Addendum 2

CDN/ID S4111AF725810.1

# Operational and Scientific Monitoring Plan

## Addendum 2: Thylacine Installation and Commissioning EP

Review record (record the last 3 revisions here or the revisions required to achieve current approval version)

| Revision | Date | Reason for issue | Reviewer/s | Consolidator | Approver |
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**THE THREE WHATS**
**What** can go wrong?
**What** could cause it to go wrong?
**What** can I do to prevent it?

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# 1 Introduction

## 1.1 Purpose

This document is an addendum to the Offshore Victoria Operational and Scientific Monitoring Plan (OSMP) (CDN/ID S4100AH717908) to incorporate the Thylacine Subsea Installation and Commissioning EP (CDN/ID: S4121AF728393) activity. It provides a description of the:

- Worst-case spill scenarios;
- Matters of national environmental significance (MNES) within the environment that may be affected (EMBA) and predicted oil exposure from stochastic spill modelling;
- Environmental values and sensitivities of key areas within the EMBA and the operational and scientific monitoring studies that may be relevant to these areas;
- Priority planning areas for scientific studies; and
- Environmental monitoring implementation plan.

## 1.2 Environment that may be affected

The EMBA has been defined as an area where a change to ambient environmental conditions may potentially occur as a result of planned or unplanned activities. It is noted that a change does not always imply that an adverse impact will occur; for example, a change may be required over a particular exposure value or over a consistent period of time for a subsequent impact to occur. The EMBA defined for the Thylacine Subsea Installation and Commissioning EP is defined in Section 5.1 of the EP and shown in Figure 1-1.

## 1.3 Spill Scenarios

The credible worst-case spill scenario modelled for the EP was a surface release over six hours of 300 $m^3$ of marine diesel oil (MDO). The risk assessment for this scenario is included at Section 7.16 of the EP. Risks associated with response activities are assessed in Section 7.17. The oil spill trajectory modelling is included as Appendix D of the EP.

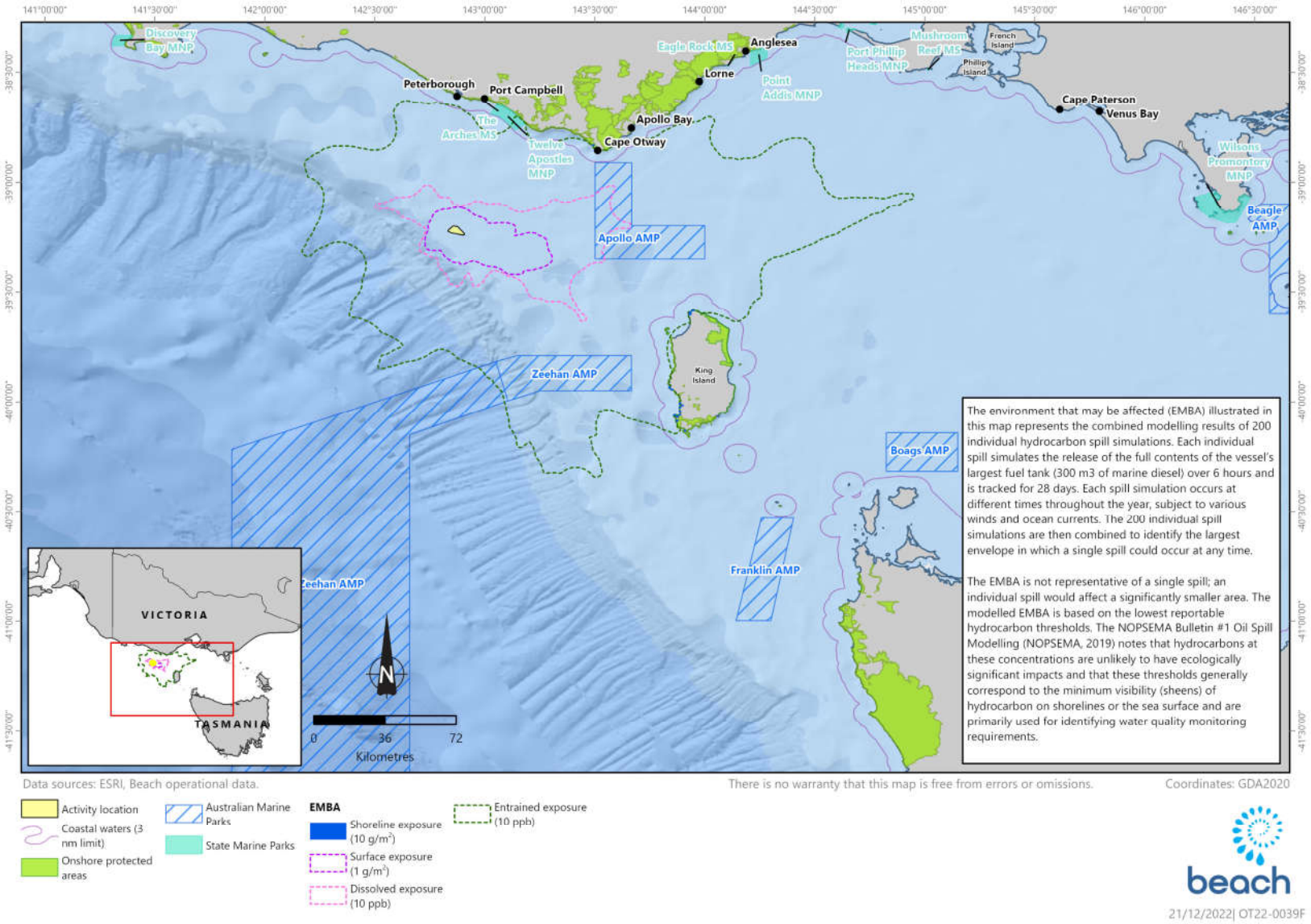


Figure 1-1: Environment that may be affected

## 2 Environmental Values and Sensitivities

Chapter 5 of the EP describes the environmental values and sensitivities within the EMBA. The information presented in this section is based on spatial extents of stochastic spill modelling (Section 1.3) and/or the EMBA and the MNES and other environmental features identified within the EP. The information is presented here as context for spill monitoring awareness and planning. It does not restrict the implementation of any monitoring of MNES (or other) features that may be affected by an actual spill event that are beyond the area of predicted oil exposure; i.e. once the relevant initiation criteria are met for an operational and/or scientific study, these can be implemented irrespective of previous modelling outcomes.

Table 2-1 provides a summary of environmental values and sensitivities of identified key areas within the EMBA. Key areas were determined as:

- Australian Marine Parks within the EMBA;
- Wetlands of International Importance (Ramsar wetlands) within the EMBA;
- Threatened ecological communities within the EMBA;
- Threatened or migratory species with a spatially defined biologically important area (BIA) within the EMBA;
- Key Ecological Features (KEFs) within the EMBA; and
- Other protected areas within the EMBA, including State protected marine and terrestrial areas, nationally important wetlands, and heritage features.

The description of values and sensitivities is summarised from Chapter 5 (Description of the Environment) of the EP.

Table 2-1: Environmental values and sensitivities of key areas within the EMBA that may be exposed to oil

| Key Area Location / Feature | Summary of Environmental Values and Sensitivities | Relevant Management Plan / Conservation Advice / Recovery Plan | Relevant Operational and Scientific Monitoring Studies |
|---|---|---|---|
| **Australian Marine Parks** | | | |
| Apollo Marine Park | • Ecosystems, habitats and communities associated with the Western Bass Strait Shelf Transition and the Bass Strait Shelf Province and associated with the seafloor features: deep/hole/valley and shelf<br>• Important migration area for blue, fin, sei and humpback whales<br>• Important foraging area for black-browed and shy albatross, Australasian gannet, short-tailed shearwater and crested tern<br>• Cultural and heritage site – wreck of the MV City of Rayville | South-east Commonwealth Marine Reserves Network Management Plan 2013-2023 | O2: Water quality<br>O3: Sediment quality<br>O4: Marine fauna surveillance<br>S1: Water quality impact assessment<br>S2: Sediment quality impact assessment<br>S3: Subtidal habitats impact assessment<br>S5: Marine fauna impact assessment<br>S7: Heritage and socioeconomic impact assessment |
| Zeehan Marine Park | • Examples of ecosystems, habitats and communities associated with the Tasmania Province, the West Tasmania Transition and the Western Bass Strait Shelf Transition and associated with the seafloor features: abyssal plain/deep ocean floor, canyon, deep/hole/valley, knoll/abyssal hill, shelf and slope<br>• Important migration area for blue and humpback whales<br>• Important foraging habitat for black-browed, wandering and shy albatrosses, and great-winged and cape petrels | | O2: Water quality<br>O3: Sediment quality<br>O4: Marine fauna surveillance<br>S1: Water quality impact assessment<br>S2: Sediment quality impact assessment<br>S3: Subtidal habitats impact assessment<br>S5: Marine fauna impact assessment |
| **State Marine Protected Areas** | | | |
| **Victoria (Marine National Parks)** | | | |
| Twelve Apostles Marine Park | • The area is representative of the Otway Bioregion and is characterised by a submarine network of towering canyons, caves, arches and walls with a large variety of seaweed and sponge gardens plus resident schools of reef fish. The park contains areas of calcarenite reef supporting the highest diversity of intertidal and sub-tidal invertebrates found on that rock type in Victoria | Management Plan for Twelve Apostles Marine National Park and The Arches Marine Sanctuary | |

| Key Area Location / Feature | Summary of Environmental Values and Sensitivities | Relevant Management Plan / Conservation Advice / Recovery Plan | Relevant Operational and Scientific Monitoring Studies |
|---|---|---|---|
| | • The park includes large sandy sub-tidal areas consisting of predominantly fine sand with some medium to coarse sand and shell fragment. Benthic sampling undertaken within the park in soft sediment habitats at 10 m, 20 m and 40 m water depths identified 31, 29 and 32 species respectively based upon a sample area of 0.1 $m^2$. These species were predominantly polychaetes, crustaceans and nematodes with the mean number of individuals decreasing with water depth.<br>• No visible macroalgae species were present within these soft sediment areas. These sandy expanses support high abundances of smaller animals such as worms, small molluscs and crustaceans; larger animals are less common. | | |
| **State Terrestrial Protected Areas** | | | |
| **Victoria (National Parks)** | | | |
| Great Otway National Park | • Mainland or island-based protected areas with a coastal interface that may be used as habitat for marine fauna (birds, pinnipeds etc)<br>• Where access is allowed, recreational activities may be present | Great Otway National Park and Otway Forest Park Management Plan | O3: Sediment quality<br>O4: Marine fauna surveillance<br>S2: Sediment quality impact assessment<br>S4: Intertidal and coastal habitats impact assessment<br>S5: Marine fauna impact assessment<br>S7: Heritage and socioeconomic impact assessment |
| Port Campbell National Park | | Port Campbell National Park Management Plan | |
| **Tasmania** | | | |
| Cape Wickham Conservation Area | | N/A | |
| Christmas Island Nature Reserve | | N/A | |
| New Year Island Game Reserve | | N/A | |
| Seal Rocks State Reserve | | N/A | |

| Key Area Location / Feature | Summary of Environmental Values and Sensitivities | Relevant Management Plan / Conservation Advice / Recovery Plan | Relevant Operational and Scientific Monitoring Studies |
|---|---|---|---|
| Disappointment Bay State Reserve | | N/A | |
| Cataraqui Point Conservation Area | | N/A | |
| Porky Beach Conservation Area | | N/A | |
| **Nationally Important Wetlands** | | | |
| Princetown Wetlands | • These wetlands consist of swamps of varying salinity on the floodplains of the Gellibrand River and its tributary, the Serpentine (Latrobe) Creek. Wetlands types present are a deep freshwater marsh, semi- permanent saline marshes and a shallow freshwater marsh<br>• The Princetown Wetlands have extensive beds of Common Reed *Phragmites australis* and meadows dominated by Beaded Glasswort which can support large numbers of water birds.<br>• A series of relict spits adjacent to the Gellibrand Estuary and a number of levee banks at various sites have State significance for their geomorphology. | N/A | O2: Water quality<br>O3: Sediment quality<br>O4: Marine fauna surveillance<br>S1: Water quality impact assessment<br>S2: Sediment quality impact assessment<br>S4: Intertidal and coastal habitats impact assessment<br>S5: Marine fauna impact assessment<br>S7: Heritage and socioeconomic impact assessment |
| **Threatened Ecological Communities** | | | |
| Assemblages of species associated with open-coast salt-wedge estuaries of western and central Victoria ecological community | • This ecological community is the assemblage of native plants, animals and micro-organisms associated with the dynamic salt-wedge estuary systems that occur within the temperate climate, microtidal regime (<2 m), high wave energy coastline of western and central Victoria. The ecological community currently encompasses 25 estuaries in the region defined by the border between South Australia and Victoria and the most southerly point of Wilsons Promontory. | Approved Conservation for the Assemblages of species associated with open-coast salt-wedge estuaries of western and central Victoria ecological community | O2: Water quality<br>O3: Sediment quality<br>S1: Water quality impact assessment<br>S2: Sediment quality impact assessment<br>S4: Intertidal and coastal habitats impact assessment |
| Giant Kelp Marine Forests of South East Australia | • Giant kelp (*Macrocystis pyrifera*) is a large brown alga that grows on rocky reefs in cold temperate waters off south east Australia. The kelp grows up from the sea floor 8 m below the sea surface and deeper, vertically toward the water surface. It is the foundation species of this | Approved Conservation Advice for Giant Kelp Marine Forests of South East Australia | O2: Water quality<br>O3: Sediment quality<br>S1: Water quality impact assessment |

| Key Area Location / Feature | Summary of Environmental Values and Sensitivities | Relevant Management Plan / Conservation Advice / Recovery Plan | Relevant Operational and Scientific Monitoring Studies |
|---|---|---|---|
| | TEC in shallow coastal marine ecological communities. The kelp species itself is not protected, rather, it is communities of closed or semi-closed giant kelp canopy at or below the sea surface that are protected<br>• The largest extent of the ecological community is in Tasmanian coastal waters; some patches may also be found in Victoria and South Australia.<br>• Surveys along the Otway Shelf from Warrnambool to Portland did not locate giant kelp at any site.<br>• Surveys of The Arches Marine Sanctuary and Twelve Apostles Marine National Park have not located giant kelp.<br>• The species has been recorded on King Island. | | S2: Sediment quality impact assessment<br>S3: Subtidal habitats impact assessment |
| Subtropical and Temperate Coastal Saltmarsh | • The coastal saltmarsh community consists mainly of salt-tolerant vegetation including grasses, herbs, sedges, rushes and shrubs. Succulent herbs, shrubs and grasses generally dominate, and vegetation is generally less than 0.5 m in height.<br>• The saltmarsh community is inhabited by a wide range of infaunal and epifaunal invertebrates and low and high tide visitors such as fish, birds and prawns<br>• It is often important nursery habitat for fish and prawn species. Insects are also abundance and an important food source for other fauna. The dominant marine residents are benthic invertebrates, including molluscs and crabs | Conservation Advice for Subtropical and Coastal Saltmarsh | O2: Water quality<br>O3: Sediment quality<br>S1: Water quality impact assessment<br>S2: Sediment quality impact assessment<br>S4: Intertidal and coastal habitats impact assessment |
| **Threatened or Migratory Fauna with BIAs** | | | |
| White Shark | • Vulnerable, migratory<br>• Foraging and distribution BIAs | Recovery Plan for the White Shark (*Carcharodon carcharias*) | O4: Marine fauna surveillance<br>S5: Marine fauna impact assessment |
| Southern Right Whale | • Endangered, migratory<br>• Aggregation, distribution, migration and resting, and connecting habitat BIAs<br>• Presence may occur from May to November | Conservation Management Plan for the Southern Right Whale, 2011-2021 | O4: Marine fauna surveillance<br>S5: Marine fauna impact assessment |

| Key Area Location / Feature | Summary of Environmental Values and Sensitivities | Relevant Management Plan / Conservation Advice / Recovery Plan | Relevant Operational and Scientific Monitoring Studies |
|---|---|---|---|
| Pygmy Blue Whale | • Endangered, migratory<br>• Foraging, foraging (annual high use area) and distribution BIAs<br>• Typically forage in the Otway region between January and April | Conservation Management Plan for the Blue Whale, 2015-2025 | O4: Marine fauna surveillance<br>S5: Marine fauna impact assessment |
| Antipodean Albatross | • Vulnerable, migratory<br>• Foraging BIA | National recovery plan for threatened albatrosses and giant petrels 2011-2016 | O4: Marine fauna surveillance<br>S5: Marine fauna impact assessment |
| Black-browed Albatross | • Vulnerable, migratory<br>• Foraging BIA | | |
| Buller's Albatross | • Vulnerable, migratory<br>• Foraging BIA | | |
| Campbell Albatross | • Vulnerable, migratory<br>• Foraging BIA | | |
| Indian Yellow-nosed Albatross | • Vulnerable, migratory<br>• Foraging BIA | | |
| Shy Albatross | • Vulnerable, migratory<br>• Foraging and breeding BIAs | | |
| Wandering Albatross | • Vulnerable, migratory<br>• Foraging BIA | | |
| Short-tailed Shearwater | • Migratory<br>• Foraging and breeding BIAs | Wildlife Conservation Plan for Seabirds (Commonwealth of Australia 2020) | O4: Marine fauna surveillance<br>S5: Marine fauna impact assessment |
| Wedge-tailed Shearwater | • Migratory<br>• Foraging BIA | | |
| Australasian gannet | • Foraging and aggregation BIAs | | |
| Black-faced cormorant | • Foraging and breeding BIAs | | |

| Key Area Location / Feature | Summary of Environmental Values and Sensitivities | Relevant Management Plan / Conservation Advice / Recovery Plan | Relevant Operational and Scientific Monitoring Studies |
|---|---|---|---|
| Common diving-petrel | • Foraging and breeding BIAs | | |
| Little Penguin | • Foraging and breeding BIAs | | |
| **Key Ecological Features** | | | |
| West Tasmanian Canyons | • An area of high productivity and aggregations of marine life.<br>• These canyons can influence currents, act as sinks for rich organic sediments and debris, and can trap waters or create upwellings that result in productivity and biodiversity hotspots.<br>• Sponges are concentrated near the canyon heads, with the greatest diversity between 200-350 m depth. Sponges are associated with abundance of fishes and the canyons support a diversity of sponges comparable to that of seamounts. | N/A | • O2: Water quality<br>• O3: Sediment quality<br>• S1: Water quality impact assessment<br>• S2: Sediment quality impact assessment<br>• S3: Subtidal habitats impact assessment |
| Shelf Rocky Reefs and Hard Substrates | • An area of high productivity and aggregations of marine life.<br>• Rocky reefs and hard grounds provide attachment sites for macroalgae and sessile invertebrates, increasing the structural diversity of shelf ecosystems. The reefs provide habitat and shelter for fish and are important for aggregations of biodiversity and enhanced productivity. | N/A | • O2: Water quality<br>• O3: Sediment quality<br>• S1: Water quality impact assessment<br>• S2: Sediment quality impact assessment<br>• S3: Subtidal habitats impact assessment |
| Bass Cascade | • An area of high productivity and aggregations of marine life.<br>• The mixing of water flows at the Bass Cascades can cause nutrient rich waters to rise, which in turn leads to increased primary productivity in those areas. The cascading water also concentrates nutrients and some fish and whales are known to aggregate along its leading edge. | N/A | • O2: Water quality<br>• O4: Marine fauna surveillance<br>• S1: Water quality impact assessment<br>• S5: Marine fauna impact assessment |

## 3 Priority Planning for Scientific Monitoring

Priority planning for scientific monitoring has been developed based on two elements: (i) sensitive areas that may be exposed within a short-period of time, and (ii) study scopes that have a short lead time on preparing an initial Sampling and Analysis Plan (SAP) for implementation.

Priority planning areas for potential scientific monitoring have been identified where the following criteria are met:

- Predicted time to exposure is ≤48 hours **or** distance from the Thylacine Installation and Commissioning EP activity area is ≤100 km, **and;**
- Any of the following sensitive environmental receptors are present:
    - Australian Marine Parks
    - State marine protected areas
    - National or internationally important wetlands
    - Mangrove or saltmarsh habitat
    - Known breeding/calving/nesting aggregation areas for protected (threatened or migratory) fauna
    - Known breeding/haul-out areas for pinnipeds
    - Threatened ecological communities; **and**
- Time given for preparation of an initial SAP for a particular scientific monitoring study is ≤48 hours.

Note, the time requirement is based upon the shortest time allowed (i.e., 48 hours) for the Monitoring Provider to prepare an initial SAP for a scientific monitoring study (as defined in the Offshore Victoria OSMP [CDN/ID S4100AH717908]).

The selection of sensitive environmental receptors is consistent with the receptors used in determining the onshore priority response planning areas within the OPEP, with the addition of marine protected areas (both Commonwealth and State).

The priority planning areas and relevant scientific monitoring scopes identified for spill scenarios that are relevant to the EP are detailed in Table 3-1. A series of checklists have been developed for these priority planning areas to assist in implementing scientific monitoring studies in these areas (Appendix A).

Table 3-1: Priority planning areas and scientific studies for the Thylacine Subsea Installation and Commissioning EP

| Sensitive Environmental Receptor | Priority Planning Area | Priority Scientific Studies |
|---|---|---|
| Australian Marine Parks | Apollo Marine Park | S1: Water quality impact assessment<br>S2: Sediment quality impact assessment |
| Victorian state marine protected areas | Twelve Apostles Marine National Park | |
| Tasmanian state marine protected areas | New Year Island Game Reserve | S1: Water quality impact assessment<br>S2: Sediment quality impact assessment |
| | Christmas Island Nature Reserve | |

| Sensitive Environmental Receptor | Priority Planning Area | Priority Scientific Studies |
|---|---|---|
| Nationally important wetlands | Princetown Wetlands | S1: Water quality impact assessment<br>S2: Sediment quality impact assessment |
| Sheltered tidal flats | None | |
| Mangrove habitat | None | |
| Saltmarsh habitat | Princetown Wetlands | S1: Water quality impact assessment<br>S2: Sediment quality impact assessment |
| Known breeding/calving/nesting aggregation areas for protected fauna | New Year Island (King Island), Christmas Island (King Island) (breeding/foraging BIA for little penguin) | S1: Water quality impact assessment<br>S2: Sediment quality impact assessment |
| Threatened ecological communities (Giant Kelp) | Twelve Apostles Marine National Park | S1: Water quality impact assessment<br>S2: Sediment quality impact assessment |
| Threatened ecological communities (Coastal Saltmarsh and/or Salt-wedge Assemblages) | Princetown Wetlands | S1: Water quality impact assessment<br>S2: Sediment quality impact assessment |
| Threatened ecological communities (Subtropical and temperate coastal saltmarsh) | Twelve Apostles Marine National Park | S1: Water quality impact assessment<br>S2: Sediment quality impact assessment |
| | King Island | S1: Water quality impact assessment<br>S2: Sediment quality impact assessment |

# 4 Implementation Plan

## 4.1 Activation

In the unlikely event of a Level 2 or Level 3 offshore spill event, operational and scientific monitoring studies will be initiated once the relevant criteria have been met (as defined in the Offshore Victoria OSMP [CDN/ID S4100AH717908]). The EMT Environment Leader (or delegate) will contact the Monitoring Provider Program Manager who will initiate their response.

## 4.2 Immediate response

Once notified, the Monitoring Provider Program Manager will confirm the availability of Study Leads, and specific sampling and analysis plans (SAPs) will be prepared based on the requirements of the individual spill event. Based on initiated studies and SAPs, personnel, equipment and mobilisation will commence.

## 4.3 Roles and responsibilities

The key roles and responsibilities for implementation of the OSMP are defined in Table 3-1 of the Offshore Victoria OSMP (CDN/ID S4100AH717908).

Key personnel within Beach with OSMP responsibilities during the activity are listed in Table 4-1.

The Monitoring Provider and associated personnel will be identified and activated on a case-by-case basis. RPS have confirmed they have a pool of suitably trained and competent personnel to utilise in the event of a Level 2 or Level 3 hydrocarbon spill event. An annual review is undertaken of the Beach operational and scientific monitoring capabilities to ensure that the Offshore Victoria OSMP can be effectively implemented. The key personnel for the monitoring scopes are listed in Table 4-2.

Table 4-1: Key Beach personnel for OSMP implementation

| Role | Name | Contact Details |
|---|---|---|
| Emergency Management Team (EMT) Leader | As per the on-call EMT Roster (refer to OPEP for details) | |
| EMT Environment Leader | As per the on-call EMT Roster (refer to OPEP for details) | |

Table 4-2: Key Monitoring Provider personnel for OSMP implementation

| Role | Name | Contact Details |
|---|---|---|
| Program Manager | Jeremy Fitzpatrick | 08 9211 1111<br>jeremy.fitzpatrick@rpsgroup.com.au |
| Study Lead/s | Jeremy Fitzpatrick | 08 9211 1111<br>jeremy.fitzpatrick@rpsgroup.com.au |
| | Kim Taylor | |
| | Dr Mike Mackie | |
| | Dr Matthew Fraser | |
| | Peter Crockett | |
| | Tamara Al-Hashimi | |

### 4.4 Capability, training and competency

Table 4-3 details the capability assessment for the implementation of the OSMP studies. It identifies the minimum number of personnel to manage and implement the OSMP studies and platforms (vessel, aircraft or vehicles) required to perform the studies. The studies have been grouped where appropriate to ensure effective use of resources.

The number of resources identified is based on:

- Deterministic scenarios from the modelling report (see Appendix D of the EP).
- higher concentrations of hydrocarbon are spatially limited to the vicinity of the release location (i.e. at the moderate exposure threshold of 10 g/m$^2$ the predicted surface exposure is up to a maximum of 24.5 km); however it is noted that lower concentrations that require monitoring do extend beyond these distances.

RPS have confirmed they have a pool of suitably trained and competent personnel to fulfil the requirements of the OSMP.

### 4.5 Sampling and Analysis Plans for Scientific Monitoring

Study S1 (water quality) and S2 (sediment quality) have implementation times of 72 hours once the study has been activated (refer to Offshore Victoria OSMP [CDN/ID S4100AH717908]). Due to the short implementation time, draft standard operating procedures (SOP) have been prepared and are attached here as Appendix B.

As the implementation times for the other scientific studies are longer (4–5 days), specific SAPs including SOP will be developed post-event by the Monitoring Provider. These will be based on the details provided in the Offshore Victoria OSMP (CDN/ID S4100AH717908) and made fit for purpose to the nature and scale of the actual spill event.

### 4.6 Study Logistics

All field logistics in regard to survey timing, scheduling and scope are subject to safe operating conditions in accordance with Beach (and/or their Monitoring Providers) health, environment and safety policies. This includes the requirements for any additional qualifications and training for field personnel (e.g., medicals, BOSIET, HUET, ADAS Level 2, Coxswains etc.)

### 4.7 Survey Schedule

Survey scheduling (in terms of locations and sampling order) will be at the discretion of the Study Lead taking into account existing and predicted oil distributions, proximity to environmental sensitivities and forecasted weather/sea state conditions.

### 4.8 Permits

The EMBA for the worst-case spill scenario extends through Commonwealth, Victorian and Tasmanian waters. The permits generally required by the governments are listed in Table 4-4. Permit applications require details on the samples to be collected (including timing, species, numbers, methods to be used etc.), and can take up to approximately six weeks for approval. However, in the event of an oil spill, this process is likely to expediated and/or given exemptions.

The Monitoring Provider will confirm the need for any permits during the development of an initial SAP once a spill event has occurred.

Table 4-3: OSMP Capability Needs Assessment

| Scope Description | Operational / Scientific Study | Study Lead | Field / Office Personnel | Platform |
|---|---|---|---|---|
| Program Manager | All | One Program Manager:<br>• Bachelor degree in environmental science/engineering (or equivalent)<br>• >20 years' experience in environmental practice<br>• Familiar OSMP and OPEP, as relevant | N/A | N/A |
| Oil, water and sediment sampling | O1: Oil characterisation and behaviour<br>O2: Water quality<br>O3: Sediment quality (offshore and intertidal)<br>S1: Water quality impact assessment<br>S2: Sediment quality impact assessment | One Study Lead:<br>• Bachelor degree in environmental science/engineering (or equivalent)<br>• >10 years' experience in environmental practice<br>• Familiar OSMP and OPEP, as relevant | Two vessel personnel:<br>• Bachelor degree in environmental science/engineering or equivalent<br>• >5 years' experience in environmental practice<br>• Experienced in the relevant sampling and/or recording techniques<br>• Familiar with oil, water and sediment sampling and recording techniques including insitu profiling).<br>One of the vessel personnel:<br>• Familiar with oil visual observations.<br>Two office personnel:<br>• Bachelor degree in environmental science/engineering or equivalent<br>• > 5 years' experience in environmental practice<br>• Experienced in water and sediment quality data analysis | Two vessels |
| Dispersant efficacy | O5: Dispersant efficacy<br>*Note: aerial surveillance requirements are detailed within the Monitor and Evaluate response within the OPEP* | One Study Lead:<br>• Bachelor degree in environmental science/engineering (or equivalent)<br>• >10 years' experience in environmental practice<br>• Familiar OSMP and OPEP, as relevant | Two vessel personnel:<br>• Familiar with vessel-based oil spill monitoring<br>• Familiar with relevant sampling techniques (e.g. sub-surface video surveillance, use of fluorometer, water sample collection)<br>One vessel personnel:<br>• Experience with ROV/UVA scopes<br>• Experience with air quality monitoring | One vessel |

| Scope Description | Operational / Scientific Study | Study Lead | Field / Office Personnel | Platform |
|---|---|---|---|---|
| Fish tainting, impact and recovery | O6: Fish tainting<br>S6: Fisheries impact assessment | One Study Lead:<br>• Bachelor degree in environmental science/engineering (or equivalent)<br>• >10 years' experience in environmental practice<br>• Familiar OSMP and OPEP, as relevant | One vessel personnel:<br>• Bachelor degree in environmental science/engineering or equivalent<br>• >5 years' experience in environmental practice<br>• Experienced in the relevant sampling and/or recording techniques (biological tissue sampling, sensory analysis)<br>One vessel personnel:<br>• Familiar with oil and water sampling and recording techniques (hydrocarbon sensory assessment, field biological tissue sampling)<br>• Trained and/or experienced olfactory analysts<br>One office personnel:<br>• Bachelor degree in environmental science/engineering or equivalent<br>• > 5 years' experience in environmental practice<br>• Experience in analysis and interpretation of biota data | One vessel |
| Intertidal and subtidal habitat impact and recovery | S3: Subtidal habitats impact assessment<br>S4: Intertidal and coastal habitats impact assessment | One Study Lead:<br>• Bachelor degree in environmental science/engineering (or equivalent)<br>• >10 years' experience in environmental practice<br>• Familiar OSMP and OPEP, as relevant | Four vessel personnel:<br>• Bachelor degree in environmental science/engineering or equivalent<br>• >5 years' experience in environmental practice<br>• Commercial dive qualifications<br>• Experienced in the relevant sampling and/or recording techniques<br>One vessel personnel:<br>• Experienced in commercial ROV operations<br>Two mainland personnel:<br>• Bachelor degree in environmental science/engineering or equivalent<br>• >5 years' experience in environmental practice<br>• Experienced in the relevant sampling and/or recording techniques<br>Two office personnel:<br>• Bachelor degree in environmental science/engineering or equivalent | Two vessels<br>One vehicle |

| Scope Description | Operational / Scientific Study | Study Lead | Field / Office Personnel | Platform |
|---|---|---|---|---|
| | | | • >5 years' experience in environmental practice<br>• Experienced in identification, analysis and interpretation of benthic habitat data and sediment quality data analysis | |
| Coastal habitat impact and recovery | O3: Sediment quality (shoreline)<br>S2: Sediment quality (shoreline) impact assessment<br>S4: Intertidal and coastal habitats impact assessment | One Study Lead:<br>• Bachelor degree in environmental science/engineering (or equivalent)<br>• >10 years' experience in environmental practice<br>Familiar OSMP and OPEP, as relevant | Four mainland personnel:<br>• Bachelor degree in environmental science/engineering or equivalent<br>• >5 years' experience in environmental practice<br>• Experienced in the relevant sampling and/or recording techniques<br>Two of the mainland personnel:<br>• Familiar with sediment sampling and recording techniques<br>Two office personnel:<br>• Bachelor degree in environmental science/engineering or equivalent<br>• >5 years' experience in environmental practice<br>Experienced in identification, analysis and interpretation of benthic habitat data and sediment quality data analysis | Two vehicles |
| Marine fauna surveillance, impact and recovery | O4: Marine fauna surveillance<br>S5: Marine fauna impact assessment<br>*Note:*<br>*Aerial surveillance requirements are detailed within the Monitor and Evaluate response within the OPEP*<br>*Oiled, injured, and diseased fauna handling to be undertaken by trained personnel resources are* | Two Study Leads (one for seabirds/shorebirds and one for marine megafauna (marine mammals, sharks, reptiles):<br>• Bachelor degree in environmental science/engineering (or equivalent)<br>• >10 years' experience in environmental practice<br>• Familiar OSMP and OPEP, as relevant | Four vessel personnel:<br>• Bachelor degree in environmental science/engineering or equivalent<br>• >5 years' experience in environmental practice<br>• Experienced in the relevant sampling and/or recording techniques<br>• Familiar with fauna observation and recording techniques<br>One of the vessel personnel:<br>• Familiar with tissue sampling, storage and preservation<br>One of the vessel personnel:<br>• Experienced with ROV/UVA scopes<br>Four field personnel seabird/shorebird:<br>• Bachelor degree in environmental science/engineering or equivalent<br>• >5 years' experience in environmental practice | One Vessel<br>Two vehicles |

| Scope Description | Operational / Scientific Study | Study Lead | Field / Office Personnel | Platform |
|---|---|---|---|---|
| | *detailed in Oiled Wildlife Response within the OPEP* | | • Experienced in the relevant sampling and/or recording techniques<br>Two office personnel:<br>• Bachelor degree in environmental science/engineering or equivalent<br>• >5 years' experience in environmental practice<br>• Experience in identification, analysis and interpretation of biota data<br>Two office personnel:<br>• Experienced with remote sensing scopes | |
| Heritage and socio-economic | S7: Heritage and socioeconomic impact assessment | One Study Lead:<br>• Bachelor degree in environmental science/engineering (or equivalent)<br>• >10 years' experience in environmental practice<br>• Familiar OSMP and OPEP, as relevant | Desktop Assessment -<br>One office personnel:<br>• Bachelor degree in environmental or social science or equivalent<br>• >10 years' experience in environmental/social practice<br>• Experienced in interpretation and management of heritage, social and economic data | N/A |
| | | | Field Sampling -<br>Four vessel personnel:<br>• Bachelor degree in environmental science/engineering or equivalent<br>• >5 years' experience in environmental practice<br>• Commercial dive qualifications<br>• Experienced in the relevant sampling and/or recording techniques<br>One vessel personnel:<br>• Experienced in commercial ROV operations<br>Two mainland personnel:<br>• Bachelor degree in environmental science/engineering or equivalent<br>• >5 years' experience in environmental practice<br>• Experienced in the relevant sampling and/or recording techniques<br>One office personnel: | One vessel<br>Two vehicles |

| Scope Description | Operational / Scientific Study | Study Lead | Field / Office Personnel | Platform |
|---|---|---|---|---|
| | | | • Bachelor degree in environmental or social science or equivalent<br>• >10 years' experience in environmental practice<br>• Experienced in interpretation and management of heritage, social and economic data<br>Two office personnel:<br>• Bachelor degree in environmental science/engineering or equivalent<br>• >5 years' experience in environmental practice | |

Table 4-4: Permits that may be required for scientific monitoring

| Permit | Relevance | Legislation | Government Agency |
|---|---|---|---|
| **Commonwealth** | | | |
| General Permit Application for:<br>• threatened species and ecological communities<br>• migratory species<br>• whales and dolphins<br>• listed marine species | Required for matters for scientific sampling for matters listed under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) | EPBC Act | Department of Climate Change, Energy, the Environment and Water (DCCEEW) |
| Access to Biological Resources in a Commonwealth Area for Non-Commercial Purposes | An applicant must obtain written permission from each Access Provider. The Access Provider must state permission for the applicant to:<br>• enter the Commonwealth area<br>• take samples from the biological resources of the area<br>• remove samples from the area | EPBC Act | DCCEEW |
| **Victoria** | | | |
| Application for a scientific permit to conduct research in areas managed under the *National Parks Act 1975* | Required for any research activity in marine and intertidal parks protected under Victorian legislation | *National Parks Act 1975* | Department of Environment, Land, Water and Planning (DELWP) |
| Application for a scientific permit | Required for any research involving fauna subject to the *Wildlife Act 1975* | *Wildlife Act 1975* | DELWP |
| **Tasmania** | | | |
| Application for a scientific permit to collect or disturb native fauna | A scientific permit is usually required for any research involving the collection or disturbance of protected wildlife, and the collection of protected wildlife products in Tasmania. | *Nature Conservation Act 2002* | Department of Primary Industries, Parks, Water and the Environment (DPIPWE) |
| Fishery Permit Application | A Fishery Permit Application is required for the taking of marine fish (including marine invertebrates) for scientific research. | *Living Marine Resources Management Act 1995* | DPIPWE |

| Permit | Relevance | Legislation | Government Agency |
|---|---|---|---|
| Animal Ethics Committee approval | If intending to take or disturb living vertebrate or higher invertebrate wildlife, then Animal Ethics Committee approval from a licensed institution is required. | *Animal Welfare Act 1993* | DPIPWE |

# Appendix A Scientific Monitoring Priority Planning Area Summaries

## A. 1. Apollo Marine Park

| Element | Description | |
|---|---|---|
| Potential oil exposure | Surface, Entrained, Dissolved | |
| Priority scientific studies | S1: Water quality impact assessment | Refer to Appendix B for SOP<br>Given location of Marine Park in relation to the spill source, a linear / grid sampling design is considered appropriate, including samples from both within and external to the boundaries of the Marine Park<br>Sample design to be confirmed by Monitoring Provider prior to implementation |
| | S2: Sediment quality impact assessment | Refer to Appendix B for SOP<br>Given location of Marine Park in relation to the spill source, a linear / grid sampling design is considered appropriate, including samples from both within and external to the boundaries of the Marine Park<br>Sample design to be confirmed by Monitoring Provider prior to implementation |
| Other scientific studies that may be implemented at the site | S3: Subtidal habitats impact assessment | SOP to be developed post-spill; refer to Offshore Victoria OSMP for relevant guides |
| | S5: Marine fauna impact assessment | SOP to be developed post-spill; refer to Offshore Victoria OSMP for relevant guides |
| | S7: Heritage and socioeconomic impact assessment | SOP to be developed post-spill; refer to Offshore Victoria OSMP for relevant guides |
| Management Plans | South-east Commonwealth Marine Reserves Network Management Plan 2013-2023 | Strategy 3 is based on protection of conservation values from detrimental impacts from environmental incidents; includes requirements for reporting and collaboration with government agencies during response<br>Listed outcomes include:<br>• Impacts associated with environmental incidents are identified and managed appropriately.<br>• Systems for timely reporting of and collaboration on responses to environmental incidents are effective |
| | Approved Conservation Advice for Giant Kelp Marine Forests of South East Australia | Change in water quality (although listed from other sources) is identified as a threat<br>No specific actions for a post-impact change in water quality listed<br>General actions to monitor changes in condition and extent |

### A. 2. Twelve Apostles Marine National Park

| Element | Description | |
|---|---|---|
| Potential oil exposure | Shoreline, Entrained, Dissolved | |
| Priority scientific studies | S1: Water quality impact assessment | Refer to Appendix B for SOP<br>Given location of Marine Park in relation to the spill source, a linear / grid sampling design is considered appropriate, including samples from both within and external to the boundaries of the Marine Park<br>Sample design to be confirmed by Monitoring Provider prior to implementation |
| | S2: Sediment quality impact assessment | Refer to Appendix B for SOP<br>Given location of Marine Park in relation to the spill source, a linear / grid sampling design is considered appropriate, including samples from both within and external to the boundaries of the Marine Park<br>If shoreline sampling is required, cross-shore beach profiles from intertidal to above high-water mark<br>Sample design to be confirmed by Monitoring Provider prior to implementation |
| Other scientific studies that may be implemented at the site | S3: Subtidal habitats impact assessment | SOP to be developed post-spill; refer to Offshore Victoria OSMP for relevant guides |
| | S4: Intertidal habitats impact assessment | SOP to be developed post-spill; refer to Offshore Victoria OSMP for relevant guides |
| | S5: Marine fauna impact assessment | SOP to be developed post-spill; refer to Offshore Victoria OSMP for relevant guides |
| | S7: Heritage and socioeconomic impact assessment | SOP to be developed post-spill; refer to Offshore Victoria OSMP for relevant guides |
| Management Plans | Twelve Apostles Marine National Park and the Arches Marine Sanctuary Management Plan | No specific management actions |
| | Approved Conservation Advice for Giant Kelp Marine Forests of South East Australia | Change in water quality (although listed from other sources) is identified as a threat<br>Priority actions include those around habitat loss, disturbance and modification; including monitoring progress of recovery through mapping, extent and condition assessments |

### A. 3. Princetown Wetlands

| Element | Description | |
|---|---|---|
| Potential oil exposure | Shoreline, Entrained, Dissolved | |
| Priority scientific studies | S1: Water quality impact assessment | Refer to Appendix B for SOP<br>Given location of wetland in relation to the spill source, a linear sampling design is considered appropriate, with samples taken along an inshore-offshore gradient and including samples from both within and external to the boundaries of the wetland<br>Sample design to be confirmed by Monitoring Provider prior to implementation |
| | S2: Sediment quality impact assessment | Refer to Appendix B for SOP<br>Given location of wetland in relation to the spill source, a linear sampling design is considered appropriate, with samples taken along an inshore-offshore gradient and including samples from both within and external to the boundaries of the wetland<br>If shoreline sampling is required, cross-shore beach profiles from intertidal to above high-water mark<br>Sample design to be confirmed by Monitoring Provider prior to implementation |
| Other scientific studies that may be implemented at the site | S4: Intertidal and coastal habitats impact assessment | SOP to be developed post-spill; refer to Offshore Victoria OSMP for relevant guides |
| | S5: Marine fauna impact assessment | SOP to be developed post-spill; refer to Offshore Victoria OSMP for relevant guides |
| | S7: Heritage and socioeconomic impact assessment | SOP to be developed post-spill; refer to Offshore Victoria OSMP for relevant guides |
| Management Plans | Conservation Advice for Subtropical and Coastal Saltmarsh | Pollution from oil spill events are identified as a threat<br>Actions for this TEC include identifying coastal saltmarsh as important habitat in all oil spill contingency planning and monitor the application of protocols on the management of spills involving saltmarshes |
| | Approved Conservation for the Assemblages of species associated with open-coast salt-wedge estuaries of western and central Victoria ecological community | Change in water quality (although listed from other sources) is identified as a threat<br>No specific actions for a post-impact change in water quality listed<br>General activities to monitor changes in condition |

## Appendix B Standard Operating Procedures for Water and Sediment Sampling

The Monitoring Provider will review and confirm / update these SOP to ensure they are fit for purpose for the nature and scale of the spill event prior to the SAP being finalised and sampling commencing.

### B. 1. Water Sampling – Surface Waters

The number of water samples will be determined on an ad hoc basis, depending on the nature of the spill, the distribution of the spill in relation to sensitive receivers, the availability of resources on site (i.e. vessel availability) and coordination with others responding to the spill (e.g. Australian Maritime Safety Authority).

Triplicate seawater samples will be collected from impact and control sites. Surface water samples will be collected using a marine grade stainless steel bucket from an available support vessel. Subsurface water samples will be collected using Niskin bottles deployed to the appropriate sample depth. The appropriate sample depth should be determined on site in consultation with other agencies, with regard to the modelled distribution of entrained hydrocarbons and a consideration of potential sensitive receivers. Samples will be collected at a range of depths. As a minimum, samples will be collected from 0.5 m below the surface, 0.5 m above the seabed, and in mid water.

Surface water sampling should be conducted as per the following instructions:

1. Prior to deployment, liaise with the vessel crew to ensure that all personnel are familiar with the planned operation.
2. After reviewing the Decon 90 Material Safety Data Sheet (MSDS), clean the sampling bucket using Decon 90, ensuring you are wearing appropriate PPE, including:
    a. high visibility clothing
    b. safety boots
    c. Personal Floatation Device (PFD) if working on the deck
    d. hard hat (if working on the deck)
    e. safety glasses
    f. nitrile gloves.
3. Rinse the sample bucket thoroughly with deionised water once cleaned with Decon 90.
4. Confirm with the deck supervisor and vessel master that the vessel is on station and is prepared for sampling to proceed.
5. Ensure the sampling location is free of potential sources of contamination, including:
    a. grease and oils
    b. overhead wires
    c. exhaust fumes (e.g. incinerators, engine exhaust, cigarette smoke, etc.)
    d. vessel discharges (e.g. ballast water, grey water, sullage, etc.)
6. Ensure the sampling location is free of entanglement risks (e.g. propellers, thrusters, etc.).
7. Ensure the sampling location is safe (guard rails in place, life ring available), and that weather conditions are suitable for sampling.
8. Prepare the sample containers by labelling them appropriately and completing any required field documentation.
9. Ensure one end of the rope is securely attached to the sampling bucket and the other end to the vessel.
10. Lower the bucket into the water, let the bucket fill and haul it back on board.
11. Once the sample is on board, put on a clean pair of nitrile gloves and collect the water samples using the laboratory sample containers provided. Attempt to collect primarily water in the larger bottles and primarily oil in the smaller bottle. Do not sample rinse the bottles and cap them immediately upon collecting the sample.
12. Once collected, ensure that samples are clearly labelled and stored in the refrigerator.
13. Clean the sampling bucket using Decon 90 (see item 2 above for details) and rinse with deionised water.

**B. 2. Water Sampling – Subsurface Waters**

Subsurface water sampling will be conducted using Niskin bottles, deployed at appropriate depths. The three 10 L Niskin bottles have Teflon coating and external springs making them suitable for trace and heavy metals and hydrocarbons. The number of Niskin bottles casts and the amount of bulk water needed will depend on the sampling design. Ensure all staff review and sign the water quality sampling JHA.

Niskin samples will be collected in accordance with the following procedure:

1. Prior to deployment, liaise with the vessel crew to ensure that all personnel are familiar with the planned operation.
2. After reviewing the Decon 90 Material Safety Data Sheet (MSDS), clean the Niskin bottles using Decon 90, ensuring you are wearing appropriate PPE, including:
    a. high visibility clothing
    b. safety boots
    c. Personal Floatation Device (PFD) if working on the deck
    d. hard hat (if working on the deck)
    e. safety glasses
    f. nitrile gloves
3. Rinse the Niskin bottles thoroughly with deionised water once cleaned with Decon 90. If possible, fill the Niskin bottles with uncontaminated seawater and allow then to sit prior to sampling.
4. Confirm with the deck supervisor and vessel master that the vessel is on station and is prepared for sampling to proceed.
5. Ensure the sampling location is free of potential sources of contamination, including:
    a. grease and oils
    b. overhead wires
    c. exhaust fumes (e.g. incinerators, engine exhaust, cigarette smoke etc.)
    d. vessel discharges (e.g. ballast water, grey water, sullage, etc.).
6. Ensure the sampling location is free of entanglement risks (e.g. propellers, thrusters, etc.).
7. Ensure the sampling location is safe (guard rails in place, life ring available), and that weather conditions are suitable for sampling.
8. Ensure one end of the rope is securely attached to the sampling bucket and the other end to the vessel.
9. Ensure the winch line is clean, smooth and has no broken wires or other things that could obstruct the messenger going down the line.
10. Attach the clump weight to the end of the winch line, approx. 10 – 20 kg (consider current at site).
11. Attach the bottom or deepest bottle 1.5–3 m above the weight.
12. Ensure top air bleed is closed, nozzle is pulled out and the bottle is open or set to sample.
13. Before firing the bottles at depth, allow the bottles to flush with sea water for 1–2 minutes at the sample depth.
14. Send the messenger down the line with enough force that it is going to travel directly down the line.
15. You can keep your hand on the line to feel each bottle close. You should be able to feel a tug on the line as the bottle fires.
16. Raise winch line slowly to retrieve bottles.
17. Take care when removing bottles from the winch line as they will be heavy, and care should be taken not too accidently open the bottles.
18. Decant sea water from the Niskin bottle directly into sample containers.
19. When using carboys, carboys should be rinsed three times with a small amount of the sample water prior to filing with the sample.
20. Prepare the sample containers by labelling them appropriately and completing any required field documentation.
21. Lower the bucket into the water, let the bucket fill and haul it back onboard.

22. Once the sample is onboard, put on a clean pair of nitrile gloves and collect the water samples using the laboratory sample containers provided. Attempt to collect primarily water in the larger bottles and primarily oil in the smaller bottle. Do not sample rinse the bottles and cap them immediately upon collecting the sample.
23. Once collected, ensure samples are clearly labelled and stored in a refrigerator.
24. Clean the sampling bucket using Decon 90 (see item 2 above for details) and rinse with deionised water.

### B. 3. Sediment Sampling

Sediment samples will be collected using a van Veen sediment grab (or similar sediment sampling device). Prior to taking a grab sample clean the grab using detergent and a scrubbing brush. Be sure to remove any material adhering to the grab. Ensure all staff review and sign the grab sampling JHA. Sediment samples will be collected in accordance with the following procedure:

Note that the vessel crew will operate the grab with assistance from RPS staff and the winch will be operated by vessel crew. Prior to taking a grab sample clean the grab using detergent and a scrubbing brush. Be sure to remove any material adhering to the grab.

1. Prior to deployment, liaise with the vessel crew to ensure that all personnel are familiar with the planned operation and that clear lines of communication are available.
2. Prepare the grab on the deck, making sure it is securely attached to the vessel winch cable. Mouse any shackles to ensure pin does not come undone under load. Be VERY careful around the grab - always keep clear of the grab jaws. Assume that they may trigger at any time.
3. Take care when the grab is off the deck. NEVER stand under the grab. Check all shackles, etc. before lifting grab off deck. Use strops if required to stabilise the grab.
4. Lower the grab to the seabed, it will trigger when the cable goes slack.
5. Bring the grab to the surface and ensure the sample is sufficient. If the grab begins to swing, lower the grab into the sea to dampen the motion.
6. Open the jaws of the grab slightly to allow emptying of surplus water from the sediment sample but try not to let the fine sediments wash away.
7. Once drained of all free water, open grab completely and empty contents onto a tarpaulin on the deck. Note: due to the mechanics of the grab when opening, surface sediments may be concentrated towards the middle of the sample.
8. Collect a sample of the surface sediments by scraping the 250 ml sample jars through the sediments. Be mindful of contamination sources and ensure that all staff handling samples are wearing clean nitrile gloves.
9. Securely stow the grab onboard when not in use.

### B. 4. Cleaning and Care

Niskin bottles should be cleaned with Decon 90 before the sampling trip. Once in the field the bottles should be soaked in sea water. This can be done by attaching the Niskin bottles to the winch line and lowering off the vessel. If time permits, allow the bottles to soak for at least one hour. Avoid touching the internal parts of the Niskin bottle or sampling bucket. Ideally Niskin bottles should be stored upright in racks on the vessel. Take care to store equipment away from potential sources of contamination.

### B. 5. Chain of Custody

All samples submitted for analysis will be accompanied by a Chain of Custody (CoC) form. The CoC form will accompany samples during transport and delivery. The form will be signed with the time and date recorded by each individual responsible for the samples including RPS staff and laboratory personnel. Upon each exchange, the CoC form is countersigned and duplicated by the relinquisher. The recipient retains the original. When samples are received by the

laboratory, a duplicate of the original will be issued to RPS confirming arrival. The CoC allows RPS to track the samples and ensure that samples arrive at the intended destinations on schedule.

### B. 6. Sample Transport and Storage

Water and sediment samples should be transported as soon as practicable to a nominated laboratory (refer to the OSMP Implementation Plan) in appropriate containers (eskies) with ice bricks. The holding times for all samples are 7 days. Samples must be provided to the analytical laboratory within this time period. Liaise with RPS staff regarding sample transport, etc., as outlined in the personnel section of the OSMP Implementation Plan.

The proposed analyses to be undertaken by the primary analytical laboratory are total petroleum hydrocarbons (TPH) and polycyclic aromatic hydrocarbons (PAH) for both sediments and water.