Judith-2 Exploration Well

Operational and Scientific Monitoring: Bridging Implementation Plan

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A	16 January 2025	Internal review	AGR/Emperor Energy	AGR/Emperor Energy
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PART A: PREPAREDNESS

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

1. INTRODUCTION

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

Emperor Energy will implement OSM, as applicable, for oil spills across both State and Commonwealth waters. In the event that control of scientific monitoring in Victorian (Vic) / New South Wales (NSW) / Tasmanian (Tas) State waters is taken over by the relevant Control Agency (Refer to Table 3-2 of the Judith-2 Exploration Well OPEP) under advice from the State Environmental Scientific Coordinator (ESC), Emperor Energy will follow the direction of the relevant Control Agency and provide all necessary resources (monitoring personnel, equipment and planning) to assist as a supporting agency.

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

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

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

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

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

Document	Description
Judith-2 Exploration Well EP	The EP describes the activity and the location, the environment, the risks to the environment as a result of the activity and the associated management controls. Of particular relevance to this plan, it identifies sensitive receptors, potential impacts from hydrocarbon spills and the environment that may be affected (EMBA).
Judith-2 Exploration Well OPEP	This plan provides the activation and response process for the credible spill scenarios, including incident management, net environmental benefit analysis (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.
Contacts Directory	Contains all internal contact and communications information to enable effective communication amongst response personnel. It also contains details of external Support Agencies, Service Providers and Government Agencies to be contacted as per the reporting requirements in Section 3.6 of the OPEP.
Emperor Energy's Emergency Response Plan	Emperor Energy's Emergency Response Plan provides the framework and requirements for incident response and crisis management. The purpose of the plan is to control and mitigate damage and injury caused by disaster and to provide a structured method of support, direction, and management at the site of an emergency or incident.
MODU Emergency Response Plan (ERP)	The ERP outlines the organisational responsibilities, actions, reporting requirements and resources required should an emergency unfold during routine and source control operations.

2. EMBA AND LOCATIONS FOR BASELINE REVIEW

2.1. EMBA

The EMBA is defined in the Judith-2 Exploration Well EP (Section 4.1) as the area where a change to ambient environmental conditions has the potential to occur as a result of the activity. The EMBA was determined using stochastic modelling results applying the following thresholds:

- ≥1 g/m^2 floating hydrocarbon thickness, which is considered to be below levels that 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) hydrocarbons, 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.

Two credible spill scenarios identified in the Judith-2 Exploration Well OPEP (Section 4.1.1) have been selected to represent worst-case spills from a response perspective, including operational and scientific monitoring:

1. An uncontrolled subsea loss of well control (LOWC) of 55,256 m^3 of condensate over 77 days.
2. A 280 m^3 release of marine diesel oil (MDO) over 6 hours following a vessel fuel tank rupture.

These scenarios have been used to inform the resourcing requirements for this operational and scientific monitoring bridging implementation plan.

2.2. Locations requiring a baseline review

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

Locations requiring a review of the baseline data available have been determined from the stochastic modelling results of the loss of well control (LOWC) scenario (RPS, 2022). Locations and associated receptors requiring a baseline review were identified as those sensitive receptors contacted by hydrocarbons at the low threshold for entrained (≥10 ppb), dissolved (≥10 ppb), floating (≥1 g/m^2), and shoreline contact (≥10 g/m^2), within 7 days (7 days was used to delineate the first-strike monitoring response) at a probability >10%, as listed in Table 2-1. No receptors were contacted by the MDO scenario at the low thresholds for floating, shoreline or dissolved, within 7 days and at a probability >10%. Receptors were contacted within 7 days and at a probability >10% by the MDO scenario for entrained hydrocarbons, however the receptors contacted were the same as the LOWC scenario, and are therefore already listed in Table 2-1. Appendix A lists the key sensitivities associated with these locations.

First-strike monitoring priorities are subsequently identified as those locations and associated receptors predicted to be contacted within 7 days at a probability >10%, and where baseline data are either not available or not sufficient (as depicted in Table 4-3 and outlined in Section 4).

In addition to these locations, there are receptors that are transient (i.e. cetaceans, seabirds) and others that are broadscale, such as managed fisheries with large spatial extents, Key Ecological Features (KEFs) and Biologically Important Areas (BIAs).

Table 2-1: Spill modelling results – subsea release of 55,256m³ of condensate over 77 days following a LOWC with a probability of contact >10% and <7 days (RPS, 2022)

Locations requiring a baseline review	Probability (%) of ≥1 g/m² floating	Min. arrival time ≥1 g/m² floating (days)	Probability (%) of ≥10 g/m² shoreline contact	Min. arrival time ≥10 g/m² shoreline contact (days)	Peak volume on shoreline (m³)	Probability (%) of contact of ≥10 ppb dissolved	Min. arrival time ≥10 ppb dissolved(days)	Probability (%) of contact of ≥10 ppb entrained	Min. arrival time ≥10 ppb entrained (days)
Beagle Australian Marine Park#	NC	NC	NA	NA	NA	52 (S)	5.8 (S)	78 (S)	5.2 (S)
East Gippsland Australian Marine Park#	NC	NC	NA	NA	NA	61 (W)	4.5 (W)	98 (W)	4.2 (W)
Cape Howe Marine National Park#	6 (W)	21.0	NA	NA	NA	100 (W)	1.7 (W)	-	-
Point Hicks Marine National Park#	1 (W)	5.8	NC	NC	NC	94 (S)	1.8 (S)	100 (W)	1.6 (W)
Batemans Marine Park#	NC	NC	NA	NA	NA	49 (W)	5.4 (W)	50 (W)	8.2 (W)
Beware Reef Marine Sanctuary*	NC	NC	NA	NA	NA	26 (W)	4.4 (W)	53 (W)	2.3 (W)
Kent Group National Park	NC	NC	-	-	-	43 (S)	6.3 (S)	74 (S)	6.2 (S)
Beware Reef#	NC	NC	NA	NA	NA	26 (W)	4.4 (W)	60 (S)	5.3 (S)
New Zealand Star Bank#	NC	NC	NA	NA	NA	100 (W)	1.2 (W)	100 (W)	0.8 (W)
Wright Rock*	NC	NC	NA	NA	NA	21 (S)	11.8 (S)	60 (S)	11.7 (S)
Bega Valley	NC	NC	69 (W)	2.9 (W)	3.8 (W)	93 (W)	2.0 (W)	98 (W)	1.9 (W)
East Gippsland	18 (W)	5.8 (W)	89 (W)	3.0 (W)	28 (W)	96 (W)	2.1 (W)	99 (W)	1.8 (W)
Gabo Island	3 (W)	20.4 (W)	55 (W)	4.0 (W)	6.9 (W)	82 (W)	2.0 (W)	99 (W)	1.7 (W)
Hogan Island Group	NC	NC	1 (S)	34.7 (S)	0.4 (S)	20 (S)	7.1 (S)	54 (S)	6.7 (S)
Kent Island Group	NC	NC	22 (S)	10.0 (S)	1.4 (S)	40 (S)	6.3 (S)	74 (S)	6.4 (S)
Montague Island	NC	NC	9 (W)	26.0 (W)	1.7 9W)1	41 (W)	5.4 (W)	45 (W)	9.6 (W)

*# Submerged receptor; * Mainly submerged with the exception of granite outcrops/islands frequented by seals; S = summer; W = winter; T = transitional season; NA = not applicable as receptor is submerged; NC = no contact*

3. RELEVANT EXISTING BASELINE INFORMATION SOURCES

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

3.1. Data.gov.au

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

3.2. Australian Ocean Data Network

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

3.3. The Atlas of Living Australia

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

3.4. National Science Program Marine and Coastal

At a federal level, as part of the National Environmental Science Program (NESP) project 3.21 (Identifying priority datasets for the Gippsland declaration area and pathways for their use in decision-making) a subset of species listed as Critically Endangered or Endangered under the *Environment Protection and Biodiversity Conservation Act* 1999 were selected and existing data sets and information sources were identified and evaluated for the Gippsland Offshore Renewable Energy declaration area and regionally.

3.5. Marine Biodiversity Values

The Victorian Department of Energy, Environment and Climate Action (DEECA) has created the Marine Biodiversity Values (MBV) which is a spatial assessment of Victoria's listed and key marine and coastal biodiversity features.

3.6. Statewide Marine Habitat Map

The Statewide Marine Habitat Map, complements the MBV map and was created from available habitat observations recorded in Victoria's waters, combined with predictive modelling and mapping techniques that synthesis existing information. This map provides a baseline for future data collection and analysis.

3.7. Victorian State of the Marine and Coastal Environment Report

The Victorian State of the Marine and Coastal Environment Report, published in 2021 by the Commissioner for Environmental Sustainability Victoria, marked the first comprehensive assessment under the *Marine and Coastal Act* 2018 framework. Using 82 indicators across 142 assessments, it established a baseline for evaluating the health of Victoria's marine and coastal environments. The report examines key areas including climate change impacts, water

quality, biodiversity, and coastal pressures. Under the Act, these detailed assessments will be conducted every five years, with the next report due in 2026, enabling long-term tracking of environmental trends and informing future policy decisions.

3.8. SeaBed NSW Map Viewer

The Seabed NSW Map Viewer covers the entire NSW coastline. The 3D zoomable maps provide highly detailed information on the sea floor habitat. Seabed data is generated by collating and analysing bathymetric and marine sediment datasets, and seabed habitats defined from swath acoustic surveys and aerial photography. Data from approximately 120 kilometres of vessel-towed underwater video surveys is also used to allow field validation of swath acoustic data and a description of the visually dominant sessile biota over large areas of the seabed.

3.9. Other sources

Other sources include:

- Australian Institute for Marine Science (AIMS) Research Data Platform, WA State of Fisheries Report
- eAtlas.org.au
- Geosciences Australia data and publications
- Australian Marine Parks Science Atlas
- Birdlife Data Zone.

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

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

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

The baseline data assessment includes these steps:

1. Identification of locations requiring a baseline review: Receptor locations predicted to be contacted at the low thresholds within 7 days, at a probability >10%, are identified and aligned with OMPs and SMPs (as per Table 2-1).
2. Collection of baseline data: Environmental baseline monitoring data relevant to the locations and receptors is located (as per sources outlined in Section 3).
3. Assessment of baseline data: The relevance of each data source is assessed:
    a. For each data source obtained, a meta-analysis is performed to determine if the parameters and methods align with the key parameters and methods outlined in the Joint Industry SMPs (Table 4-1), the spatial extent of the data, the sampling effort/duration, and the temporal relevance is also noted. Table 4-2 outlines the overall assessment criteria used for each data source.
4. Assessment of baseline data: An evaluation of the adequacy (in terms of the likely ability to detect changes between pre-impact and post-impact conditions) of the collective baseline data for each location and associated receptors is undertaken. This evaluation takes into consideration the following:
    a. Background historical information on the presence, distribution, seasonality, and if applicable, the reproductive state of the receptor (as outlined in Appendix A) is compared with the data available from monitoring within the last 5 years. Depending on the receptor and associated Joint Industry SMP, the following is considered:
        i. Does the data collectively cover the required spatial extent of the receptor within a location (taking into consideration any background historical information on the distribution of the receptor)?
        ii. Does the data collectively cover all the species/biological communities required for the relevant Joint Industry SMP and that may be present at the location?
5. Assessment outcome: Each location and associated receptor is then categorised as either 'First-Strike Monitoring Priority' or 'Lower Priority for First-Strike Monitoring', as outlined below, and summarised in Table 4-3:
    a. First-Strike Monitoring Priority – current baseline data are not in place, not suitable or not sufficient; and post-spill pre-impact baseline data collection should be prioritised; and
    b. Lower Priority for First-Strike Monitoring – collectively there is substantial baseline data or ongoing monitoring from within the last 5 years. This data aligns with the key parameters and methodologies of the relevant Joint Industry SMP, encompasses the required species/biological communities, and covers the required spatial extent of the location. The current baseline data are therefore considered sufficient and could likely be used to detect a level of change in the event of a significant impact. Hence this receptor is considered a lower priority for post-spill, pre-impact data collection.

During an actual spill, monitoring priorities will vary according to the spill event—the monitoring priorities provided in Table 4-3 are listed for planning and guidance purposes. Monitoring should focus on locations most at risk of consequences, such as in shallow waters, in sensitive habitats, and in areas with protected species. Consequently,

shorelines and adjacent nearshore areas will generally take priority over reefs, shoals and banks, unless they are the main locations impacted by a spill event. In Victoria the Marine Biodiversity Values, may also be consulted to provide further focus and prioritisation.

The assessment of baseline data adequacy followed a precautionary approach, with first-strike monitoring priorities assigned where data uncertainty existed (Table 4-3). While Victoria's Marine Biodiversity Values provides comprehensive baseline data, it has several limitations: many data sources contain only presence-only or presence-absence information, and mapping is often at a coarse resolution. Due to the limited availability of marine species and habitat distribution data, the assessment incorporated some historical data sources (DEECA, 2024). Similarly, the Statewide Marine Habitat Map of Victoria, though comprehensive, has limitations including resolution constraints, lack of species-level detail, inclusion of outdated information, and inherent constraints of predictive modelling techniques.

Several environmental monitoring projects are currently underway associated with the Gippsland Offshore Wind Zone. While not yet publicly available, these studies are expected to provide valuable baseline data, as noted in Table 4-3.

At the time of a spill, Emperor Energy will work with its OSM Services Provider and key stakeholders in the initial stages of the spill to identify priority monitoring receptors and to assist in the finalisation of the monitoring design, ensuring that resources are allocated appropriately and according to the greatest risk of impact. This process is outlined in Section 13.

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

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

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

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

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

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

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

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

Location	SMP									
	Water quality impact assessment	Sediment quality impact assessment	Intertidal and coastal habitat assessment	Seabirds and shorebirds	Marine megafauna assessment – reptiles	Marine megafauna assessment – cetaceans and pinnipeds	Benthic habitat assessment	Marine fish and elasmobranch assemblages assessment	Fisheries impact assessment	Heritage and social impact assessment
Bega Valley										
East Gippsland				***		***	***	***		
Gabo Island										
Hogan Island Group				***		***	***	***		
Kent Island Group				***		***	***	***		
Montague Island						Pinnipeds				
Reefs and banks										
Key										
	First-strike monitoring priority									
	Lower priority for first-strike monitoring									
***	Adequate baseline data may exist associated with the monitoring undertaken for the Gippsland Offshore Wind Zone. This data is currently not publicly available and the exact monitoring locations are unknown.									

5. OSM ORGANISATIONAL STRUCTURE

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

The Emperor Energy DIMT structure is shown in Figure 5-1. Where Emperor Energy is not the Control Agency, the DIMT will be managed through coordinated command and Emperor Energy will still be expected to continue monitoring activities in State waters, with oversight from the relevant Control Agency.

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

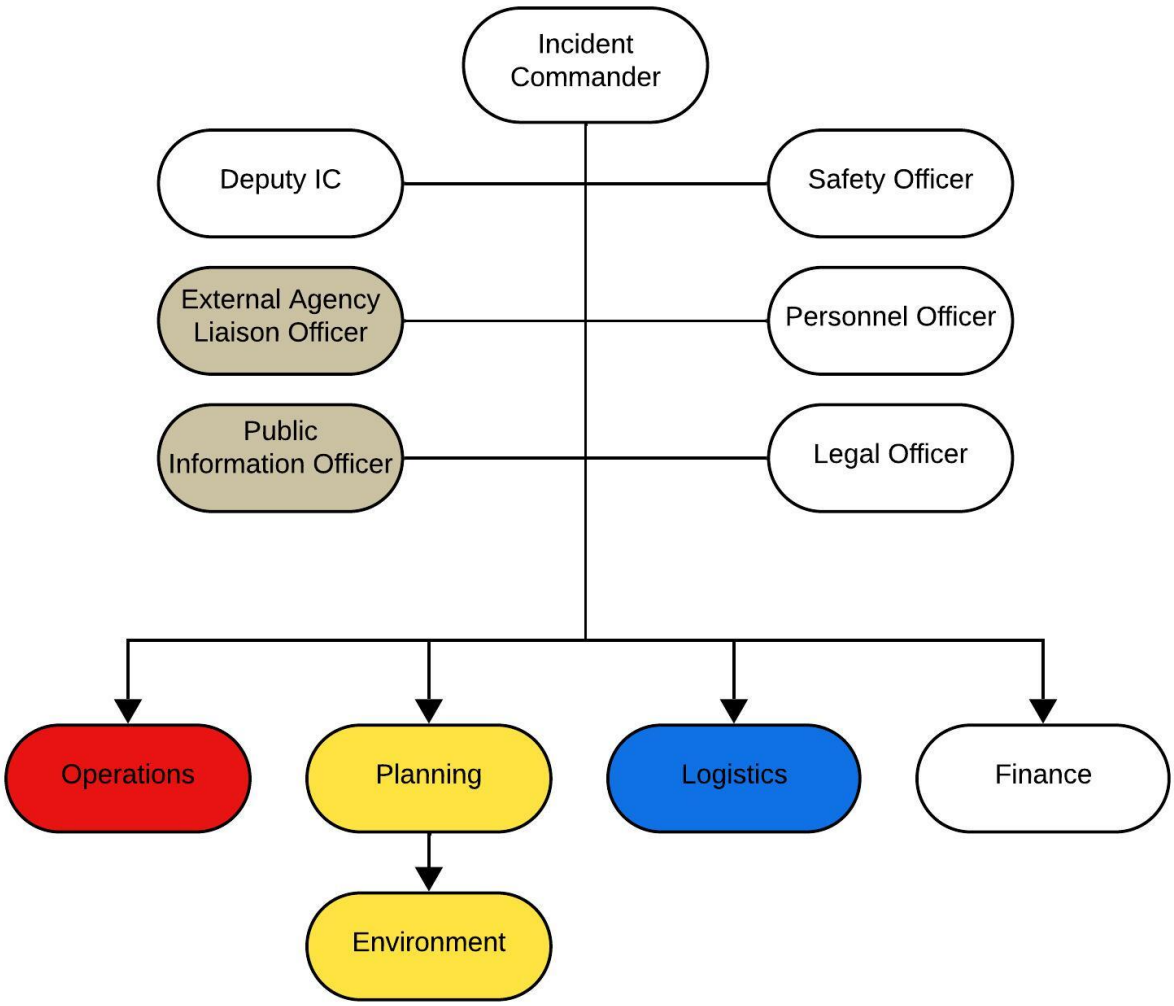

Figure 5-1: Emperor Energy DIMT structure

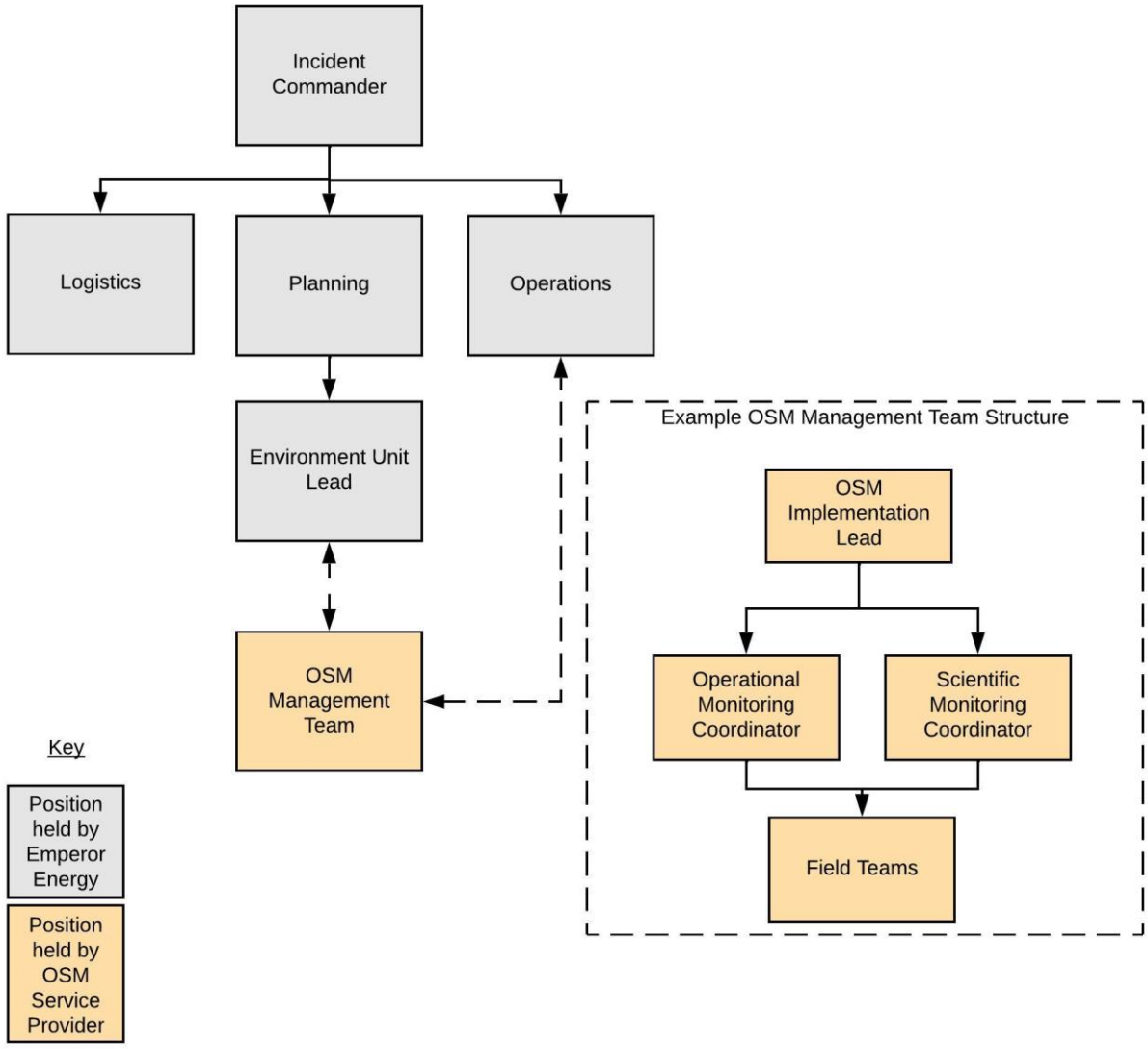

Figure 5-2: Emperor Energy DIMT structure with OSM Team

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 key OSM roles held by Emperor Energy and the OSM Services Provider.

During the post-response phase an Emperor Energy representative 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
Planning Section Chief and Environment Unit Lead	Emperor Energy
OSM Implementation Lead	OSM Services Provider
Operational Monitoring Coordinator and/or Scientific Monitoring Coordinator	OSM Services Provider
OSM Field Operations Manager	OSM Services Provider
OSM Field Teams	OSM Services Provider

7. MOBILISATION AND TIMING OF OMP AND SMP IMPLEMENTATION

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

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

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

Proximity to spill source	Monitoring type	0–48 hours from OSM activation	Within 72 hours of OSM activation	~5–7 days from OSM activation	Weeks 1–2 from OSM activation	>2 weeks from OSM activation
Spill site and surrounding waters	OM	• Activation of OMP Team Leads. • Finalise OMPs. • Commence activation and mobilisation of OM personnel.	Implement: • OMP: Hydrocarbon Properties And Weathering Behaviour, where resources are available • OMP: Water Quality Assessment • OMP: Sediment Quality Assessment • OMP: Marine Fauna Assessment • Continue to finalise OMPs. • Continue to activate and mobilise OM personnel.	Continued (as per ongoing arrangements)	• OMP: Subsea Chemical Dispersant Effectiveness and Fate Assessment • Continued (as per ongoing arrangements)	As results from implemented OMPs are available, data are provided to relevant personnel in DIMT (e.g. Planning Section) and used in the Incident Action Planning process for the next operational period. OMP is redesigned or reallocated according to the specifics of the actual spill.
	SM	• Commence activation and mobilisation process. • Activation of SMP Team Leads.	• Continue to activate and mobilise personnel. • Work on finalising SMPs.	Implement: • SMP: Water Quality Impact Assessment • SMP: Sediment Quality Impact Assessment • SMP: Benthic habitat assessment • SMP: Marine Fish and Elasmobranch Assemblages assessment	Continued	Continue SMP monitoring until termination criteria are met
Sensitive receptors where stochastic	OM	• Activation of OMP Team Leads.	Implement:	Continued (as per ongoing arrangements)	Continued (as per ongoing arrangements)	As results from implemented OMPs are

Proximity to spill source	Monitoring type	0–48 hours from OSM activation	Within 72 hours of OSM activation	~5–7 days from OSM activation	Weeks 1–2 from OSM activation	>2 weeks from OSM activation
modelling shows contact within 72 hours (3 days) Judith-2 LOWC spill*: • New Zealand Bank# • Bega Valley • East Gippsland • Gabo Island • Montague Island MDO vessel collision spill: • nil		• Finalise OMPs. • Commence activation and mobilisation of OM personnel.	• OMP: Hydrocarbon Properties And Weathering Behaviour at Sea • OMP: Water Quality Assessment • OMP: Sediment Quality Assessment • OMP: Marine Fauna Assessment • Continue to finalise OMPs. • Continue to activate and mobilise OM personnel.			available, data are provided to relevant personnel in DIMT (Environment Unit Lead) and used in the Incident Action Planning process for the next operational period. OMP is redesigned or reallocated according to the specifics of the actual spill until termination criteria are met
	SM	• Activation of SMP Team Leads and finalisation of SMPs.	• Continue to activate and mobilise personnel. • Work on finalising SMPs.	• SMP: Water Quality Impact Assessment • SMP: Sediment Quality Impact Assessment • SMP: Benthic habitat assessment • SMP: Seabirds and Shorebirds • SMP: Marine Megafauna Assessment – Reptiles • SMP: Marine Megafauna Assessment – cetaceans, pinnipeds • SMP: Marine Fish and Elasmobranch Assemblages assessment	Continued (as per ongoing arrangements)	Continue SMP monitoring until termination criteria are met

Proximity to spill source	Monitoring type	0–48 hours from OSM activation	Within 72 hours of OSM activation	~5–7 days from OSM activation	Weeks 1–2 from OSM activation	>2 weeks from OSM activation
				• SMP: Commercial and recreational fisheries impact assessment • SMP: Heritage Assessment • SMP: Social Assessment		
Sensitive receptors (including shorelines) where stochastic modelling shows contact 3–7 days Judith-2 LOWC spill: • Beware Reef[#] • Hogan Island Group • Kent Island Group MDO vessel collision spill: • East Gippsland	OM	-	• Activation of OMP Team Leads. • Commence activation and mobilisation of additional OM personnel.	• Continue to finalise OMPs. • Continue to activate and mobilise OM personnel. • OMP: Hydrocarbon Properties And Weathering Behaviour at Sea • OMP: Water Quality Assessment • OMP: Sediment Quality Assessment • OMP: Shoreline clean-up assessment • OMP: Marine Fauna Assessment	Continued (as per ongoing arrangements)	As results from implemented OMPs are available, data are provided to relevant personnel in DIMT (Environment Unit Lead) and used in the Incident Action Planning process for the next operational period. OMP is redesigned or reallocated according to the specifics of the actual spill until termination criteria are met
	SM	-	• Additional Activation of SMP Team Leads and finalisation of SMPs. • Commence activation and mobilisation of additional SM personnel.	Implement: • SMP: Water Quality Impact Assessment • SMP: Sediment Quality Impact Assessment • SMP: Benthic Habitat Assessment • SMP: Intertidal and Coastal Habitat Assessment • SMP: Seabirds and Shorebirds	Continued (as per ongoing arrangements)	Continue SMP monitoring until termination criteria are met

Proximity to spill source	Monitoring type	0–48 hours from OSM activation	Within 72 hours of OSM activation	~5–7 days from OSM activation	Weeks 1–2 from OSM activation	>2 weeks from OSM activation
				• SMP: Marine Megafauna Assessment – Reptiles • SMP: Marine Megafauna Assessment – Cetaceans, Pinnipeds • SMP: Marine Fish and Elasmobranch Assemblages assessment • SMP: Commercial and recreational fisheries impact assessment • SMP: Heritage Assessment • SMP: Social Impact Assessment		

**The receptors listed are based on stochastic modelling, therefore this provides all possible receptors that could be contacted. Deterministic modelling represents a single spill run from the group of stochastic runs to help understand the likely behaviour and impacts of a single simulation of a worst-case spill scenario. Deterministic modelling was undertaken for the Judith-2 LOWC and the run with the most receptors contacted within 7 days for floating hydrocarbons ≥1 g/m^2 and entrained hydrocarbons (≥10 ppb) was determined. The maximum number of receptors that could be contacted in 7 days (by entrained ≥10 ppb) was three (New Zealand Star Bank [2.9 days], East Gippsland [4.2 days], and Gabo Island [5.3 days]) (RPS, 2024).*

8. RESOURCE REQUIREMENTS

To guide first-strike resource requirements for OSM, deterministic modelling was undertaken for the uncontrolled subsea LOWC of 55,256 m^3 of condensate over 77 days and the run with the most receptors contacted by shoreline accumulation ≥10 g/m^2 and entrained hydrocarbons (≥10 ppb) within 7 days was selected. Run 65 had the most receptors contacted by floating hydrocarbons (≥1 g/m^2) and entrained hydrocarbons (≥10 ppb) within 7 days. Only one receptor, Gabo Island had shoreline contact (≥10 g/m^2) within 7 days and a further two receptors (Bega Valley and Montague Island) within 7-14 days. Dissolved (≥10 ppb) and entrained (≥10 ppb) hydrocarbon contact was similar with three receptors being contacted within 7 days, including New Zealand Star Bank, East Gippsland and Gabo Island; and two additional receptors, Bega Valley and Montague Island, contacted within 7–14 days (RPS, 2024) (Table 8-1).

Based on Run 65, considered the worst-case scenario for initial resource requirements, three locations may be affected before scientific monitoring can begin in the field: New Zealand Star Bank, East Gippsland and Gabo Island. As a result, post-spill pre-impact monitoring for these locations is unlikely to occur. Table 4-3 indicates a lack of existing baseline data for some of these locations. Therefore, the scientific monitoring (SM) design for these locations will likely require either:

- an impact versus control approach
- a gradient approach
- a combination of both approaches.

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

The resources required to assist the DIMT in coordinating and managing OSM are outlined in Table 8-2. The resources required to implement operational and scientific monitoring components are presented in Table 8-3 and Table 8-4 respectively, which are based on the monitoring priorities in Section 4, the implementation schedule outlined in Table 7-1, and the worst-case deterministic trajectories outlined in Table 8-1, including the resources required for monitoring unaffected control sites.

Table 8-1: Judith-2 LOWC scenario – deterministic trajectory (winter run 65) that resulted in the most receptors contacted by floating hydrocarbons at ≥1 g/m² and entrained hydrocarbons ≥10 ppb within 7 days of the spill commencing (RPS, 2024)

Priority monitoring areas	Min. time to receptor for 10 ppb dissolved (days)	Max. dissolved hydrocarbon exposure (ppb)	Min. time to receptor for 10 ppb entrained	Max. entrained hydrocarbon exposure (ppb)	Min. time to receptor ≥1 g/m² for floating (days)	Min. time to receptor ≥10 g/m² for shoreline contact (days)	Min. time to receptor ≥100 g/m² for shoreline contact (days)	Max. accumulated volume (m³) along shoreline ≥10 g/m²
New Zealand Star Bank[#]	3.0	428	2.9	195	NC	NA	NA	NA
East Gippsland	4.4	81	4.2	100	NC	11.3	NC	<1
Gabo Island	6.0	109	5.3	57	NC	6.6	NC	2
Bega Valley	7.3	126	7.1	148	NC	11	19.25	6
Montague Island	10.9	475	10.9	185	NC	11.6	15.4	5
Eurobodalla	12.5	382	15	37	NC	56	NC	NC
Shoal Haven	14.7	150	14.7	115	NC	15.8	NC	3
Kiama	16.5	14	NC	7	NC	NC	NC	NC

[#]*Submerged receptor*

NA = not applicable as receptor is submerged

NC = no contact

Table 8-2: Resources required for key OSM coordination roles

Role	Resources required	Arrangement
OSM Implementation Lead (OSM Services Provider)	1 x OSM Implementation Lead / Operational Monitoring / Scientific Monitoring Coordinator / Principal Scientist	OSM Service Provider contract
Operational Monitoring Coordinator and Scientific Monitoring Coordinator (OSM Services Provider)		

Role	Resources required	Arrangement
OSM Field Operations Manager (OSM Services Provider)	1 x OSM Field Operations Manager / Senior Scientist	

Table 8-3: Resources required for initially implementing OMPs#

OMP	Resources Required (Week 1–2)	Arrangement
Hydrocarbon properties and weathering behaviour at sea*	1 team (spill site and surrounds including shoals in vicinity) 1 team (East Gippsland, Gabo Island and New Zealand Star Bank) 1 team (Bega Valley, Montague Island and Eurobodalla) Total 3 teams	OSM Service Provider contract Marine contractors Laboratory arrangements
Shoreline clean-up assessment	4 teams (East Gippsland, Gabo Island, Bega Valley, Montague Island)	Australian Marine Oil Spill Centre (AMOSC) Master Services Agreement (MSA) and/or OSM Service Provider contract Marine contractors State Response Teams and AMSA National Response Team
Subsea chemical dispersant effectiveness and fate	1 team for visual observations, which may be performed by trained aerial observers used during monitor and evaluate if trained in observation and verification of chemical dispersant effectiveness For water quality observations, refer to OMP: Water quality assessment	OSM Service Provider contract AMOSC MSA Marine contractors
Water quality assessment*	Refer to OMP: Hydrocarbon properties and weathering behaviour at sea resourcing* (all sites)	OSM Service Provider contract Marine contractors
Sediment quality assessment*	Refer to OMP: Hydrocarbon properties and weathering behaviour at sea resourcing* (all sites)	OSM Service Provider contract Marine contractors
Marine fauna assessment	1 team to conduct initial aerial surveys for all sites (2 observers per aircraft) Note: Fauna related SMPs are likely to be initiated simultaneously or following aerial assessment with vessel and ground-based fauna surveys carried out as part of the relevant fauna SMP.	OSM Service Provider contract Marine contractors Aviation contractors

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

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

Table 8-4: Resources required for initially implementing SMPs[#]

SMP	Resources Required (Week 1–2)	Arrangement
Water quality impact assessment	1 team (spill site and surrounds including shoals in vicinity) 1 team (East Gippsland, Gabo Island and New Zealand Star Bank) 1 team (Bega Valley, Montague Island and Eurobodalla) 1 team (control site(s)) Total 4 teams *Note: Can initially be performed by the same team as OMP: Water quality assessment. This SMP may replace OMP: Water quality assessment if the OMPs termination criteria are triggered*	OSM Service Provider contract Marine contractors Laboratory arrangement
Sediment quality impact assessment	Refer to SMP: Water quality impact assessment* (all sites)	OSM Service Provider contract Marine contractors Laboratory arrangement
Intertidal and coastal habitat assessment	1 team (East Gippsland and Gabo Island) 1 team (Bega Valley, Montague Island and Eurobodalla) 1 team (control site(s)) Total 3 teams	OSM Service Provider contract Marine contractors Laboratory arrangement
Seabirds and shorebirds	1 team to conduct aerial surveys for all sites for all fauna (Can initially be performed by the same aerial team as OMP: Marine fauna assessment) 1 team to conduct vessel-based surveys for all impacted sites 1 team to conduct vessel-based survey at control site(s) Total 2 vessel-based teams (surveys would include all fauna [birds, reptiles, cetaceans, and pinnipeds]) 1 team to conduct ground-based surveys at East Gippsland and Gabo Island 1 team to conduct ground-based surveys at Bega Valley, Montague Island and Eurobodalla 1 team to conduct ground-based surveys at control site(s) Total 3 ground-based teams (at least 1 experienced ornithologist per team) This SMP may replace the relevant OMP: Marine fauna assessment if the OMPs termination criteria are triggered	OSM Service Provider contract Marine contractors Laboratory arrangement

SMP	Resources Required (Week 1–2)	Arrangement
Marine megafauna assessment – Cetaceans and pinnipeds	Aerial surveys refer to SMP: Seabirds and shorebirds Vessel surveys refer to SMP: Seabird and shorebirds This SMP may replace the relevant OMP: Marine fauna assessment if the OMPs termination criteria are triggered	OSM Service Provider contract Marine contractors Laboratory arrangement
Marine megafauna assessment – reptile	Aerial surveys refer to SMP: Seabirds and shorebirds Vessel surveys refer to SMP: Seabird and shorebirds Ground-based survey refer to SMP: Seabird and shorebirds (including 1 member experienced with ground turtle surveys) This SMP may replace the relevant OMP: Marine fauna assessment if the OMPs termination criteria are triggered	OSM Service Provider contract Marine contractors Laboratory arrangement
Benthic habitat assessment	2–3 teams (all impacted sites) 1 team (control sites) Total 3–4 teams	OSM Service Provider contract Marine contractors Laboratory arrangement
Marine fish and elasmobranch assemblages assessment	2–3 teams (all impacted sites) 1 team (control sites) Total 3–4 teams	OSM Service Provider contract Marine contractors Laboratory arrangement
Fisheries impact assessment	1 team	OSM Service Provider contract Marine contractors Laboratory arrangement
Heritage features assessment	1 team	OSM Service Provider contract Marine contractors Laboratory arrangement
Social impact assessment	1 team	OSM Service Provider contract

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

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

9. CAPABILITY ARRANGEMENTS

Emperor Energy will engage an OSM Services Provider, providing standby OSM response and implementation services, prior to commencement of the activity.

Details of OSM services are provided in Table 9-1.

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

Personnel listed on the report are accessible following Emperor Energy's initial activation of OSM Services.

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

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

9.1. Personnel competencies

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

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

9.2. Equipment

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

Table 9-2.

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

Availability of key equipment will be listed in the OSM Services Provider's Equipment Register.

Table 9-2: OSM equipment

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

9.3. Exercises

Testing of key service provider arrangements would be done as a standalone test prior to the mobilisation of the activity, and would assess the capability and availability of resources by the service provider against the performance requirements. More information of exercise and testing arrangements is provided in Section 7.2 of the Judith-2 Exploration Well OPEP.

10. CAPABILITY ASSESSMENT

Table 10-1 compares Emperor Energy's worst-case capability requirements (as outlined in Table 8-3 and Table 8-4) with the OSM Services Provider capability to implement each OMP and SMP. Where there are synergies between OMPs and SMPs, the same personnel may implement multiple OMPs/SMPs simultaneously, as identified in Table 10-1. For example, personnel assigned to the OMP for Hydrocarbon Properties and Weathering Behaviour at Sea can also carry out the OMPs for Water Quality Assessment and Sediment Quality Assessment concurrently.

Table 10-1: OSM capability

Component	Total personnel required (Weeks 1–2) [1]	Personnel available via OSM service provider contract	Personnel available via OSROs	Total personnel available#
OSM Personnel embedded in DIMT	1 OSM Implementation Lead / OM / SM Coordinator 1 Field Operations Manager	1 OSM Implementation Lead / OM / SM Coordinator 1 Field Operations Manager	-	1 OSM Implementation Lead / OM / SM Coordinator 1 Field Operations Manager
OMPs				
Hydrocarbon properties and weathering behaviour at sea*	3 teams	3 teams	-	3 teams
Shoreline clean-up assessment	4 teams	2 teams	60 + AMOSC Core Group 12 AMOSC staff trained in SCAT	60 + AMOSC Core Group 12 AMOSC staff 2 teams via OSM Service Provider Contract
Subsea chemical dispersant effectiveness and fate (relevant only to a LOWC spill)	Visual observations: 1 team For water quality assessment – refer to SMP: Water quality assessment	1 visual observation team	-	Visual observations: 1 team
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 (reptiles, cetaceans, pinnipeds, seabirds and shorebirds, fish)	1 aerial team (including 1 Marine Mammal Observer (MMO) and 1 Aerial survey observer)	1 team	-	1 team

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

Component	Total personnel required (Weeks 1–2) [1]	Personnel available via OSM service provider contract	Personnel available via OSROs	Total personnel available[#]
SMPs				
Water quality impact assessment	4 teams Note: can initially be performed by the same team as OMP: Water quality assessment. This SMP may replace OMP: Water quality assessment if the OMPs termination criteria are triggered	4 teams	-	4 teams
Sediment quality impact assessment	Refer to SMP: Water quality impact assessment*			
Intertidal and coastal habitat assessment	3 teams	3 teams	-	3 teams
Seabirds and shorebirds	1 aerial team (Can initially be performed by the same aerial team as OMP: Marine fauna assessment) 2 vessel teams (surveys would include all fauna [birds, reptiles, cetaceans, and pinnipeds]) 3 ground teams (including 1 experienced ornithologist per team)	1 aerial team 2 vessel teams 3 ground-based teams	- - -	1 aerial team 2 vessel teams 3 ground-based teams
Marine megafauna assessment – whale shark, dugong and cetaceans	Aerial and vessel – Refer to SMP: seabirds and shorebirds			
Marine megafauna assessment – reptiles	Aerial and vessel – Refer to SMP: seabirds and shorebirds Ground surveys – Refer to SMP: seabirds and shorebirds (plus 1 team member per team experienced with ground turtle surveys)			

Component	Total personnel required (Weeks 1–2) [1]	Personnel available via OSM service provider contract	Personnel available via OSROs	Total personnel available[#]
Benthic habitat assessment	3-4 teams	4 teams	-	4 teams
Marine fish and elasmobranch assemblages assessment	3-4 teams	4 teams	-	4 teams
Fisheries impact assessment	1 team	1 team	-	1 team
Heritage features assessment	1 team (including either ROV operator or marine diver/s)	1 team	-	1 team
Social impact assessment	1 team	1 team	-	1 team

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

[#] During capability assessment, available personnel were allocated to one monitoring team only

11. REVIEW OF PLAN

As part of the Environment Plan review cycle, this document will be reviewed annually and revised, if required, in accordance with Emperor Energy Management of Change process as detailed in Section 9.9.2 of the EP. This could include changes required in response to one or more of the following:

- When major changes have occurred which affect Operational and/or Scientific Monitoring coordination or capabilities (e.g. change of services providers)
- Changes to the activity that affect Operational and/or Scientific Monitoring coordination or capabilities (e.g. a significant increase in spill risk)
- Changes to legislative context related to Operational and/or Scientific Monitoring (e.g. *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) protected maters requirements)
- Following routine testing of the OSM if improvements or corrections are identified; or
- After a Level 2/3 spill incident.

The extent of changes made to this OSM Bridging Implementation Plan and resultant requirements for regulatory resubmission will be informed by the relevant Commonwealth regulations, i.e. the Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2023 (OPGGS (E) Regulations).

PART B – IMPLEMENTATION

Control Agencies and Jurisdictional Authorities

Section 3.2 of the Judith-2 Exploration Well OPEP provides detailed information on Control Agency responsibilities, and should be referred to when planning operational and scientific monitoring activities, particularly in Vic, NSW and Tas State Waters and along their shorelines. In particular, OMP: Shoreline Clean-up Assessment will be implemented under the direction of the relevant Control Agency, with resources provided by Emperor Energy.

In addition, Section 3.6 of the Judith-2 Exploration Well OPEP provides regulatory and stakeholder notification and reporting requirements. Whilst all notification and reporting will be performed by Emperor Energy DIMT personnel, monitoring personnel should be aware of these requirements, and confirm all relevant notifications and reporting have been completed prior to undertaking monitoring activities.

12. MOBILISATION AND ACTIVATION PROCESS

Emperor Energy's DIMT Environment Unit Lead is responsible for activating OSM components, subject to approval from the Incident Commander. Table 12-1 outlines the Emperor Energy OSM activation process.

Table 12-1: OSM activation process

Responsibility	Task	Timeframe	Complete
Environment Unit Lead (Emperor Energy)	Review initiation criteria of OMPs and SMPs (provided in Table 9-1 (OMPs) and Table 9-2 (SMPs) of the Joint Industry Operational and Scientific Monitoring Framework) during the preparation of the initial Incident Action Plan (IAPs) and subsequent IAPs; and if any criteria are met, activate relevant OMPs and SMPs	Within 4 hours of spill notification	☐
	Obtain approval from Incident Commander to activate OSM Services Provider	Within 4 hours of spill notification	☐
	Contact OSM Services Provider and verbally notify their on-call Duty Officer of the 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, current IAPs) 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	☐
	Liaise directly with Emperor Energy's Logistics Lead to identify potential staging and departure location/s for monitoring activities. Provide this information to OSM Services Provider	Within 4–6 hours of spill notification	☐
	Record tasks in Personal Log	At time of completion of task	☐
Logistics Lead (Emperor Energy)	Commence arrangements for vessels, accommodation and transport to mobilise monitoring teams	Within 24 hours of spill notification	☐
OSM Services Provider	Duty Manager to activate relevant monitoring personnel	Within 8 hours of notification being made to OSM Services Provider	☐
	OSM personnel (OSM Implementation Lead and OM/SM Coordinators) requested by Emperor Energy to be sent to Emperor Energy's DIMT	Within 12 hours of notification being made to OSM Services Provider	☐
	Liaise directly with Emperor Energy's Environment Unit Lead to confirm which OMPs and SMPs are to be fully activated	Within 4 hours of monitor and evaluate data being received from DIMT	☐
	Confirm availability of initial personnel and equipment resources	Within 5 hours of monitor and evaluate data being received from DIMT	☐

13. FIRST-STRIKE MONITORING PRIORITIES

As described in Section 2 and Section 4, the available stochastic spill trajectory modelling, in conjunction with a desktop analysis has been analysed to understand the likely initial monitoring priorities in the EMBA. In addition, Table 4-3 lists comparability of available baseline data for receptors, to assist in identifying where post-spill, pre-impact monitoring should be prioritised.

The monitoring priorities provided in Section 2 and Table 4-3 are to be used for guidance when confirming monitoring priorities in consultation with key stakeholders and Monitoring Service Providers (including subject matter experts, where available) at the time of the spill. Table 13-1 provides a checklist to assist in the confirmation of monitoring priorities for individual spills.

Table 13-1: Checklist for determining monitoring priorities

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

14. PROTECTED MATTERS REQUIREMENTS

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

The management plans, recovery plans and conservation advice statements relevant for the Protected Matters that are likely to be relevant to the final design of the OMPs and SMPs within the EMBA are listed in Appendix B of the Judith-2 Exploration Well EP. Appendix A also includes relevant locations where these receptors are known to occur in order to expedite consideration of relevant information into finalised monitoring designs.

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

Responsibility	Task	Complete
Environment Unit Lead with input from OSM Services Provider	Review Monitoring, Evaluation and Surveillance data and available OMP data to determine likely presence and encounter of protected species in predicted trajectory of the spill	☐
	Review the relevant recovery plan/conservation advice/management plan in Appendix B of the Judith-2 Exploration Well EP online protected matters search tool and determine if there have been any updates to the relevant conservation threats/actions. Integrate relevant considerations into the final monitoring design for affected OMPs and SMPs	☐
	Review restrictions on marine mammal buffer distances in SMP: Marine megafauna and ensure this is included in all relevant response and monitoring IAPs (e.g. Shoreline Protection Plan, Shoreline Clean-up Plan, OSM Plan), so that response and monitoring field teams maintain required buffer distances from fauna during operations	☐

15. FINALISING MONITORING DESIGN

The methods presented in the Joint Industry OMPs and SMPs are designed to allow the OSM Services Provider 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.

Emperor Energy's checklist for finalising monitoring designs post-spill is provided in Table 15-1. The Environment Unit Lead and 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
Environment Unit Lead (Emperor Energy) and 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	☐
	Review Table 10-4 of the Joint Industry OSM Framework to ensure potential impacts from response activities are considered and incorporated into relevant OMP/SMP designs	Prior to finalising monitoring designs	☐
	Liaise with Environment Unit Lead (Emperor Energy) to review the Environmental Performance Standards listed in the Judith-2 Exploration Well EP and integrate checks into the monitoring design that will help determine if relevant Environmental Performance Standards are being met	Prior to finalising monitoring designs	☐
	Scientific monitoring: • Establish benchmarks and guidelines to be used • Confirm indicator species • Confirm parameters and metrics	Within 96 hours of initial monitoring priorities being confirmed by DIMT	☐

16. MOBILISATION OF MONITORING TEAMS

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

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

A checklist for mobilising monitoring teams is provided in Table 16-1.

Table 16-1: Checklist for mobilisation of monitoring teams

Responsibility	Task	Complete
OSM Services Provider with input from Environment Unit Lead (Emperor Energy)	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 comply 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 Emperor Energy Logistics have arranged flights, accommodation, and car hire arrangements are in place	☐
	Develop field survey schedules, detailing staff rotation	☐
	Equipment	
	Confirm Emperor Energy Logistics have arranged survey platforms (vessel, vehicle, aircraft) as required to survey or access survey sites and ensure they are equipped with appropriate fridge and freezer space for transportation of samples (and carcasses if collecting)	☐
	Confirm Emperor Energy Logistics have arranged vessels with correct fit-out specifications (e.g. winches, Geographic Positioning System [GPS], satellite, deck crane, sufficient deck space, water supplies [fresh and/or salt], accommodation)	☐
	Confirm consumables (including personal protective equipment) have been purchased and will be delivered to required location	☐
	Liaise with NATA-accredited laboratories to confirm availability, limits of detection, sampling holding times, transportation, obtain sample analysis quotes and arrange provision of appropriate sample containers, Chain of Custody (CoC) forms and suitable storage options for all samples. Make arrangements for couriers (if necessary)	☐
	Confirm specialist equipment requirements and availability (including redundancy)	☐

Responsibility	Task	Complete
	Check GPS units and digital cameras are working and that sufficient spare batteries and memory cards are available	☐
	Confirm sufficient equipment to allow integration of survey software and navigational systems (e.g. GPS, additional equipment and adaptors), and additional GPS units prepared	☐
	Confirm GPS survey positions (where available) have been Quality Assurance and Quality Control (QA/QC) checked and pre-loaded into navigation software/positioning system	☐
	Check field laptops, ensuring they have batteries (including spares), power cable, and are functional	☐
	Check if a first aid kit or specialist Personal Protective Equipment (PPE) is required	☐
	Confirm arrangements for freight to mobilisation port is in place	☐

17. PERMITS AND ACCESS REQUIREMENTS

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

The OSM Services Provider will work with Emperor Energy to request 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 flora and/or fauna	N/A	Department of Climate Change, Energy, the Environment and Water (DCCEEW) Victoria - Department of Energy, Environment and Climate Action NSW - Department of Climate Change, Energy, the Environment and Water (Environment and Heritage) Tasmania - Department of Natural Resources and Environment Tasmania	Cth - Any interactions involving nationally listed threatened fauna may require approval from DCCEEW (http://www.environment.gov.au/biodiversity/threatened/permits) Vic – No specific permitting requirements required for observational monitoring, however, permits may be required for some protected species. Additional information on flora and fauna permits can be found at: https://www.vic.gov.au/research-permits NSW - No specific permitting requirements required for observational monitoring, however, a Biodiversity Conservation Licence may be required for approaching or interfering with a marine mammal in a manner that varies from the prescribed regulations. Additional information on flora and fauna permits can be found at: https://www2.environment.nsw.gov.au/licences-and-permits/scientific-licences Tas – A scientific permit is required to 'take and possess wildlife, or wildlife products', but does not appear to be required for observational monitoring. Additional information on fauna permits can be found at: https://nre.tas.gov.au/wildlife-management/forms-permits-and-fees/scientific-permits-for-fauna/about-scientific-permits-(fauna)
State Marine Protected Areas	Victoria • Cape Howe • Point Hicks • Beware Reef • Ninety Mile Beach • Nooramunga Marine and Coastal Park • Wilsons Promontory NSW • North Sydney Harbour • Bronte-Coogee • Cape Banks • Towra Point • Boat Harbour • Batemans	Victoria – Parks Victoria NSW - Department of Primary Industries and Regional Development Tasmania – Tasmania Parks and Wildlife Service	Vic – A permit may be required to conduct research on Parks Victoria managed land, some exemptions apply for observational monitoring and research. Additional information can be found at: https://www.parks.vic.gov.au/get-into-nature/conservation-and-science/science-and-research/access-agreements-for-research-activities NSW – A Section 37 permit may be required under the *Fisheries Management Act* 1994 if the monitoring involves taking or possessing fish or marine vegetation. Additional information can be found at: https://www.dpi.nsw.gov.au/fishing/closures/section-37-permits or contacting the marine park - https://www.dpi.nsw.gov.au/fishing/marine-protected-areas/marine-parks Tas – No specific permitting requirements required for observational monitoring. For more information, contact Tasmania Parks and Wildlife Service - https://parks.tas.gov.au/about-us/contact-us

Receptor	Location	Jurisdictional Authority	Relevant information on permits
	Tasmania • Kent Group • Marriott Reef • Arthur Bay • Chappell Islands • Moriarty Rocks		
Ramsar wetland	• Corner Inlet • Gippsland Lakes • Logan Lagoon • East Coast Cape Barron Island Lagoon • Towra Point Nature Reserve	DCCEEW	Additional information on Ramsar wetlands and how they are protected as a matter of national environmental significance under the EPBC Act is available at: https://www.environment.gov.au/epbc/what-is-protected/wetlands
Australian (Commonwealth) Marine Parks	• Beagle • Freycinet • Flinders • East Gippsland • Jervis • Hunter • Central Eastern	Director of National Parks Parks Australia	Permit and licence application information for Marine Protected Areas (including monitoring) can be found at: https://onlineservices.environment.gov.au/parks/australian-marine-parks and https://onlineservices.environment.gov.au/parks/australian-marine-parks/permits Additional information on permitting requirements in Australian Marine Parks can be obtained through Parks Australia via email marineparks@environment.gov.au or phone 1800 069 352 Information on permits to access biological resources in Commonwealth areas can be found at: http://www.environment.gov.au/topics/science-and-research/australias-biological-resources/access-biological-resources-commonwealth
State Managed Fisheries	Victoria • Abalone Fishery • Giant Crab Fishery • Multi-species Ocean Fishery • Octopus Fishery • Pipi Fishery • Rock Lobster Fishery	Victorian Fisheries Authority	Information on Victorian State Managed Fisheries may be sought by contacting the Victorian Fisheries Authority - https://vfa.vic.gov.au/about/contact-us

Receptor	Location	Jurisdictional Authority	Relevant information on permits
	• Ocean Scallop Fishery • Scallop Dive (Port Phillip) Fishery • Sea Urchin Fishery • Wrasse Fishery		
	New South Wales • Lobster fishery • Ocean Trap and Line fishery • Ocean Trawl fishery • Abalone fishery • Estuary General fishery • Ocean Hauling fishery • Sea urchin and turban shell fishery • Southern fish trawl fishery • S37 Permit	Department of Primary Industries	A Section 37 permit may be required under the *Fisheries Management Act* 1994 if the monitoring involves taking or possessing fish or marine vegetation. Additional information can be found at: https://www.dpi.nsw.gov.au/fishing/closures/section-37-permits or contacting the Department of Primary Industries - https://www.dpi.nsw.gov.au/contact-us/contact-a-dpi-fisheries-officer
	Tasmania • Abalone Fishery • Commercial Dive Fishery • Giant Crab Fishery • Octopus Fishery • Scalefish Fishery • Scallop Fishery • Marine Plant Fishery • Shellfish Fishery • Southern Rock Lobster Fishery	Department of Natural Resources and Environment Tasmania - Wild Fisheries Management Branch	A permit may be required under the *Living Marine Resources Management Act* 1995 for environmental monitoring. Additional information can be found at: https://fishing.tas.gov.au/commercial-fishing/commercial-fisheries/permits

Receptor	Location	Jurisdictional Authority	Relevant information on permits
Commonwealth Managed Fisheries	• Bass Strait Central Zone Scallop Fishery • Eastern Tuna and Billfish Fishery • Small Pelagic Fishery • Southern and Eastern Scalefish and Shark Fishery – Commonwealth Trawl Sector • Southern and Eastern Scalefish and Shark Fishery – Scalefish Hook Sector • Southern and Eastern Scalefish and Shark Fishery – Gillnet Hook and Trap Sector • Southern Bluefin Tuna Fishery • Southern Squid Jig 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
Aboriginal Cultural Heritage	Specific information not publicly available	Victoria State Government : First Peoples - State Relations NSW - Department of Climate Change, Energy, the Environment and Water (Environment and Heritage) Aboriginal Heritage Tasmania	Aboriginal heritage information for Victoria - https://www.firstpeoplesrelations.vic.gov.au/cultural-heritage-permit Aboriginal heritage information for NSW - https://www2.environment.nsw.gov.au/topics/heritage/apply-for-heritage-approvals-and-permits/aboriginal-objects-and-places. Guidelines are available to help determine if a permit is required. Aboriginal heritage information for Tas – link

Receptor	Location	Jurisdictional Authority	Relevant information on permits
Defence/restricted military area	9 restricted and prohibited defence sites and 30 UXO sites located within the EMBA (Refer to Section 4.6.3.3 of the Judith-2 Exploration Well EP	Department of Defence	Unexploded Ordanances (mapping information): https://www.defence.gov.au/UXO/default.asp Maritime military firing practice and exercise areas: https://www.hydro.gov.au/factsheets/FS_Navigation-Firing_Practice_and_Exercise_Areas.pdf
Industry (e.g. operational zone of offshore oil or gas platform)	Gippsland Basin offshore petroleum industry Proposed projects for renewable energy wind farms	Operating company	Safety zones (up to 500 m from outer edge of well or equipment) – https://www.nopsema.gov.au/safety/safety-zones/
Underwater cultural heritage (including shipwrecks, sunken aircraft, relics)	The Australian Underwater Cultural Heritage Database identified no sites within the Operational Area. However, over 100 sites were identified within the EMBA, all of which are shipwrecks, the majority of which are considered historic (>75 years old). Historic shipwrecks within 50 km of the Operational Area are detailed in Table 4-17 of the Judith-2 Exploration Well EP.	DCCEEW	Refer to the *Underwater Cultural Heritage Act* 2018 (Commonwealth): https://www.dcceew.gov.au/parks-heritage/heritage/underwater-heritage/underwater-cultural-heritage-act

18. USE OF DATA IN RESPONSE DECISION-MAKING

18.1. Operational monitoring to inform response activities

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

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

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

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

Analysed data will then be incorporated into the Common Operating Picture (managed by the Planning Section Chief) and used by the Environment Unit Lead during development of the operational Spill Impact Mitigation Assessment (SIMA), which would be included in the IAP for the current or next operating period.

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

Table 18-1: Checklist for using OM data to inform DIMT decision-making

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

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

OMP	Data generated[2]	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; • 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)
Subsea chemical dispersant effectiveness and fate	Visual observations of dispersant efficacy; concentration of hydrocarbons in water column (see also water quality assessment)	Environment Unit for use in operational SIMA; Planning Section to aid in IAP development; Operations Section to confirm dispersant effectiveness for decision-making purposes in current operations period.	Determine the effectiveness of dispersant in removing oil from sea surface and how dispersed oil is being distributed through the water column. This information can be used in NEBA to help decide if dispersants are being effective at minimising oil reaching sensitive 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	Environment Unit Lead to validate surveillance and modelling data; Planning Section for use in IAP	Confirm spatial extent of spill within the water column and verify spill modelling and surveillance data; extent of spill can in turn influence location of other OMP and SMP monitoring components and sites. Data can also influence ongoing use of dispersant through ongoing operational SIMA.
Sediment quality assessment	Distribution of oil in sediment and change in hydrocarbon concentrations (e.g. Total recoverable hydrocarbons, BETEXN, PAH)	Environment Unit Lead to validate surveillance and modelling data; Planning Section for use in IAP	Confirm spatial extent of spill; extent of spill can in turn influence location of other OMP and SMP monitoring components and sites

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

OMP	Data generated[2]	DIMT Section requiring data	How data may be used by DIMT
Marine fauna assessment • Reptiles • Cetaceans (observational only) • Pinnipeds • Seabirds and shorebirds • Fish	Rapid assessment of presence and distribution of marine fauna; evaluate impact of spill and response activities on fauna	Planning Section for use in IAP; Oiled Wildlife Section/Division to help in developing Wildlife Response Sub-plan	Understanding of species, populations and geographical locations at greatest risk from spill impacts. DIMT can use this information to help qualify locations with highest level of protection priority (e.g. pinniped haul out site 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)

18.2. Impacts from response activities

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

When finalising monitoring designs, the OSM Implementation Lead shall review Table 10-4 of the Joint Industry OSM Framework and the Judith-2 Exploration Well EP to ensure potential impacts from response activities are considered and any suitable mitigation actions are incorporated into relevant OMP/SMP designs.

18.3. Operational monitoring of effectiveness of control measures and to ensure environmental performance standards are met

As stated in Table 15-1, when finalising monitoring designs, the OSM Implementation Lead and Environment Unit Lead (or delegate) shall review the Environmental Performance Standards (EPSs) listed in the Judith-2 Exploration Well EP and OPEP and integrate checks into the monitoring design that will help determine if relevant Environmental Performance Standards (EPSs) are being met.

19. DATA MANAGEMENT

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

20. QUALITY ASSURANCE AND QUALITY CONTROL

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

21. COMMUNICATION PROTOCOLS

21.1. OSM services provider/s

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

The following communication protocols must be observed:

- Communication between Emperor Energy and its OSM Services Provider during the preparedness phase (pre-spill) will be between an Emperor Energy representative (or delegate) and the OSM Services Provider.
- Communication between Emperor Energy and its OSM Services Provider during activation (prior to deployment) will be between the DIMT Environment Unit Lead (or delegate) and the OSM Services Provider representative.
- During implementation (post deployment), primary communication occurs via two pathways:
    - Emperor Energy representative (or delegate) and the OSM Services Provider Duty Manager for contractual, management, scientific and general direction matters; and
    - Emperor Energy's DIMT Operations Section Chief and the OSM Services Provider's Field Operations Manager(s) Field Team Leads for on-site matters.
- All key OSM operational decisions should be logged in an OSM decision log by key personnel, including but not limited to the OSM Services Provider Implementation Lead, OSM Field Operations Manager, Operational Monitoring Coordinator, Scientific Monitoring Coordinator and Field Team Leads.
- All key OSM tasks, actions and requirements should be documented in an IAP during the response phase of the spill.
- The Emperor Energy DIMT Environment Unit Lead will keep the DIMT Operations Lead, Logistics Lead and Planning Section Chief briefed of the OSM status as required.
- All correspondence (copies of emails and records of phone calls) between Emperor Energy and the OSM Services Provider during a response should be recorded and kept on file.
- All communication received by OSM Services Provider not in line with these protocols should be reported to the Emperor Energy DIMT Planning Section Chief 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 these protocols should be confirmed via the Emperor Energy DIMT Planning Section Chief or On-Scene Commander prior to implementation.

During the post-response phase all communications shall be between a nominated Emperor Energy representative and the OSM Services Provider OSM Implementation Lead and/or OSM Services 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.

Emperor Energy Crisis Management Team Member will be the focal point for external engagement during the response operation.

Stakeholder communications post-response will be managed by an Emperor Energy representative.

22. STAND-DOWN PROCESS

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

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

Table 22-1: Checklist for terminating monitoring components

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

23. TERMS

Term	Definition
AEP	Australian Energy Producers (formerly Australian Petroleum Production and Exploration Association [APPEA]; from 13 September 2023)
AIIMS	Australasian Inter-Service Incident Management System
ALA	Atlas of Living Australia
AMOSC	Australian Marine Oil Spill Centre
AMP	Australian Marine Park
AMSA	Australian Maritime Safety Authority
AODN	Australian Data Network
BACI	Before-After Control-Impact
BIP	Bridging Implementation Plan
BIA	Biologically Important Areas
BRUVS	Baited Remote Underwater Video Stations
BTEXN	Benzene, Toluene, Ethylbenzene and Xylenes And Naphthalene
CoA	Commonwealth of Australia
CoC	Chain of Custody
CSIRO	Commonwealth Scientific and Industrial Research Organisation
DCCEEW	Department of Climate Change, Energy, the Environment and Water (Cth)
DIMT	Drilling Incident Management Team
EMBA	Environment that may be Affected
EP	Environment Plan
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999 (Cth)
EPS	Environmental Performance Standard
ESC	Environmental Scientific Coordinator
FOB	Forward Operating Base
GIS	Geographic Information System
GPS	Geographic Positioning System
IAP	Incident Action Plan
ICS	Incident Command System
IMOS	Integrated Marine Observing System
IMSA	Index of Marine Surveys for Assessment
IMT	Incident Management Team
KEF	Key Ecological Feature
LOWC	Loss of Well Control
MDO	Marine Diesel Oil
MSA	Master Service Agreement
NATA	National Association of Testing Authorities

Term	Definition
OM	Operational Monitoring
OMP	Operational Monitoring Plan
OPEP	Oil Pollution Emergency Plan
OPGGS (E)	Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2009 Regulations
OSM	Operational and Scientific Monitoring
OSRA	Oil Spill Response Atlas
OSTM	Oil Spill Trajectory Modelling
PAH	Polycyclic aromatic hydrocarbons
PPE	Personal Protective Equipment
QA/QC	Quality Assurance and Quality Control
ROV	Remotely Operated Vehicle
SBRUVS	Stereo Baited Remote Underwater Video Stations
SIMA	Spill Impact Mitigation Assessment
SM	Scientific Monitoring
SMP	Scientific Monitoring Plan
TRH	Total Recoverable Hydrocarbons
TPH	Total Petroleum Hydrocarbons

24. REFERENCES

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Appendix A Background information for key sensitivities

Table A-1: Background information for key sensitivities for locations predicted to be contacted within 7 days, at a probability >10%, and requiring a baseline review

Location	Receptor	Background	Key locations	Seasonality
Bega Valley (Sapphire Coast)	Estuaries and other important ecological communities	The estuaries and foreshores of the Bega Valley support valuable seagrass, saltmarsh and mangrove communities. Mangrove species include Grey Mangrove (*Avicennia marina*) and River Mangrove (*Aegceras corniculatum*). Seagrass can be found in 20 of 29 estuaries within the shire with *Posidonia australis* located in Bermagui, Merimbula, Pambula and Twofold Bay Seagrass species include: • *Posidonia australis* (most vulnerable to impacts from human activity due to limited distribution and slow to recover post disturbance). • *Zostera capricorni* • *Zostera muelleri* • *Halophila ovalis* • *Ruppia* spp. Five endangered ecological communities can be found along the coastline: • Coastal saltmarsh • Littoral rainforest • Themeda grassland on sea cliffs and coastal headlands • Bangalay Sand Forest • Freshwater Wetlands on Coastal Floodplains (Bega Valley Shire Council 2022)		
	Sharks	Grey Nurse Sharks are know to frequent the coast (Dalton 2004).	Mewstone Rock and Soth Head near Eden (Otway and Parker 2000)	

Location	Receptor	Background	Key locations	Seasonality
	Fish	Weedy sea dragon (*Phyllopteryx taeniolatus*) generally found in shallow protected reefs and in seagrass meadows (Dalton 2004).	Twofold Bay and Tathra (Dalton 2004)	
	Cetaceans	Humpback and South Right Whales frequent the coast during their migration. Bottlenose dolphin and common dolphins are regularly observed in the coastal waters of Bega Valley (Dalton 2004)		
	Seals	Australian fur seals	Green Cape South of Eden (Dalton 2004)	
	Birds	The beaches, estuaries, sand spits and rocky headlands of the Bega Valley support a range of threatened shorebird and seabird species including: • Hooded Plover • Pied Oystercatcher • Sooty Oystercatcher • Little Tern • Fairy Tern (Bega Valley Shire Council 2022)		
East Gippsland	Estuarine and Coastal Wetlands	The coastal wetlands and saltmarsh of East Gippsland are mostly barrier-built intermittently closed and open lakes and lagoons (Boon et al. 2015).	In 2021 DELWP conducted an assessment of the condition of Victoria's estuaries. In East Gippsland estuaries in excellent condition included those within the Croajingolong National Park and Sand Patch Wilderness Area, and Mallacoota Inlet. Flora was in good condition at the Nicholson and Tambo River estuaries. Estuaries with Flora in poor condition included Sydenham Inlet and two tributaries to the Gippsland Lakes: Tom Creek and the Mitchell River (DELWP (2021).	
	Intertidal Reef	Intertidal reefs are typically structured around boulders, rock and reef platforms, and support highly diverse ecosystems including brown algae dominated	Cape Howe Marine National Park Beware Reef Marine Sanctuary- provide feeding areas for Pied Cormorants, Little	

Location	Receptor	Background	Key locations	Seasonality
		communities and macroinvertebrate communities. A diverse range of fish assemblages use intertidal reefs, and shorebirds such as the Sooty and Pied Oystercatchers and Ruddy Turnstone rely on them for both feeding and roosting (Parks Victoria 2023).	Penguins may traverse this area, important seal haul out habitat for Australian and New Zealand Fur Seals. Point Hicks Marine National Park (Parks Victoria 2023)	
	Subtidal Reef	Kelp plays an important role in Victoria's shallow reef ecosystems. These seaweeds create vast underwater forests that serve as crucial living spaces for diverse marine life, including fish, invertebrate species, and smaller algae species (Parks Victoria 2023). Sea urchin overgrazing is causing reef decline across East Gippsland, with Cape Howe and Beware Reef rated as fair, while Point Hicks' condition remains unstudied (Parks Victoria 2023).	Cape Howe Marine National Park Point Hicks Marine National Park Beware Marine Sanctuary (Parks Victoria 2023)	
	Cetaceans and Seals	Bottlenose Dolphin (*Tursiops* sp.), Common Dolphin (*Delphinus delphis*), Southern Right Whale (*Eubalaena australis*), Humpback Whale (*Megaptera novaeangliae*), Killer Whale/Orca (*Orcinus orca*) Humpback whale migration route Southern Elephant Seal (*Mirounga leonine*), Long-nose (previously New Zealand) Fur Seal (*Arctocephalus forsteri*), Australian Fur Seal (*Arctocephalus pusillus doriferus*)		Humpback Whale and Southern Right Whale: May to October
	Birds	Breeding, roosting and foraging habitat for many threatened and/or migratory bird species including Caspian Tern (*Hydroprogne caspia*), Fairy Tern (*Sternula nereis nereis*), Crested Tern (*Thalasseus bergii*), Short-tailed Shearwater (*Puffinus tenuirostris*), Wedge-tail Shearwater (*Puffinus pacificus*), Little Penguin (*Eudyptula minor*), White-bellied Sea Eagle (*Haliaeetus leucogaster*), Ruddy Turnstone (*Arenaria interpres*), Common Tern (*Sterna hirundo*), Eastern Reef Egret (*Egretta sacra*), Hooded Plover (*Thinornis cucullatus*), Eastern Curlew (*Numenius madagascariensis*) (Parks Victoria 2023).		

Location	Receptor	Background	Key locations	Seasonality
		Pelagic species (foraging habitat) include Wandering Albatross (*Diomedea exulans*), Shy Albatross (*Thalassarche cauta*), Yellow-Nosed Albatross (*Thalassarche chlororhynchos*), Fairy Prion (*Pachyptila turtur*), White-faced Storm Petrel (*Pelagodroma marina*).		
	Reptiles	Leatherback Turtle (*Dermochelys coriacea*)		
	Shipwreck		Ridge Park (1881) Beware Reef, Cape Conran	
Gabo Island	Birds	Little Penguins (*Eudyptula minor*)- nesting has dramatically declined by 90% in recent years (Parks Victoria 2023) Short-tailed Shearwater (*Puffinus tenuirostris*) (BirdLife International 2024)		
Hogan Island Group (Hogan Island, Long Island, Round Island, Twin Islets, East Island, Boundary Islet, Seal Rock)	Birds	The Hogan archipelago is an important seabird location, with at least 30 species recorded in the area (Carlyon et al. 2011). Breeding has been recorded for Little Penguin (*Eudyptula minor*), Short-tailed Shearwater (*Puffinus tenuirostris*), Fairy Prion (*Pachyptila turtur*), Common Diving Peterl (*Pelecanoides urinatrix*) and Pacific Gull (Larus pacificus). In 2011, the population of the following species was estimated to occur on the Hogan Island Group: Little Penguin >10,000 Short-tailed Shearwater 11,400 (noted, that this is likely an over estimation) Fairy Prion >1000 Black-faced Cormorant (*Phalacrocorax fuscescens*) ~ 50 (Carlyon et al. 2011)	Little penguins occur in high numbers on all islands except Boundary Islet and Seal Rock.	Short-tailed shearwater breeding season: September – April.
	Seals	Australian Fur Seals (*Arctocephalus pusillus*) and Long-nose (previously New Zealand) Fur Seals (*Arctocephalus forsteri*) have been observed to haul-out at specific sites. No pups have been observed at these haul-outs and they are not classified as breeding colonies. This is	Australian Fur Seal haul-outs have been observed on Boundary Islet and Seal Rock. Sea Rock supports the highest number of seals in the area.	

Location	Receptor	Background	Key locations	Seasonality
		unlikely to change due to the exposed nature of these sites, however accidental births are possible. (Carlyon et al. 2011)	Evidence that seals also haul out on the east coast of East Island. (Carlyon et al. 2011)	
Kent Island Group (Deal Island, Dover Island, Erith Island, North East Island)	Seagrass		Seagrass beds in the Kent Group are restricted to several of the large coves inside Murray Pass and Squally Cove at southern Deal Island.	
	Rocky Reef	Jordon et al. (2002) observed that rocky reef is a significant habitat throughout the Kent Group of islands representing approximately 5 % of all habitats with 3 nautical miles and up to 56% in depths of 0-40 m. Reefs on the exposed coasts were dominated by the macroalgae *Phyllospora comosa* which extends from the immediate subtidal zone to depths of 10 to 20 m where it is gradually replaced by *Ecklonia radiata*. At depths below 25 m, Ecklonia radiata is gradually replaced by invertebrate assemblages (most notably sponges), until approximately 40 m where it is completely replaced by invertebrates (Jordon et al. 2002).		
	Seals	Australian Fur Seals (*Arctocephalus pusillus*) occur around all of the islands (Tasmanian Parks and Wildlife Service).	Judgement Rocks is home to the largest Australian Fur Seal Colony in Tasmania (Tasmanian Parks and Wildlife Service)	
	Birds	Seabirds including Common Diving Petrels (*Pelecanoides urinatrix*), Fairy Prions (*Pachyptila turtur*), Short-tailed Shearwaters (*Ardenna tenuirostris*), Little Penguin (*Eudyptula minor*), Sooty Oystercatchers (*Haematopus fuliginosus*), Cormorants and Terns (Tasmanian Parks and Wildlife Service).	North East and South West Isles (Tasmanian Parks and Wildlife Service)	
Montague (Barunguba) Island	Seals	Haul out and breeding site for Australian Fur Seals (*Arctocephalus pusillus*) and Long-nosed (previously New Zealand) Fur Seals (*Arctocephalus forsteri*). This is the	Historically, fur seals mainly gathered on the island's northwestern coast. However, they have now expanded their territory to include	Pups are born from November to January and are present until they are weaned from spring onwards (NSW National

Location	Receptor	Background	Key locations	Seasonality
		largest aggregation of fur seals in NSW (NSW National Parks and Wildlife Service 2023). In October 1998 540 Australian Fur Seals were recorded (Shaughnessy et al. 2001).	the western and southern coastal areas (NSW National Parks and Wildlife Service 2023).	Parks and Wildlife Service 2023). Australian Fur Seals and Long-nosed Fur Seals are present throughout the year. Their population reaches its highest levels during the August-October, when both juvenile and a substantial number of adult individuals are present at the same time.
	Birds	More than 100 species of birds have been recorded on the island, including 20 breeding species. An estimated 15,000 pairs of shearwaters breed annually on the island, predominately Short-tailed Shearwaters (*Ardenna tenuirostris*) and Wedge-tailed Shearwaters (*Ardenna pacifica*), and fewer than 100 pairs of Sooty Shearwaters (*Ardenna grisea*) (Montague Island Partners 2009). The island supports smaller colonies of Greater Cresterd Terns (*Thalasseus bergii*) and Silver Gulls (*Chroicocephalus novaehollandiae*) (NSW National Parks and Wildlife Service 2023). The island also supports one to the largest colonies of Little Penguins (*Eudyptula minor*) in NSW. Gould's Petrels (*Pterodroma leucoptera*), White-faced Storm-Petrels (*Pelagodroma marina*) and Caspian Terns (*Hydroprogne caspia*) now also breed on the island (Carlile et al. 2020). Sooty Oystercatchers (*Haematopus fuliginosus*) can be found seasonally around the rocky periphery of the island, where they lay eggs above the shoreline in open rock 'scrapes' (NSW National Parks and Wildlife Service 2023).		Shearwater breeding season: September – April Sooty Oystercatchers breeding season: October – February Greater Crested Tern and Silver Gull breeding Season: September – January Penguins: small numbers are present all year with peak season September - February
	Aboriginal sites	There are currently 69 recorded sites on Barunguba.		

Location	Receptor	Background	Key locations	Seasonality
		Barunguba Montague Island has great cultural and spiritual significance to the local Aboriginal people. Dreaming stories and song lines link the island to Gulaga and Najanuka. Everything on Barunguba Montague Island is protected by law. There are several locations on the island that are particularly culturally sensitive. Some areas are out of bounds to all visitors. (NSW National Parks and Wildlife Service 2023)		
	Historic Heritage Listing	The Montague Island light station and its setting is listed on the State Heritage Register. The State Heritage Register listing curtilage includes the entire island. The lighthouse itself, which remains under the control of the Australian Maritime Safety Authority (AMSA), is also listed on the Commonwealth Heritage List (NSW National Parks and Wildlife Service 2023).		

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Appendix B Baseline data sources

Table B-1: Baseline data sources

Receptor	Existing baseline monitoring	Source / Data Custodian	Spatial extent
Sediment	Hook SE, Foster S, Althaus F, Bearham D, Angel BM, Revill AT, Simpson SL, Strzelecki J, Cresswell T, Hayes KR (2023) The distribution of metal and petroleum-derived contaminants within sediments around oil and gas infrastructure in the Gippsland Basin, Australia. Marine Pollution Bulletin, 193	CSIRO (Link to article)	Gippsland Basin
Intertidal	NSW Department of Primary Industries. 2021. NSW Estuarine Habitat Dashboard, https:// nsw- dpi. shiny apps. io/ NSW_ Estuarine_Habitat/	NSW Department of Primary Industries and Regional Development (Link to Map Explorer)	NSW
	NW Environment and Heritage. Monitoring, evaluating and reporting on estuaries	NSW Environment and Heritage (Link to website)	NSW
Benthic	Keesing J, Strzelecki J Thomson D, Haywood M, Orr M, Mattio L, Stephenson S (2021): CCS - MV Seca 2019 V02 Diver Deployed Sediment Cores. v1. CSIRO. Data Collection. https://doi.org/10.25919/cms5-9f23	CSIRO (Link to data)	Gippsland
	West GJ, Glasby (2021) Interpreting long-term patterns of seagrasses abundance: how seagrass variability is dependent on genus and estuary type. Estuaries and Coasts https://link.springer.com/article/10.1007/s12237-021-01026-w	NSW Department of Primary Industries	Wallis Lake (NSW) Port Stephens (NSW) Lake Macquarie (NSW) Brisbane Water (NSW) Hawkesbury River (NSW) Pittwater (NSW) Port Jackson (NSW) Botany Bay (NSW) Port Hacking (NSW) Jervis Bay (NSW) St Georges Basin (NSW) Batemans Bay (NSW) Wagonga Inlet (NSW) Bermagui River (NSW)

Receptor	Existing baseline monitoring	Source / Data Custodian	Spatial extent
			Merimbula Lake (NSW) Pambula Lake (NSW) Twofold Bay (NSW)
	Atlas of Life. South Coast Sea Slug Census	Atlas of Life (Link to website)	Bega Valley (NSW) Sapphire Coast (NSW)
	O'Hara T (2019). The Eastern Australian Marine Parks: Biodiversity, assemblage structure, diversity and origin. Report to Parks Australia from the National Environmental Science Program Marine Biodiversity Hub. Museums Victoria.	University of Tasmania (Link to report)	Coral Sea MP (QLD) Fraser Island (QLD) Moreton Bay (QLD) Byron Bay (NSW) Central East MP (NSW) Hunter MP (NSW) Newcastle (NSW) Jervis MP Bermagui (NSW) East Gippsland MP (Vic) Bass Strait Flinders MP (Bass Strait) Freycinet MP (Tas)
	Reef Watch	Victorian National Parks Association citizen-science program (Link to webpage)	Victoria
	Glasby T M, Gibson PT (2020). Decadal dynamics of subtidal barrens habitat. Marine Environmental Research, 154, 104869. https://doi.org/10.1016/j.marenvres.2019.104869	New South Wales Department of Primary Industries (Link to article)	New South Wales
	Phillips LR, Harcourt R, Malan N, Roughan M, Jonsen I, Cox M, Brierley AS, Slip D, Wilkins A, Carroll G (2022) Coastal seascape variability in the intensifying East Australian Current Southern Extension. Front. Mar. Sci. 9:925123. doi: 10.3389/fmars.2022.925123	Macquarie University (Link to article)	Batemans Marine Park
	NSW Government (2017) NSW coastal nearshore reef extent	NSW Government (Link to website)	New South Wales

Receptor	Existing baseline monitoring	Source / Data Custodian	Spatial extent
	NSW Government (2016) NSW Subtidal marine habitat data	NSW Government (Link to website)	New South Wales
Marine Fish	Knott N A, Williams J, D. Harasti D, Malcolm HA, Coleman MA, Kelaher BP, Rees MJ, Schultz A, Jordan A (2021) A coherent, representative, and bioregional marine reserve network shows consistent change in rocky reef fish assemblages. Ecosphere 12(4):e03447. 10.1002/ecs2.3447	New South Wales Department of Primary Industries (Link to article)	New South Wales
	Phillips LR, Harcourt R, Malan N, Roughan M, Jonsen I, Cox M, Brierley AS, Slip D, Wilkins A, Carroll G (2022) Coastal seascape variability in the intensifying East Australian Current Southern Extension. Front. Mar. Sci. 9:925123. doi: 10.3389/fmars.2022.925123		
Megafauna	Evans K, Charlton C, Watson M, Carlyon K, Double M (2021): NESP Project A13 - ARWPIC Right Whale sighting data summaries. .dataset.	University of Tasmania (Link to metadata)	Western Australia South Australia Victoria New South Wales Tasmania
	Australian Right Whale Phot-Identification Catalogue	Australian Antarctic Division (Link to catalogue)	Western Australia South Australia Victoria New South Wales Tasmania
	Seabirds to Seascapes Seal Survey 2024	NSW Government Environment and Heritage (Link to webpage)	Barrenjoey Headland (NSW) Montague Island (NSW) Seal Rocks Nature Reserve (NSW) Cabbage Tree Island (NSW) Martin Islet (NSW) Drum and Drumsticks (NSW) Steamers Head (NSW)
Birds	Studying seabirds: recording biodiversity above ocean waves	CSIRO (Link to article)	Australia wide
	Sutherland D, Dann P (2021) Gabo Island Little Penguin Survey October 2021. Phillip Island Nature Parks	Phillip Island Nature Parks	Gabo Island (Vic)

Receptor	Existing baseline monitoring	Source / Data Custodian	Spatial extent
	Ekanayake K (2023) Report on the 2022 Biennial Hooded Plover Population Count. (Report by BirdLife Australia)	BirdLife Australia (Link to report)	South Australia Victoria New South Wales Tasmania
	Carlile N, Harris A, Lloyd C (2020) 'Seabird Islands 2/1: Montague Island New South Wales – Additional breeding seabirds', Corella 44:71–73	NSW Department of Planning, Industry and Environment	Montague Island (NSW)
	Survey Seabirds annually on Montague Island	Montague Island Partners Group and NSW government	Montague Island (NSW)
	Phillips L, Carroll G (2023). Tracking of Little Penguins (*Eudyptula minor*) from Montague Islands, New South Wales coast, Australia (2012-2019). CSIRO National Collections and Marine Infrastructure (NCMI) Information and Data Centre (IDC). Occurrence dataset https://doi.org/10.15468/4fcktz accessed via GBIF.org on 2024-11-19.	Macquarie University (Link to dataset)	Montague Island (NSW)
	Phillips LR, Carroll G, Jonsen I, Harcourt R, Brierley AS, Wilkins A, Cox M. 2022 Variability in prey field structure drives inter-annual differences in prey encounter by a marine predator, the little penguin. R. Soc. Open Sci. 9: 220028. https://doi.org/10.1098/rsos.220028	Macquarie University (Link to article)	Montague Island (NSW)
	Cansse T, Lens L, Orben RA, Sutton GJ, Botha JA, Arnould JPY (2024) Partial migration pays off in black-faced cormorants: insights from post-breeding GPS tracking. Mar Biol 171, 213. https://doi.org/10.1007/s00227-024-04541-z	Deakin University (Link to article)	Notch Island (Bass Strait) Hogan Island (Bass Strait) Deal Island (Bass Strait) Lake Entrance (Vic) Gabo Island (Vic) Skerries Island (Vic)
	South Coast Shorebird Recovery Program	South Coast Shorebird Recovery Program (Link to website)	Bega Valley (NSW)