013; Report for PTTEP Australasia (Ashmore Cartier) Pty Ltd. Australian Institute of Marine Science, Perth.	PTTEP (Link to report)	Barracouta, Goeree and Vulcan Shoals
	Montara: Barracouta, Goeree and Vulcan Shoals Survey 2016 Report for PTTEP Australasia (Ashmore Cartier) Pty Ltd. Australian Institute of Marine Science, Townsville.	PTTEP (Link to report)	Barracouta, Goeree and Vulcan Shoals
	Montara reports: Final Report on Benthic Surveys at Ashmore, Cartier and Seringapatam Reefs (post-spill)	PTTEP (Link to report)	Ashmore, Cartier and Seringapatam Reefs
	Applied Research Program (ARP7): Subtidal Benthos: towards benthic baselines in the Browse Basin. Final report – Submerged Shoals	Shell/INPEX (Link to report)	Echuca and Heywood shoals
	Marine Biodiversity Survey of Mermaid Reef (Rowley Shoals), Scott and Seringapatam Reef	Western Australian Museum (Link to report)	Mermaid Reef (Rowley Shoals), Scott and Seringapatam Reef
	Browse Island habitat descriptions – Draft EIS Technical Appendices – Appendix 4 Ichthys Gas Field Development Project Studies of the Offshore Marine Environment	INPEX (2010) (Link to report)	Browse Island, Echuca Shoal, Ichthys Field
	ARP7: Subtidal Benthos: towards benthic baselines in the Browse Basin – Quantitative information on the abundance, diversity and temporal variability of benthos and associated fish – Browse Island reef	AIMS (Shell/INPEX)	Browse Island
	Benthic primary productivity: production and herbivory of seagrasses, macroalgae and microalgae	WAMSI (Link to report)	Bardi Jawi Indigenous Protected Area (IPA), encompassing Cygnet Bay, One Arm Point, Jalan (Tallon Island) and Iwany (Sunday Island)
	Baselines of benthic communities, herbivory and reef metabolism at Browse Island	CSIRO/UWA/AIMS (Link to report)	Browse Island
	Egg size and fecundity of biannually spawning corals at Scott Reef	AIMS – Foster, T and Gilmour, J (Link to report)	Scott Reef
Marine reptiles	Long term monitoring of the marine turtles of Scott Reef	SKM/Woodside (Link to report)	Scott Reef
	Marine Turtles in the Kimberley: key biological indices required to understand and manage nesting turtles along the Kimberley coast	WAMSI (Link to report)	Near complete coverage of Kimberley Coast and Islands (>44,000 georeferenced images)
	Ecology of Marine Turtles of the Dampier Peninsula and the Lacepede Island Group, 2009–2010	RPS/Woodside (Link to report)	Dampier Peninsula and the Lacepede Islands
	Ecological studies of the Bonaparte Archipelago and Browse Basin – Marine Turtles	INPEX (Waayers, D) (Link to report)	Maret Islands and other islands in the Bonaparte Archipelago

Receptor	Existing baseline monitoring	Source / Data Custodian	Spatial extent
Seabirds and shorebirds	The status of seabirds and shorebirds at Ashmore Reef, Cartier Island and Browse Island. Monitoring Program for the Montara Well Release. Pre-Impact Assessment and First Post-Impact Field Survey	PTTEP (Clarke, R. et al) (Link to report)	Ashmore Reef (including Cartier Island) and Browse Island
	Evaluating the impacts of local and international pressures on migratory shorebirds in Roebuck Bay and Eighty Mile Beach	WAMSI (Rogers et al.) (Link to report)	Roebuck Bay and Eighty Mile Beach
	Adele Island Bird Survey Report	DBCA (Boyle, et al.) (Link to report)	Adele Island
	Shell/INPEX ARP6 Milestone Report #7- Lacepede Islands: Report comparing the diet composition, foraging habitat and breeding between species and between years on Lacepede islands	Monash/UWA/AIMS	Lacepede Islands
	Ecological studies of the Bonaparte Archipelago and Browse Basin – Seabird survey	INPEX (Link to report)	Browse Island and Maret Islands
Marine mammals	Humpback Whale Survey Report. Browse Marine Mammal Fauna Survey	Woodside (RPS) (Link to Humpback Whale report 2010) (Link to Humpback Whale report 2011) (Link to dugong report 2009)	Browse Basin – James Price Point Migration Corridor, Pender Bay, Gourdon Bay, Scott Reef
	Humpback whale use of the Kimberley: understanding and monitoring spatial distribution (analysis of historical data, including other reports mentioned in this review. Also provides analysis of whale survey techniques and recommendations for future monitoring)	WAMSI	Kimberley region
	Browse Island habitat descriptions – Draft EIS Technical Appendices – Appendix 4 Ichthys Gas Field Development Project Studies of the Offshore Marine Environment (also described in Ecological studies of the Bonaparte Archipelago and Browse Basin – Cetacean survey – additional detail on a 2006 aerial survey in contained in this report)	INPEX (Link to report)	Browse Basin Region (Browse Island to Scott Reef)
	Integrating Indigenous knowledge and survey techniques to develop a baseline for dugong (Dugong dugon) management in the Kimberley	WAMSI (Link to report)	North Kimberley (Broome to NT border) South Kimberley (Broome to Port Hedland)
Commercial fisheries	Commercial Fisheries data collected by WA Department of Fisheries (WA DoF) and Australian Fishing Management Authority (AFMA)	WA Department of Fisheries / Australian Fishing Management Authority	Australia wide
	Montara Well Release: Olfactory analysis of Timor Sea fish fillets	Curtin University/PTTEP (Link to report)	Timor Sea
	Montara Well Release Monitoring Study S4A – Assessment of Effects on Timor Sea Fish	Curtin University/PTTEP (Link to report)	Vulcan Shoal, Heywood Shoal, Browse Island, Echuca Shoal, Scott Reef
	Montara Well Release: Assessment of Fish catch for the presence of Oil	PTTEP (Link to report)	Northern Demersal Scalefish Managed Fishery (NDSF)
	Monitoring the Northern Demersal Scalefish Managed Fishery: Establishing Baseline Biomarker Levels in Commercially Important Demersal Fishes	Curtin/AIMS	East Browse Basin
	Monitoring the Northern Demersal Scalefish Managed Fishery: accounting for spatial variability and detecting change in key fish populations	Curtin/CSIRO/AIMS	East Browse Basin

Appendix B Protected Matters in the EMBA

Recovery plan / conservation advice (date issued)	Relevant threats	Relevant conservation actions	Relevant OMPs and SMPs	Relevant priority monitoring locations (quickest modelled time to contact8)
Mammals (refer to Appendix 5 [Section 5.3.5] of the Beehive-1 Drilling EP for additional description of key receptors)				
DotE. 2015. Conservation Management Plan for the Blue Whales - A Recovery Plan under the EPBC Act (2015-2025). TSSC. 2015. *Balaenoptera borealis* (Sei Whale) Conservation Advice. TSSC. 2015. Approved Conservation Advice for *Megaptera novaeangliae* (humpback whale). TSSC. 2015. Approved Conservation Advice for *Balaenoptera physalus* — Fin Whale. EPBC Act Regulations 2000. Part 8 Interacting with cetaceans and whale watching. Division 8.1 Interacting with cetaceans. DotE and Heritage, 2005. Australian National Guidelines for Whale and Dolphin Watching - Information Sheet. DoEE. 2018. Threat abatement plan for the impacts of marine debris on the vertebrate wildlife of Australia's coasts and oceans. DoEE. 2017. National Strategy for Reducing Vessel Strike on Cetaceans and other Marine Fauna.	• Waste / marine debris • Noise and vibration • Introduced Marine Species • Vessel strike • Benthic habitat degradation / seabed disturbance • Emissions and discharges • Oil spill	• Ensure all vessel strike incidents are reported in the National Ship Strike Database. • Ensure the risk of vessel strikes on whales and dugongs is considered when assessing actions that increase vessel traffic in areas where whales occur and, if required, appropriate mitigation measures are implemented. • Protect habitat important to the survival of the species; assess and manage physical disturbance and development activities (such as ship-strike and pollution). • Environmental assessment processes must ensure that existing information about coastal habitat requirements, environmental suitability of coastal locations, historic high use and emerging areas are taken into consideration. • Contribute to the long-term prevention of the incidence of harmful marine debris. • If a whale, dolphin or dugong surfaces in the vicinity of a vessel travelling for a purpose other than whale and dolphin watching, take all care necessary to avoid collisions. • Increased reporting of vessel collision (a requirement of the EPBC Act). • Reduce risk of collision such as maintaining look out, consider reducing vessel speed and course alterations away from sightings.	OMP: Marine fauna assessment – Cetaceans SMP: Marine mega-fauna assessment – Whale sharks, dugongs and cetaceans	Cox-Finniss Daly Thamarrurr Victoria-Daly Wyndham-East Kimberley Mitchell River Ashmore Reef/Cartier Island Scott Reef/ Browse Island
Reptiles (refer to Appendix 5 [Section 5.3.6] of the Beehive-1 Drilling EP for additional description of key receptors)				
DoEE 2017. Recovery Plan for Marine Turtles in Australia, Commonwealth of Australia 2017. TSSC. 2011. Commonwealth Conservation Advice on *Aipysurus apraefrontalis* (Short-nosed Seasnake). TSSC. 2011. Commonwealth Conservation Advice on *Aipysurus foliosquama* (Leaf-scaled Seasnake). DoEE. 2018. Threat abatement plan for the impacts of marine debris on the vertebrate wildlife of Australia's coasts and oceans. DSEWPaC. 2012. Marine bioregional plan for the North-west Marine Region. DSEWPaC. 2012. Marine bioregional plan for the North Marine Region. DoEE. 2020. Light pollution guidelines – National light pollution guidelines for wildlife: Including marine turtles, seabirds and migratory shorebirds. DoEE. 2017. National Strategy for Reducing Vessel Strike on Cetaceans and other Marine Fauna.	• Waste / marine debris • Noise and vibration • Introduced Marine Species • Vessel strike • Benthic habitat degradation / seabed disturbance • Emissions and discharges • Oil spill • Light emissions	• Manage artificial light from onshore and offshore sources to ensure biologically important behaviours of nesting adults and dispersing hatchlings can continue. • Implementation of best practice light management guidelines for developments adjacent to marine turtle nesting beaches. • Identify the cumulative impact on turtles from multiple sources of onshore and offshore light pollution. • Support retrofitting of lighting at coastal communities and industrial developments, including imposing restrictions around nesting seasons. • Manage anthropogenic activities to ensure marine turtles are not displaced from identified habitat critical for survival. • Contribute to the reduction in the source of marine debris. • Ensure that spill risk strategies and response programs include management for turtles and their habitats, particularly in reference to slow to recover habitats, e.g. seagrass meadows or corals.	OMP: Shoreline clean-up assessment OMP: Marine fauna assessment – Reptiles SMP: Marine mega-fauna assessment – Reptiles	Cox-Finniss Daly Thamarrurr Victoria-Daly Wyndham-East Kimberley Mitchell River Ashmore Reef/Cartier Island Scott Reef/ Browse Island

[8] Unless otherwise noted, all results are floating oil timeframes to contact.

Recovery plan / conservation advice (date issued)	Relevant threats	Relevant conservation actions	Relevant OMPs and SMPs	Relevant priority monitoring locations (quickest modelled time to contact8)
		• Implement best practices to minimise impacts to turtle health and habitats from chemical discharges. • Identify populations and areas of high conservation priority (sea snakes). • Ensure there is no anthropogenic disturbance / implement measures to reduce adverse impacts of habitat degradation and/or modification (sea snakes). • Increased reporting of vessel collision (a requirement of the EPBC Act). • Reduce risk of collision such as maintaining look out, consider reducing vessel speed and course alterations away from sightings.		
Marine Fish and Elasmobranchs (refer to Appendix 5 [Section 5.3.4] of the Beehive-1 Drilling EP for additional description of key receptors)				
Whale shark management. 2013. Wildlife management program no. 57. Department of Parks and Wildlife. State of Western Australia. TSSC. 2015. Approved Conservation Advice for Rhincodon typus (whale shark). DSEWPaC. 2013. Recovery Plan for the White Shark (Carcharodon carcharias). TSSC. 2014. Approved Conservation Advice for Glyphis garricki (northern river shark). TSSC. 2009. Commonwealth Conservation Advice on Pristis clavata (Dwarf Sawfish). TSSC. 2008. Approved Conservation Advice for Pristis zijsron (Green Sawfish). DotE. 2015. Sawfish and River Sharks - Multispecies Recovery Plan. DoEE. 2018. Threat abatement plan for the impacts of marine debris on the vertebrate wildlife of Australia's coasts and oceans. DSEWPaC. 2012. Marine bioregional plan for the North-west Marine Region. DSEWPaC. 2012. Marine bioregional plan for the North Marine Region. TSSC. 2014. Approved Conservation Advice for Glyphis glyphis (speartooth shark).	• Waste / marine debris • Noise and vibration • Introduced Marine Species • Vessel strike • Benthic habitat degradation / seabed disturbance • Emissions and discharges • Oil spill	• Identify populations and areas of high conservation priority (sawfishes). • Ensure there is no anthropogenic disturbance / implement measures to reduce adverse impacts of habitat degradation and/or modification (northern river shark). • Ensure all future developments will not significantly impact upon sawfish and river shark habitats critical to the survival of the species or impede upon the migration of individual sawfish or river sharks. Implement measures to reduce adverse impacts of habitat degradation and/or modification. • Review and assess the potential threat of introduced species, pathogens and pollutants. • Contribute to the long-term prevention of the incidence of harmful marine debris.	OMP: Marine fauna assessment – Fish SMP: Marine mega-fauna assessment – Marine fish and elasmobranch assemblages assessment SMP: Marine mega-fauna assessment – Whale sharks, dugongs and cetaceans	Cox-Finniss Daly Thamarrurr Victoria-Daly Wyndham-East Kimberley Mitchell River Ashmore Reef/Cartier Island Scott Reef/ Browse Island
Seabirds and Shorebirds (refer to Appendix 5 [Section 5.3.7] of the Beehive-1 Drilling EP for additional description of key receptors)				
DotE. 2015. EPBC Act Policy Statement 3.21 - Industry guidelines for avoiding, assessing and mitigating impacts on EPBC listed migratory shorebird species. DotE. 2015. Wildlife conservation plan for migratory shorebirds. DotE. 2015. Draft referral guideline for 14 birds listed as migratory under the EPBC Act. DSEWPaC. 2012. Species group report card - seabirds and migratory shorebirds. Supporting the marine bioregional plan for the North-west Marine Region. Prepared under the EPBC Act. DEWHA. 2009. Threat abatement plan to reduce the impacts of exotic rodents on biodiversity on Australian offshore islands of less than 100 000 hectares. Commonwealth of Australia. DoEE. 2018. Threat abatement plan for the impacts of marine debris on the vertebrate wildlife of Australia's coasts and oceans. DSEWPaC. 2012. Marine bioregional plan for the North-west Marine Region. DSEWPaC. 2012. Marine bioregional plan for the North Marine Region. TSSC. 2016. Calidris tenuirostris (Great Knot) Approved Conservation Advice. TSSC. 2016. Calidris canutus (Red Knot) Approved Conservation Advice.	• Waste / marine debris • Noise and vibration • Introduced Marine Species • Introduced Terrestrial Pests (rodents) • Benthic habitat degradation / seabed disturbance • Emissions and discharges • Oil spill • Light emissions	• Reduce risk of rodents gaining access to key vessels at key ports • Contribute to the long-term prevention of the incidence of harmful marine debris • Identify threats to important (migratory shorebird) habitat and develop conservation measures for managing them. • Avoid degradation of migratory shorebird habitat that may occur through the introduction of exotic species, changes to hydrology or water quality (including toxic inflows), fragmentation of habitat or exposure to litter, pollutants and acid sulphate soils. Minimise human disturbance, a major threat to migratory shorebirds • Best practice waste management should be implemented.	OMP: Shoreline clean-up assessment OMP: Marine fauna assessment – Seabirds and shorebirds SMP: Seabirds and shorebirds	Cox-Finniss Daly Thamarrurr Victoria-Daly Wyndham-East Kimberley Mitchell River Ashmore Reef/Cartier Island Scott Reef/ Browse Island

Recovery plan / conservation advice (date issued)	Relevant threats	Relevant conservation actions	Relevant OMPs and SMPs	Relevant priority monitoring locations (quickest modelled time to contact8)
TSSC. 2016. Charadrius leschenaultii (Greater Sand Plover) Approved Conservation Advice. TSSC. 2016. Charadrius mongolus (Lesser Sand Plover) Approved Conservation Advice. TSSC. 2016. Limosa lapponica menzbieri — Northern Siberian Bar-tailed Godwit. Approved Conservation Advice. TSSC. 2015. Calidris ferruginea (Curlew Sandpiper) Approved Conservation Advice. TSSC. 2015. Papasula abbotti — Abbott's Booby. Approved Conservation Advice. DotE. 2015. Conservation advice Numenius madagascariensis (eastern curlew). TSSC. 2015. Approved Conservation Advice for Anous tenuirostris melanops (Australian lesser noddy). TSSC. 2002. Commonwealth Listing Advice on Sterna albifrons sinensis (Little Tern (western Pacific)). DSEWPaC. 2013. Approved Conservation Advice for Rostratula australis (Australian painted snipe). Canberra, ACT. DoEE. 2020. Light pollution guidelines – National light pollution guidelines for wildlife: Including marine turtles, seabirds and migratory shorebirds.				
Threatened Ecological Communities (refer to Appendix 5 [Section 5.4.5] of the Beehive-1 Drilling EP for additional description of key receptors for each location)				
Approved Conservation Advice for the Monsoon vine thickets on the coastal sand dunes of Dampier Peninsula	• Clearing (shoreline clean-up and/or shoreline based monitoring activities)	• Protect and conserve remaining areas of the ecological community, monitor condition of Monsoon vine tickets	OMP: Shoreline clean-up assessment SMP: Intertidal and Coastal Habitat Assessment	
RAMSAR Wetlands (refer to Appendix 5 [Section 5.4.4] of the Beehive-1 Drilling EP for additional description of key receptors for each location)				
Department of Environment and Conservation 2012, Ord River and Parry Lagoons nature reserves management plan 77 2012, Department of Environment and Conservation, Perth.		• Appendix 2 Limits of acceptable change for the Ord River Floodplain Ramsar site	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	Approx. 107 km SSW
BMT WBM (2011) Ecological Character Description for Cobourg Peninsula Ramsar Site. Prepared for the Australian Government, Canberra.		• Table 4-1 Limits of acceptable change (LAC)		Approx. 500 km NE
BMT WBM (2010) Ecological Character Description for Kakadu National Park Ramsar Site. Prepared for DSEWPaC.		• Table 4-3 Limits of acceptable change (LAC)		Approx. 500 km NE
Hale, J. and Butcher, R. (2013) Ashmore Reef Commonwealth Marine Reserve Ramsar Site Ecological Character Description. A report to the Department of the Environment, Canberra	• Relevant threat: oil and gas exploration and mining – boat strike, lighting, toxic effects of oil spills	• Limits of acceptable change to elements (component, process, service) of ecological character defined in Table 27 of Ecological Character Description		Ashmore Reef (601 km NW)
Australian Marine Parks (refer to Appendix 5 [Section 5.4.1] of the Beehive-1 Drilling EP for additional description of key receptors for each location)				
Director of National Parks 2018, North Marine Parks Network Management Plan 2018, Director of National Parks, Canberra.	• Climate change • Changes in hydrology • Extraction of living resources • Habitat modification • Human presence • Invasive species	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	Oceanic Shoals (152 km N) Arafura (548 km NNE) Arnhem (585 km NE)
Director of National Parks 2018, North-west Marine Parks Network Management Plan 2018, Director of National Parks, Canberra. North-west Marine Parks Network Management Plan 2018-28, Implementation Plan 1, Foundation Phase 2018-2022				Argo-Rowley Terrace (890 km W) Ashmore Reef (601 km NW) Cartier Island (553 km W)

Recovery plan / conservation advice (date issued)	Relevant threats	Relevant conservation actions	Relevant OMPs and SMPs	Relevant priority monitoring locations (quickest modelled time to contact8)
	• Marine pollution		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	Joseph Bonaparte Gulf (35 km E) Kimberley (235 km W) Mermaid Reef (1052 km SSW) Montebello (1025 km SSW)
Western Australian Marine Parks and Northern Territory National Parks (refer to Appendix 5 [Section 5.4.9] of the Beehive-1 Drilling EP for additional description of key receptors for each location)				
North Kimberley Marine Parks joint management plan (WA)	• oil spills • physical disturbance to reefs • disturbance to seabirds/shorebirds • anchoring from vessels • boat strike (turtles, cetaceans, dugongs, dolphins) • humpback calving, lighting (turtles)	• Relevant management actions: ensure the values of the park are fed into predictive models for oil spills, apply appropriate anchoring practices • 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 SMP: Benthic habitat assessment SMP: Marine fish and elasmobranch assemblages assessment	(68 km S)
Lalang-garram/Horizontal Falls and North Lalang- garram marine parks joint management plan (WA)				(423 km SW)
Lalang-garram / Camden Sounds Marine Park management plan (WA)				(423 km SW)
Rowley Shoals Marine Park Management Plan (2007) 2007-2017, Management Plan No. 56. DEC, Perth, WA				(1,044 km SW)
Management Plan for the Montebello/Barrow Islands Marine Conservation Reserves 2007–2017 Management Plan No 55 (WA)				(1,544 km SW)
Cobourg Marine Park Plan of Management. August 2011. Cobourg Peninsula Sanctuary and Marine Park Board and Parks and Wildlife Service of the Northern Territory, Department of Natural Resources, Environment, The Arts and Sport – includes Garig Gunak Barlu National Park (NT)				(460 km NE)
Commonwealth Heritage Places and National Heritage Places (refer to Appendix 5 [Sections 5.4.3 and 5.4.6] of the Beehive-1 Drilling EP for additional description of key receptors for each location)				
Connell Wagner (1997). *Environmental Impact Study and Environmental Management Plan for Bradshaw Field Training Area*. Report prepared for Department of Defence.	• oil spills • physical disturbance to reefs • disturbance to seabirds/shorebirds • anchoring from vessels • boat strike (turtles, cetaceans, dugongs, dolphins) • humpback calving, lighting (turtles)	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 SMP: Benthic habitat assessment SMP: Marine fish and elasmobranch assemblages assessment SMP: Social Impact Assessment	Approx. 120 km SE
West Kimberley National Heritage Place				Approx. 70 km SW

Recovery plan / conservation advice (date issued)	Relevant threats	Relevant conservation actions	Relevant OMPs and SMPs	Relevant priority monitoring locations (quickest modelled time to contact8)
Nationally Important Wetlands (refer to Appendix 5 [Section 5.4.8] of the Beehive-1 Drilling EP for additional description of key receptors for each location)				
Ord River Floodplain (WA) Mitchell River System (WA) Parry Floodplain (WA) Prince Regent River System (WA) Yampi Sound Training Area (WA) Mermaid Reef (WA)	• oil spills • physical disturbance to reefs • disturbance to seabirds/shorebirds • anchoring from vessels • boat strike (turtles, cetaceans, dugongs, dolphins) • humpback calving, lighting (turtles)	• 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 SMP: Benthic habitat assessment SMP: Marine fish and elasmobranch assemblages assessment SMP: Social Impact Assessment	(91 km S) (323 km SW) (168 km S) (411 km SW) (578 km SW) (1,021 km SW)
Legune Wetlands (NT) Moyle Floodplain and Hyland Bay System (NT) Daly-Reynolds Floodplain Estuary System (NT) Finniss Floodplain and Fog Bay Systems (NT) Port Darwin (NT) Adelaide River Floodplain System (NT) Shoal Bay - Micket Creek (NT) Mary Floodplain System (NT) Kakadu National Park (NT) Murgenella-Cooper Floodplain System (NT) Cobourg Peninsula System (NT)				(131 km SE) (123 km E) (193 km NE) (209 km NE) (294 km NE) (352 km NE) (313 km NE) (374 km NE) (420 km NE) (498 km NE) (460 km NE)