Offshore Victoria Operational and Scientific Monitoring Plan

Sole: VIC/L32, VIC/PL006401(V), VIC/PL43

Patricia Baleen: VIC/RL16, VIC/PL31(V), VIC/PL31

Basker Manta Gummy: VIC/RL13

Casino Henry Netherby: VIC/L24, VIC/L30, VIC/PL37, VIC/PL37(V), VIC/PL42

Juliet Elanora/Isabella Nestor: VIC/L24, VIC/L30, VIC/P76

Projects & Operations | Offshore Victoria | OSMP

Document Control

Approvals		Role	Signature	Document Control
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Revision History

Rev	Issue Date	Revision summary	Originator	Reviewer	Approver
6	03/09/2024	Updated to reflect new locations and state response information.	Consultant	Senior Environment Advisor	Manager Environment and Sustainability
5	21/06/2023	Updated to reflect changes to Sc's. Updated to reflect changes in government departments.	Consultant	Senior Environment Advisor	Manager Environment and Sustainability
4	25/10/21	Update for inclusion of BMG Closure Project (Phase 1) activities	Consultant	HSEC Coordinator	Manager Environment and Sustainability
3	2019	Updated to be relevant to all Victorian assets and activities. Updated for NOPSEMA RFFWI (Gippsland Operations) and OMR (Otway Drilling). Updated for NOPSEMA audit outcomes.	Consultant	HSEC Coordinator	Manager Environment and Sustainability
2	31/05/17	Updated for NOPSEMA (RFFWI)	Consultant	HSEC Coordinator	General Manager – HSE and Technical Assurance
1	27/04/17	Updated for NOPSEMA (RFFWI) on BMG NPP EP	Consultant	HSEC Coordinator	General Manager – HSE and Technical Assurance
0	27/02/17	Issued to NOPSEMA	Consultant	HSEC Coordinator	General Manager – HSE and Technical Assurance

Approvals

This Operational and Scientific Monitoring Plan has been approved by Cooper Energy for Offshore Victoria.

Name	Signature	Date
Manager Environment and Sustainability **Cooper Energy Limited**		

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Glossary

Item	Description
AFMA	Australian Fisheries Management Authority (Cth)
AMOSC	Australian Marine Oil Spill Centre
AMSA	Australian Maritime Safety Authority
ANZECC	Australian and New Zealand Environment and Conservation Council
ANZG	Australian & New Zealand Guidelines for fresh & Marine Water quality
ARMCANZ	Agriculture and Resource Management Council of Australia and New Zealand
BACI	Before/After and Control/Impact
BAOAC	Bonn Agreement Oil Appearance Code
BMG	Basker Manta Gummy
BTEXN	Benzene, Toluene, Ethyl-Benzene, Xylene and Naphthalene
CHN	Casino Henry Netherby
CoC	Chain of Custody
CSIRO	Commonwealth Scientific and Research Organisation
CV	Curriculum Vitae
DAFF	Department of Agriculture, Fisheries and Forestry
DCCEEW	Department of Climate Change, Energy, Environment and Water
DEECA	Department of Energy, Environment and Climate Action (Vic) (formerly DELWP)
DEWHA	Department of Environment, Water, Heritage and the Arts (now DCCEEW)
DPI	Department of Primary Industries
DPIPWE	Department of Primary Industries, Parks, Water and the Environment (Tas) (now NRE)
DTP	Department of Transport and Planning (Vic); Control Agency State Waters. (formerly DoT)
EIA	Environmental Impact Assessment
EP	Environment Plan
EPA	Environmental Protection Authority
EPO	Environmental Performance Outcome
IC	Incident Controller
IMT	Incident Management Team
IP	Implementation Plan
JHA	Job Hazard Assessment
MAH	Mono-aromatic hydrocarbons
MDO	Marine Diesel Oil
MNES	Matters of National Environmental Significance
MP	Monitoring Personnel
NATA	National Association of Testing Authorities
NEBA	Net Environmental Benefit Assessment
NOPSEMA	National Offshore Petroleum Safety and Environmental Management Authority (Cth)
NPP	Non-Production Phase
NRE	Department of Natural Resources and Environment (Tasmania) (formerly DPIPWE)
NSW	New South Wales
Op	Operational
OPEP	Oil Pollution Emergency Plan
OPGGS Act	*Offshore Petroleum and Greenhouse Gas Storage Act, 2006*
OPGGS(E)R	*Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations, 2009 (Com)*

Item	Description
OPGGSR	*Offshore Petroleum and Greenhouse Gas Storage Regulations, 2011 (Vic)*
OSMP	Operational and Scientific Monitoring Plan
OSRA	Oil Spill Response Atlas
OWR	Oiled Wildlife Response
PB	Patricia Baleen (asset)
PAH	Poly-aromatic Hydrocarbons
PI	Principal Investigator
QA/QC	Quality Assurance/Quality Control
RAMSAR	Ramsar Convention (1971) - Convention on Wetlands of International Importance
Sc	Scientific
SCAT	Shoreline Clean-up Assessment Team
SINTEF	The Foundation for Scientific and Industrial Research (Norway)
SMART	Special Monitoring of Applied Response Technologies
VFA	Victorian Fisheries Authority
WHAM	Wildlife Health and Marine

References

Document code	Title
VIC-ER-EMP-0001	Offshore Victoria Oil Pollution Emergency Plan
VGB-EN-EMP-0004	Gippsland Offshore Operations Environment Plan Summary
CHN-EN-EMP-0003	Casino-Henry-Netherby Environment Plan Summary
TBA	Athena Supply Project Environment Plan
COE-EN-EMP-0001	Description of the Environment
BMG-DC-EMP-0001	BMG Closure Project (Phase 1) Environment Plan
BMG-ER-EMP-0004	BMG Closure Project (Phase 1) Oil Pollution Emergency Plan

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1 Scope

This Operational and Scientific Monitoring Plan (OSMP) (VIC-ER-EMP-0002) has been prepared to support Cooper Energy's assets and activities in offshore Victorian waters.

The OSMP consolidates Cooper Energy's monitoring response to all Level 2 and Level 3 hydrocarbon spill risks across the Gippsland Basin (Patricia-Baleen (PB), Basker Manta Gummy (BMG), and Sole) and Otway Basin (Casino, Henry, Netherby, Elanora/Isabella, Juliet and Nestor) (

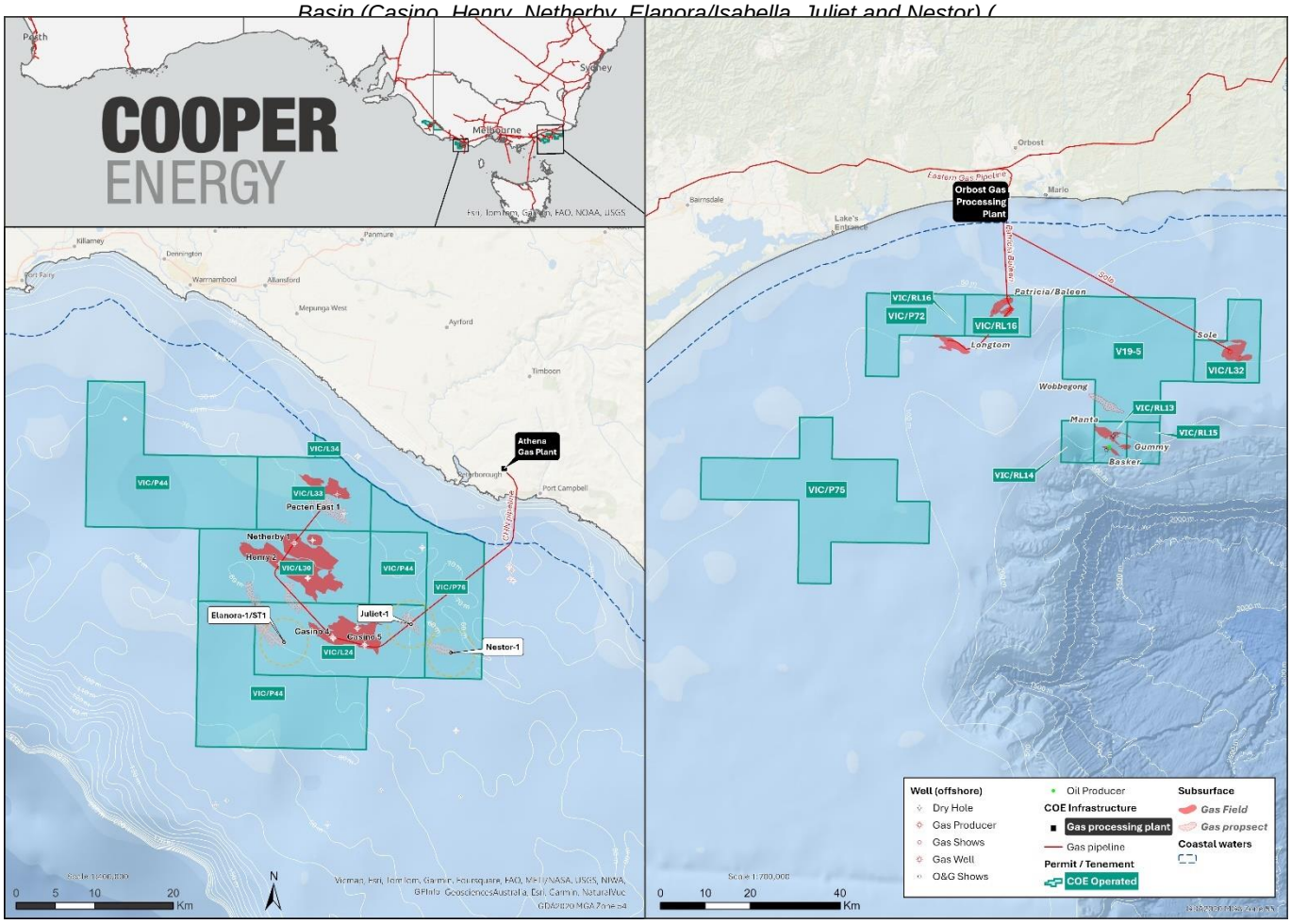

Figure 1-1) and associated petroleum activities.

This document is supported by the Offshore Victorian OSMP Addendum Logistics and Coordination Plan (VIC-ER-EMP-0003).

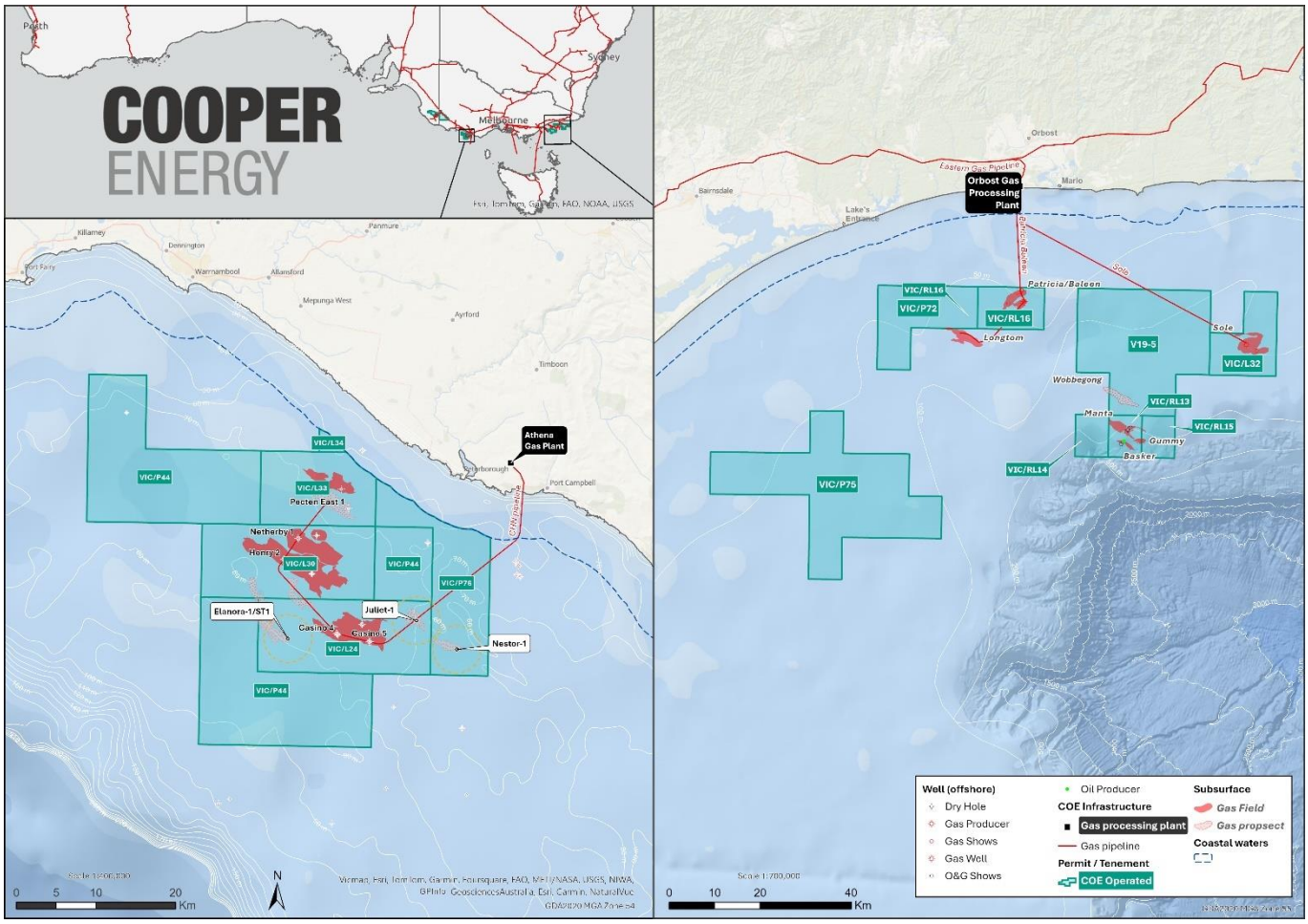

Figure 1-1: Cooper Energy's offshore Victoria assets

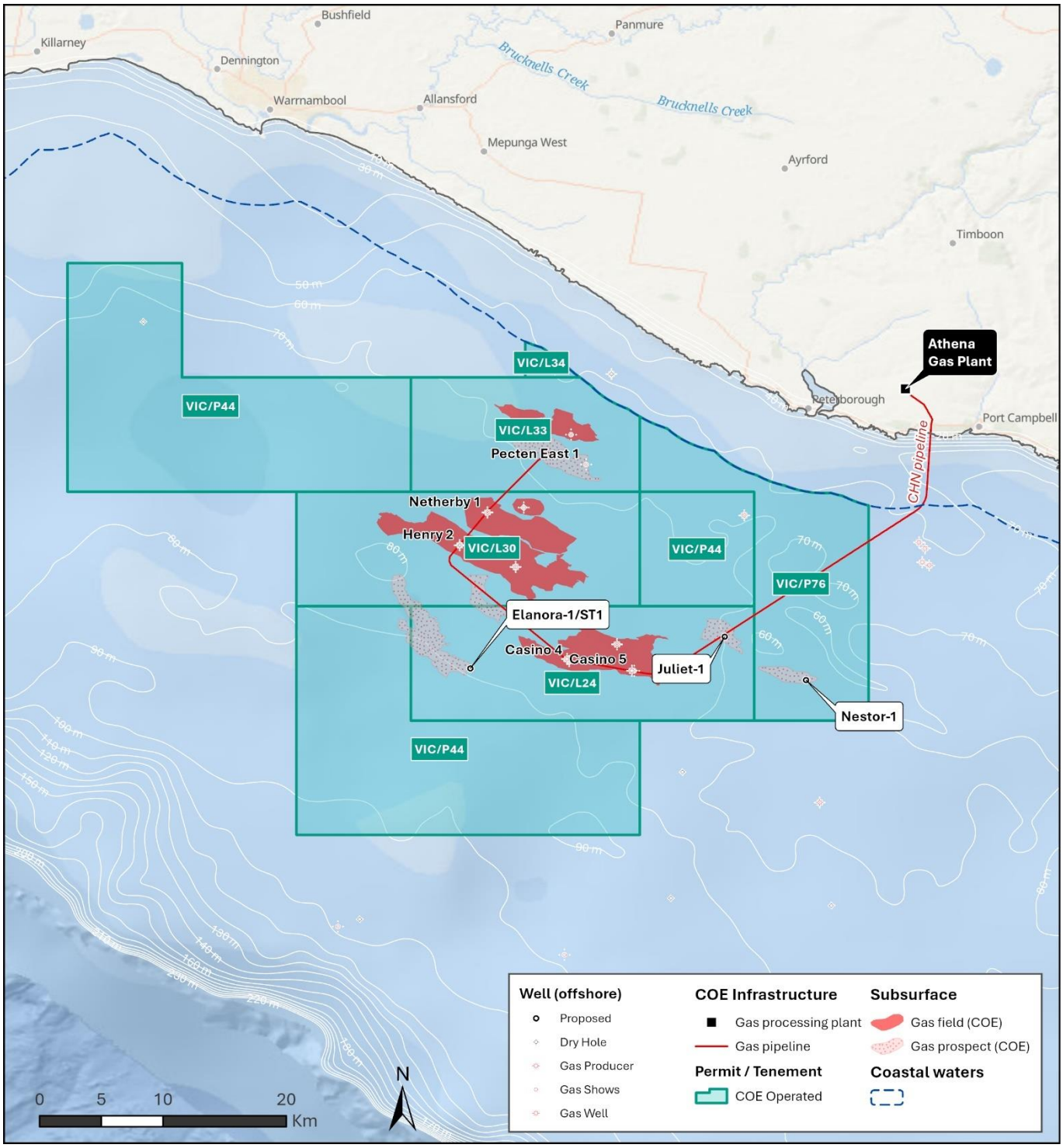

Figure 1-2: Existing Offshore Otway Facilities

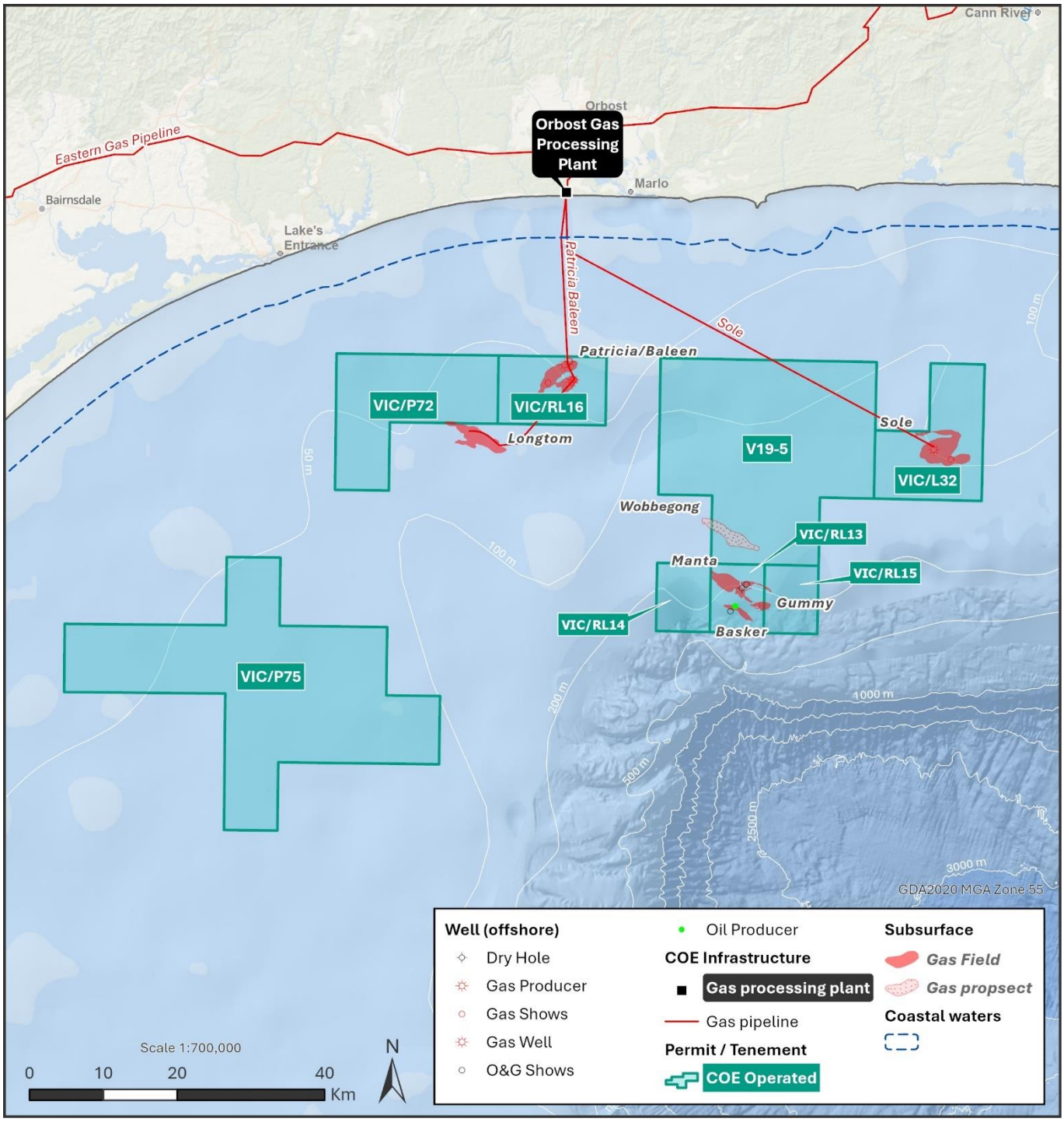

Figure 1-3: Existing Offshore Gippsland Facilities

1.1 Geographical extent

This OSMP is relevant and applicable to all Commonwealth and State marine and coastal areas potentially at risk of exposure to hydrocarbons in the event of a spill resulting from petroleum activities.

The spatial boundaries of an individual monitoring study will depend primarily on the actual or potential area affected by the spill. Spatial boundaries will be sufficient to meet monitoring objectives, usually by determining impacted areas and the level of effects, linking effects to the spill source, and supporting decisions on clean-up strategies. The spatial extent of a monitoring study would only be finalised once a spill event has occurred.

1.2 Objectives of this OSMP

The objectives of this OSMP are to:

- Provide a clear, easy to use framework for monitoring following a Level 2 or Level 3 hydrocarbon spill to the marine environment;
- Outline the monitoring required to inform, plan and execute the spill response to reduce environmental harm (Operational or Type I monitoring);
- Outline the monitoring to assess any short-term and long-term impacts to the marine and coastal environments, their subsequent recovery and inform any remediation activities required (Scientific or Type II monitoring);
- Provide the strategy for each of the monitoring studies, which includes an overview of the monitoring performance objectives, monitoring standards and their measurement criteria; and
- Reference the specific Implementation Plans (IP) that have been prepared for each of the monitoring studies.

This OSMP demonstrates Cooper Energy's commitment to achieving monitoring 'readiness' with OSMP arrangements in place in the event of Level 2 or Level 3 spill events from their assets and activities in offshore Victorian waters.

1.3 Guidance for OSMP Preparation

This OSMP has been prepared to satisfy the National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA) requirements for OSMP readiness prior to a hydrocarbon release and incorporates guidance from the following NOPSEMA documents:

- Oil pollution risk management – Guidance note (N-04750-GN1488, February 2021).
- Operational and scientific monitoring programs – Information paper (N-04700-IP1349, October 2020).
- Source control planning and procedures – Information paper (N-04750-IP1979 June 2021)
- Oil spill modelling – Environmental bulletin (A652993 April 2019)

This OSMP has also been developed to satisfy the requirements of Regulation 14 (8AA) and 14(8D) of the *Commonwealth Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations, 2009* (OPGGS(E)R) and Regulation 16 of the *Victorian Offshore Petroleum and Greenhouse Gas Storage Regulations 2011* (OPGGSR).

1.4 Types of Monitoring

A two-class nomenclature has been developed in Australia to define the primary objectives of a hydrocarbon monitoring program, which can be defined as:

- **Type I** monitoring (also referred to as **operational** monitoring) - undertaken during a spill response to support response planning and operations. Type I monitoring focuses on obtaining and processing information regarding the nature and scale of the spill and the resources at risk so it can be acted upon as quickly as possible. Operational monitoring typically finishes when the spill response is terminated.
- **Type II** monitoring (also referred to as **scientific** monitoring) - aims to quantify the extent, severity, and persistence of environmental impacts from a significant spill and inform on appropriate remediation activities. Scientific monitoring may continue for extended periods after a spill response is terminated.

1.5 Structure of OSMP

This OSMP has been designed to provide:

- Monitoring coordination by the Principal Investigator (PI) and Cooper Energy's Environment Officer and/or Planning Officer (or delegates);
- Ease of implementation by OSMP monitoring-related team members with details of the required information from each study;

- Certainty in the outputs/information/data from the monitoring studies to inform response planning and measures; and
- A clear and auditable response strategy for Cooper Energy and relevant regulatory agencies.

This OSMP is structured in the following manner:

- Section 1: Introduction;
- Section 2: OSMP Implementation Framework and Strategy; and
- Section 3: Monitoring strategies for each of the monitoring studies.

2 OSMP Implementation Framework and Strategy

2.1 OSMP Framework

In the event of a significant hydrocarbon release incident at Cooper Energy assets and activities in offshore Victorian waters, several environmental monitoring studies will be implemented to inform spill response (Type I) and to evaluate the potential environmental impacts to the marine environment (Type II).

The potential impacts of Marine Diesel Oil (MDO), gas and condensate spills have been assessed in the respective Environment Plans (EPs) with management and response measures provided in the Offshore Victoria Oil Pollution Emergency Plan (OPEP) (VIC-ER-EMP-0001) or activity specific OPEPs, as required. The content of this OSMP is aligned with the environmental sensitivities outlined in the overarching Description of the Environment (COE-EN-EMP-0001) and within the respective EPs.

2.2 Monitoring Management and Information Pathways

This OSMP has primarily been developed to achieve operational monitoring 'readiness' in the event of an unplanned Level 2 or Level 3 spill from assets and activities in offshore Victorian waters.

In the unlikely event of a Level 2 or Level 3 incident, Cooper Energy will immediately initiate Type I and Type II monitoring according to the relevant study module initiation criteria and sensitivities affected. The sensitivities identified within the Gippsland and Otway regions and the linkages to OSMP studies are outlined in Section 2.2.2.

Information Pathways:

Type I monitoring information will be used by Cooper Energy and the Control Agencies for petroleum facility-related spills, to inform operational response activities. The Australian Maritime Safety Authority (AMSA), the Control Agency for vessel-based spills, is responsible for the operational monitoring to inform response activities, however Cooper Energy will assist with monitoring wherever possible. All Type I monitoring information will be directed to the Australian Marine Oil Spill Centre (AMOSC), AMSA and the Victorian Department of Transport and Planning (DTP) to assist in operational response planning and effectiveness.

Information resulting from Type II monitoring will be directed to the relevant Commonwealth and State environmental authorities as it becomes available.

These monitoring and information flow management pathways are illustrated conceptually in Figure 2-2-1 below.

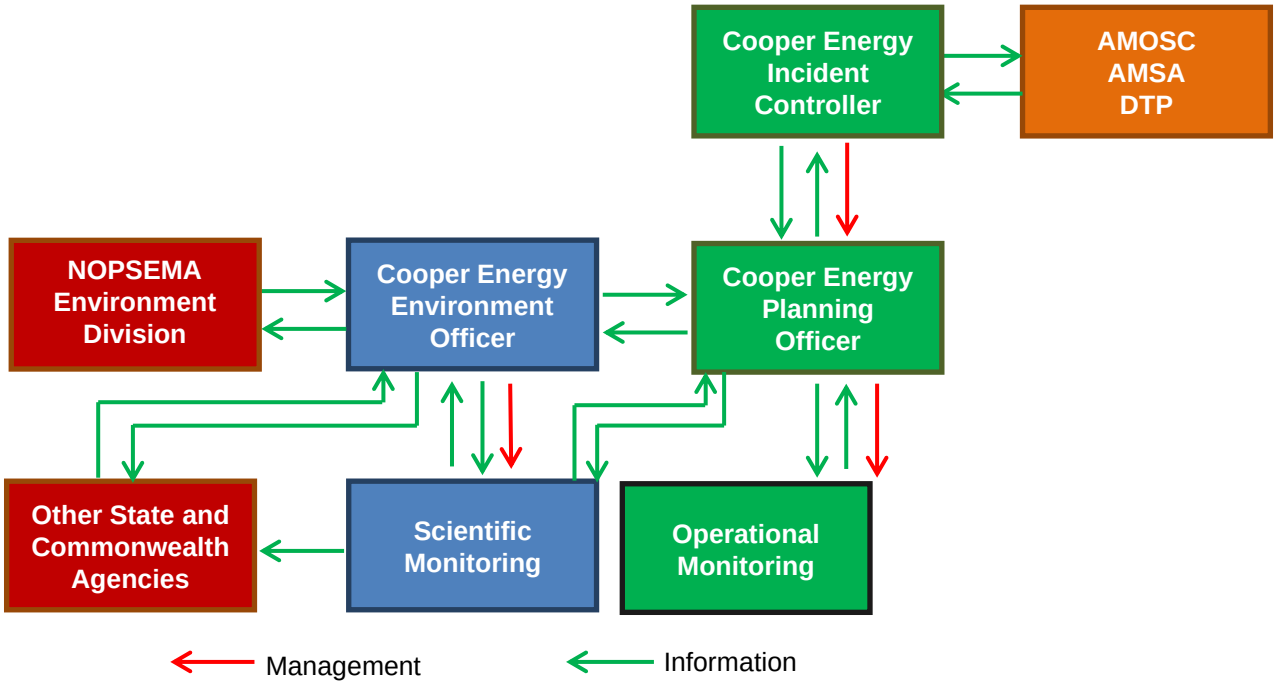

Figure 2-2-1 Monitoring and Information Flow Management Framework

Type II (scientific) monitoring consultation:

Cooper Energy will consult with relevant Commonwealth and State authorities prior to the implementation of Type II monitoring studies to ensure that scientific monitoring is undertaken to the satisfaction of the Commonwealth and State authorities. These authorities will include the Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW) for Matters of National Environmental Significance (MNES) and for Victoria, the Department of Transport and Planning (DTP) who will coordinate the whole of government advice on the focus, scope and duration of the program. If an incident affecting wildlife occurs in Commonwealth waters close to Victorian State waters, the Control Agency DTP may request support from Department of Energy, Environment and Climate Action (DEECA) to assess and lead a wildlife response.

Depending on the extent of the spill, authorities may also include:

- Tasmanian waters: Tasmanian Environmental Protection Authority (EPA), the Wildlife Health and Marine (WHAM) division of the Department of Natural Resources and Environment Tasmania (NRE Tas)
- NSW waters: Transport for NSW (or relevant Port Authority), NSW Maritime and NSW Environment Protection Authority
- South Australia waters: Department for Infrastructure and Transport, and Department for Environment and Water.

Cooper Energy will notify these authorities on the relevant spill 'level' event and provide operational data to these authorities. Cooper Energy will consult with these authorities on the content of the Type II studies (e.g., baseline, location of reference and control sites, study method) and obtain feedback which will be incorporated into the Type II study design to ensure Type II monitoring is to the satisfaction of the Commonwealth and State authorities. The Type II implementation plans within this OSMP are for guidance only and may be modified based upon this feedback.

Note that under Victorian state legislation (e.g., *Emergency Management Act 2013*) the State has over-riding decision making authority on the requirements of scientific monitoring. If there is a conflict between the current OSMP modules and State and Commonwealth feedback, regulator recommendations will be adopted. This consultation process will continue throughout the spill event to ensure that changing impacts and risks are captured within the process.

The results of Operational Type I monitoring will be provided to these authorities throughout the response to allow for continued feedback on and refinement of the Type II study design.

2.2.1 List of Monitoring Studies

OSMP studies and monitoring performance objectives and reference to OSMP Sections for each study's strategy and implementation are provided in Table 2-1.

Table 2-1 Consolidated list of OSMP studies and references to each study's strategy and implementation plan

Study ID	Study Name	OSMP Section for Study Strategy	Implementation Plan[1][2]
Op1	Operational Forecast Modelling	3.2.1	IP Op1
Op2	Hydrocarbon Surveillance and Tracking	3.2.2	IP Op2
Op3	Hydrocarbon Weathering Assessment	3.2.3	IP Op3
Op4	Coastal Shoreline Assessment	3.2.4	IP Op4A (Otway) IP Op4B (Gippsland)
Op5	Dispersant Efficacy Assessment	3.2.5	IP Op5
Sc1	Ecotoxicology Assessment of Hydrocarbons	3.3.1	IP Sc1
Sc2	Hydrocarbon Monitoring in Marine Waters	3.3.2	IP Sc2A (Otway) IP Sc2B (Gippsland)

[1] *Implementation Plans labelled 'Gippsland' also include additional sensitivities and priority response areas identified with BMG Closure Project (Phase 1).*

[2] *Implementation Plans labelled 'Otway' also include additional sensitivities and priority response areas identified with Athena Supply Project*

Study ID	Study Name	OSMP Section for Study Strategy	Implementation Plan[12]
Sc3	Hydrocarbon Monitoring in Marine Sediments	3.3.3	IP Sc3A (Otway) IP Sc3B (Gippsland)
Sc4	Inter-tidal & Sub-tidal Habitat Monitoring	3.3.4	IP Sc4A (Otway) IP Sc4B (Gippsland)
Sc5	Shorebird and Seabird Population Monitoring	3.3.5	IP Sc5A (Otway) IP Sc5B (Gippsland)
Sc6	Marine Megafauna Surveys	3.3.6	IP Sc6A (Otway) IP Sc6B (Gippsland)
Sc7	Hydrocarbon Monitoring of Representative Commercial and Recreational Fish Species	3.3.7	IP Sc7
Sc8	Hind-cast Modelling for Impact Assessment	3.3.8	IP Sc8
Sc9	Socio-Economic Surveys	3.3.9	IP Sc9A (Otway) IP Sc9B (Gippsland)

2.2.2 Environmental Sensitivities and Priority Response Areas

Environmental sensitivities of priority response areas may be monitored as part of the OSMP studies and OPEP response options in case of a Level 2 or Level 3 hydrocarbon spill from assets and activities.

The linkage between the environmental sensitivities, priority response areas, this OSMP's study strategies and the OPEP response options are summarised in Table 2-2 (Otway Basin; including Athena Supply Project), Table 2-3 (Gippsland Basin; excluding BMG Closure Project (Phase 1)), and Table 2-4 (BMG Closure Project (Phase 1)).

BMG Closure Project (Phase 1) was completed in May 2024, eliminating the LOWC risk from the BMG wells; the worst-case spill scenario for the facility is now an MDO spill from a work vessel. The table of environmental sensitivities and priority response areas and corresponding tactical response plans will remain active during ongoing decommissioning activities that involve offshore vessels, noting that spill risk will vary with fuel inventory, which varies from vessel to vessel, and is likely to be within the conservative bounds established in the OPEP and OSMP.

Table 2-2 Environmental Sensitivities of Priority Response Areas - Otway Basin [including Athena Supply Project]

Receptor	General Marine / Offshore	Priority Response Planning Area				Response Options							Relevant OSMP Modules
		Warrnambool Bay Hopkins River, Logans Beach	Curdies Inlet Bay of Islands Coastal Park, Peterborough Coastal Reserve	Princetown Wetlands Port Campbell National Park, Twelve Apostles Marine National Park, Gellibrand River	Lower Aire River Wetlands Otway National Park, Aire River Beach, Aire River	Source Control	Monitor & Evaluate	Subsea Dispersant Application	Contain & Recover	Protect & Deflect	Shoreline Clean-up	Oiled Wildlife Response	
Marine Ecology													
Cetaceans	✓	✓				✓	✓	✓	✓				Sc6
Pinnipeds	✓					✓	✓	✓	✓			✓	Sc6
Turtles	✓					✓	✓	✓	✓			✓	Sc6
Fish & Sharks	✓			✓		✓	✓		✓				Sc2, Sc7
Seabirds	✓			✓		✓	✓	✓	✓			✓	Op3, Op4, Sc4, Sc5
Invertebrates	✓			✓		✓	✓		✓				Sc3, Sc4
Plankton	✓			✓		✓	✓		✓				Sc1, Sc2
Coastal Habitats													
Saltmarsh/Seagrass		✓	✓	✓		✓	✓	✓	✓	✓	✓		Op3, Op4, Sc4
Kelp Habitats (inter-tidal)					✓	✓	✓	✓	✓	✓			Op3, Sc4
Sand Beaches		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		Op4, Sc3, Sc4
Sub-tidal Reef				✓		✓	✓	✓	✓	✓			Sc3, Sc4

Receptor	General Marine / Offshore	Priority Response Planning Area				Response Options							Relevant OSMP Modules
		Warrnambool Bay	Curdies Inlet	Princetown Wetlands	Lower Aire River Wetlands	Source Control	Monitor & Evaluate	Subsea Dispersant Application	Contain & Recover	Protect & Deflect	Shoreline Clean-up	Oiled Wildlife Response	
		Hopkins River, Logans Beach	Bay of Islands Coastal Park, Peterborough Coastal Reserve	Port Campbell National Park, Twelve Apostles Marine National Park, Gellibrand River	Otway National Park, Aire River Beach, Aire River								
Inter-tidal Rocky Flat/Headland		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		Op4, Sc3, Sc4
Wetlands			✓	✓	✓	✓	✓	✓	✓	✓	✓		Op4, Sc4
Coastal Ecology													
Shoreline Birds		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	Op3, Op4, Sc4, Sc5
Pinniped Haul-out Sites		✓			✓	✓	✓	✓	✓	✓		✓	Sc6
Penguin Colonies			✓	✓	✓	✓	✓	✓	✓	✓		✓	Sc6
Socio-economic													
Tourism		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		Sc9
Ports, Harbours, Yacht Club		✓				✓	✓	✓	✓	✓	✓		Sc9
Commercial Fishing/ Aquaculture	✓					✓	✓		✓	✓	✓		Sc7
Recreational Fishing/Diving		✓	✓	✓	✓	✓	✓		✓	✓	✓		Sc7, Sc9

Receptor	General Marine / Offshore	Priority Response Planning Area				Response Options							Relevant OSMP Modules
		Warrnambool Bay	Curdies Inlet	Princetown Wetlands	Lower Aire River Wetlands	Source Control	Monitor & Evaluate	Subsea Dispersant Application	Contain & Recover	Protect & Deflect	Shoreline Clean-up	Oiled Wildlife Response	
		Hopkins River, Logans Beach	Bay of Islands Coastal Park, Peterborough Coastal Reserve	Port Campbell National Park, Twelve Apostles Marine National Park, Gellibrand River	Otway National Park, Aire River Beach, Aire River								
Shipwrecks (submerged)			✓	✓	✓	✓	✓		✓				Sc2, Sc9
First Nations Cultural Heritage (Tangible and intangible cultural heritage sites and habitats and species)		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		Sc9

Table 2-3 Environmental Sensitivities of Priority Response Areas - Gippsland Basin [excluding BMG Closure Project (Phase 1)]

Receptor	General Marine / Offshore	Priority Response Planning Area							Response Options							Relevant OSMP Modules
		Pt Hicks / Croajingolong NP	Tamboon Inlet / Croajingolong NP	Sydenham Inlet / Cape Conran Coastal Park	Beware Reef / Beware Reef Marine Sanctuary	Yeerung River / Cape Conran Coastal Park	Snowy River / Snowy River National Park	Gippsland Lakes / The Lakes National Park	Source Control	Monitor & Evaluate	Subsea Dispersant Application	Contain & Recover	Protect & Deflect	Shoreline Clean-up	Oiled Wildlife Response	
Marine Ecology																
Cetaceans	✓								✓	✓	✓	✓				Sc6
Pinnipeds	✓				✓				✓	✓	✓	✓				Sc6
Turtles	✓								✓	✓	✓	✓			✓	Sc6
Fish & Sharks	✓	✓	✓	✓	✓	✓		✓	✓	✓		✓				Sc2, Sc7
Seabirds	✓					✓	✓	✓	✓	✓	✓	✓			✓	Op3, Op4, Sc4, Sc5
Invertebrates	✓	✓			✓				✓	✓		✓				Sc3, Sc4
Plankton	✓								✓	✓		✓				Sc1, Sc2
Coastal Habitats																
Saltmarsh/Seagrass		✓		✓					✓	✓	✓	✓	✓	✓		Op3, Op4, Sc4
Mudflats			✓	✓							✓	✓				
Kelp Habitats (inter-tidal)					✓				✓	✓	✓	✓				Op3, Sc4
Sand Beaches		✓	✓	✓		✓	✓	✓	✓	✓	✓	✓		✓		Op4, Sc3, Sc4
Sub-tidal Reef									✓	✓	✓	✓				Sc3, Sc4

Receptor	General Marine / Offshore	Priority Response Planning Area							Response Options							Relevant OSMP Modules
		Pt Hicks	Tamboon Inlet	Sydenham Inlet	Beware Reef	Yeerung River	Snowy River	Gippsland Lakes	Source Control	Monitor & Evaluate	Subsea Dispersant Application	Contain & Recover	Protect & Deflect	Shoreline Clean-up	Oiled Wildlife Response	
		Croajingolong NP	Croajingolong NP	Cape Conran Coastal Park	Beware Reef Marine Sanctuary	Cape Conran Coastal Park	Snowy River National Park	The Lakes National Park								
Inter-tidal Rocky Flat/Headland		✓			✓				✓	✓	✓	✓		✓		Op4, Sc3, Sc4
Wetlands			✓	✓			✓	✓	✓	✓	✓	✓	✓	✓		Op4, Sc4
Coastal Ecology																
Shoreline Birds		✓					✓	✓	✓	✓	✓	✓	✓	✓	✓	Op3, Op4, Sc4, Sc5
Pinniped Haul-out Sites		✓			✓				✓	✓	✓	✓			✓	Sc6
Penguin Colonies									✓	✓	✓	✓			✓	Sc6
Socio-economic																
Tourism		✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		Sc9
Amenity Beach							✓				✓	✓				
Ports, Harbours, Yacht Club		✓						✓	✓	✓	✓	✓	✓	✓		Sc9
Commercial Fishing/ Aquaculture	✓							✓	✓	✓		✓		✓		Sc7
Recreational Fishing/Diving		✓	✓	✓	✓	✓	✓	✓	✓	✓		✓		✓		Sc7, Sc9

Receptor	General Marine / Offshore	Priority Response Planning Area							Response Options							Relevant OSMP Modules
		Pt Hicks	Tamboon Inlet	Sydenham Inlet	Beware Reef	Yeerung River	Snowy River	Gippsland Lakes	Source Control	Monitor & Evaluate	Subsea Dispersant Application	Contain & Recover	Protect & Deflect	Shoreline Clean-up	Oiled Wildlife Response	
		Croajingolong NP	Croajingolong NP	Cape Conran Coastal Park	Beware Reef Marine Sanctuary	Cape Conran Coastal Park	Snowy River National Park	The Lakes National Park								
Shipwrecks (submerged)					✓				✓	✓		✓				Sc2, Sc9
First Nations Cultural Heritage (Tangible and intangible cultural heritage sites and habitats and species)		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		Sc9

Table 2-4 Environmental Sensitivities of Priority Response Areas - associated with BMG Closure Project (Phase 1) (Gippsland)

Receptor	General Marine / Offshore	Priority Response Planning Area (VIC)																			Priority Response Planning Area (NSW)				Priority Response Planning Area (TAS)			Response Options							Relevant OSMP Modules
		Benedore River	Betka River	Beware Reef	Cape Howe Marine National Park	Easby Creek	Gabo Island	Mallacoota	Merriman Creek	Mueller River	Pt Hicks	Red River	Shipwreck Creek	Snowy River	Sydenham Inlet	Tamboon Inlet	The Skerries	Thurra River	Tullaburga Island	Wingan Inlet	Yeerung River	Bittangabee Bay	Merica River	Nadgee Nature Reserve	Wonboyn River	Kent Group	Flinders Island	Cape Barren Island	Source Control	Monitor & Evaluate	Subsea Dispersant Application	Contain & Recover	Protect & Deflect	Shoreline Clean-up	Oiled Wildlife Response	
Marine Ecology																																			
Cetaceans	✓				✓		✓										✓		✓							✓	✓	✓	✓	✓	✓	✓				Sc6
Pinnipeds	✓			✓	✓		✓			✓							✓		✓							✓	✓	✓	✓	✓	✓	✓				Sc6
Turtles	✓				✓		✓																						✓	✓	✓	✓			✓	Sc6
Fish & Sharks	✓	✓	✓	✓	✓	✓	✓				✓	✓	✓		✓	✓	✓	✓	✓		✓		✓	✓	✓	✓	✓	✓	✓	✓		✓				Sc2, Sc7
Seabirds	✓				✓	✓	✓	✓						✓			✓		✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓			✓	Op3, Op4, Sc4, Sc5
Shorebirds		✓	✓		✓	✓	✓	✓	✓			✓		✓			✓		✓	✓	✓	✓	✓	✓		✓	✓	✓			✓	✓				Op3, Op4, Sc4, Sc5
Invertebrates	✓			✓	✓	✓	✓				✓	✓							✓							✓	✓		✓	✓		✓				Sc3, Sc4
Plankton	✓																												✓	✓		✓				Sc1, Sc2
Coastal Habitats																																			
Saltmarsh/ Seagrass						✓				✓	✓	✓		✓	✓	✓		✓		✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		Op3, Op4, Sc4
Mangroves			✓					✓																						✓	✓				Op3, Op4, Sc4
Mudflats			✓			✓		✓				✓			✓	✓		✓					✓	✓							✓	✓				Op3, Op4, Sc4
Kelp Habitats (inter-tidal)																										✓	✓	✓	✓	✓	✓	✓				Op3, Sc4
Sand Beaches		✓	✓	✓	✓	✓				✓	✓	✓	✓		✓	✓		✓	✓				✓	✓			✓	✓	✓	✓	✓	✓		✓		Op4, Sc3, Sc4
Sub-tidal Reef		✓			✓		✓			✓																✓	✓	✓	✓	✓	✓	✓				Sc3, Sc4
Inter-tidal Rocky Flat/Headland			✓				✓			✓	✓						✓		✓	✓				✓		✓	✓	✓	✓	✓	✓	✓		✓		Op4, Sc3, Sc4
Wetlands		✓	✓	✓		✓		✓				✓		✓	✓	✓				✓				✓			✓	✓	✓	✓	✓	✓	✓	✓		Op4, Sc4
Coastal Ecology																																			
Shoreline Birds								✓			✓			✓							✓						✓	✓	✓	✓	✓	✓	✓	✓	✓	Op3, Op4, Sc4, Sc5

Receptor	General Marine / Offshore	Priority Response Planning Area (VIC)																			Priority Response Planning Area (NSW)				Priority Response Planning Area (TAS)			Response Options							Relevant OSMP Modules
		Benedore River	Betka River	Beware Reef	Cape Howe Marine National Park	Easby Creek	Gabo Island	Mallacoota	Merriman Creek	Mueller River	Pt Hicks	Red River	Shipwreck Creek	Snowy River	Sydenham Inlet	Tamboon Inlet	The Skerries	Thurra River	Tullaburga Island	Wingan Inlet	Yeerung River	Bittangabee Bay	Merica River	Nadgee Nature Reserve	Wonboyn River	Kent Group	Flinders Island	Cape Barren Island	Source Control	Monitor & Evaluate	Subsea Dispersant Application	Contain & Recover	Protect & Deflect	Shoreline Clean-up	Oiled Wildlife Response	
Pinniped Haul-out Sites							✓				✓						✓									✓	✓		✓	✓	✓	✓			✓	Sc6
Penguin Colonies				✓	✓		✓												✓										✓	✓	✓	✓			✓	Sc6
Protected Area			✓		✓					✓	✓		✓				✓	✓	✓				✓	✓		✓	✓	✓				✓				Sc6
Socio-economic																																				
Tourism			✓		✓		✓		✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		Sc9
Amenity Beach				✓				✓	✓	✓				✓								✓		✓	✓						✓	✓				Sc9
Ports, Harbours, Yacht Club							✓	✓			✓														✓		✓	✓	✓	✓	✓	✓	✓	✓		Sc9
Commercial Fishing / Aquaculture	✓						✓							✓					✓			✓			✓				✓	✓		✓		✓		Sc7
Recreational Fishing/Diving			✓			✓	✓	✓	✓	✓	✓	✓		✓		✓			✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓		✓		✓		Sc7, Sc9
Shipwrecks (submerged)				✓	✓		✓	✓					✓						✓							✓	✓	✓	✓	✓		✓				Sc2, Sc9
First Nations Cultural Heritage (Tangible and intangible cultural heritage sites and habitats and species)			✓	✓	✓		✓		✓	✓	✓		✓		✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	Sc9

Generally, the monitoring performance outcomes for the OSMP focus on:

- The relevant monitoring Environmental Performance Outcomes (EPOs) of the EPs.
- Informing response planning and management activities in the OPEP.
- Assessing impacts, recovery and possible remedial measures for environmental sensitivities identified in the EPs.

Hence, the OSMP monitoring performance outcomes explicitly link why the monitoring studies are required for the OPEP (i.e., Type I environmental information for response planning and management) and EP (i.e., Type II scientific study to monitor impact to and recovery of environmental sensitivities).

2.2.3 Monitoring Strategy Template

This section describes the generic format and content of a monitoring (field) study strategy.

Each monitoring strategy outlines the process for a study's implementation and specifically addresses the following key questions:

- Why? – Monitoring performance outcome.
- What? – Monitoring performance standards.
- Who? When? How? Where? – Measurement criteria and other components of the strategy. The technical details of the when (e.g., monitoring frequency), the how (e.g., sampling and analysis methods and logistics) and the where (e.g., locations of sites) are provided in the implementation plans for each monitoring study.

Each monitoring study's strategy has been structured consistently to facilitate familiarity and ease of reference via a tabular format as described in Table 2-5.

Table 2-5 Structure of operational and scientific monitoring strategies

Strategy Component	Description
Monitoring Performance Outcome	'Monitoring' goal(s) for implementing the monitoring program.
Monitoring Performance Standard	**Measurement Criteria**
Performance(s) required of the monitoring study elements (systems, equipment, personnel and procedures) that are used as the basis to manage achievement of the monitoring performance outcome.	Criteria to assess whether the monitoring performance standards for the monitoring study have been achieved. Criteria are auditable.
Initiation Trigger	Criteria to initiate the monitoring study.
Termination Trigger	Criteria to terminate the monitoring study.
Study Implementation Plan	Reference to OSMP Implementation Plan (IP) for a particular Study.
Competencies	Competency criteria for roles on the monitoring study team.
Reporting	Outputs (e.g., reports) of the findings of the study for dissemination to relevant and approved parties.
Review and Auditing	Internal (reviews) and external (audit) overview.
Responsibilities	Responsibilities for different elements of each monitoring study.
Relevant References and Guidelines	Guidelines and high-level references to implement the strategy.

2.2.4 Monitoring Implementation Plan Template

The implementation plans have been developed by the Principal Investigator (PI) for each study in accordance with the measurement criteria of the strategy. The implementation plans for each study include, at a minimum, the following elements:

- Introduction.
- Project Management.
- Baseline Data Establishment (studies Sc2-Sc7 and Sc9 only).
- Sampling and Analysis Methods (or Modelling Methods).
- Quality Assurance/Control Procedures.
- Reporting and Communications.
- Internal Reviews and External Audits: Compliance Schedule and Reporting.

Cooper Energy has also developed a Logistics and Coordination Plan (VIC-ER-EMP-0003) to support the implementation of the OSMP.

2.3 OSMP Implementation

2.3.1 Roles and Responsibilities

In the event of a Level 2 or 3 hydrocarbon release, Cooper Energy is responsible for implementing and adhering to this OSMP. Table 2-6 identifies the primary responsibilities associated with OSMP key roles. Each strategy in Section 3 provides more specific responsibilities for a particular monitoring program.

Table 2-6 Generic roles and responsibilities for this OSMP

Position	Responsibilities
Cooper Energy Incident Controller (IC) (or delegate)	• Overall responsibility for implementation of this OSMP.
Cooper Energy Planning Officer (or delegate)	• Interface between IC and Environment Officer. • Responsibility for the provision of spill characteristics and response measures needed for the implementation of this OSMP. • Ensures field response is informed by operational monitoring. • Initiate operational and scientific monitoring modules as required. • Termination of operational and scientific monitoring modules as required.
Cooper Energy Environment Officer (or delegate)	• Approval of reports and plans for operational and scientific monitoring. • Day-to-day coordination and review of scientific monitoring programs. • Provide advice to the Planning Officer on initiation/termination criteria. • Terminating scientific monitoring modules as required (where the IMT Planning Officer position is no longer in place). • Oversee external audits. • Compliance interface with regulator(s).
Principal Investigator (PI)	• Development of IP. • Responsible for the implementation of a particular OSMP study. • Review and carry out the study's monitoring and reporting requirements. • Provide advice concerning environmental issues as required.
Monitoring Personnel (MP)	• Implement this OSMP. • Compliance with the requirements of this OSMP.

2.3.2 OSMP Phased Approach

The development and implementation of the OSMP is detailed in Table 2-7. The overall decision trees for the OSMP implementation for operational (Type I) and scientific (Type II) monitoring studies are illustrated in Figure 2-2 and Figure 2-3, respectively.

Table 2-7 OSMP implementation phases

Time Period	Activity	Purpose	Output
Approval			
Regulatory acceptance of the Environment Plan(s).	Implementation Plans (IPs) are prepared and made available to support OSMP.	Operational and Scientific Monitoring Studies defined.	OSMP and IPs.
	Ensure the availability of human resources, logistics and scientific equipment to implement OSMP if required.	'Readiness' for initiation of OSMP field activities if required.	Resources under existing agreements (people, equipment, plant) and confirmation that competent persons (PIs) are aware of OSMP responsibilities.
Readiness			
Capacity available and enhanced if and where required.	The pool of resources for the monitoring team was identified, and a contract call-off was provided.	'Readiness' for a timely response upon notification of OSMP mobilisation.	Timely mobilisation of environmental monitoring teams in the event of a Level 2 or Level 3 hydrocarbon release.
Monitoring			
Post-spill, pre-exposure (Type I and Type II – as triggered)	Mobilisation of the monitoring team and implementation of OSMP (Type I and Type II – as triggered).	Operational monitoring studies (Type I) to inform response planning and management of a hydrocarbon spill.	Data, notifications, and reports will inform the response team about the required response planning and management (Type I).
		Collection of reactive baseline data in scientific monitoring studies (Type II – as triggered).	The condition of environmental values is established at the start of the hydrocarbon spill before hydrocarbon exposure (Type II – as triggered).
Post-exposure (Type I and Type II – as triggered)	Continued implementation of OSMP (Type I and Type II – as triggered).	Operational monitoring studies (Type I) to inform response planning and management of hydrocarbon spill and scientific monitoring studies to monitor impact to environmental sensitivities.	Data, notifications, and reports to inform response planning and management (Type I) and to monitor impact to environmental sensitivities (Type II – as triggered).
	Collate and assess existing baseline data for environmental sensitivities (Type II – as triggered).	Acquisition of existing data to establish baseline condition of environmental sensitivities and identify gaps in baseline data to be acquired for scientific monitoring (Type II – as triggered).	A database of available baseline data has been established, and a plan for acquiring baseline data gaps has been formulated (Type II— as triggered).
	Cease operational (Type I) monitoring when termination criteria are met.	The cessation of response planning and management is necessary because environmental sensitivities are no longer at risk from additional hydrocarbon impacts.	Data/information collated to date for both Type I and Type II to inform Type II Hind-cast modelling.
Long-Term Monitoring	Continued implementation of OSMP (Type I only).	Scientific monitoring studies to monitor impact/recovery to environmental sensitivities.	Data and reports to monitor impact/recovery to environmental sensitivities (Type II).

Time Period	Activity	Purpose	Output
(Type II)	Cease scientific (Type II) monitoring when termination criteria are met.	The cessation of monitoring is justified when the environmental sensitivities have completely / sufficiently recovered from hydrocarbon impacts.	Final Reports.

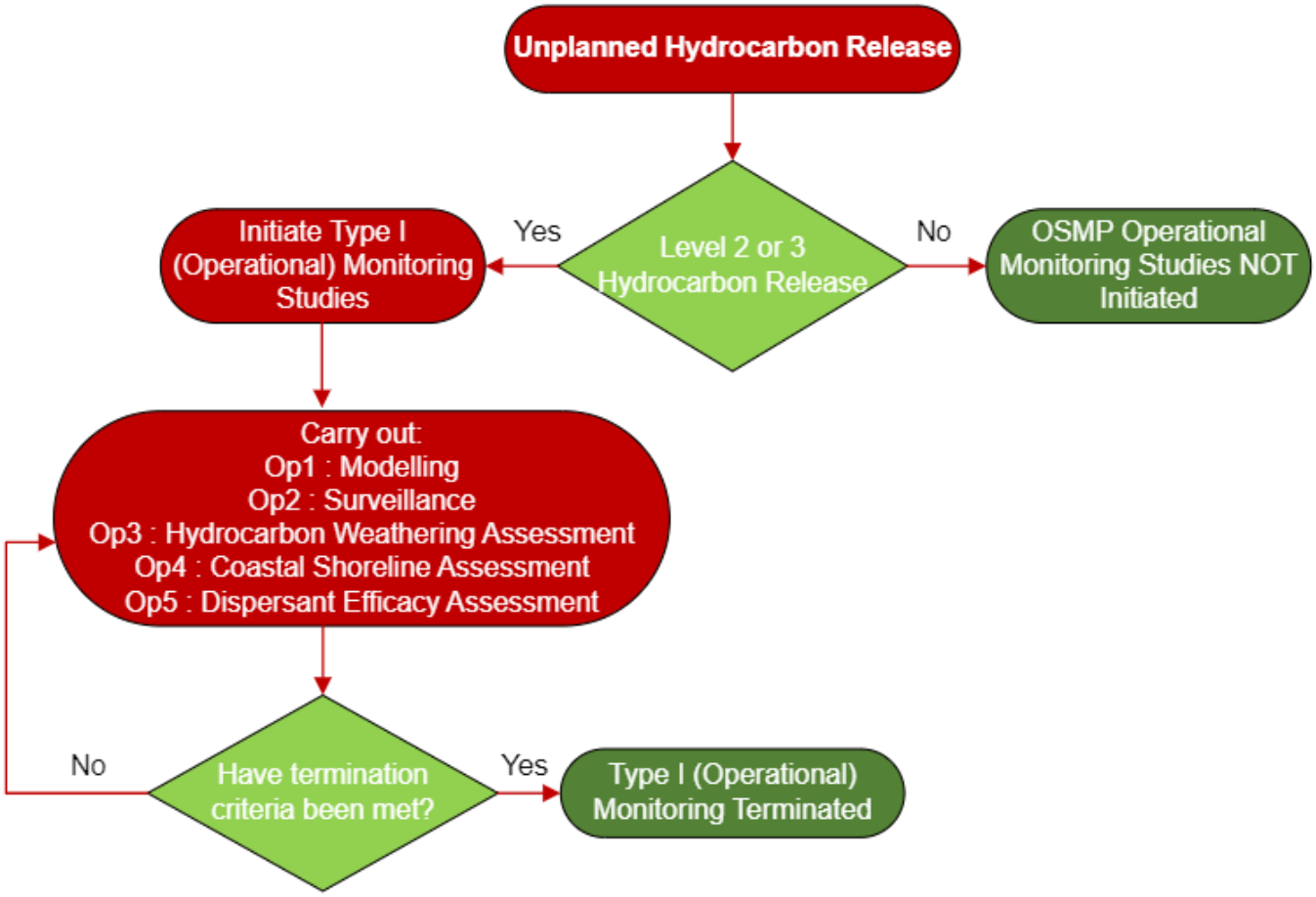

Figure 2-2: Diagram of decision tree for the overall implementation of the Operational (Type I) monitoring program

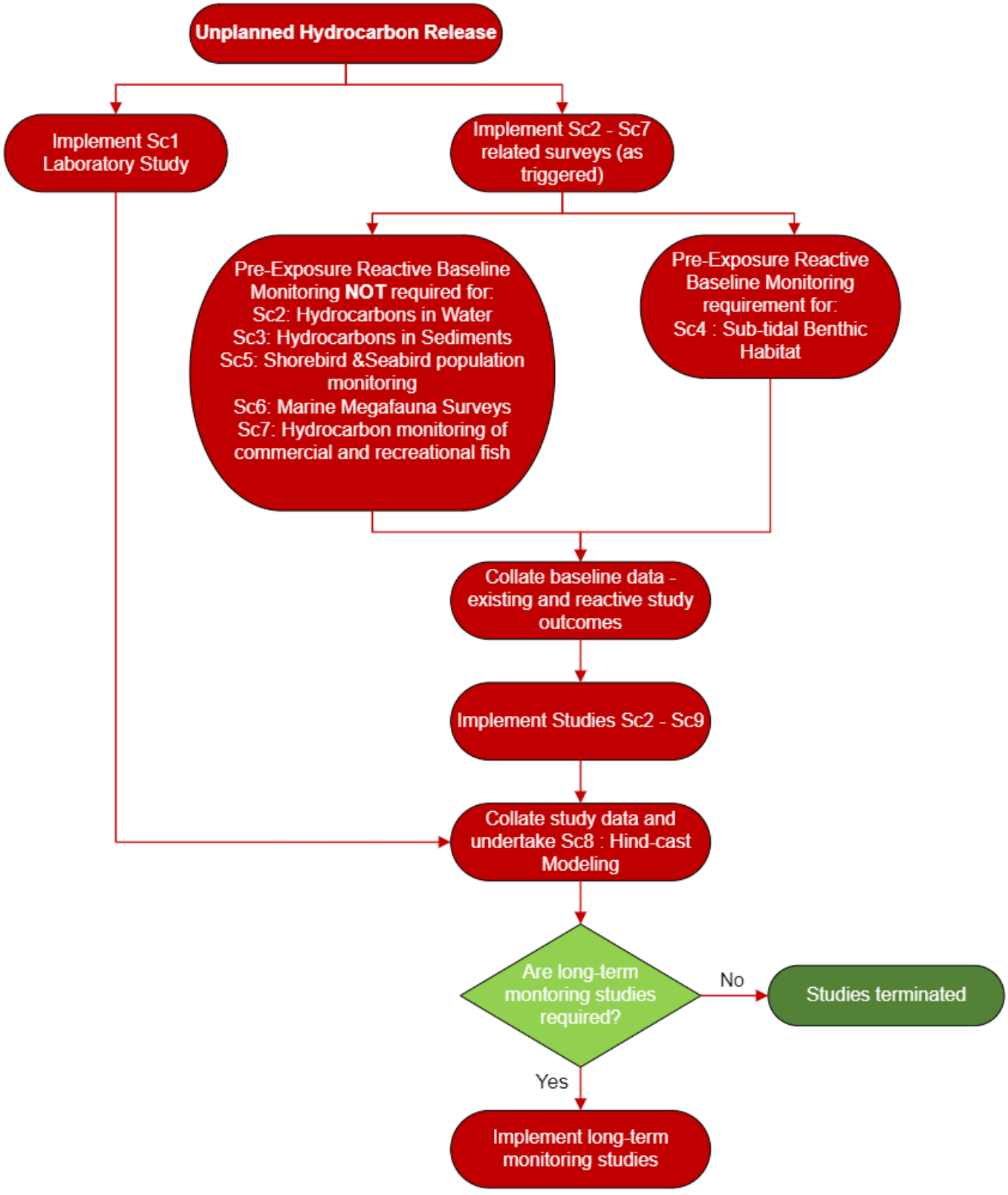

Figure 2-3: Diagram of decision tree for the overall implementation of the scientific (Type II) monitoring program

2.3.3 Reporting

The reporting requirements for the OSMP are detailed in each monitoring study's strategy (Section 3).

For the scientific (Type II) monitoring studies, the appropriate regulator will be provided with:

- Annual reports summarising all the ongoing (or recently terminated) monitoring studies; and/ or
- Final reports for each monitoring study.

Where required and agreed, the appropriate regulator can request other reports from the Cooper Energy Environment Officer (or delegate) and can also confirm adherence to the reporting schedule and contents (defined in the strategies and implementation plans) through the auditing mechanism, which is described in Section 2.3.4 below.

2.3.4 Internal Review and External Auditing

Across the suite of OSMP studies, the adopted internal review and auditing approach includes:

- A monitoring compliance audit schedule based on the commitments in the study's strategy (refer Section 3) will be defined in its implementation plan when finalised upon activation.
- Internal review by the Cooper Energy Environment Officer regarding the conformance to the OSMP's audit schedule elements will be carried out routinely (every month for Type I, every three months for Type II). The PI must rectify any non-conformances within two weeks of the internal review. All internal reviews will be recorded and archived on compliance pro forma reports in each study's implementation plan to be finalised upon activation.
- The relevant regulator(s) may carry out external audits of completed compliance reports and other OSMP commitments at any time.

2.3.5 OSMP Review and Revisions

Regulation 19 of the OPGGS(E) Regulations provides for the revision of this OSMP framework at least 14 days before the end of the period of five years from the most recent approval of any associated EP.

The OSMP (and supporting IPs) are also subject to review and revision, if necessary, on an annual basis to incorporate the following:

- Significant change in the hydrocarbon spill risks associated with Cooper Energy activities and/or assets within offshore Victorian waters.
- Significant environmentally relevant changes (e.g. changes to applicable legislation, stakeholder information, MNES, State/Commonwealth management plans, or availability of new literature).
- Findings from internal or external audits or exercises.
- Lessons learned following any actual spill event.

Review records will be captured in Cooper Energy's document management system. Subsequent revisions to the OSMP or IPs will be actioned and closed out as soon as practicable after the review.

2.4 Scientific Monitoring Elements

2.4.1 Establishment of Baseline Dataset

Cooper Energy has prepared a Description of the Environment document, identifying and describing ecological and social receptors that may be present in the coastal and marine regions extending from Cape Jaffa (South Australia) to Gladstone (Queensland) (COE-EN-EMP-0001). This report is the primary source of publicly available information used to describe the environment within EPs for assets and activities in offshore Victorian waters.

While this baseline description of the environment provides useful information on the environmental values in the region, it is insufficient to serve as a robust baseline dataset for a scientifically based impact and recovery assessment in the event of a hydrocarbon spill. The primary data gaps for the scientific monitoring studies are likely to be:

- Differences between methods used in various monitoring studies (e.g., field methods and data analysis techniques).
- Spatial and temporal data coverage (e.g., sensitive locations not monitored, temporal gaps at sensitive locations).

Given the short time before hydrocarbons may reach the coast and impact the identified environmental sensitivities, the identification/rectification of gaps in baseline data will be a priority during routine operations and during the post-impact phase of any spill events. The procedure for establishing baseline data for each relevant scientific monitoring implementation plan will, where possible, be as follows:

- Catalogue relevant scientific monitoring studies at sensitive environmental receptors and the custodian's contact details.
- Data custodians will be contacted, and datasets requested. As a contingency, 'data mining' from publicly available information will occur continuously to establish a baseline database through consultancy resources**.**
- The monitoring methods, sites, sampling duration, and frequency of these relevant monitoring studies (where known) will be tabulated to aid in identifying baseline data gaps.
- Any identified data gaps will be used by the PI of a particular study in the development of the sampling and analysis component of the IP to optimise the design of each scientific monitoring study, considering the methods and spatial and temporal properties of the existing scientific monitoring studies.

2.4.2 Impact and Reference Sites

In the event of a hydrocarbon release, monitoring sites will be established within and beyond the exposure area, including around identified priority locations / environmentally sensitive receptors where relevant.

A hydrocarbon release may not impact all identified priority locations or environmentally sensitive receptors. Therefore, non impacted locations, may serve as suitable reference locations (i.e., control or 'non-impact' locations) in the event of a hydrocarbon release. However, as a contingency, additional suitable reference locations should be established outside the predicted spill exposure area.

Monitoring sites at reference locations will be selected that are:

- As similar as possible to impacted sites;
- Representative of the wider area; and
- Free from obvious anthropogenic impacts, unless the impact areas are also influenced by the same anthropogenic impacts (i.e. nutrients from rivers).

They should also be similar in key physical parameters (e.g., shore profile, shore exposure, tidal currents, habitat type, substrate, temperature, and salinity) and not differ significantly between sites. The selection of multiple reference sites will assist in accounting for natural variability between impact and reference sites.

2.4.3 Impact Assessment Approach

Collection of post-impact data for comparison with baseline data (where it exists) is required to determine whether any differences between the impact and reference locations are attributable to the hydrocarbon release. Detection of environmental impacts from a hydrocarbon release requires careful consideration of the sampling/survey strategy since spatial and temporal variability will contribute to differences between locations irrespective of whether there has been a disturbance or not. Multiple reference locations will be necessary to prevent falsely attributing any differences in the spatial data to the impact (Type I errors). Furthermore, this would allow for more robust statistical analyses of the resultant data, ensuring the ability to establish cause-effect relationships and identify sources of variation.

Where limited or no baseline data is available as identified in the final implementation plan, post-impact monitoring will, where practicable, be designed by the PI with 'beyond- BACI' principles resulting in data that are amenable to statistical techniques such as asymmetrical analyses of variance following procedures described by Underwood (1994). However, in situations where neither a BACI nor a 'beyond- BACI' design is practicable or appropriate, other impact assessment approaches may be adopted, including (but not limited to):

- Impact versus Control;

- Gradient of Impacts;
- Control Charts; and
- Lines of Evidence.

2.4.4 Duration of the Two Phases of Monitoring for a Level 2 and Level 3 Incident

This OSMP will be implemented after a Level 2 or Level 3 hydrocarbon release incident on the following basis:

- The duration of any unplanned release may vary from an instantaneous release (0-24 hours) for an MDO spill to about two weeks for a pipeline leak and up to 120 days for a loss of well control.
- Both MDO and condensate typically evaporate and weather very rapidly, having little persistence in the water column or on shorelines.
- Subsequent monitoring after the cessation of the hydrocarbon release will be as per the relevant IPs to allow:
  - Six months to complete study Sc8 (Hind-cast Modelling Impact Assessment), informing the long-term monitoring phase adjustment to the IPs for studies Sc2-Sc7 & Sc9.
  - One month for the PI of studies Sc2-Sc7 & Sc9 to revise IP for long-term modelling revisions to these Plans.
  - Two months for the Cooper Energy Environment Officer to consult with relevant regulatory authorities and key stakeholders regarding any proposed modifications to the IPs.
- IPs for any long-term monitoring phase of studies Sc2-Sc7 & Sc9 will be followed until the relevant termination criteria are met.

3 Monitoring Strategies

3.1 Preliminary Activities for Monitoring Strategies

3.1.1 Impacts from Response Activities

Implementation of oil spill response actions may impact environmental sensitivities at each response location. This OSMP considers these 'secondary' impacts in addition to the primary objective of monitoring impacts from the hydrocarbon spill.

Cooper Energy has assessed possible secondary impacts on environmental sensitivities in areas associated with response activities. These impacts are identified in Table 3-1 and should be considered by PIs when finalising IPs.

This listing may be reviewed, expanded or modified during a response to respond to site-specific conditions and circumstances.

Table 3-1 Secondary Monitoring Activities

Response or Monitoring Activity	Secondary Impact	Monitoring Strategy	Monitoring Parameters
Source Control	Vessel impacts on megafauna	Sc6: Marine Megafauna Surveys	Megafauna 'damage incidents'
	Chemical contamination from dispersant	Sc6: Marine Megafauna Surveys Sc7: Hydrocarbon Monitoring of Representative Commercial and Recreational Fish Species	Megafauna injuries or mortalities Fish tainting
Monitor & Evaluate **OP2: Spill surveillance and monitoring**	Vessel impacts on megafauna	Sc6: Marine Megafauna Surveys	Megafauna 'damage incidents'
	Aviation impacts to megafauna	Sc6: Marine Megafauna Survey	Incidents of altered megafauna behaviour (e.g., change in migration route, altered behaviour)
Protect & Deflect	Native Vegetation Impact Cultural Heritage Impacts Coastal Habitat Disruption	Op4: Coastal Shoreline Assessment	Native Vegetation damage Altered access routes to shoreline
	Secondary contamination from spills	Op4: Coastal Shoreline Assessment	Secondary 'spill' incidents Evidence of soil discolouration/ waterway sheens
Shoreline Assessment & Clean-up	Native Vegetation Impact Cultural Heritage Impacts Coastal Habitat Disruption	Op4: Coastal Shoreline Assessment	Native Vegetation damage Altered access routes Disturbance to supratidal areas

Response or Monitoring Activity	Secondary Impact	Monitoring Strategy	Monitoring Parameters
	Shorebird Habitat Disturbance	Op4: Coastal Shoreline Assessment Sc5: Shorebird and Seabird Population Monitoring	Disturbance to, or abandonment of nesting areas/young Dead/injured birds (non-oiled) Damage to nests and young
	Secondary contamination from clean-up activities	Op4: Coastal Shoreline Assessment	Clean-up litter incident Soil discolouration outside decontamination points
Oiled Wildlife Clean-up	Non-oiled wildlife injury	Op4: Coastal Shoreline Assessment	Non-oiled fauna death/ injury
OP3: Hydrocarbon weathering assessment **SC2: Hydrocarbon monitoring in marine waters** **SC3: Hydrocarbon monitoring of marine sediments (vessel)** **SC4: Inter-tidal and sub-tidal habitat monitoring (vessel)** **SC6: Marine megafauna surveys (vessel)** **SC7: Hydrocarbon monitoring of commercial and recreational fish species (vessel)**	Vessel impacts on megafauna	Sc6: Marine Megafauna Surveys	Megafauna 'damage' incidents'
OP4: Shoreline Assessment & Clean-up **SC3: Hydrocarbon monitoring in marine sediments (inter-tidal)** **SC4: Intertidal and sub-tidal habitat monitoring** **SC6: Marine Megafauna (terrestrial)**	Native Vegetation Impact Cultural Heritage Impacts Coastal Habitat Disruption Shorebird Habitat Disturbance	Op4: Coastal Shoreline Assessment Sc5: Shorebird and Seabird Population Monitoring (shorebird impacts only)	Native Vegetation damage Altered access routes to shoreline Disturbance to supratidal areas Disturbance to, or abandonment of nesting areas Dead/injured birds (non-oiled) Damage to nests and young

3.1.2 Monitoring Strategies - Protected Matters Constraints

Species Protection

Before deploying monitoring teams to a spill location, a Job Hazard Assessment (JHA) will be undertaken to ensure all activities are performed safely, with minimal impacts to the environment and verified equipment. This assessment will consider the following concerning the protected matters that may be present at monitoring locations:

- Likelihood of encounter with protected species at monitoring locations and the seasonal activity of the protected species (i.e., nesting, calving, etc.).

- Review of the latest threatened species recovery plans or conservation advice regarding species threats and management controls and restrictions to prevent impacts during monitoring activities.
- Confirmation of regulatory restrictions (e.g., marine mammal buffer distances), which must be observed when undertaking activities.
- Determine whether any other protected areas (e.g., world heritage sites, marine parks) are likely to be impacted by monitoring activities. Where applicable, consult the relevant management plans.

These requirements will be documented within the JHA, and monitoring personnel will participate in it to confirm their awareness of these constraints.

Monitoring Parameter Selection

Monitoring parameters and methods selected should consider the requirements of applicable management plans when finalising IPs. Where available, management plans provide details of relevant 'umbrella species' which are monitored over time (e.g. long-term indicators for RAMSAR sites) to monitor the long-term health of the area and meet objectives of the Management Plan (e.g. water quality indicators, inter-tidal reef indicators). While relevant management plans have been consulted in the preparation of IPs to identify these indicators (e.g., for bird species such as the Eastern hooded plover, as well as parameters such as population size and breeding success), they should be reviewed when finalising IPs to ensure the most up to date information is utilised.

Protected matters requirements have been considered in the selection of methods and monitoring parameters in the respective monitoring strategies.

3.1.3 Prioritisation within monitoring strategies for species/populations/habitats

In the event of a Level 2/3 spill, operational forecast modelling (Op1) will be undertaken to establish the predicted trajectory and location of oil spill residues. In conjunction with this information, the Victorian DTP provides Vicmap, a valuable mapping tool to identify the distribution of shoreline habitats and biologically sensitive species present in the spill trajectory pathway.

The scale of the spill and likelihood/consequence of oil impact on sensitive habitats, protected species or areas of conservation value (Marine National Park, Coastal Park, etc.) at potential risk will define the level of effort required and the parameters (e.g. species/habitat) monitored during scientific monitoring. Factors affecting the selection and prioritisation of species and/or habitats to be monitored during a spill incident include:

- Species/habitats sensitivity to oiling and the likelihood of oiling;
- Ability to access the monitoring location;
- Identified species that are to be monitored according to conservation management plans;
- Social factors which may affect selection due to their iconic nature (e.g., Little Penguin) or may have commercial impacts (e.g., iconic species [Little Penguin], fishing interest [Southern Bluefin Tuna]);
- Available baseline data for individual species or habitats;
- Predicted time for oil to impact the habitat/species; and
- Feedback from the Victorian Environment and Science Coordinator (ESC) on the required species selection during the spill event.

The Cooper Energy Environment Officer will consider these factors when determining, selecting and prioritising species/populations/habitats to the monitored.

The respective IPs contain information on the species currently targeted for monitoring based on available information (baseline and conservation management plans).

3.2 Operational (Type I) Monitoring Strategies

As noted in Section 1.4, the Operational (Type I) Monitoring Studies aim to provide timely information for planning and executing the hydrocarbon spill response. The Cooper Energy Incident Controller (or delegate) will initiate the OSMP upon notification of an uncontrolled hydrocarbon release. The strategy for each Operational (Type I) Monitoring Study is provided in this section, together with a reference to the corresponding IP for each study. The Operational Monitoring Strategies outlined in this section include:

- Op1 – Operational Forecast Modelling;
- Op2 – Hydrocarbon Spill Surveillance and Tracking;
- Op3 – Hydrocarbon Weathering Assessment;
- Op4 – Coastal Shoreline Assessment; and
- Op5 – Dispersant Efficacy Assessment.

3.2.1 Study Op1: Operational Forecast Modelling

Table 3-2 Study Op1 Strategy: Operational Forecast Modelling

Strategy Component	Description
Monitoring Performance Outcomes	Carry out daily real-time predictions (forecasts) of the temporal/spatial distribution and concentrations of hydrocarbons on the surface and within the water column via numerical modelling to meet the following OPEP requirements: ○ In the event of a hydrocarbon release, provide operational data/information to monitor the weathering of hydrocarbons. ○ Implement operational monitoring in accordance with the OPEP to identify environmental sensitivities at risk of hydrocarbon exposure, inform the (Appendix 2 Net Environmental Benefit Assessment) NEBA and identify which environmental sensitivities require scientific monitoring. ○ OPEP Section 7 (Monitor & Evaluate).
Monitoring Performance Standards	**Measurement Criteria**
1. Readiness to implement Op1 forecast modelling.	1a: Ongoing membership with access to the modelling service provider (RPS) to provide operational forecast modelling in the event of a hydrocarbon spill. 1b: Study Op1 IP for operational forecast modelling developed by RPS, which is in place and approved by the Environment Officer.
2. Provision of daily quasi-real-time predictions (forecasts) to inform operational responses (and scientific monitoring of sensitive locations).	2a: Location, volume, start time and duration of spill provided to RPS by Planning Officer to initiate modelling as soon as reasonably practicable after initial notification. Allowing for spill modelling results within 4 hours of information provision. 2b: Daily information from Operational Monitoring Studies: Op2 (Hydrocarbon Spill Surveillance and Tracking), Op3 (Hydrocarbon Weathering Assessment), and Op4 (Coastal Shoreline Assessment) will be provided to refine and improve short-term model forecasts of hydrocarbon spill distributions. 2c: Up to 3-day hydrodynamic forecasts performed at least daily to provide inputs to hydrocarbon fate modelling. Performed daily to incorporate updates to regional current hydrodynamic and wind forecasts. The model should be adjusted where applicable based on the validation information provided by the PI. 2d: Availability of RPS personnel for advice and explanation of model results at any time (24 hours a day for 7 days a week).
Initiation Trigger	Implementation following notification of a Level 2 or Level 3 hydrocarbon spill
Termination Criteria	The Planning Officer will terminate the operational module when the following criteria have been met: • The hydrocarbon spill has ceased; • The spill is no longer visible to human observers; and • 24 hrs have elapsed since the last confirmed observation of surface hydrocarbons. Specifically, a 'silvery/grey' sheen, as defined by the Bonn Agreement Oil Appearance Code (BAOAC), is not observable.
Study Implementation Plan	Refer to Implementation Plan: Op1 (Operational Forecast Modelling)
Competencies	RPS is the recognised industry leader in the predictive modelling of hydrocarbon incidents. Therefore, competency tests and training are not warranted.
Reporting	• RPS developed the IP Op1 (Operational Forecast Modelling).

Strategy Component	Description
	• Cooper Energy (Planning Officer) will provide the location, start time, volume, and duration of the spill memorandum to RPS. • Forecast modelling daily report including forecast modelling inputs, outputs, validation and uncertainties and modelling results uploaded daily to a secure website by RPS for the Planning Officer, Environment Officer and Study Op2 PI.
Review and Auditing	• Review of operational forecast modelling by Environment Officer and AMOSC. • Annual internal review of Study Op1 Monitoring Strategy and Study IP (methods, procedures and processes) by the Environment Officer with the period between reviews no longer than 12 months. • Non-conformances were recorded with follow-up by the Environment Officer within 2 weeks.
Responsibilities	IC: • Overall responsibility for the implementation of the Strategy and IP. Planning Officer: • Interface between IC and Environment Officer. • Provides necessary spill input parameters to PI. • Communicate forecast modelling results to response personnel. • Communicate with RPS, AMSA, and AMOSC as required regarding forecasting modelling. Environment Officer (or delegate): • Ongoing review and approval of the Study Op1 IP. • Day-to-day coordination of the study results. • Carry out periodic internal reviews of IP implementation. • Oversee external audits. • Ensure information from Studies Op2 (Hydrocarbon Spill Surveillance and Tracking) and Op4 (Coastal Shoreline Assessment) is provided to RPS. • Ensure information from Study Op1 is provided to the PI of Study Op2. • Provide advice as required to IC and the Planning Officer. • Communications with NOPSEMA's Environment Division. PI (RPS): • Review / update Study Op1 IP • Daily implementation of this IP. • Provision by RPS of quasi-real-time modelling and daily updates to a secure website. • Provide Cooper Energy with advice concerning modelling forecasts. • Ensure availability of RPS staff 24 hours a day, 7 days a week, for consultation regarding modelling results with response personnel.
Relevant References and Guidelines	• RPS Guidelines

3.2.2 Study Op2: Hydrocarbon Spill Surveillance and Tracking

Table 3-3 Study Op2 Strategy: Hydrocarbon Spill Surveillance and Tracking

Strategy Component[3]	Description
Monitoring Performance Outcomes	Conduct surveillance and tracking of surface hydrocarbon spill distribution to meet the following OPEP requirements: o Provide operational data/information to support and inform response planning and operations and monitor the spill response. o Implement operational monitoring following the IP to identify environmental sensitivities at risk of hydrocarbon exposure, inform the NEBA and identify environmentally sensitive receptors that require scientific monitoring. o OPEP Section 7 (Monitor and Evaluate).

[3] EPSs and MCs do not conform to table heading to facilitate relations between them.

Strategy Component[3]	Description
Monitoring Performance Standards	**Measurement Criteria**
1: Readiness to implement Study Op2 surveillance and tracking of hydrocarbon.	1a: PI and MP to be sourced from a pool of resources under existing contracts and agreements (i.e., AMOSC, AMSA). 1b: The Environment Officer has arrangements in place with the vessel and aircraft service providers. 1c: Study Op2 IP (Hydrocarbon Spill Surveillance and Tracking) in place and approved by the Environment Officer.
2: Acquisition of daily vessel-based and aerial surveys of hydrocarbon distributions.	2a: PI, in consultation with the Planning Officer, plans vessel and aircraft-based daily surveillance activities on the basis of model forecasts from Study Op1 (Operational Forecast Modelling) and other available information. Day's vessel-based and aerial monitoring objectives and plans are recorded on the daily report. 2b: MP prepares a summary of daily vessel-based and aerial surveillance activities for inclusion in daily reports.
3: Daily information for response planning and management.	3: PI prepares daily reports on hydrocarbon spill surveillance and tracking observations. Provided to the Planning Officer, Environment Officer (or delegate) and Study Op1 PI.
4: Provision of Final Surveillance and Tracking Overview Report and Data.	4: PI provides final report to summarise surveillance and tracking data sufficiently to serve as the validation data set for Study Sc8 (Hind-cast Modelling Impact Assessment) and to inform planning for post-incident scientific monitoring of Sc2-Sc7, Sc9 within 4 weeks after cessation of monitoring activities. Provided to IC, Environment Officer (or delegate) and Study Sc2 – Sc7, Sc9 PIs.
Initiation Trigger	Implementation following a Level 2 or Level 3 hydrocarbon spill
Termination Criteria	The Planning Officer will terminate the operational module when the following criteria have been met: • The hydrocarbon spill has ceased; • The spill is no longer visible to human observers. Specifically, a 'silvery / grey' sheen, as defined by BAOAC is not observable; • 24 hours have elapsed since the last confirmed observation of surface hydrocarbons; and • The latest modelling results (Op1) do not predict surface exposures at visible levels.
Study Implementation Plan	Refer to Implementation Plan: Op2 (Hydrocarbon Spill Surveillance and Tracking).
Competencies	• PI with experience managing and leading hydrocarbon spill responses or similar monitoring. • Vessel-based observers trained in vessel-based hydrocarbon spill monitoring. • Aerial-based observers trained in aerial-based hydrocarbon spill monitoring. • Prequalified vessels and aircraft**.** • CVs to be kept on file.
Reporting	• Daily Study Op2 reports on hydrocarbon spill surveillance and tracking observations. • Final Study Op2 Report within 1 month after cessation of monitoring activities.
Review and Auditing	• Validation of hydrocarbon mapping confidence using vessel-based surveillance and tracking buoys. • Annual internal review of Study Op2 Monitoring Strategy and Study IP methods, procedures, processes and records by Environment Officer (or delegate). • Non-conformances recorded with the PI and follow-up by Environment Officer (or delegate) within 2 weeks.
Responsibilities	IC: • Overall responsibility for the implementation of the Strategy and IP. Planning Officer: • Interface between IC and Environment Officer. • Facilitate daily surveillance activities. • Disseminate Study Op2 information to the response team.

Strategy Component[3]	Description
	• Communications with AMOSC and AMSA, as required, regarding surveillance and tracking of the spill. Environment Officer (or delegate): • Ongoing review and approval of Study Op2 IP. • Compliance with Study Op2 IP requirements. • Day-to-day coordination of the study results. • Carry out periodic internal reviews of IP implementation. • Oversee external audits. • Ensure information from Study Op1 is provided to Study Op2 PI. • Provide advice as required to IC and the Planning Officer. • Communications with NOPSEMA's Environment Division and other regulators. PI: • Daily implementation of this IP. • Plan, coordinate and implement daily surveillance and tracking field activities. • Review, approve and disseminate daily surveillance information and final report. • Daily communication with the MP. • Advise Environment Officer (or delegate) and IC. • Review the Hydrocarbon Spill Surveillance and Tracking Final Report. MP: • Undertake and record field observations. • Contribute to reports. • Contribute to the Hydrocarbon Spill Surveillance and Tracking Final Report (where required).
Relevant References and Guidelines	• AMSA (2003a) Oil Spill Monitoring Handbook. • AMSA (2003b) Oil Spill Monitoring: Background Paper. • Oil Spill Handbook (Hook et al, 2016)

3.2.3 Study Op3: Hydrocarbon Weathering Assessment

Table 3-4 Study Op3 Strategy: Hydrocarbon Weathering Assessment

Strategy Component[4]	Description
Monitoring Performance Outcomes	To determine the physical and chemical properties of hydrocarbon as it weathers to characterise temporal decrease in toxicity to meet the following OPEP requirements: ○ Provide operational data/information to support and inform response planning and operations and monitor the spill response. ○ Implement operational monitoring following the OSMP to identify environmental sensitivities at risk of hydrocarbon exposure, inform the NEBA and identify which environmentally sensitive receptors require scientific monitoring. ○ OPEP Section 7 (Monitor and Evaluate).
Monitoring Performance Standards	**Measurement Criteria**
1: Readiness to implement Op3 Hydrocarbon Weathering Assessment.	1a: PI and MP to be sourced from a large pool of resources under existing contracts (i.e. Stantec). 1b: The Environment Officer has arrangements in place with vessel service providers and access to NATA-accredited analytical laboratory (e.g., ALS for weathering testing) 1c: Study Op3 (Hydrocarbon Weathering Assessment) IP is in place and approved by the Environment Officer.

[4] EPSs and MCs do not conform to table heading to facilitate relations between them.

Strategy Component[4]	Description
2: Acquisition of data on hydrocarbon chemical properties.	2a: PI plans a monitoring survey based on information from Studies Op1 (Operational Forecast Modelling) and Op2 (Hydrocarbon Spill Surveillance and Tracking), coordination with other studies, and planned response activities. The vessel-based monitoring objective and plan are recorded on the daily report. 2b: Experienced MP carries out vessel-based sampling at nominated locations along a longitudinal transect through the slick, at various water depths. Fluorescence, turbidity, temperature and salinity profiles will be carried out initially to verify proxy indicators of dissolved aromatics and entrained hydrocarbons, respectively, and to select depths for sample collection. Water samples are then collected and stored appropriately and organised for immediate couriering under holding time to the analysis laboratory. Chain of Custody (CoC), laboratory receipt notification and field records are to be stored/archived by MP. 2c: NATA-accredited laboratory analyses analytes (e.g., BTEX, MAH, PAH) and physical properties (e.g., wax content) appropriate to the hydrocarbon spill. CoC and laboratory analysis report provided, and data archived by MP. 2d: 2a-2c carried out on at least 3 surveys as soon as possible after the spill event, and at frequencies thereafter determined by the hydrocarbon type as defined by the PIs.
3: Characterise fate / weathering properties of hydrocarbon.	3a: After each survey, the PI / MP analyses hydrocarbon data to characterise weathering characteristics, discussing the likely decrease in toxicity with weathering time based on the chemical composition of different 'ages' of hydrocarbon in terms of release into the marine environment. 3b: PI / MP to provide a summary of fate/weathering properties of hydrocarbon in study Op3 final report within 3 weeks of receipt of the last laboratory analysis report.
4: Informing spill response and MP.	4a: Interim reports provided by PI after each survey, within one week of receipt of laboratory analysis provided to the Planning Officer, Environment Officer (or delegate) and all PIs. 4b: Study Op3 final report summarising hydrocarbon weathering assessment (for informing NEBA of hydrocarbon persistence) provided by PI / MP within 4 weeks of final laboratory results to Planning Officer, Environment Officer (or delegate) and all PIs.
Initiation Trigger	Immediate implementation following a Level 2 or Level 3 hydrocarbon spill
Termination Criteria	Field activity termination: The Planning Officer will terminate the operational module when the Planning Officer (or delegate) and PI, in consultation with NOPSEMA, DoT and/or AMSA, deem that weathering characteristics of hydrocarbon are sufficiently characterised, so further assessment is no longer required. Study Termination: Submission and approval of Hydrocarbon Weathering Assessment Final Report (Study Op3).
Study Implementation Plan	Refer to Implementation Plan: Op3 (Hydrocarbon Weathering Assessment)
Competencies	• PI is an experienced and qualified water quality scientist (5+ years) with experience in using fluorometry (or similar) and with field experience in monitoring campaigns. • MP (field) with appropriate training and/or experience as a marine scientist or technician with appropriate training and field experience in vessel-based water quality monitoring. Trained in vessel-based hydrocarbon spill sampling and interpreting data from a fluorometer. • MP (office) to be experienced water quality analysts for Study Op3 office-based analyses. • Prequalified vessel supplier. • Laboratory with NATA accreditation. • CVs to be kept on file.
Reporting	• Daily reporting on pro forma during field surveys, including daily monitoring objectives, planning, analytical progress, and emerging results. • Laboratory analysis reports. • Interim reports with an assessment of the hydrocarbon weathering properties for each survey. • Final Op3 report summarising hydrocarbon weathering assessment.

Strategy Component[4]	Description
Review and Auditing	• Field and data QA/QC procedures. • Laboratory QA/QC sample analyses. • Annual internal review of Study Op3 Monitoring Strategy and Study IP methods, procedures, processes and records by Environment Officer (or delegate). • Non-conformances are recorded with PIs and followed up by the Environment Officer (or delegate) within 2 weeks.
Responsibilities	IC: • Overall responsibility for the implementation of the Strategy and IP. Planning Officer: • Interface between IC and Environment Officer. • Facilitates field monitoring. • Disseminate Study Op3 information to the response team. • Communicate with AMOSC, AMSA, Environment Officer (or delegate): • Ongoing review and approval of the Study Op3 IP. • Day-to-day coordination and review of the study results. • Compliance with Study Op3 IP requirements. • Carry out periodic internal reviews of IP implementation. • Oversee external audits. • Communications with NOPSEMA's Environment Division. • Provide advice to the IC and Planning Officer. PI (Stantec): • Plan, coordinate and implement daily hydrocarbon weathering assessment survey. • Daily communications with the Environment Officer (or delegate) and MP. • Advise the Environment Officer (or delegate). • Review daily pro forma, interim survey reports and Hydrocarbon Weathering Assessment Final Report. MP: • Undertake hydrocarbon weathering monitoring activities. • Coordinate laboratories and transport of samples to laboratories. • Carry out hydrocarbon weathering analyses and reporting. • Contribute to vessel-based surveillance sections of interim survey reports and the final report. • Store and archive data (as required).
Relevant References and Guidelines	• Oil Spill Monitoring Handbook (Hook et al., 2016). • AMSA (2003b) Oil Spill Monitoring: Background Paper.

3.2.4 Study Op4: Coastal Shoreline Assessment

Table 3-5 Study Op4 Strategy: Coastal Shoreline Assessment

Strategy Component[5]	Description
Monitoring Performance Outcomes	To obtain information on the physical and biological character of the shoreline before hydrocarbon exposure at priority shorelines to establish an operational baseline condition, to monitor post-exposure hydrocarbon distribution and the physical and biological character of the shoreline, and to measure the effectiveness of shoreline response measures to meet the following OPEP requirements: ○ Provide operational data/information to support and inform response planning and operations and monitor the spill response. ○ Implement operational monitoring following the OSMP to identify environmental sensitivities at risk of hydrocarbon exposure, inform the NEBA and identify which environmentally sensitive receptors require scientific monitoring.

[5] EPSs and MCs do not conform to table heading to facilitate relations between them.

Strategy Component[5]	Description
	○ Provide a shoreline clean-up response appropriate for the nature and scale of shoreline impacts. ○ Monitor the effectiveness of response and clean-up operations along shorelines.
Monitoring Performance Standards	**Measurement Criteria**
1: Readiness to implement Study Op4 on coastal shoreline assessment before hydrocarbon spill.	1a: PI and MP (Shoreline Clean-up Assessment Team, SCAT) to be sourced from a pool of resources under existing contracts or agreements (i.e., AMOSC, Stantec, AMSA). 1b: Cooper Energy has arrangements with vessel and aircraft service providers. 1c: All SCAT members have undertaken AMOSC operations training in shoreline response (or equivalent competency).
2: Acquisition of shoreline baseline information before hydrocarbon exposure at priority shorelines.	2a: Study Op4 IP has nominated priority shorelines to acquire baseline information based on the modelled risk of contact. Any re-prioritisation based on potential hydrocarbon shoreline exposure risk is to be informed by model forecasts from Studies Op1 (Operational Forecast Modelling), hydrocarbon spill observations from Op2 (Hydrocarbon Spill Surveillance and Tracking) and direction from the IMT or Victorian authorities. Decision log/rationale recorded and archived. 2b: SCAT mobilised within 12 hrs of predicted shoreline contact (daylight permitting) as per OPEP. 2c: SCAT will carry out a baseline assessment as per Study Op4 IP, including physical shoreline characteristics (substrate, drainage, gradient, protection/exposure, coastal morphology) and biological shoreline characteristics (e.g., shorebirds). Field records will be backed up and archived at priority shorelines. 2d: Baseline data prepared by SCAT to facilitate rapid comparison of any post-exposure coastline shoreline surveys at the same location. The Baseline Shoreline Condition Report will be submitted to the Environment Officer (or delegate) within one week of the final SCAT baseline survey day. 2e: If needed, acquisition of any additional shoreline baseline data to follow measurement criteria 2a-2d. Any additional Coastal Shoreline Baseline Assessment survey plans will be recorded in relevant field documentation and appended to an updated version of the Baseline Coastal Shoreline Condition report(s) by the SCAT with the Environment Officer (or delegate) approval within one week.
3: Acquisition of shoreline data post-exposure to inform the effectiveness of preventative or clean-up measures	3a: PI directed by the Planning Officer and Environment Officer (or delegate) to shorelines to carry out post-exposure assessments. The survey plan is recorded on the field documentation. 3b: SCAT carries out post-exposure shoreline assessments as per Study Op4 IP, including visual observations of shoreline including substrate (e.g., sand), biological character (e.g., shorebirds, hydrocarbon impacts) and hydrocarbon distribution (if any) on the shoreline (e.g., hydrocarbon position, thickness, depth, total hydrocarbon coverage area). Field records (hard copy and digitised data) archived. 3c: If hydrocarbon comes ashore, then collection, appropriate storage and transport (under holding time) to NATA accredited laboratory of shoreline samples for laboratory analysis of shoreline hydrocarbon properties (e.g., BTEX, PAH) and physical properties (e.g., wax content). Completed CoCs and laboratory analysis report archived.
4: Quasi-real time information for other spill responses and MP	4a: SCAT to provide a sub-daily assessment of visual observations of the shoreline, including a substrate, biological character and hydrocarbon distribution (if any) on the shoreline. 4b: SCAT will provide twice-daily in-field assessments of the effectiveness and impacts of clean-up and preventative response measures. 4c: Information is provided to the Planning Officer and Environment Officer (or delegate) to inform NEBA of the assessment of response measures and the effectiveness of implemented measures. 4d: SCAT to immediately notify the Planning Officer and Environment Officer (or delegate) of hydrocarbon-impacted coastal wildlife (e.g., shorebirds) to inform potential Oiled Wildlife Response measures.
5: Assess toxicity/weathering of shoreline hydrocarbon	5a: Periodic Shoreline Hydrocarbon Assessment reports on the chemical composition from shoreline samples sent from the laboratory summarised and evaluated to estimate toxicity (i.e. inferred from hydrocarbon composition) and degradation rates of various

Strategy Component[5]	Description
	hydrocarbon components (i.e., weathering). This will be provided within one week of receipt of the laboratory analysis report. 5b: Information provided to the Planning Officer and Environment Officer to inform NEBA for assessment of response measures.
6: Provision of final surveillance and tracking overview report and data	6a: Final report to summarise Study Op4 (Coastal Shoreline Assessment) to be sufficiently detailed to serve as a validation data set of shoreline hydrocarbon distribution and weathering for Study Sc8 (Hind-cast Modelling Impact Assessment) and to inform planning for post-incident scientific monitoring of Sc2-Sc7, Sc9, within 4 weeks of the cessation of study.
Initiation Trigger	Implementation following a Level 2 or Level 3 hydrocarbon spill where risk to shoreline contact is identified.
Termination Criteria	Field activity termination: The Environment Officer, in consultation with relevant Victorian State control authorities, will terminate the operational module when the following criteria have been met: • The hydrocarbon spill has ceased; • No additional response or clean-up of habitat is predicted; • Locations predicted to be contacted by hydrocarbons have been contacted; • Independent scientific advice indicates that further clean-up activities are unlikely to decrease lasting hydrocarbon impacts on environmentally sensitive receptors. Study Termination: Submission and approval by Environment Officer (or delegate) of Coastal Shoreline Assessment Final Report.
Study Implementation Plan	Refer to Implementation Plans: Op4A (Coastal Shoreline Assessment - Otway) and Op4B (Coastal Shoreline Assessment - Gippsland).
Competencies	• PI with SCAT training and/or similar experience. • MP with appropriate training and/or field experience with wildlife, coastal, and oil spill response surveys. • NATA-accredited laboratory (e.g., ALS) for chemical composition measurements of hydrocarbon. • Driver's License. • Response team must be suitable, qualified, and licensed to operate vehicles safely.
Reporting	• Baseline coastal shoreline condition reports. • Daily reports of visual shoreline observations (substrate, biological, hydrocarbon distribution) undertaken and locations visited. • Laboratory reports of shoreline hydrocarbon chemical composition and physical properties. • Periodic coastal shoreline hydrocarbon assessment reports. • Final Op4 report summarising coastal shoreline assessment monitoring within 2 months of survey completion.
Review and Auditing	• Field and data QA/QC procedures. • Laboratory QA/QC sample analyses • Annual internal review of Study Op4 Strategy and Study IP methods, procedures, processes and records by Environment Officer (or delegate). • Non-conformances are recorded with PI and followed up by the Environment Officer (or delegate) within 2 weeks.
Responsibilities	IC: • Overall responsibility for the implementation of the Strategy and IP. Planning Officer: • Interface between IC and Environment Officer. • Facilitate coastal shoreline monitoring. • Inform the SCAT of planned / ongoing coastal response measures. • Disseminate Study Op4 Coastal Shoreline Hydrocarbon Assessment information for response planning and management. • Communicate and coordinate with AMOSC, AMSA, and State authorities.

Strategy Component[5]	Description
	Environment Officer (or delegate): • Compliance with Study Op4 IP requirements. • Coordinate transfer of information between PIs of different OSMP studies. • Day-to-day coordination and review of SCAT results • Carry out internal periodic reviews of IP implementation. • Oversee external audits. • Complete compliance reporting requirements. • Provide advice as required to IC and GMO. • Communications with NOPSEMA's Environment Division, State authorities and Commonwealth DCCEEW. PI: • Daily implementation of the IP. • Plan, coordinate and implement daily coastal shoreline assessment surveys. • Coordinate field monitoring, communications and daily reporting. • Quality control of laboratory data. • Advise the Environment Officer (or delegate). • Review baseline coastal shoreline condition reports and daily coastal shoreline assessment reports. • Review periodic coastal shoreline hydrocarbon assessment interim reports and the final report. MP (SCAT): • Implement field monitoring and transport of samples to the laboratory. • Carry out coastal shoreline assessments. • Carry out associated reporting and data archiving.
Relevant References and Guidelines	• Oil Spill Monitoring Handbook (Hook et al., 2016). • NOAA (2013) Shoreline Assessment Manual

3.2.5 Study Op5: Dispersant Efficacy Assessment

Table 3-6: Study Op5 Strategy: Dispersant Efficacy Assessment

Strategy Component[6]	Description
Monitoring Performance Outcomes	To provide information on the efficacy of the chemical dispersant applied to the spilled hydrocarbon and to meet the following OPEP requirements: ○ Provide operational data/information to support and inform response planning and operations and monitor the spill response. ○ Monitor the effectiveness of dispersant application to reduce surface VOCs.
Monitoring Performance Standards	**Measurement Criteria**
1: Readiness to implement Study Op5 on dispersant efficacy assessment.	1a: PI and MP to be sourced from a pool of resources under existing contracts or agreements (i.e., AMOSC, Stantec, AMSA). 1b: Cooper Energy has arrangements in place with vessel service providers. 1c: Study Op5 (Dispersant Efficacy Assessment) IP in place and approved by Environment Officer.
2: Acquisition of data on hydrocarbon dispersion and surface VOCs.	2a: PI plans a monitoring survey based on information supplied by the Planning Officer (or delegate) regarding planned response activities and the use of dispersants. The vessel-based monitoring objective and plan are recorded on the daily report. 2b: An experienced MP carries out vessel and/or aerial-based sampling for dispersant efficacy for surface dispersant application, aligned with the industry standard Special Monitoring of Applied Response Technologies (SMART) protocol.

[6] EPSs and MCs do not conform to table heading to facilitate relations between them.

Strategy Component[6]	Description
	2c: An experienced MP carries out vessel—or aerial-based sampling for dispersant efficacy for subsurface dispersant application, aligned with the industry-recommended American Petroleum Institute (API) method. 2d: For any dispersant application, experienced MPs carry out our vessel-based air quality monitoring for VOCs and % Lower Explosive Limits (LELs) as per the industry-recommended API method.
3: Quasi-real time information for spill response	3a: Provide sub-daily assessment of efficacy observations and/or measurements. 3b: Provide sub-daily assessment of VOCs, %LELs, and relevance to human health.
Initiation Trigger	Immediate implementation following a Level 2 or Level 3 hydrocarbon spill **only** when dispersant has been selected as a response option.
Termination Criteria	Field activity termination: The Environment Officer will terminate the operational module when the use of dispersant as a response activity has ceased. Study Termination: Submission and approval by Environment Officer (or delegate) of Dispersant Efficacy Assessment Final Report.
Study Implementation Plan	Refer to Implementation Plan: Op5 (Dispersant Efficacy Assessment)
Competencies	• PI with experience managing and leading hydrocarbon spill responses or similar monitoring. • MP trained in vessel-based and/or aerial-based hydrocarbon spill monitoring. • MP are familiar with relevant sampling techniques (e.g. sub-surface video surveillance, use of fluorometer, water sample collection etc.). • MP familiar with air quality monitoring. • Prequalified vessels and aircraft. • CVs to be kept on file.
Reporting	• Sub-daily reports of dispersant efficacy and air quality. • Final Op5 report summarising dispersant efficacy assessment monitoring within one month of survey completion.
Review and Auditing	• Field and data QA/QC procedures. • Annual internal review of Study Op5 Strategy and Study IP methods, procedures, processes and records by Environment Officer (or delegate). • Non-conformances recorded with the PI and follow-up by Environment Officer (or delegate) within 2 weeks.
Responsibilities	IC: • Overall responsibility for the implementation of the Strategy and IP. Planning Officer: • Interface between IC and Environment Officer. • Facilitate dispersant efficacy monitoring. • Inform the PI of planned / ongoing response measures. • Disseminate Study Op5 Dispersant Efficacy Assessment information for response planning and management. • Communication and coordination with AMOSC, AMSA, and DTP. Environment Officer (or delegate): • Compliance with Study Op5 IP requirements. • Day-to-day coordination and review of Op5 results. • Carry out internal periodic reviews of IP implementation. • Oversee external audits. • Complete compliance reporting requirements. • Provide advice as required to IC and GMO. • Communications with NOPSEMA's Environment Division DoT and DAFF. PI: • Daily implementation of the IP. • Plan, coordinate and implement surveys. • Coordinate field monitoring, communications and daily reporting.

Strategy Component[6]	Description
	• Advise the Environment Officer (or delegate). • Review final report. MP: • Implement field monitoring. • Carry out associated reporting.
Relevant References and Guidelines	• Oil Spill Monitoring Handbook (Hook et al, 2016). • Industry Recommended Subsea Dispersant Monitoring Plan (American Petroleum Institute, 2013). • Dispersant Application Monitoring Field Guide Tier I Visual Observation (Oil Spill Response Limited, 2011). • Special Monitoring of Applied Response Technologies (NOAA 2006)

3.3 Scientific (Type II) Monitoring Strategies

As noted in Section 1.4, the aim of the scientific (Type II) Monitoring Studies is to quantify the nature, extent, severity, and persistence of environmental impacts from a significant spill event and inform on appropriate remediation activities. Upon notification of a Level 2 or Level 3 hydrocarbon release, the Cooper Energy Oil Spill Incident Controller (or delegate) will initiate the OSMP. The strategy for each Scientific (Type II) Monitoring Study is provided in this section with a reference to their respective IP.

The Scientific Monitoring Strategies outlined in this section include:

- Sc1 – Ecotoxicology Assessment of Hydrocarbons.
- Sc2 – Hydrocarbon Monitoring in Marine Waters.
- Sc3 – Hydrocarbon Monitoring in Marine Sediments.
- Sc4 – Sub-tidal Benthic Habitat Monitoring.
- Sc5 – Shorebird and Seabird Population Monitoring.
- Sc6 – Marine Megafauna Surveys.
- Sc7 – Hydrocarbon Monitoring of Representative Commercial and Recreational Fish Species.
- Sc8 – Hind-cast Modelling for Impact Assessment
- Sc 9 - Socio-Economic Tourism

3.3.1 Study Sc1: Ecotoxicology Assessment of Hydrocarbons

Table 3-7: Study Sc1 Strategy: Ecotoxicology Assessment of Hydrocarbons

Strategy Component	Description
Monitoring Performance Outcomes	Undertake eco-toxicological studies to establish hydrocarbon exposure thresholds for sensitive biotic receptors to assist with assessing impacts to environmentally sensitive receptors affected by the spill. This is used to: • Define hydrocarbon eco-toxicities and subsequent contribution to changes in the marine environment from unplanned hydrocarbon releases. • Reduce the range of uncertainty of impacts to fauna. • Informs initiation and termination criteria of other scientific monitoring modules. • Contribute to publicly available hydrocarbon exposure thresholds so that the oil and gas industry can utilize this information for future environmental assessments of hydrocarbon spills.
Monitoring Performance Standards	**Measurement Criteria**

Strategy Component	Description
1: Readiness to implement Sc1 monitoring program.	1a: PI and MP to be sourced from a pool of resources under existing contracts (i.e., Stantec). 1b: Cooper Energy has arrangements with vessel service providers 1c: PI has arrangements with experienced ecotoxicology and NATA-accredited laboratories (e.g., Écotox Services).
2: Acquisition of hydrocarbon samples.	2a: When safe to do so (considering hydrocarbon volatility), MP to collect hydrocarbon and dispersant (if used in response) samples from the surface near the release. Field records stored / archived. 2b: CoC will confirm samples transported and received by laboratories, and sample receipt notifications will be used to confirm arrival at laboratories.
3: Determination of hydrocarbon exposure threshold.	3a: The report issued by the ecotoxicology laboratory provides industry-standard exposure thresholds for several relevant indicator organisms for hydrocarbon.
4. Characterisation of the composition of released hydrocarbon.	4a: Report issued by NATA-accredited laboratory detailing hydrocarbon and dispersant (if used in response) composition of samples used in ecotoxicology assessment.
5. Exposure threshold values made available to industry.	5a: PI will provide the Environment Officer (or delegate) with the Study Sc1 final report within one month of the ecotoxicology laboratory report. The Environment Officer (or delegate), after consultation with DAFF, NOPSEMA, and DoT, will approve the Study Sc1 Final Report within one month of submission by PI.
Initiation Trigger	Implemented following a Level 2 or Level 3 hydrocarbon spill.
Termination Criteria	The Environment Officer (or delegate) will terminate the study when, in consultation with NOPSEMA, AMOSC, AMSA and State authorities: • Laboratory toxicity testing has established the risk of environmental damage caused by the hydrocarbon release; and • Independent scientific specialists have agreed that the testing result provides a satisfactory exposure threshold for hydrocarbons.
Study Implementation Plan	Refer to Implementation Plan: Sc1 (Ecotoxicology Assessment of Hydrocarbons)
Competencies	• PI will be an experienced and qualified eco-toxicologist with at least 10 years of experience in eco-toxicological assessment, including hydrocarbons (or equivalent). • MP (field) to be an experienced marine scientist or technician with appropriate training and field experience in vessel-based water quality monitoring. Trained in vessel-based water quality monitoring. • CVs to be kept on file. • Laboratory services with NATA certification. • Nationally (e.g., Geotechnical Services) or internationally (e.g., SINTEF) recognised ecotoxicology laboratory for exposure value determination of hydrocarbon. • Commercial certified / surveyed plant (vessels and aircraft).
Reporting	• Laboratory analysis report of hydrocarbon chemical composition within 7 weeks of the spill. • Ecotoxicology laboratory report of exposure hydrocarbon threshold and dispersed hydrocarbon threshold (if dispersant used in response) within 10 weeks of the spill. • Study Sc1 final report within two weeks of receiving the eco-toxicological laboratory report.
Review and Auditing	• CoC documentation for samples. • QA/QC sample analysis. • Validation and checking of laboratory results. • Annual internal review of Strategy Sc1 IP (methods, procedures, processes, records, reporting and QA/QC) by Environment Officer (or delegate). • Any non-conformances recorded with PI and follow-up by Environment Officer (or delegate) within two weeks.

Strategy Component	Description
Responsibilities	IC: • Overall responsibility for implementation of Study Sc1. Planning Officer: • Facilitate the collection of hydrocarbon samples. Environment Officer: • Compliance with Study Sc1 IP requirements. • Carry out periodic internal reviews of IP implementation. • Day-to-day coordination and review of study results. • Oversee external audits. • Approve and provide compliance reporting requirements. • Approve the Study Sc1 Final Report. • Provide advice concerning environmental issues as required to the IC and Planning Officer. • Communications with NOPSEMA's Environment Division, AMSA, and DoT. PI (Stantec): • Daily implementation of the Sc1 IP. • Plan, coordinate and implement ecotoxicology assessment of hydrocarbon. • Review, approve and disseminate hydrocarbon monitoring information and Study Sc1 final report. • Communications between MP and Environment Officer (or delegate). • Provide advice as required to the Environment Officer (or delegate). MP: • Undertake hydrocarbon monitoring activities. • Coordinate laboratories and storage and transport of samples. • Carry out data analysis and reporting. • Store and archive data.
Relevant References and Guidelines	Australian and New Zealand Water Quality Guidelines for Fresh and Marine Waters Quality, ANZECC & ARMCANZ (2000) (now ANZG (2018)).

3.3.2 Study Sc2: Hydrocarbon Monitoring in Marine Waters

Table 3-8: Study Sc2 Strategy: Hydrocarbon Monitoring in Marine Waters

Strategy Component	Description
Monitoring Performance Outcomes	Monitor hydrocarbon and dispersant content (if used in response) in marine waters at sub-tidal and intertidal impact sites (which may include, where relevant, priority/sensitive locations, State or Commonwealth marine protected areas, pelagic sites, commercial fishery areas) and reference sites to support the assessment of environmental impacts and recovery. This will be used for: • Informing response planning of hydrocarbon and dispersant content (if used in response) concentrations in marine waters at priority sensitive locations as an NEBA input during the incident. • Provide data to validate hind-cast modelling confidence of the fate and transport of hydrocarbons.
Monitoring Performance Standards	**Measurement Criteria**
1: Readiness to implement the Sc2 program.	1a: PI and MP to be sourced from a pool of resources under existing contracts (i.e., Stantec). 1b: Cooper Energy has arrangements in place with vessel service providers.
2: Appropriate collection, transport and analysis of water samples.	2a: MP will collect and store water samples and keep field records (e.g., field book, checklists) as per the Study Sc2 IP. CoC to confirm sample collection, transport to appropriate laboratories, and sample receipt notification from the NATA-accredited laboratory (e.g., ALS) to confirm the arrival of water samples within holding times. Documents stored/archived by MP.

Strategy Component	Description
	2b: Laboratory Analysis Report issued by NATA-accredited laboratory with analyte list defined in the IP (within three weeks of sample collection) and stored by MP.
3: Acquisition and dissemination of water quality data for hydrocarbons in water.	3a: MP collects water quality data as soon as possible in sensitive priority areas, commercial fishery areas, pelagic sites, and reference sites as per the IP. MP stores/archives field records. 3b: PI to provide hydrocarbon and dispersant (if used in response) in Marine Waters Survey (within one week of receipt of Laboratory Analysis Report) to Environment Officer (or delegate). The Environment Officer (or delegate) will approve it within one week of submission and distribute it to the Planning Officer and other PIs.
4: Acquisition of hydrocarbon data from marine waters during the hydrocarbon release and for 3 months after the cessation of the release.	5a: Collect and analyse hydrocarbon and dispersant (if used in response) concentrations in marine waters as prescribed in the Sc2 IP by MP during the hydrocarbon release and for three months after the cessation of the hydrocarbon release. 5b: PI will provide a short report for each survey (within one week of receipt of the Laboratory Analysis Report) to the Environment Officer (or delegate). The Environment Officer (or delegate) will approve it within one week of submission and distribute it to the Planning Officer and other PIs.
5. Provision of hydrocarbon monitoring of marine waters dataset to Study Sc8 for Hind-cast Modelling.	6a: The Planning Officer (or delegate) is responsible for the provision of the Study Sc2 dataset to the PI of Study Sc8 (Hind-cast Modelling Impact Assessment) to serve as validation data of hydrocarbon and dispersant (if used in response) concentrations in marine waters at monitored sites within four weeks of cessation of unplanned hydrocarbon releases.
6: Revise the IP for the long-term monitoring phase of hydrocarbons in water after the cessation of the hydrocarbon release and carry out the long-term monitoring phase.	7a: PI will consider the final information/results from Sc8 (Hind-cast Modelling for Impact Assessment) in the revision of the IP for the long-term monitoring phase of hydrocarbons in marine waters after the cessation of the hydrocarbon release. Recommendations will be provided as a brief memorandum to participants for the Study Sc8 Hind-cast Modelling workshop within three months after cessation of hydrocarbon release. 7b: PI revises Sc2 IP for long-term monitoring phase of hydrocarbons in water within three months after cessation of hydrocarbon releases and provides to Environment Officer (or delegate). Environment Officer (or delegate) to approve the revision to Sc2 IP for the long-term monitoring phase of hydrocarbons in marine waters within eight weeks of submission after consultation with DCCEEW, NOPSEMA and State authorities and disseminate to MP. 7c: PI responsible for the implementation of the Long-Term Monitoring Phase of the Study Sc2 IP.
7: Assess the impact of hydrocarbons in marine waters	8a: PI responsible for assessing the impact of hydrocarbons and dispersant (if used in response) in marine waters within the survey (single survey), annual (data to date, EP reporting commitment) and final (all data) reports relative to the established baseline condition and the reference sites as prescribed in the Study Sc3 IP.
8: Regulatory compliance reporting.	9a: Environment Officer (or delegate) to provide regulators (NOPSEMA, State authorities and DCCEEW) with the Final Study Sc2 Scientific Monitoring Report within four weeks of approval by the Environment Officer (or delegate).
Initiation Trigger	Implemented following a Level 2 or Level 3 hydrocarbon spill.
Termination Criteria	Field Study Termination: The Planning Officer or Environment Officer (or delegate) will terminate the study when, in consultation with NOPSEMA, State authorities and DCCEEW: • The hydrocarbon spill has ceased, and • Concentrations of hydrocarbons and dispersants (if used in response) in water are within the natural variability of the baseline conditions and no longer pose a risk to environmentally sensitive receptors. • No detectable changes to water quality values as identified within relevant State or Commonwealth marine protected areas. Study Termination: Submission and approval of Study Sc2 Final Report.
Study Implementation Plan	Refer to Implementation Plans Sc2A (Hydrocarbon Monitoring in Marine Waters - Otway) and Sc2B (Hydrocarbon Monitoring in Marine Waters - Gippsland).

Strategy Component	Description
Competencies	• PI to be an experienced (5+ years) and qualified water quality scientist with field experience in vessel-based water quality monitoring (or equivalent). • MP (field) is to be experienced marine scientists or technicians with appropriate training and experience in water quality sampling. • MP (office) will be an experienced water quality analyst for Study Sc2 office-based analyses. • Laboratory services with NATA accreditation. • CVs to be kept on file. • Commercial certified / surveyed plant (vessels).
Reporting	PI and MP are responsible for the preparation, and the Environment Officer (or delegate) is responsible for the approval and dissemination of the following: • Study Sc2 IP. • Study Sc2 Reactive Baseline Survey and Baseline Data Report. • Study Sc2 Survey Reports. • Long-Term Monitoring Phase Study revision of Sc2 IP. • Study Sc2 Final Report.
Review and Auditing	• Chain of Custody Documentation for samples. • Laboratory QA/QC sample analysis. • Annual internal review of Strategy Sc2 IP (methods, procedures, processes, records, reporting and QA/QC) by Environment Officer (or delegate). • Any non-conformances recorded with the PI and follow-up by the Environment Officer (or delegate) within two weeks.
Responsibilities	<u>IC:</u> • Overall responsibility for implementation of the Study Sc2 Strategy and IP. <u>Planning Officer:</u> • Facilitation of water quality sampling in areas contacted by the hydrocarbon and dispersant (if used in response). <u>Environment Officer (or delegate):</u> • Ongoing review and approval of the Study Sc2 IP long-term monitoring phase revision of the IP. • Compliance with Study Sc2 IP requirements. • Day-to-day coordination and review of monitoring results. • Carry out periodic internal reviews of IP implementation. • Oversee external audits. • Communications with NOPSEMA's Environment Division and other regulators. • Approve and provide compliance reporting requirements. • Approve Hydrocarbon Monitoring of Marine Waters Final Report. • Provide advice to IC and Planning Officer as required. <u>PI (Stantec)</u>: • Daily implementation of this IP. • Plan, coordinate and implement daily water quality surveys. • Review, approve and disseminate water quality monitoring information. • Daily communications between MP and Environment Officer (or delegate). • Review water survey reports, baseline reports, and the final report on hydrocarbon monitoring of marine waters. • Provide advice as required to the Environment Officer (or delegate). <u>MP:</u> • Undertake water quality monitoring activities. • Coordinate with laboratories. • Carry out data analyses. • Prepare reports, including water quality survey reports and final reports. • Store and archive data.
Relevant References and Guidelines	Oil Spill Monitoring Handbook (Hook et al., 2016)

Strategy Component	Description
	Australian and New Zealand Water Quality Guidelines for Fresh and Marine Waters Quality, ANZECC & ARMCANZ (2000) (now ANZG (2018)).

3.3.3 Study Sc3: Hydrocarbon Monitoring of Marine Sediments

Table 3-9: Study Sc3 Strategy: Hydrocarbon Monitoring of Marine Sediments

Strategy Component	Description
Monitoring Performance Outcomes	Monitor hydrocarbons in marine sediments at sub-tidal (rocky reef) and intertidal (sandy beaches) sensitive locations, pelagic sites, commercial fishery areas and reference sites to support assessment of environmental impacts and recovery. This will be used for: • Informing response planning of hydrocarbon concentrations in sediments at priority-sensitive locations to inform the NEBA during the incident. • To provide data to validate hind-cast modelling confidence of the sedimentation of hydrocarbons onto the seabed.
Monitoring Performance Standards	**Measurement Criteria**
1: Readiness to implement Sc4 Hydrocarbon Monitoring in Marine Waters program.	1a: PI and MP to be sourced from a large pool of resources under existing contracts (i.e., Stantec). 1b: Cooper Energy has arrangements in place with vessel service providers.
2: Appropriate collection, transport and analysis of sediment samples.	2a: MP will collect and store sediment samples and keep field records (e.g., field book, checklists) as per the Study Sc3 IP. CoC to confirm sample collection, transport to appropriate laboratories, and sample receipt notification from the NATA-accredited laboratory (e.g., ALS) to confirm the arrival of sediment samples within holding times. Documents stored/archived by MP. 2b: Laboratory Analysis Report issued by NATA-accredited laboratory with analyte list defined in the IP (within three weeks of sample collection) and stored/archived by MP.
3: Acquisition and dissemination of data for hydrocarbons in sediments.	3a: MP to collect sediment quality data from the seabed at sub-tidal (rocky reef) and intertidal (sandy beaches) locations, pelagic sites, commercial fishery areas and reference sites within one week of hydrocarbon release. MP stores/archives field records and CoC. 3b: PI will provide the Hydrocarbon in Sediments Survey (within one week of reactive baseline survey completion) to the Environment Officer (or delegate). The Environment Officer (or delegate) will approve it within one week of submission and distribute it to the Planning Officer and other PIs.
4: Acquisition of routine hydrocarbon data in marine sediments during the hydrocarbon release and for 3 months after the cessation of hydrocarbon release.	4a: Collect and analyse hydrocarbon concentrations in sediments as prescribed in the Sc3 IP by MP during the hydrocarbon release and for nine months after the cessation of hydrocarbon releases. 4b: PI will provide a short data report summarising each field survey (within four weeks of completion of each survey) to the Environment Officer (or delegate). The Environment Officer (or delegate) will approve it within one week of submission and distribute it to the Planning Officer and other PIs.
5. Provision of hydrocarbon monitoring of marine sediments dataset to Study Sc8 for Hind-cast Modelling Impact Assessment.	5a: PI responsible for provision of Study Sc3 dataset to PI of Study Sc8 Hind-cast Modelling Impact Assessment to serve as a validation data set for sedimentation of hydrocarbons onto the sea bottom at priority sensitive locations, pelagic sites and reference sites within four weeks of termination of unplanned hydrocarbon release.
6: Revise the IP for the long-term monitoring phase of hydrocarbons in sediments after the hydrocarbon release and carry out the long-term monitoring phase.	6a: PI to consider final information/results from Sc8 (Hind-cast Modelling for Impact Assessment) in revising the IP for the long-term monitoring phase of hydrocarbons in sediments after cessation of the hydrocarbon release. 6b: PI revises Sc3 IP for long-term monitoring phase of hydrocarbons in sediments (within four weeks after Sc8 Final Report approval). Environment Officer (or delegate) to approve revision of Sc4 IP for long-term monitoring phase of hydrocarbons in sediments within eight weeks of submission after consultation with DCCEEW, NOPSEMA and State authorities and disseminate to MP.

Strategy Component	Description
	6c: PI responsible for the implementation of the Long-Term Monitoring Phase of the Study Sc4 IP.
7: Assess the impact of hydrocarbons in marine sediments.	7a: PI responsible for reporting survey results and assessing the effect of hydrocarbons on marine sediment quality in the Survey (single survey), Annual (data to date, EP reporting commitment), and Final (all data) reports relative to the established baseline condition and the reference sites as prescribed in the Study Sc3 IP. 7b: PI will prepare and provide the Environment Officer (or delegate) with a Study Sc3 Chapter for Annual Reports by 1 October each year and the Hydrocarbons in Marine Sediments Final Report within eight weeks of field termination. Environment Officer (or delegate), after consultation with DCCEEW, NOPSEMA, and State authorities, will approve the Final Hydrocarbons in Marine Sediments Report within three months of field termination for dissemination.
8: Regulatory compliance reporting	8a: The Environment Officer (or delegate) is to provide regulators (NOPSEMA, State authorities and DCCEEW) with Annual Scientific Monitoring Reports that include a Study Sc3 chapter and the Final Study Sc3 Scientific Monitoring Report within four weeks of approval by the Environment Officer (or delegate).
Initiation Trigger	Implemented following a Level 2 or Level 3 hydrocarbon spill.
Termination Criteria	Field Study Termination: The Planning Officer or Environment Officer (or delegate) will terminate the study when, in consultation with NOPSEMA, DAFF and State authorities: • Concentrations of hydrocarbons in sediment samples are below ANZG (2018) default guideline values (GV's) for biological disturbance or hydrocarbon levels in sediments are within natural variability of baseline condition and/or no longer pose a risk to environmental receptors and • The extent, severity and persistence of hydrocarbons from concentrations recorded in sediments have been documented. Study Termination: Submission and approval of Study Sc3 Final Report.
Study Implementation Plan	Refer to Implementation Plans Sc3A (Hydrocarbon Monitoring of Marine Sediments - Otway) and Sc3B (Hydrocarbon Monitoring of Marine Sediments - Gippsland).
Competencies	• PI must be an experienced marine scientist with at least 5 years of experience in collecting marine sediment samples (or equivalent). • MP (field) will include experienced and qualified marine scientists with field experience in vessel-based sediment sampling. • MP (office) to be experienced sediment quality analysts for Study Sc3 office-based analysis. • Laboratory services will be NATA certified. • CVs to be kept on file. • Commercial certified/surveyed plant (vessels).
Reporting	PI and MP are responsible for the preparation, and the Environment Officer (or delegate) is responsible for the approval and dissemination of the following: • Study Sc3 (Hydrocarbon Monitoring in Marine Sediments) IP. • Study Sc3 Monitoring Hydrocarbons in Sediments Baseline Report within two weeks of spill. • Study Sc3 Survey Reports within one month of completion. • Long-Term Monitoring Phase Study revision of Sc3 IP within one month of final survey completion. • Study Sc3 Chapter in Annual Reports. • Study Sc3 Final Report one month after study termination
Review and Auditing	• NATA Accredited laboratory services. • Chain of Custody Documentation for samples. • Annual internal review of Strategy Sc3 IP (methods, procedures, processes, records, reporting and QA/QC) by Environment Officer (or delegate). • Any non-conformances recorded with the PI and followed up by the Environment Officer (or delegate) within two weeks.

Strategy Component	Description
Responsibilities	IC: • Overall responsibility for the implementation of the Strategy and IP. Planning Officer: • Facilitate sediment quality sampling in areas of active response measures during the hydrocarbon release. Environment Officer (or delegate): • Ongoing review and approval of the Sc3 IP and the long-term monitoring phase revision of the IP. • Compliance with Study Sc3 IP requirements. • Day-to-day coordination and review of monitoring results. • Carry out periodic reviews of IP implementation. • Oversee external audits. • Communications with NOPSEMA's Environment Division and other regulators. • Approval and provision of any compliance reporting requirements. • Approve all reporting (Survey, Baseline, Chapter Sc4 in Annual, Final), and the Final and Long-Term Monitoring Phase IPs. • Provide advice to IC and Planning Officer as required. PI (Stantec): • Develop the long-term monitoring phase revision of the IP. • Daily implementation of the IP. • Plan, coordinate and implement daily Sediment Quality Survey • Review Survey Reports, Baseline Reports, Sc4 Chapters in Annual Reports, revision of IP for Long-term Monitoring Phase, and Final Report. • Review of data provided for inputs into Study Sc8 Hind-cast Modelling. • Review of any compliance reports. • Provide advice as required to the Environment Officer (or delegate). MP: • Undertake sediment quality monitoring activities. • Coordinate laboratories. • Carry out data analyses. • Prepare reports including the Hydrocarbon Monitoring in Marine Sediments Final Report. • Store and archive data.
Relevant References and Guidelines	• Oil Spill Monitoring Handbook (Hook et al, 2016). • ANZECC & ARMCANZ (2000) (now ANZG (2018)) Fresh and Marine Water Guidelines (including ISQC sediments).

3.3.4 Study Sc4: Intertidal and Sub-tidal Habitat Monitoring

Table 3-10: Study Sc4 Strategy: Intertidal and Subtidal Habitat Monitoring

Strategy Component	Description
Monitoring Performance Outcomes	Monitor sub-tidal habitats (e.g., sponge gardens), including demersal fish and also inter-tidal salt marsh at priority sensitive locations and one reference site to support the assessment of environmental impacts and recovery. This will be used to: • Quantify the distribution, abundance and community composition of marine organisms in soft sediment and hard substrate environments; • Quantify the level of exposure to affected communities; and. • Determine the impact and recovery of the hydrocarbon release on those habitats.
Monitoring Performance Standards	**Measurement Criteria**
1: Readiness to implement the Sc4 program.	1a: PI and MP to be sourced from a large pool of resources under existing contracts (i.e., Stantec). 1b: PI has some vessels available for near-coastal work, and Cooper Energy has arrangements in place with vessel service providers.

Strategy Component	Description
	1c: PI has arrangements in place for specialised monitoring equipment (e.g., video / drop cameras, ROV).
2: Reactive baseline monitoring and establishment of sub-tidal benthic habitat monitoring sites	2a: PI to consider outputs from Studies Op1 and Op2 to prioritise sensitive priority areas for the establishment of monitoring sites and gathering reactive monitoring data. 2b: MP to establish sites and to carry out a survey at the five sensitive priority areas and one reference site: • First Priority: Sponge habitat within one week of the hydrocarbon release. • Secondary Priority: Macro-algae sites within 2 weeks of the hydrocarbon release. • Third Priority: Saltmarsh within 3 weeks of the spill. 2c: PI will provide a Reactive Baseline Survey Report (within four weeks of the completion of the reactive baseline survey) to the Environment Officer (or delegate). The Environment Officer (or delegate) will approve it within one week of submission and distribute it to the Planning Officer and other PIs. 2d. MP stores/archives field records, photos, video and other data.
3: Acquisition and dissemination of existing intertidal and sub-tidal habitat baseline data.	3a: PI responsible for the acquisition of existing baseline sponge and macro-algae habitat and saltmarsh habitat data from various sources as per the procedure in the Sc4 IP to establish the baseline dataset. 3b: PI to provide Study Sc4 - Intertidal and Sub-tidal Benthic Habitat Baseline Data Report (within eight weeks of hydrocarbon release) to Environment Officer (or delegate). to approve within two weeks of submission and distribute to Planning Officer and other PIs.
4: Acquisition of routine inter-tidal and sub-tidal benthic habitat surveys during the hydrocarbon release and for 3 months after the cessation of hydrocarbon releases	4a: MP to routinely carry out scientific surveys of inter-tidal and sub-tidal benthic habitat sites at priority sensitive locations and reference sites as prescribed in the Sc4 IP during the hydrocarbon release and for 3 months after the cessation of the hydrocarbon release. Field records, photos, video and other data to be stored/archived. 4b: PI to provide a short report for each survey (within 4 weeks of completion of field survey) to the Environment Officer (or delegate). Environment Officer (or delegate) to approve within one week of submission and distribute to Planning Officer and other PIs.
5: Revise IP for the long-term monitoring phase of inter-tidal and sub-tidal benthic habitats after the hydrocarbon release and carry out the long-term monitoring phase	5a: PI to consider final information/results from Sc8 (Hind-cast Modelling for Impact Assessment) in the revision of the IP for the long-term monitoring phase of inter-tidal and sub-tidal benthic habitats after cessation of the hydrocarbon release. 5b: PI revises Sc4 IP for the long-term monitoring phase of inter-tidal and sub-tidal benthic habitats (within four weeks of receiving the Study Sc8 Final Report) and provides it to the Environment Officer (or delegate). Environment Officer (or delegate) to approve revision of Sc4 IP for long-term monitoring phase of inter-tidal and sub-tidal benthic habitats within four weeks of submission after consultation with DCCEEW, NOPSEMA and State authorities and disseminate to MP. 5c: PI responsible for the implementation of Long-Term Monitoring Phase Sc4 IP.
6: Assess the impact of hydrocarbon release on inter-tidal and sub-tidal benthic habitats	6a: Assessment of potential impacts to inter-tidal and sub-tidal habitats using methods detailed in the Sc4 IP and utilising Study Sc4 data. 6b: PI responsible for reporting data and assessing the impact of hydrocarbons on inter-tidal and sub-tidal benthic habitats in the survey (single survey), annual (data to date, EP reporting commitment) and final (all data) reports relative to the established baseline condition and the reference sites. 6c: PI to prepare and provide the Environment Officer (or delegate) with a Sc4 Annual Report as requested each year and the Intertidal and Sub-tidal Benthic Habitat Final Report within eight weeks of field termination. After consultation with DCCEEW, NOPSEMA and State authorities, the Environment Officer (or delegate) to approve the Final Intertidal and Sub-tidal Benthic Habitat Report within two months of field termination for dissemination.
7: Regulatory compliance reporting	7a: The Environment Officer (or delegate) is to provide regulators (NOPSEMA, State authorities and DCCEEW) with Annual Scientific Monitoring Reports that include a Study Sc4 Chapter and the Final Study Sc4 Scientific Monitoring Report within 4 weeks of approval by the Environment Officer (or delegate).
Initiation Trigger	Implemented following a Level 2 or Level 3 hydrocarbon spill.

Strategy Component	Description
Termination Criteria	Field Study Termination: The Planning Officer or Environment Officer (or delegate) will terminate the study when, in consultation with NOPSEMA, DCCEEW and State authorities: • Overall impacts to inter-tidal and sub-tidal benthic habitats from hydrocarbon exposure have been quantified; • Recovery of impacted benthic habitats has been evaluated; and • Agreement has been reached with relevant stakeholders and regulators, based upon cessation of impacts attributable to the spill. Study Termination: Submission and approval of Study Sc4 Final Report.
Study Implementation Plan	Refer to Implementation Plans Sc4A (Intertidal and Subtidal Habitat Monitoring - Otway) and Sc4B (Intertidal and Subtidal Habitat Monitoring - Gippsland).
Competencies	• PI will be an experienced marine scientist with 5 years of vessel-based marine benthic habitat expertise (or equivalent). • MP will be experienced and qualified marine scientists with experience in undertaking marine benthic surveys, including inter-tidal and sub-tidal monitoring and habitat analysis. • MP (office) will be experienced inter-tidal and sub-tidal benthic habitat analysts for Study Sc4 office-based analysis. • Dive teams with Australian standard commercial certification. • Wet laboratory services will be required for organism sampling processing. • CVs to be kept on file. • Commercial certified/surveyed plant (vessels).
Reporting	PI and MP are responsible for the preparation, and the Environment Officer (or delegate) is responsible for the approval and dissemination of the following: • Study Sc4 Inter-tidal and Sub-tidal Benthic Habitat Monitoring IP. • Study Sc4 Baseline Report within two weeks of the spill. • Study Sc4 Survey Reports within one month of survey completion. • Long-Term Monitoring Phase Study revision of Sc4 IP within one month of final survey completion. • Study Sc4 Chapter in Annual Reports. • Study Sc4 Final Report one month after study termination.
Review and Auditing	• Random internal reviews of Strategy Sc4 IP (methods, procedures, processes, records, reporting and QA/QC) by the Environment Officer (or delegate) with a duration between reviews no longer than three months. • Any non-conformances recorded with the PI and followed up by the Environment Officer (or delegate) within two weeks.
Responsibilities	IC: • Overall responsibility for the implementation of the Strategy and IP. Planning Officer: • Facilitation of inter-tidal and sub-tidal benthic habitat monitoring in areas of active response measures during the hydrocarbon release. Environment Officer (or delegate): • Ongoing review and approval of the Sc4 IP and long-term monitoring phase revision of the IP. • Day-to-day coordination and review of monitoring results. • Compliance with Study Sc4 IP requirements. • Carry out periodic internal reviews. • Oversee external audits of IP implementation. • Communications with NOPSEMA's Environment Division and other regulators. • Approval and provision of any compliance reporting requirements. • Approve all reporting (Survey, Baseline, Annual and Final), the IP and revision for the Long-Term Monitoring Phase. • Provide advice to IC and Planning Officer as required. PI (Stantec): • Develop the long-term monitoring phase revision of the IP. • Daily implementation of this IP. • Plan, coordinate and implement daily Inter-tidal and Sub-tidal Benthic Habitat Monitoring Survey.

Strategy Component	Description
	• Daily communications between MP and Environment Officer (or delegate). • Review all reporting (Survey Reports, Baseline Reports, Annual Reports, Sub-tidal Benthic Habitat Monitoring Final Report). • Review of any compliance reports. • Provide advice as required to the Environment Officer (or delegate). MP: • Undertake inter-tidal and sub-tidal benthic habitat monitoring activities. • Carry out data analyses. • Prepare reports including the Inter-tidal and Sub-tidal Benthic Habitat Monitoring Final Report. • Store and archive data.
Relevant References and Guidelines	• Edgar et al. (2000) Impact of the Iron Baron oil spill on sub-tidal reef assemblages in Tasmania. • ANZECC & ARMCANZ (2000) (now ANZG (2018) Australian and New Zealand Guidelines for Fresh and Marine Water Quality. • Cappo et al. (2006) Counting and Measuring Fish with Baited Video Techniques - An Overview. • Keough and Carnell (2009) Ecological Performance Measures for Victorian Marine Protected Areas: Review of the existing biological sampling data

3.3.5 Study Sc5: Shorebird and Seabird Population Monitoring

Table 3-11: Study Sc5 Strategy: Shorebird and Seabird Population Monitoring

Strategy Component	Description
Monitoring Performance Outcomes	Monitor shorebird and seabird populations to assess potential impacts to, and subsequent recovery following a hydrocarbon release. This will be used to: • Quantify the level of exposure to affected populations. • Provide operational response resources to implement secondary and tertiary oiled wildlife response strategies. • Assess any impacts to shorebirds or seabirds resulting from response activities. • Determine the recovery of populations after hydrocarbon release.
Monitoring Performance Standards	**Measurement Criteria**
1: Readiness to implement Sc5 Shorebird and Seabird Monitoring Survey program.	1a: PI and MP to be sourced from a large pool of resources under existing contracts (i.e., Stantec). 1b: PI has some vessels available for near-coastal work, and Cooper Energy has arrangements in place with vessel service providers.
2: Acquisition and dissemination of existing shorebird and seabird population baseline data	2a: PI responsible for the acquisition of existing shorebird and seabird population baseline data from various sources as per the procedure in the Sc5 IP to establish the baseline dataset. 2b: PI to provide Study Sc5 Monitoring Baseline Data Report (within eight weeks of hydrocarbon release) to Environment Officer (or delegate). The Environment Officer (or delegate) will approve it within two weeks of submission and distribute it to the Planning Officer and other PIs.
3: Acquisition of shorebird and seabird populations monitoring data during the hydrocarbon release and for 3 months after the cessation of hydrocarbon release	3a: Collection and analysis of shorebird and seabird population data from priority sensitive locations and predicted impact and reference sites, at frequencies prescribed in the Sc5 IP by MP during the hydrocarbon release and for three months after the cessation of the hydrocarbon release. 3b: PI to provide a short data report summarising each field survey within four weeks of completion of each field survey to the Environment Officer (or delegate). The Environment Officer (or delegate) will approve it within one week of submission and distribute it to the Planning Officer and other PIs. 3c. MP stores/archives field records at a secure site.

Strategy Component	Description
4: Revise IP for the long-term monitoring phase of shorebird and seabird populations after the hydrocarbon release and carry out the long-term monitoring phase	4a: PI to consider final information/results from Sc8 (Hind-cast Modelling for Impact Assessment) in the revision of the IP for the long-term monitoring phase of shorebird and seabird populations after cessation of hydrocarbon release. 4b: PI revises Sc5 IP for the long-term monitoring phase of shorebird and seabird populations (within four weeks of receiving the Study Sc8 Final Report) and provides it to the Environment Officer (or delegate). Environment Officer (or delegate) to approve revision of Sc5 IP for long-term monitoring phase of shorebird and seabird populations within four weeks of submission after consultation with DAFF, NOPSEMA and State authorities and disseminate to MP. 4c: PI responsible for the implementation of revised long-term phase Sc5 IP.
5: Assess impact of hydrocarbon release on shorebird and seabird populations and provision of performance reporting	5a: PI responsible for assessing and reporting on monitoring of shorebird and seabird populations for each survey (single survey), annual (data to date, EP performance report) and final (all data) reports relative to the established baseline condition and the reference sites. 5b: PI to prepare and provide the Environment Officer (or delegate) the Study Sc5 Annual Reports as specified by the Environment Officer (or delegate) each year and the Shorebird and Seabird Population Monitoring Final Report within eight weeks of field termination. After consultation with DAFF, NOPSEMA and State authorities, the Environment Officer (or delegate) to approve the Final Shorebird and Seabird Population Monitoring Report within three months of field termination for dissemination.
6: Regulatory compliance reporting	6a: The Environment Officer (or delegate) is to provide regulators (NOPSEMA, State authorities and DAFF) with Annual Scientific Monitoring Reports that include a Study Sc5 Annual Report and the Study Sc5 Final Scientific Monitoring Report within four weeks of approval by the Environment Officer (or delegate).
Initiation Trigger	Implemented following a Level 2 or Level 3 hydrocarbon spill.
Termination Criteria	Field Study Termination: The Planning Officer or Environment Officer (or delegate) will terminate the study when, in consultation with NOPSEMA, DAFF and State authorities: • Impacts on seabird and shorebird populations from hydrocarbon exposure have been quantified. • Recovery of impacted seabird and shorebird populations has been evaluated and is reasonably satisfied. • Agreement has been reached with relevant stakeholders and regulators, based upon cessation of impacts attributable to the spill. Study Termination: Submission and approval of Study Sc5 Final Report.
Study Implementation Plan	Refer to Implementation Plans Sc5A (Shorebird and Seabird Population Monitoring - Otway) and Sc5B (Shorebird and Seabird Population Monitoring - Gippsland).
Competencies	• PI will be an experienced ornithologist with at least 5 years of coastal seabird experience (or equivalent); and • MP (vessel-based) will be qualified ornithologists and/or marine zoologists with experience in vessel-based monitoring activities. • MP (land-based) will be qualified ornithologists and/or marine zoologists with experience in shorebird and seabird population monitoring surveys. • MP (office) to be experienced shorebird and seabird analysts for Study Sc5 office-based analyses. • Commercial certified/surveyed plant (vessels). • CVs to be kept on file.
Reporting	PI and MP are responsible for the preparation, and the Environment Officer (or delegate) is responsible for the approval and dissemination of the following: • Study Sc5 (Shorebird and Seabird Population Monitoring) IP. • Study Sc5 Baseline Data Report within two weeks of a spill. • Study Sc5 Survey Reports within one month of survey completion. • Revised Study Sc5 IP for Long-term Monitoring Phase within one month of final survey completion. • Study Sc5 Annual Reports. • Study Sc5 Final Report one month after study termination.

Strategy Component	Description
Review and Auditing	• Annual internal review of Strategy Sc5 IP (methods, procedures, processes, records, reporting and QA/QC) by Environment Officer (or delegate). • Any non-conformances recorded with the PI and follow-up by the Environment Officer (or delegate) within two weeks.
Responsibilities	IC: • Overall responsibility for the implementation of the Strategy and IP. Planning Officer: • Facilitate shorebird and seabird population monitoring in areas of active response activities during the hydrocarbon release. Environment Officer (or delegate): • Ongoing review and approval of the Study Sc5 IP long-term monitoring phase revision of the IP. • Day-to-day coordination and review of monitoring data. • Compliance with Study Sc5 IP requirements. • Carry out internal periodic reviews of IP implementation. • Oversee external audits. • Communications with NOPSEMA's Environment Division. • Approval and provision of any compliance reporting requirements. • Approve all reporting (Reactive Baseline Survey Report, Baseline Data Report, Final Report, Sc5 Annual Reports, IP) and the Revised IP for the long-term monitoring phase. • Provide advice to IC and Planning Officer. PI (Stantec): • Develop the long-term monitoring phase revision of the IP. • Daily implementation of this IP. • Plan and coordinate shorebird and seabird population monitoring. • Review, approve and disseminate monitoring information. • Review all reporting (Survey Reports, Baseline Report, Shorebird and Seabird Population Monitoring Final Report, Annual Reports). • Review of any compliance reports. • Provide advice as required to the Environment Officer (or delegate). MP: • Carry out field monitoring activities, subsequent data analysis and data reporting (field staff). • Collate existing baseline data and prepare the Baseline Data Report. • Prepare reports including Shorebird and Seabird Population Monitoring Final Report. • Store and archive data.
Relevant References and Guidelines	• Oil Spill Monitoring Handbook (Hook et al., 2016). • Watkins, D. (1993). A National Plan for Shorebird Conservation in Australasia. • Watson et al. (2009). A Rapid Assessment of the Impacts of the Montara Oil Leak on Birds, Cetaceans and Marine Reptiles. Prepared on behalf of the DEWHA (now DCCEEW).

3.3.6 Study Sc6: Marine Megafauna Surveys

Table 3-12: Study Sc6 Strategy: Marine Megafauna Surveys

Strategy Component	Description
Monitoring Performance Outcomes	Undertake marine megafauna monitoring to assess: • The impacts and disturbance to marine megafauna; and • Monitor the recovery of shoreline megafauna following a hydrocarbon release.
Monitoring Performance Standards	**Measurement Criteria**
1: Readiness to implement Sc6 Marine Megafauna Surveys program.	1a: PI and MP to be sourced from a pool of resources under existing contracts (i.e., Stantec). 1b: Cooper Energy has arrangements in place with vessel and aircraft service providers
2: Acquisition and dissemination of existing marine megafauna baseline data	2a: PI responsible for acquiring existing marine mega-fauna data from various sources as per the procedure in the Sc6 IP to establish the baseline dataset. 2b: PI to provide Study Sc6 Megafauna Monitoring Baseline Data Report (within eight weeks of hydrocarbon release) to Environment Officer (or delegate). The Environment Officer (or delegate) will approve it within two weeks of submission and distribute it to the Planning Officer and other PIs.
3: Acquisition of marine megafauna survey data during the hydrocarbon release and for three months after the cessation of the hydrocarbon release	3a: Collect and analyse marine mega-fauna data from priority-sensitive locations and predicted impact and reference sites at frequencies prescribed in the Sc6 IP by MP during the hydrocarbon release. 3b: The PI will provide the Environment Officer (or delegate) with a short data report summarising each field survey within four weeks of its completion. The Environment Officer (or delegate) will approve the report within one week of submission and distribute it to the Planning Officer and other PIs. 3c. MP to store/archive field records.
4: Revise IP for the long-term monitoring phase of marine megafauna surveys after the hydrocarbon release and carry out the long-term monitoring phase	4a: The PI will consider final information/results from Sc8 (Hind-cast Modelling for Impact Assessment) in revising the IP for the long-term monitoring phase of marine megafauna after the cessation of hydrocarbon release. 4b: PI will revise Sc6 IP for the long-term monitoring phase of marine megafauna (within four weeks of receiving the Study Sc8 Final Report) and provide it to the Environment Officer (or delegate). The Environment Officer (or delegate) will approve a revision to Sc6 IP for the long-term monitoring phase of marine megafauna surveys within four weeks of submission after consultation with DCCEEW, NOPSEMA and State authorities and disseminate it to MP. 4c: PI is responsible for the implementation of revised long-term phase Sc6 IP.
5: Assess the impact of hydrocarbon release on marine megafauna and provision of performance reporting	5a: PI responsible for assessing and reporting on monitoring of marine megafauna for each survey (single survey), annual (data to date, EP performance report) and final (all data) reports relative to the established baseline condition and the reference sites (as relevant). 5b: PI to prepare and provide the Environment Officer (or delegate) the Sc6 Annual Reports as specified by the Environment Officer (or delegate) each year and the Marine Megafauna Monitoring Final Report within eight weeks of the final field survey. The Environment Officer (or delegate), after consultation with DCCEEW, NOPSEMA, and State authorities, will approve the final Marine Megafauna Monitoring Report within three months of field termination for dissemination.
6: Regulatory compliance reporting	6a: Environment Officer (or delegate) to provide regulators (NOPSEMA, State authorities and DCCEEW) with Annual Scientific Monitoring Reports that includes a Study Sc6 Annual Report and the Final Study Sc6 Scientific Monitoring Report within four weeks of approval by the Environment Officer (or delegate). 6b: MP to inform Environment Officer (or delegate) of any injuries or mortality of marine megafauna within 12 hours of observation. Environment Officer (or delegate) to report any injuries or mortality of marine megafauna to relevant regulators ASAP. This must be within 48 hours of observation.
Initiation Trigger	Implemented following a Level 2 or Level 3 hydrocarbon spill.
Termination Criteria	Field Termination: The Planning Officer or Environment Officer (or delegate) will terminate the study when, in consultation with NOPSEMA, State authorities and DCCEEW, it is deemed: • Characterisation of impacts to species has been established; and • Monitoring of recovery is reasonably satisfied for marine megafauna.

Strategy Component	Description
	Study Termination: Submission and approval of Study Sc6 Final Report.
Study Implementation Plan	Refer to Implementation Plans Sc6A (Marine Megafauna Surveys - Otway) and Sc6B (Marine Megafauna Surveys - Gippsland).
Competencies	• PI will include experienced and qualified marine zoologists with at least five years' experience in surveys of marine megafauna. PI should have post-graduate research in marine fauna management (or equivalent). Field experience managing marine fauna surveys (aerial, boat-based, telemetry, acoustic). Experience in leading marine mega-fauna technical studies and reporting. • MP (vessel and aerial-based) will include experienced and qualified marine zoologists with experience in surveys of marine megafauna. • MP (office) will be an experienced marine megafauna analyst for Study Sc6 office-based analyses. • Commercial certified/surveyed plant (vessels and aircraft). • CVs to be kept on file.
Reporting	PI and MP are responsible for the preparation, and the Environment Officer (or delegate) is responsible for the approval and dissemination of the following: • Study Sc6 (Marine Megafauna Monitoring) IP. • Study Sc6 Baseline Data Report. • Study Sc6 Survey Reports. • Revision of Study Sc6 IP for the long-term monitoring phase. • Study Sc6 Annual Reports. • Study Sc6 Final Report.
Review and Auditing	• Annual internal review of Strategy Sc6 IP (methods, procedures, processes, records, reporting and QA/QC) by Environment Officer (or delegate). • Any non-conformances recorded with the PI ans follow-up by Environment Officer (or delegate) within two weeks.
Responsibilities	IC: • Overall responsibility for the implementation of the Strategy and IP. Planning Officer: • Facilitate marine megafauna monitoring in areas of response activities during the hydrocarbon release. Environment Officer (or delegate): • Ongoing review and approval of the Study Sc6 IP long-term monitoring phase revision of the IP. • Day-to-day review and coordination of monitoring data. • Compliance with Study Sc6 IP requirements. • Carry out periodic reviews of IP implementation. • Oversee external audits. • Communications with NOPSEMA's Environment Division and other regulators. • Approval and provision of compliance reporting requirements. • Report any injuries or fatalities of marine megafauna to the relevant regulator as soon as possible. This must be within 48 hours of the sighting. • Approval of Marine Megafauna Monitoring Final Report, Survey Reports, Baseline Data Report, Annual Reports, and the long-term monitoring phase revision of the IP. • Provide advice to IC and Planning Officer as required. PI (Stantec): • Development of the long-term monitoring phase revision of the IP. • Daily implementation of this IP. • Plan, coordinate, and implement field activities and data analysis. • Daily communications between MP and Environment Officer (or delegate) • Review the Marine Megafauna Monitoring Final Report, Survey Reports, Baseline Report, and Annual Reports. • Review compliance reports.

Strategy Component	Description
	• Report any injuries or fatalities of marine megafauna to the Environment Officer (or delegate) within 2 hours of sighting to ensure the relevant regulator is notified within 48 hours. • Provision of advice as required to the Environment Officer (or delegate). MP: • Carry out monitoring activities. • Report any injuries or fatalities of marine megafauna to the PI within 2 hours of sighting. • Perform data analyses. • Prepare reports. • Store and archive data.
Relevant References and Guidelines	• Oil Spill Monitoring Handbook (Hook et al., 2016). • CoA (2017). The Australian National Guidelines for Whale and Dolphin Watching.

3.3.7 Study Sc7: Hydrocarbon Monitoring of Representative Commercial and Recreational Fish Species

Table 3-13: Study Sc7 Strategy: Hydrocarbon Monitoring of Representative Commercial and Recreational Fish Species

Strategy Component	Description
Monitoring Performance Outcomes	Monitor for hydrocarbon and dispersant content (if used in response) in representative commercial and recreational fish species (including shellfish) to assess the physiological impacts on fisheries, seafood quality/safety, and fisheries recovery following a hydrocarbon release.
Monitoring Performance Standards	**Measurement Criteria**
1: Readiness to implement the Sc7 program.	1a: PI and MP to be sourced from a pool of resources under existing contracts (i.e., Stantec). 1b: PI has some vessels available for near-coastal work, and Cooper Energy has arrangements in place with vessel service providers. 1c: PI will have arrangements in place with an accredited laboratory (e.g., NMI) to analyse fish toxicological samples.
2: Acquisition and dissemination of existing commercial and recreational fish data	2a: PI is responsible for acquiring existing commercial and recreational fish data from various sources as per the procedure in the Sc7 IP to confirm the commercial and recreational fish species caught in the area. 2b: A baseline of no hydrocarbon contamination has been assumed for this study for recreational and commercial fishing stock.
3: Acquisition of data for hydrocarbon monitoring of representative commercial and recreational fish species during the hydrocarbon release and for 3 months after the cessation of the hydrocarbon release	3a: Collection and analysis of representative commercial and recreational fish species at predicted impact and reference sites to determine the presence and absence of hydrocarbons and dispersant (if used in response) at frequencies prescribed in the Sc7 IP by MP during the hydrocarbon release and for three months after the cessation of the hydrocarbon release. Where possible, samples will be obtained from commercial catches at the point of landing. Cooper Energy will liaise with the Victorian Fisheries Authority (VFA), other State authorities (if required) and/or the Australian Fisheries Management Authority (AFMA) regarding sampling and analysis of commercial fish stock. MP to store/archive field records. 3b: Laboratory analysis of fish samples at an accredited laboratory (e.g., NMI). CoC to confirm sample collection, transport to appropriate laboratories, and sample receipt notification from the accredited laboratory to confirm the arrival of fish samples within holding times. Documents are stored/archived at a secure site by MP. 3c: Laboratory Analysis Report issued by an accredited laboratory with analysis techniques defined in IP (within three weeks of sample collection) and stored/archived by MP. 3d: PI to provide a short report for each Survey (within four weeks of completion of field survey) to the Environment Officer (or delegate). The Environment Officer (or delegate) will approve it within one week of submission and distribute it to the Planning Officer and other PIs.

Strategy Component	Description
4: Revise IP for the long-term monitoring phase of hydrocarbon monitoring of representative commercial and recreational fish species after the hydrocarbon release and carry out the long-term monitoring phase	4a: PI will consider final information/results from Sc8 (Hind-cast Modelling for Impact Assessment) in revising the IP for the long-term monitoring phase of hydrocarbon monitoring in commercial and recreational fish species after cessation of the hydrocarbon release. 4b: PI revises Sc7 IP for long-term monitoring phase of hydrocarbon monitoring in representative commercial and recreational fish species within four weeks after cessation of hydrocarbon release and provides to Environment Officer (or delegate). Environment Officer (or delegate) to approve revision of Sc7 IP for long-term monitoring phase within four weeks of submission after consultation with DCCEEW, NOPSEMA, VFA, other State authorities (if required) and AFMA; and disseminates to MP. 4c: PI is responsible for the implementation of the revised long-term phase Sc7 IP.
5: Assess the impact of hydrocarbon release on representative commercial and recreational fish species and performance reporting	5a: PI responsible for assessing and reporting the monitoring of hydrocarbons and dispersant (if used in response) on representative commercial and recreational fish species for each survey (single survey), annual (data to date, EP performance report) and final (all data) report to the established baseline condition and the reference sites for each survey. 5b: PI to prepare and provide the Environment Officer (or delegate) the Sc7 Annual Reports as specified by the Environment Officer (or delegate) each year and the Final Report within eight weeks of field termination. After consultation with DCCEEW, NOPSEMA, VFA, other State authorities (if required) and AFMA, the Environment Officer is to approve the Final Report within three months of field termination for dissemination.
6: Regulatory compliance reporting	6a: Environment Officer (or delegate) to provide regulators (NOPSEMA, VFA, other State authorities (if required), DCCEEW and/or AFMA) with Annual Scientific Monitoring Reports that include a Study Sc7 Annual Report and the Final Study Sc7 Scientific Monitoring Report within four weeks of approval by the Environment Officer (or delegate).
Initiation Trigger	Implemented following a Level 2 or Level 3 hydrocarbon spill.
Termination Criteria	Field Termination: The Planning Officer or Environment Officer (or delegate) will terminate the study when, in consultation with NOPSEMA, VFA, other State authorities (if required), DCCEEW and/or AFMA: • The hydrocarbon spill has ceased; • Impacts to quality/safety of fish species from hydrocarbon and dispersant (if used in response) exposure have been quantified and information provided to the relevant stakeholders and regulators for the management of any affected fisheries; and • Recovery of affected commercial fish, shellfish and aquaculture from hydrocarbon and dispersant (if used in response) has been evaluated. Hydrocarbon levels in representative commercial and recreational fishing tissue are below relevant food safety standards and pose minimal risk. Study Termination: Submission and approval of Study Sc7 Final Report.
Study Implementation Plan	Refer to Implementation Plan Sc7 - Hydrocarbon Monitoring of Representative Commercial and Recreational Fish Species.
Competencies	• PI will be a fisheries scientist with at least five years of professional experience in epidemiological studies of marine fish and aquaculture species (or equivalent). • MP (field) sampling teams include experienced and qualified marine scientists with experience collecting fish samples. • Olfactory analysis must be led by a scientist who is experienced in using the duo-trio method. • MP (office) will be an experienced fish analyst for Study Sc7 office-based analyses. • CVs to be kept on file. • Laboratory services will be NATA accredited.
Reporting	PI and MP are responsible for the preparation, and the Environment Officer (or delegate) is responsible for the approval and dissemination of the following: • Study Sc7 IP. • Study Sc7 Baseline Data Report. • Study Sc7 Survey Reports.

Strategy Component	Description
	• Revised Study Sc7 IP for Long-term Monitoring Phase. • Study Sc7 Annual Reports. • Study Sc7 Final Report.
Review and Auditing	• Annual internal review of Strategy Sc7 IP (methods, procedures, processes, records, reporting and QA/QC) by Environment Officer (or delegate). • Any non-conformances recorded with the PI and follow-up by the Environment Officer (or delegate) within two weeks.
Responsibilities	IC: • Overall responsibility for implementation of the Study Sc7 Strategy and IP. Planning Officer: • Facilitate sampling of representative commercial and recreational fish species in areas of response activities during the hydrocarbon release. Environment Officer (or delegate): • Ongoing review and approval of the Study Sc7 IP long-term monitoring phase revision of the IP. • Day-to-day coordination and review of the monitoring data. • Compliance with Study Sc7 IP requirements. • Carry out periodic internal reviews of IP implementation. • Oversee external audits. • Liaise with State / or Commonwealth Fisheries Departments regarding sampling and monitoring of fish. • Communications with NOPSEMA's Environment Division and other regulators. • Approval and provision of any compliance reporting requirements. • Approve all reporting (Survey Reports, Baseline Data Report, Final Report, Annual Reports, IP) and the revision of the IP for the Long-term Monitoring Phase. • Provide advice to IC and Planning Officer as required. PI (Stantec): • Daily implementation of this IP. • Plan, coordinate and implement fish sampling at commercial and recreational charter boat landings. • Daily communications between MP and Environment Officer (or delegate). • Review, approve and disseminate monitoring information. • Review all reporting (Survey Reports, Baseline Report, Hydrocarbon Monitoring in Representative Commercial and Recreational Fish Species Final Report and Annual Reports). • Revise the IP for the long-term monitoring phase. • Review of data provided for inputs into Study Sc8 Hind-cast Modelling. • Review of any compliance reports. • Provide advice as required to the Environment Officer (or delegate). MP: • Coordinate fish sampling at home ports. • Undertake fish sampling activities. • Coordination of laboratories. • Perform data analyses. • Prepare reports including Hydrocarbon Monitoring in Representative Commercial and Recreational Fish Species Final Report. • Store and archive data.
Relevant References and Guidelines	• Oil Spill Monitoring Handbook (Hook et al., 2016). • ANZECC & ARMCANZ (2000) Fresh and Marine Water Guidelines • Yender et al. (2002) Managing Seafood Safety after an Oil Spill. • Reilly and York. (2001) Guidance on Sensory Testing and Monitoring of Seafood for Presence of Petroleum Taint Following an Oil Spill. • Gagnon et al. (1999) Biochemical and Chemical Parameters for Aquatic Ecosystem Health Assessments Adapted to the Australian Oil and Gas Industry.

3.3.8 Study Sc8: Hind-cast Modelling Impact Assessment

Table 3-14: Study Sc8 Strategy: Hind-cast Modelling Impact Assessment

Strategy Component	Description
Monitoring Performance Outcomes	Undertake hind-cast simulations of a hydrocarbon release, validated with information/data from other OSMP studies to refine post-incident impact assessment and to inform long-term scientific monitoring specifications to support assessments of the impacts and recovery of environmentally sensitive receptors affected by the hydrocarbon spill.
Monitoring Performance Standards	**Measurement Criteria**
1: Readiness to implement Op1 forecast modelling within three months of acceptance of EP and OPEP	1a: Environment Officer (or delegate) to extend the existing ongoing contract with a modelling service provider (RPS) for six months after termination criteria for Op1 (Operational Forecast Modelling). 1b: RPS to be operationally ready to provide hind-cast modelling services within one week after cessation of Study Op1 (Operational Forecast Modelling). 1c: Sc8 IP for hind-cast modelling updated by RPS and approved by the Environment Officer (or delegate) within one week after cessation of Study Op1 (Operational Forecast Modelling).
2: Conduct hind-cast simulations to inform post-incident impact assessment	2a: Environment Officer (or delegate) to provide RPS available pertinent information/data from Op2 (Hydrocarbon Spill Surveillance and Tracking), Op4 (Coastal Shoreline Assessment), Sc2 (Hydrocarbon Monitoring in Marine Waters) and Sc3 (Hydrocarbon Monitoring in Marine Sediments) in digital format with accompanying meta-data documents within four weeks after cessation of Study Op1 (Operational Forecast Modelling). 2b: The Planning Officer will provide RPS with pertinent information/data regarding response measures implemented during the incident in digital format with an accompanying meta-data document within four weeks after cessation of Study Op1 (Operational Forecast Modelling). 2c: RPS to provide the Hind-cast Modelling Impact Assessment Modelling Report on simulated estimates of environmental impacts in terms of surface slick, entrained hydrocarbon and dissolved aromatic exposures, and shoreline accumulation within three months after cessation of Study Op1 (Operational Forecast Modelling).
3: Refined post-incident impact assessment informs long-term monitoring specifications	3a: Report provided to Environmental Officer (or delegate) to distribute to PIs of studies Sc2-Sc7 to inform hydrocarbon distributions from incident to be considered in the long-term monitoring specifications (e.g., locations, frequency). 3b: RPS to run a workshop with PIs from Studies Sc2-Sc7 and Environment Officer (or delegate) to present results and provide subsequent recommendations based on hind-cast modelling of long-term modelling specifications within four months after cessation of Study Op1 (Operational Forecast Modelling).
Initiation Trigger	Immediately after the cessation of Study Op1 (Operational Forecast Modelling) by the Environment Officer.
Termination Criteria	The Planning Officer or Environment Officer (or delegate) approves the Hind-cast Modelling Impact Assessment Modelling Report submitted by RPS, and the Hind-cast Modelling Impact Assessment Workshop is conducted.
Study Implementation Plan	Refer to Implementation Plan Study Sc8 - Hind-cast Modelling Impact Assessment
Competencies	RPS is the recognised industry leader in hind-cast modelling of hydrocarbon incidents; no competency test and training are anticipated.
Reporting	RPS is responsible for the preparation, and the Environment Officer (or delegate) is responsible for the approval and dissemination of the following: • RPS will provide Study Sc8 IP updates within one week after cessation of Study Op1 (Operational Forecast Modelling). • Final Hind-cast Modelling Impact Assessment Report within six months of study initiation.

Strategy Component	Description
Review and Auditing	• Internal review of Study Sc8 'readiness' after the termination of Study Op1 (Operational Forecast Modelling) by Environment Officer (or delegate). • Annual internal review of Sc8 Strategy and Study IP (methods, procedures, processes and records) by Environment Officer (or delegate). Non-conformances recorded with RPS and follow-up by Environment Officer (or delegate) within two weeks.
Responsibilities	IC: • Overall responsibility for implementation of Strategy and Study IP. Planning Officer: • Provide necessary spill parameters to PI. Environment Officer (or delegate): • Review and approval of any updates to the IP. • Current contract with RPS includes hind-cast modelling of the spill period. • Day-to-day coordination and review of monitoring data. • Ensure RPS is operationally ready. • Compliance with Study Sc8 IP requirements. • Carry out periodic internal reviews. • Oversee external audits. • Coordinate provision of information from Studies Op2, Op4, Sc2 and Sc3 to Study Sc8 PI. • Review and approve the Final Hind-cast Modelling Impact Assessment Report. • Provide the Final Hind-cast Modelling Impact Assessment Report to the PIs of scientific studies Sc2 (Hydrocarbon Monitoring in Marine Waters), Sc3 (Hydrocarbon Monitoring of Marine Sediments), Sc4 (Sub-tidal Benthic Habitat Monitoring), Sc5 (Shore and Seabird Population Monitoring), Sc6 (Marine Megafauna Surveys), and Sc7 (Hydrocarbon Monitoring of Fish) to assist in refining their long-term monitoring specifications. • Coordinate Hind-cast Modelling Impact Assessment Workshop (led by RPS) for PIs (Sc2-Sc7) • Provide advice concerning environmental issues as required to the Environment Officer (or delegate). PI (RPS): • Ensure modelling 'readiness' within one week of study initiation. • Lead the Hind-cast Modelling Impact Assessment Workshop, organised by the Environment Officer (or delegate) for the PIs of Studies Sc2 –Sc7. • Provide hind-cast modelling after cessation of Study Op1 (Operation Forecast Modelling) and associated reporting to estimate the impacts of the hydrocarbon spill to inform the long-term scientific monitoring program. PIs of Studies Op2, Op4, Sc2 and Sc3 are responsible for: • Validation data and meta-data documents for hind-cast modelling are provided to RPS. PIs of Studies Sc2-Sc7 are responsible for: • Preparation and attendance at the Hind-cast Modelling Workshop.
Relevant References and Guidelines	• RPS guidelines.

3.3.9 Study Sc9: Socio-Economic Surveys

Table 3-15: Study Sc9 Strategy: Socio-economic Survey Assessment

Strategy Component	Description
Monitoring Performance Outcomes	The monitoring performance outcome for this study is to carry out socio-economic monitoring studies to assess the socio-economic impacts and subsequent recovery pathways following a Level 2/3 hydrocarbon spill.
Monitoring Performance Standards	**Measurement Criteria**

Strategy Component	Description
1: Readiness to implement the Sc9 program.	1a: PI and MP are to be sourced from a pool of resources under the existing contract (i.e., Stantec).
2: Acquisition and dissemination of existing socioeconomic baseline data	2a: PI responsible for acquiring existing socioeconomic data from various sources (e.g., Council's REMPLAN) as per the procedure in the Sc9 IP to establish the baseline dataset. 2b: PI to provide Study Sc9 Baseline Data Report within eight weeks of hydrocarbon release to Environment Officer (or delegate). Environment Officer (or delegate) to approve within two weeks of submission and to distribute to the Planning Officer and other PIs.
3: Acquisition of data for socio-economic monitoring during the hydrocarbon release and for three months after the cessation of the hydrocarbon release	3a: Collect and analyse representative socio-economic data at predicted impact and reference sites to determine socio-economic impacts at frequencies prescribed in the Sc9 IP by MP during the hydrocarbon release and for three months after the cessation of the hydrocarbon release. MP to store/archive field records. 3b: The PI will provide a short report for each survey (within four weeks of completion of the field survey) to the Environment Officer (or delegate). The Environment Officer (or delegate) will approve it within one week of submission and distribute it to the Planning Officer and other PIs.
4: Revise IP for the long-term monitoring phase of socio-economic recovery and carry out the long-term monitoring phase	4a: PI will consider the final information/results from Sc8 (Hind-cast Modelling for Impact Assessment) in revising the IP for the long-term monitoring phase of socio-economic impacts after cessation of the hydrocarbon release. 4b: PI revises Sc9 IP for long-term monitoring phase of socio-economic impact within four weeks after cessation of hydrocarbon release and provides to Environment Officer (or delegate). The Environment Officer (or delegate) will approve a revision to Sc9 IP for the long-term monitoring phase within four weeks of submission after consultation with NOPSEMA, DTP, and other state authorities. 4c: PI is responsible for the implementation of the revised long-term phase Sc9 IP.
5: Assess the impact of hydrocarbon release socio-economic indicators and performance reporting	5a: PI is responsible for assessing and reporting the monitoring of socio-economic impacts for each survey (single survey), annual (data to date, EP performance report) and final (all data) report to the established baseline condition and the impacts for each survey. 5b: PI to prepare and provide the Environment Officer (or delegate) the Sc9 Annual Reports as specified by the Environment Officer (or delegate) each year and the Final Report within eight weeks of field termination. After consultation with NOPSEMA and other State authorities, the Environment Officer (or delegate) will approve the Final Report within three months of field termination for dissemination.
6: Regulatory compliance reporting	6a: The Environment Officer (or delegate) is to provide regulators (NOPSEMA, other State authorities) with Annual Scientific Monitoring Reports that include a Study Sc9 Annual Report and the Final Study Sc9 Scientific Monitoring Report within four weeks of approval by the Environment Officer (or delegate).
Initiation Trigger	Implemented following a Level 2 or Level 3 hydrocarbon spill.
Termination Criteria	Field Termination: The Planning Officer or Environment Officer (or delegate) will terminate the study when, in consultation with NOPSEMA and other State authorities: • Characterisation of impacts on socio-economic conditions has been established; and • Monitoring of recovery is reasonably satisfied for socio-economic conditions. Study Termination: Submission and approval of Study Sc9 Final Report.
Study Implementation Plan	Refer to Implementation Plans Sc9A (Socio-economic Survey Assessment - Otway) and Sc9B (Socio-economic Survey Assessment - Gippsland).
Competencies	• PI with an experienced economist with at least five years' experience in collecting and analysing socio-economic data (or equivalent). • MP (office) is to be an experienced economist with experience in collecting and analysing socio-economic data. • CVs to be kept on file.
Reporting	PI and MP are responsible for the preparation, and the Environment Officer (or delegate) is responsible for the approval and dissemination of the following: • Study Sc9 IP.

Strategy Component	Description
	• Study Sc9 Baseline Data Report. • Study Sc9 Survey Reports. • Revised Study Sc9 IP for Long-term Monitoring Phase. • Study Sc9 Chapter for Annual Reports. • Study Sc9 Final Report.
Review and Auditing	• Annual internal review of Strategy Sc9 IP (methods, procedures, processes, records, reporting and QA/QC) by Environment Officer (or delegate). • Any non-conformances recorded with the PI and follow-up by the Environment Officer (or delegate) within two weeks.
Responsibilities	IC: • Overall responsibility for implementation of the Study Sc9 Strategy and IP. Planning Officer: - • Facilitate field access and surveying where necessary. Environment Officer (or delegate): • Ongoing review and approval of the Study Sc9 IP long-term monitoring phase revision of the IP. • Compliance with Study Sc9 IP requirements. • Carry out periodic internal reviews of IP implementation. • Day-to-day coordination and review of monitoring data. • Oversee external audits. • Liaise with State / or Commonwealth Departments regarding socio-economic monitoring and results. • Communications with NOPSEMA's Environment Division and other regulators. • Approval and provision of any compliance reporting requirements. • Approve all reporting (Survey Reports, Baseline Data Report, Final Report, Sc9 Chapter in Annual Reports, IP) and the revision of the IP for the Long-term Monitoring Phase. • Provide advice to GMOs as required. PI (Stantec): • Daily implementation of this IP. • Daily communications between MP and Environment Officer (or delegate). • Review, approve and disseminate monitoring information. • Review all reporting (Survey Reports, Baseline Report, Final Report, Study Sc9 Annual Reports). • Revise the IP for the long-term monitoring phase. • Review of data provided for inputs into Study Sc8 Hind-cast Modelling. • Review of any compliance reports. • Provide advice as required to the Environment Officer (or delegate). MP: • Perform socio-economic impact analyses. • Prepare reports including Baseline Report, Survey Reports, Sc9 Annual Report and Final Report. • Store and archive data.
Relevant References and Guidelines	N/A