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

Projects & Operations | Offshore Victoria | OSMP

Document Control

Approvals	Name	Role	Signature	Document Control
Document Originator:	E. Thillainath	Stantec Environmental Consultant		**Document Number:** VIC-ER-EMP-0002
Document Reviewer:	J. Morris	Environment Advisor		**Revision Number:** 5
Document Approver:	O. Glade-Wright	Manager Environment and Sustainability	Digitally signed by Ollie Glade-Wright Date: 2023.09.07 15:46:00 +08'00'	**Revision Date:** Sept 2023

Revision History

Rev	Issue Date	Revision summary	Originator	Reviewer	Approver
5	04/09/2023	Updated to reflect changes to Sc's. Updated to reflect changes in government departments.	E. Thillainath, Stantec	J. Morris	O. Glade-Wright
4	25/10/21	Update for inclusion of BMG Closure Project (Phase 1) activities	Xodus, GHD	J. Hinks	O. Glade-Wright
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.	M. Carey	J. Hinks	O. Glade-Wright
2	31/05/17	Updated for NOPSEMA (RFFWI)	L. Chapman	J. Hinks	I. MacDougall
1	27/04/17	Updated for NOPSEMA (RFFWI) on BMG NPP EP	L. Chapman	J. Hinks	I. MacDougall
0	27/02/17	Issued to NOPSEMA	L. Chapman/ D. Petch	J. Hinks	I. MacDougall

Approvals

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

Name	Signature	Date
Ollie Glade-Wright **Manager Environment and Sustainability** **Cooper Energy Limited**		September 2023

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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
BTEX	Benzene, Toluene, Ethyl-Benzene, Xylene
CHN	Casino Henry Netherby
CoC	Chain of Custody
CSIRO	Commonwealth Scientific and Research Organisation
CV	Curriculum Vitae
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)*
OPGGSR	*Offshore Petroleum and Greenhouse Gas Storage Regulations, 2011 (Vic)*

Item	Description
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

References

Document code	Title
COE-ER-ERP-0001	Cooper Energy Incident Management Plan
COE-ER-ERP-0003	Cooper Energy Crisis Management Plan
VIC-DC-ERP-0001	Campaign Source Control Emergency Response Plan
BMG-DC-EMP-0001	BMG Closure Project (Phase 1) Environment Plan
BMG-ER-EMP-0004	BMG Closure Project (Phase 1) Oil Pollution Emergency Plan
COE-EN-EMP-0001	Description of the Environment

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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 (CHN)) (Figure 1-1) and nearfield drilling activities.

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

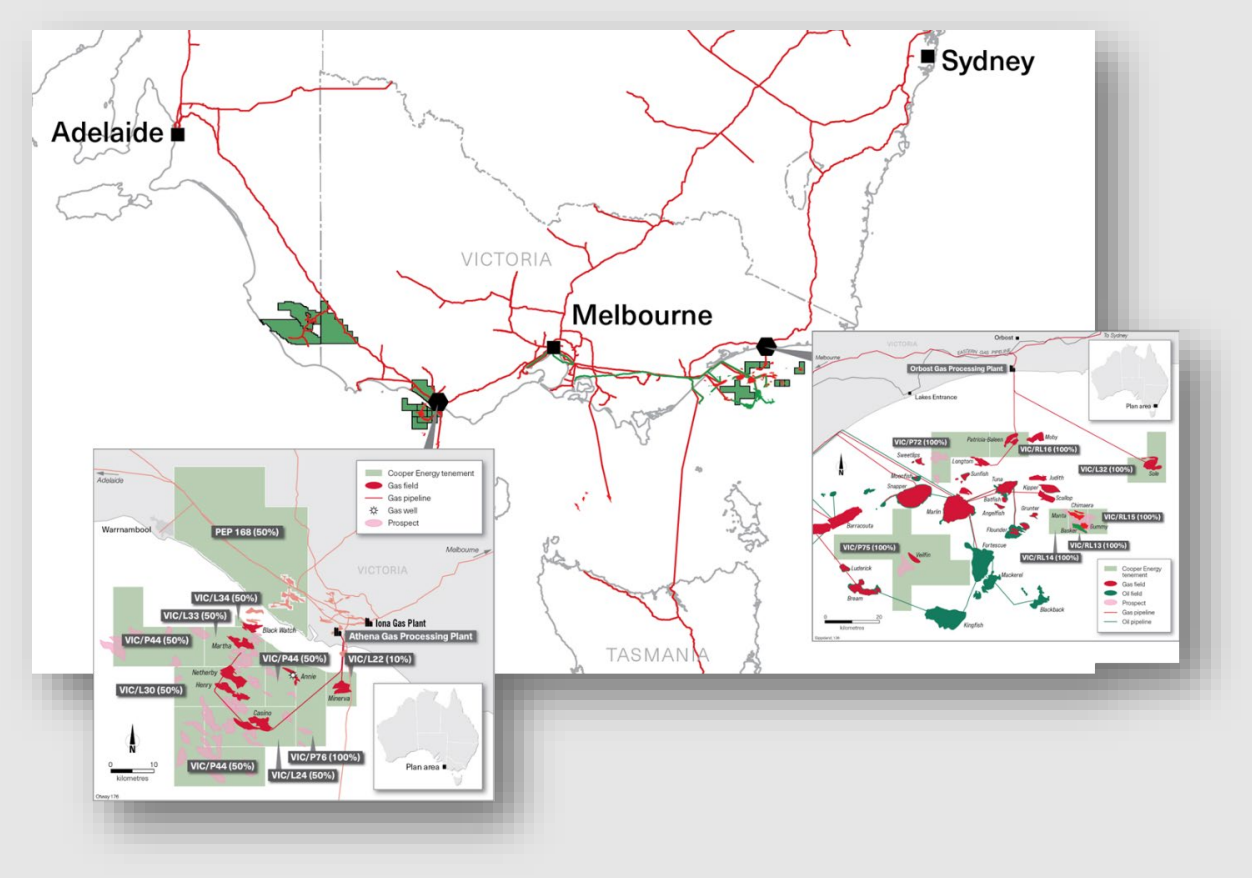

Figure 1-1: Cooper Energy's offshore Victoria assets

1.1 Geographical extent

This OSMP is relevant and applicable to all Commonwealth and State marine and coastal areas that are 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 include an overview of the monitoring performance objectives, monitoring standards and their measurement criteria; and
- Reference the specific Implementation Plans (IP) which has been prepared for each of the monitoring studies.

This OSMP demonstrates Cooper Energy's commitment to achieve 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)

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. The focus of Type I monitoring is to obtain and process 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 thoroughness of required information to carry out 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
- 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, a number of 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 Agency for petroleum facility-related spills in Commonwealth waters, to inform operational response activities. The Australian Maritime Safety Authority (AMSA), the Control Agency for vessel-based spills, is responsible for operational monitoring in Commonwealth waters 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 below.

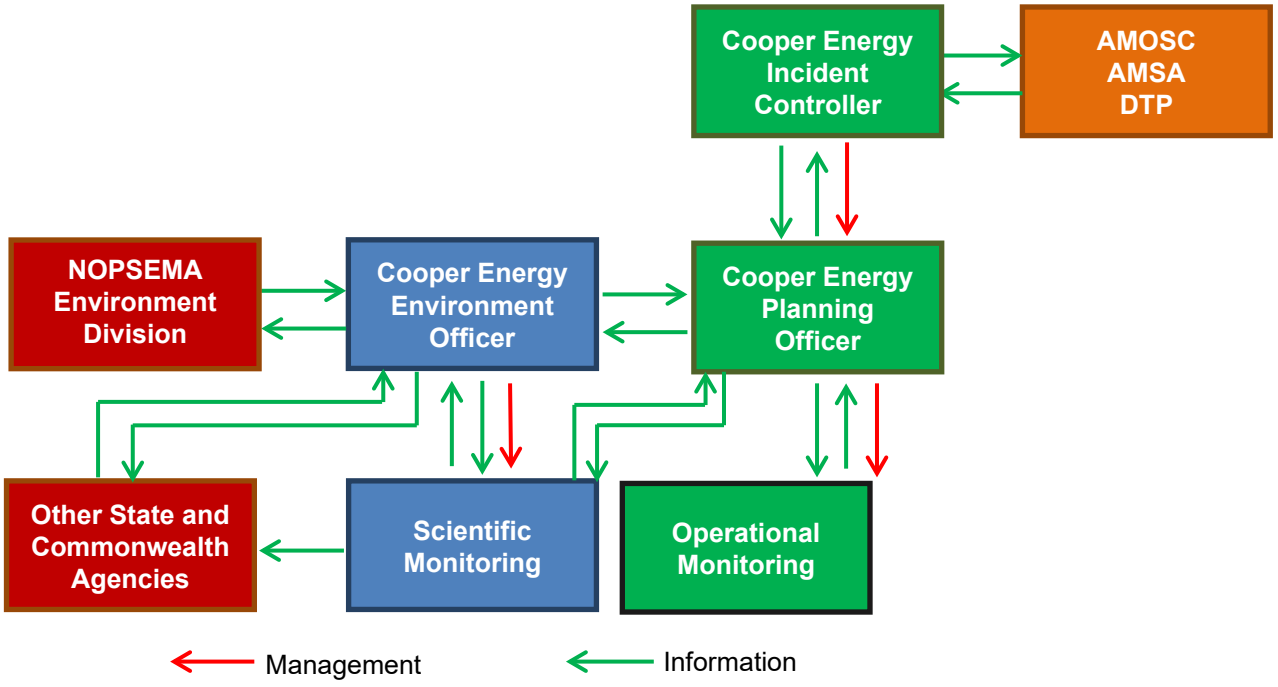

Figure 2-2 Monitoring and Information Flow Management Framework

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 the Tasmanian Environmental Protection Authority (EPA) Division of the Department of Natural Resources and Environment Tasmania (NRE Tas), Transport for NSW (NSW State waters), with assistance from Department of Primary Industries (DPI), and Maritime Safety Queensland (QLD State waters).

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. From this, the Type II implementation plans within this OSMP 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. In the event that there is a conflict between the current OSMP modules and State and Commonwealth feedback, regulator recommendations will be adopted. This liaison will be adopted throughout the spill event to ensure that changing impacts and risks are captured within the process.

Operational Type I monitoring will be provided to these authorities throughout the response to allow for continued feedback 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]
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)
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)

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

Study ID	Study Name	OSMP Section for Study Strategy	Implementation Plan[1]
			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	Hindcast 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 the event 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), Table 2-3 (Gippsland Basin; excluding BMG Closure Project (Phase 1)), and Table 2-4 (BMG Closure Project (Phase 1)).

Table 2-2 Environmental Sensitivities of Priority Response Areas - Otway Basin

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 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	
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
		Warrnamboo l 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
Aboriginal Heritage/Cultural		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		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	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								
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
Aboriginal Heritage/Cultural		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		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
Aboriginal Heritage / Cultural			✓	✓	✓		✓		✓	✓	✓		✓		✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	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 provide explicit linkages as to 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 standard.
- 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 methodology 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 in a consistent manner 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) from the implementation of the monitoring program.
Monitoring Performance Standard	**Measurement Criteria**
Performance(s) required of the monitoring study elements (systems, equipment, personnel and/or 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 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 Methodology (or Modelling Methodology).
- 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 implementation of the OSMP.

2.3 OSMP Implementation

2.3.1 Roles and Responsibilities

In the event of a Level 2 hydrocarbon release, Cooper Energy is responsible for the implementation and adherence to this OSMP. Table 2-6 identifies primary responsibilities associated with OSMP key roles. Each strategy in Section 3 provides more specificity of 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 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 Planning Officer on initiation / termination criteria. • Termination of scientific monitoring modules as required (where 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 implementation of a particular OSMP study. • Review and/or carry out study's monitoring reporting requirements. • Provides advice with respect to environmental issues as required.
Monitoring Personnel (MP)	• Implement this OSMP. • Compliance with the requirements of this OSMP.

2.3.2 OSMP Phased Approach

Development and implementation of the OSMP is as 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 2-3 and Figure 2-4 respectively.

Table 2-7 OSMP implementation phases

Time Period	Activity	Purpose	Output
Approval			
Regulatory acceptance of the Environment Plan(s).	Implementation Plans (IPs) prepared and available to support OSMP.	Operational and Scientific Monitoring Studies defined.	OSMP and IPs.
	Ensure 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.	Pool of resources for monitoring team identified and provided with a contract call-off.	'Readiness' for a timely response upon notification of OSMP mobilisation.	Timely mobilisation of environmental monitoring teams in event of a Level 2 or Level 3 hydrocarbon release.
Monitoring			
Post-spill, pre-exposure (Type I and Type II – as triggered)	Mobilisation of 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 to inform response team to the required response planning and management (Type I).
		Collection of reactive baseline data in scientific monitoring studies (Type II – as triggered).	Condition of environmental values established at start of hydrocarbon spill prior to 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).	Database of available baseline data established, plan for acquisition of baseline data gaps formulated (Type II – as triggered).
	Cease operational (Type I) monitoring when termination criteria met.	Cessation of response planning and management because environmental sensitivities 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.	Cessation of monitoring because environmental sensitivities completely / sufficiently recovered from hydrocarbon impacts.	Final Reports.

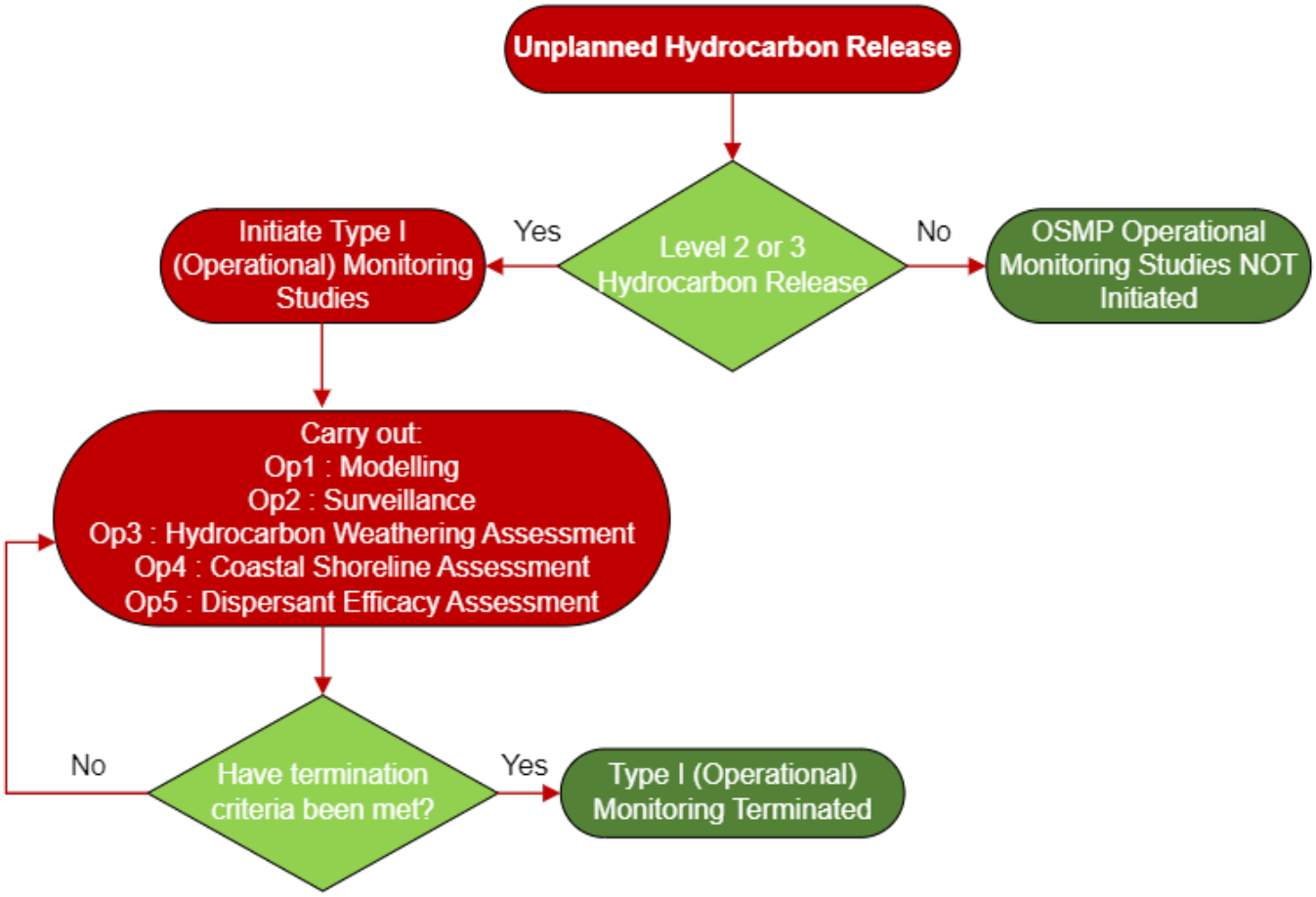

Figure 2-3: Diagram of decision tree for the overall implementation of the Operational (Type I) monitoring program

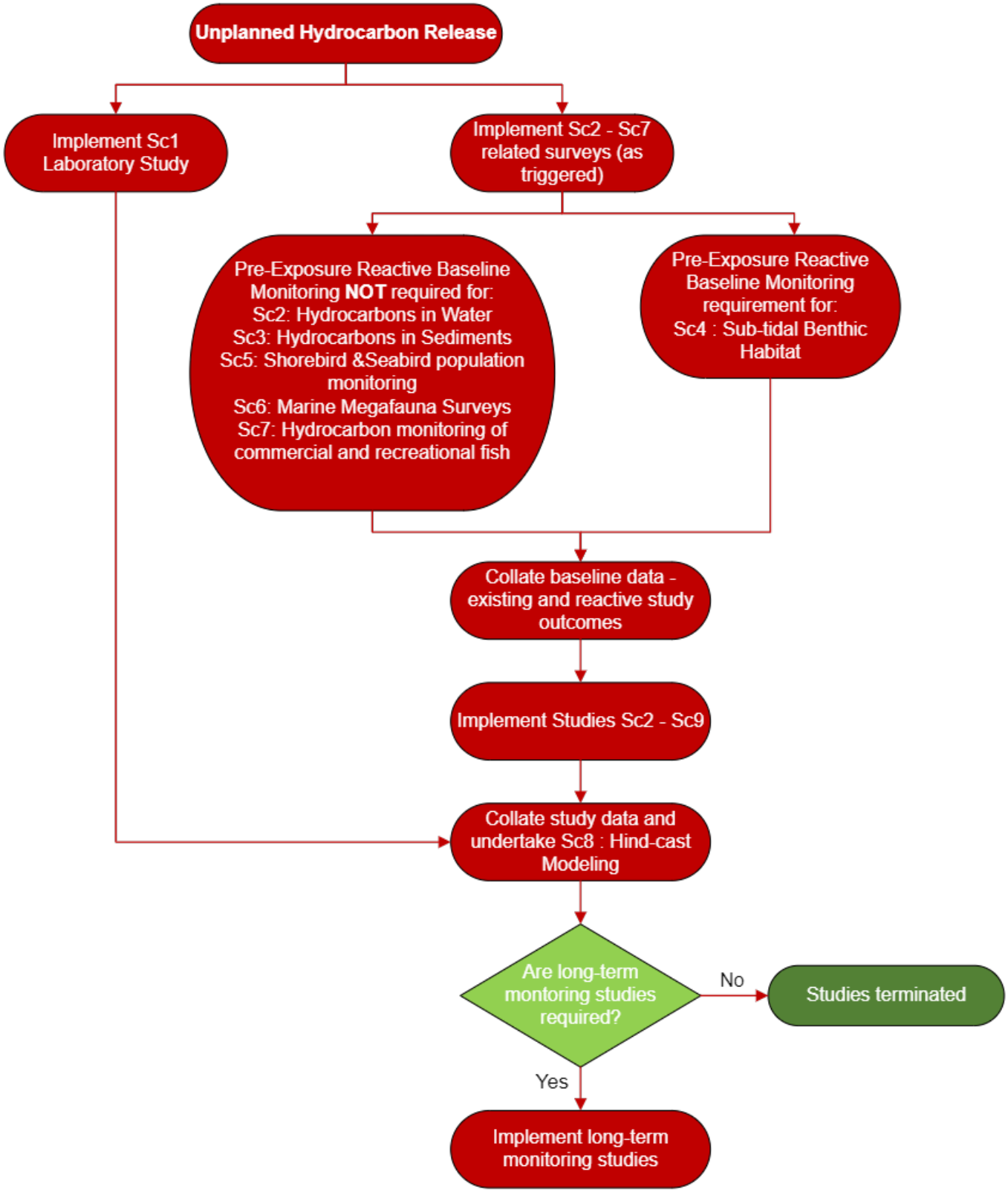

Figure 2-4: Diagram of decision tree for the overall implementation of the scientific (Type II) monitoring program

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 that summarise all of the on-going (or recently terminated) monitoring studies.
- 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 comprises the following framework:

- Each study's IP will define a monitoring compliance audit schedule on the basis of the commitments in the study's strategy (refer Section 3) and more detailed commitments defined in each study's implementation plan.
- Internal review by the Cooper Energy Environment Officer regarding the conformance to the OSMP's audit schedule elements will be carried out routinely (one month for Type I, three months for Type II). Any non-conformances will need to be rectified by the PI 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.
- External audits by the relevant regulator(s) of completed compliance reports and other OSMP commitments may be carried out 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 revised, if necessary, on an annual basis to incorporate the following:

- Significant change in the hydrocarbon spills risks associated with Cooper Energy activities and/or assets within offshore Victorian waters.
- Significant environmentally relevant changes (e.g. changes to relevant 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 following 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:

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

Furthermore, establishment of a robust baseline dataset is primarily required for assessment of impacts and recovery to environmental sensitivities at sensitive locations. As there is only a short time before hydrocarbons may reach the coast and impact on identified environmental sensitivities, establishment of baseline datasets as far as practicable during routine operations is important. Hence, the procedure for the establishment of baseline data in each relevant scientific monitoring implementation plan will, where possible, be as follows:

- Relevant scientific monitoring studies at the sensitive locations are catalogued along with the custodian's contact details.
- The monitoring methodology, monitoring sites, and sampling duration and frequency of these relevant monitoring studies will (where known) be available in a tabular format to identify methodology and spatial/temporal types of baseline data gaps.
- Data custodians will be contacted, and datasets requested. As a contingency, 'data mining' from publicly available information will occur on an ongoing basis for baseline database establishment through consultancy resources**.**
- 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; given the methodological, spatial and temporal properties of the existing monitoring data sets identified in the 'study catalogue'.

Baseline studies in addition to obtaining the existing baseline information will only be triggered by a Level 2 or Level 3 hydrocarbon release.

2.4.2 Impact and Reference Sites

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

Not all identified priority/sensitive locations may be impacted by a hydrocarbon release, so several priority/sensitive locations may be able to serve as a suitable reference location (i.e., control or 'non-impact' location) in the event of a hydrocarbon release. However, as a contingency, additional reference locations will be established for those monitoring studies where all environmental receptors are present at all sensitive locations and are predicted to be well 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.
- Free from obvious anthropogenic impacts.

They should also be similar in key physical parameters (e.g., shore profile, shore exposure, tidal currents, habitat type, substrata, temperature, and salinity) and not differ significantly between sites. 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 is attributable to the hydrocarbon release. To enable detection of environmental impact from a hydrocarbon release requires careful consideration of the sampling/survey strategy since spatial and temporal variability will also account for differences between locations despite 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 and to allow robust statistical analyses of the resultant data.

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 a BACI design is not practicable or not appropriate, other impact assessment approaches may be adopted, including (but not limited to):

- Impact versus Control
- Gradient of Impacts
- Control Charts
- 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 is likely to vary from an instantaneous release (0-24 hours) for a MDO spill or gas pipeline rupture to about 2 weeks for a pipeline leak and up to approximately 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) and thereby inform the long-term monitoring phase adjustment to the IPs for studies Sc2-Sc7.
  - 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 have impacts upon environmental sensitivities located at each of the response locations. This OSMP considers these 'secondary' impacts in addition to the primary objective of monitoring impacts from the oil spill itself.

Cooper Energy has assessed possible secondary impacts to sensitivities in areas associated with response activities. These impacts are identified in Table 3-1 and have been incorporated into the respective monitoring strategies.

This listing may be reviewed, expanded or modified during a response in order 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 to 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 to 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/direction, altered behaviour to avoid spill / response)
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	Op4 : Coastal Shoreline Assessment	Native Vegetation damage Altered access routes Disturbance to supratidal areas

Response or Monitoring Activity	Secondary Impact	Monitoring Strategy	Monitoring Parameters
	Coastal Habitat Disruption		
	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 to 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

Prior to the deployment of 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 with respect to the protected matters which 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 latest threatened species recovery plans or conservation advice with respect to 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.

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

Monitoring Parameter Selection

Monitoring parameters and methodologies selected observe the necessary requirements of conservation management plans with respect to monitoring methodology and parameters to be monitored. 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). 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, parameters such as population size and breeding success).

Protected matters requirements have been considered in the selection of methodologies 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, with the Tasmanian NRE providing The LIST (Land Information System Tasmania), which constitute valuable mapping tools 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 particular parameters (e.g. species/habitat) monitored in each scientific monitoring strategy. Factors affecting the selection and prioritisation of species and/or habitats to be monitored during a spill incident include:

- The species/habitat sensitivity to oiling and the likelihood of oiling
- Ability to access the monitoring location
- Identified species which are monitored within 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 [abalone, lobster])
- Available baseline data for individual species or habitat
- Time for oil to impact the habitat/species and the ability to access the monitoring locations
- Feedback from the Victorian Environment and Science Coordinator (ESC) on the required species selection during the spill event.

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

Species currently targeted for monitoring on the basis of available information (baseline and conservation management plans) are contained within the respective monitoring strategies within this OSMP.

3.2 Operational (Type I) Monitoring Strategies

As noted in Section 1.4, the aim of the Operational (Type I) Monitoring Studies is to provide timely information to be used in planning and executing hydrocarbon spill responses. Upon notification of an uncontrolled hydrocarbon release, the Cooper Energy Incident Controller (or delegate) will initiate the Operational Monitoring Program. The strategy for each Operational (Type I) Monitoring Study is provided in

this section together with a reference to the corresponding implementation plan (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
- Op5 – Dispersant Efficacy Assessment.

3.2.1 Study Op1: Operational Forecast Modelling

Table 3-2 Study Op1 Strategy: Operational Forecast Modelling

Strategy Component[2]	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 sensitivities at risk of hydrocarbon exposure, inform the NEBA and identify which 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 modelling service provider (RPS) provides operational forecast modelling**.** 1b : Study Op1 IP for operational forecast modelling developed by RPS in place and approved by 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 and provide 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 to improve short-term model forecasts of hydrocarbon spill distributions. 2c : Up to 3-day hydrodynamic forecasts performed at least on a daily basis, to provide inputs to hydrocarbon fate modelling. Performed daily to incorporate updates to regional current hydrodynamic and wind forecasts. Model adjusted where applicable based on validation information provided by the PI of Study Op2. 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 has been met: • The hydrocarbon spill has ceased; and • When the spill is no longer visible to human observers and 24 hrs has elapsed since the last confirmed observation of surface hydrocarbons. Specifically, a 'silvery / grey' sheen, as defined by Bonn Agreement Oil Appearance Code (BAOAC) is not observable.
Study Implementation Plan	Refer Implementation Plan Op1.

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

Strategy Component[2]	Description
Competencies	RPS is the recognized industry leader in predictive modelling of hydrocarbon incidents and no competency test and training is warranted.
Reporting	• RPS developed Study Op1 IP. • Provision of location, start time, volume and duration of 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 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 Strategy and Study IP (methodology, procedures, processes) by Environment Officer with period between reviews no longer than 12 months. • Non-conformances recorded with follow-up by Environment Officer within 2 weeks.
Responsibilities	IC: • Overall responsibility for 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. • Communications with RPS, AMSA and AMOSC as required regarding forecasting modelling. Environment Officer (or delegate): • Ongoing review and approval of the Study Op1 IP. • Day-today 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) provided to RPS. • Ensure information from Study Op1 is provided to the PI of Study Op2. • Provide advice as required to IC and 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. • Provision by RPS of advice with respect to modelling forecasts to Cooper Energy Environment Officer and Planning Officer. • Ensure availability of RPS staff 24 hours a day for 7 days a week for consultation of 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: ○ Provide operational data / information to support and inform response planning and operations and monitor the spill response.

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

Strategy Component[3]	Description
	○ Implement operational monitoring in accordance with the OSMP to identify sensitivities at risk of hydrocarbon exposure, inform the NEBA and identify sensitivities which require scientific monitoring. ○ OPEP Section 7 (Monitor and Evaluate).
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 : Environment Officer has arrangement in place with vessel and aircraft service provider. 1c : Study Op2 IP (Hydrocarbon Spill Surveillance and Tracking) in place and approved by Environment Officer.
2: Acquisition of daily vessel-based and aerial surveys of hydrocarbon distributions.	2a : PI in consultation with Planning Officer plans vessel and aircraft based daily surveillance activities on basis of model forecasts from Study Op1 (Operational Forecast Modelling) and other available information. Day's vessel-based and aerial monitoring objective and plan are recorded on the daily report. 2b : MP prepares summary of daily vessel-based and aerial surveillance activities for inclusion in daily report.
3: Daily informing for response planning and management.	3: PI prepares daily report 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 within 4 weeks after cessation of monitoring activities. Provided to IC, Environment Officer (or delegate) and Study Sc2 – Sc7 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 has been met: • The hydrocarbon spill has ceased; and • When the spill is no longer visible to human observers. Specifically, a 'silvery / grey' sheen, as defined by BAOAC is not observable and 24 hours has 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 Implementation Plan Op2.
Competencies	• PI with experience in managing and leading hydrocarbon spill 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 4 weeks 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 Strategy and Study IP methodology, procedures, processes and records by Environment Officer (or delegate). • Non-conformances recorded with follow-up by Environment Officer (or delegate) within 2 weeks.
Responsibilities	IC: • Overall responsibility for implementation of the Strategy and IP. Planning Officer: • Interface between IC and Environment Officer. • Facilitate daily surveillance activities.

Strategy Component[3]	Description
	• Disseminate Study Op2 information to response team. • Communications with AMOSC, AMSA, as required regarding surveillance and tracking of spill. Environment Officer (or delegate): • Ongoing review and approval of Study Op2 IP. • Compliance with Study Op2 IP requirements • Day-today 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 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 characterize temporal decrease in toxicity 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 in accordance with the OSMP to identify sensitivities at risk of hydrocarbon exposure, inform the NEBA and identify which sensitivities require scientific monitoring. o 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 large pool of resources under existing contracts (i.e. Stantec). 1b : Environment Officer has arrangement in place with vessel service provider and access to NATA accredited analytical laboratory (e.g., ALS for weathering testing) 1c : Study Op3 (Hydrocarbon Weathering Assessment) IP in place and approved by 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 monitoring survey on basis of information from Studies Op1 (Operational Forecast Modelling), Op2 (Hydrocarbon Spill Surveillance and Tracking), coordination with other studies, and planned response activities. Vessel-based monitoring objective and plan recorded on the daily report. 2b : Experienced MP carry out vessel-based sampling at nominated locations along a longitudinal transect through the slick and water depths. Fluorescence and turbidity (in addition to temperature and salinity) profiles carried out initially to verify proxy indicators of dissolved aromatics and entrained hydrocarbons, respectively, and to select depths for sample collection. Water samples then collected and stored appropriately and organised for immediate couriering under holding time to analysis laboratory. Chain of Custody (CoC), Laboratory Receipt Notification and field records stored / archived by MP. 2c : NATA-accredited laboratory carries out analysis of analytes (e.g., BTEX, MAH, PAH) and physical properties (e.g., wax content) as appropriate to the hydrocarbon spill. CoC and Analysis Report provided, and data archived by MP. 2d : 2a-2c carried out on at least 3 surveys that are 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 carries out analyses of hydrocarbon data to characterise weathering characteristics with discussion on likely decrease in toxicity with weathering time on the basis of chemical composition of different 'ages' of hydrocarbon in terms of release into the marine environment. 3b : PI / MP provides summary of fate / weathering properties of hydrocarbon in Study Op3 Final Report within 3 weeks of receipt of 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 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 following criteria has been met: ○ For hydrocarbon weathering assessments, 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 no longer required. Study Termination: Submission and approval of Hydrocarbon Weathering Assessment Final Report (Study Op3).
Study Implementation Plan	Refer Implementation Plan Op3.
Competencies	• PI is an experienced and qualified water quality scientist with experience in using fluorometry (or similar) and with field experience in monitoring campaigns. • MP (field) with appropriate training and/or experienced as marine scientist or technicians with appropriate training and field experience in vessel-based water quality monitoring. Trained in vessel-based hydrocarbon spill sampling and interpreting data from 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, plan, analytical progress and emerging results. • Laboratory analysis reports. • Interim reports with assessment of the hydrocarbon weathering properties for each survey.

Strategy Component[4]	Description
	• Final Op3 Report summarizing hydrocarbon weathering assessment.
Review and Auditing	• Field and data QA/QC procedures. • Laboratory QA/QC sample analyses. • Annual internal review of Study Op3 Strategy and Study IP methodology, procedures, processes and records by Environment Officer (or delegate). • Non-conformances recorded with follow-up by Environment Officer (or delegate) within 2 weeks.
Responsibilities	IC: • Overall responsibility for implementation of the Strategy and IP. Planning Officer: • Interface between IC and Environment Officer. • Facilitates field monitoring. • Disseminate Study Op3 information to 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 Environment Officer (or delegate) and MP. • Advise 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 Final Report. • Store and archive data.
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 prior to 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 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.

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

Strategy Component[5]	Description
	○ Implement operational monitoring in accordance with the OSMP to identify sensitivities at risk of hydrocarbon exposure, inform the NEBA and identify which sensitivities require scientific monitoring. ○ Provide a shoreline clean-up response that is 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 prior to hydrocarbon spill.	1a : PI and MP (Shoreline Clean-up Assessment Team, SCAT) to be sourced from pool of resources under existing contracts or agreements (i.e., AMOSC, Stantec, AMSA). 1b : Cooper Energy has arrangement in place with vessels 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 prior to hydrocarbon exposure at priority shorelines.	2a : Study Op4 IP has nominated priority shorelines for acquisition of baseline information based on modelled risk of contact. Any re-prioritisation on the basis of potential hydrocarbon shoreline exposure risk 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 EMT or Victorian authorities. Decision log and rationale recorded and archived. 2b : SCAT mobilised within 12 hrs of predicted shoreline contact (daylight permitting) as per OPEP. 2c : SCAT carry out baseline assessment as per Study Op4 IP including physical shoreline characteristics (substrate, drainage, gradient, protection / exposure, coastal morphology), biological shoreline characteristics (e.g. shorebirds). Field records 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 same location. Baseline Shoreline Condition Report submitted to Environment Officer (or delegate) within one week of 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 to be recorded in relevant field documentation and appended to an updated version of the Baseline Coastal Shoreline Condition report(s) by the SCAT with approval by the Environment Officer (or delegate) within one week.
3: Acquisition of shoreline data post-exposure to inform effectiveness of preventative or clean-up measures	3a : PI directed by Planning Officer and Environment Officer (or delegate) to shorelines to carry out post-exposure assessments. The survey plan recorded on the field documentation. 3b : SCAT carry 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 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 Analysis Report provided by laboratory archived.
4: Quasi-real-time informing of other spill response and MP	4a : SCAT to provide sub-daily assessment of visual observations of shoreline including substrate, biological character and hydrocarbon distribution (if any) on shoreline. 4b : SCAT to provide twice-daily in-field assessments of effectiveness and impacts of clean-up response measures and preventative response measures. 4c : Information provided to Planning Officer and Environment Officer (or delegate) to inform NEBA for assessment of response measures, and effectiveness of implemented measures. 4d : SCAT to immediately notify Planning Officer and Environment Officer (or delegate) of hydrocarbon impacted coastal wildlife (e.g., shorebirds) to inform potential Oiled Wildlife Response measures.

Strategy Component[5]	Description
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 hydrocarbon components (i.e., weathering). To be provided within one week of receipt of Laboratory Analysis Report. 5b : Information provided to 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, 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 has 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 materially decrease lasting hydrocarbon impacts on environmental sensitivities. Study Termination: Submission and approval by Environment Officer (or delegate) of Coastal Shoreline Assessment Final Report.
Study Implementation Plan	Refer Implementation Plans Op4A (Otway) and Op4B (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 safely operate vehicles.
Reporting	• Baseline Coastal Shoreline Condition report. • 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 summarizing 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 methodology, procedures, processes and records by Environment Officer (or delegate). • Non-conformances recorded with follow-up by Environment Officer (or delegate) within 2 weeks.
Responsibilities	IC: • Overall responsibility for 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.

Strategy Component[5]	Description
	• Disseminate Study Op4 Coastal Shoreline Hydrocarbon Assessment information for response planning and management. • Communication and coordination with AMOSC, AMSA, State authorities. 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 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.
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 pool of resources under existing contracts or agreements (i.e., AMOSC, Stantec, AMSA). 1b : Cooper Energy has arrangement 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 monitoring survey on basis of information supplied by Planning Officer (or delegate) regarding planned response activities and use of dispersant. Vessel-based monitoring objective and plan recorded on the daily report.

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

Strategy Component[6]	Description
	2b : For surface dispersant application: Experienced MP carry out vessel or aerial-based sampling for dispersant efficacy. Sampling aligned with industry standard SMART protocol. 2c : For sub-surface dispersant application: Experienced MP carry out vessel or aerial-based sampling for dispersant efficacy. Sampling aligned with industry recommended API method. 2d : For any dispersant application: Experienced MP carry our vessel-based air quality monitoring for VOCs and %LELs as per the industry recommended API method.
3: Quasi-real-time informing of 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 following criteria has been met: • 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 Implementation Plan Op5.
Competencies	• PI with experience in managing and leading hydrocarbon spill or similar monitoring. • MP with trained in vessel-based and/or aerial-based hydrocarbon spill monitoring. • MP 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 methodology, procedures, processes and records by Environment Officer (or delegate). • Non-conformances recorded with follow-up by Environment Officer (or delegate) within 2 weeks.
Responsibilities	IC: • Overall responsibility for 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, 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 DAWE. PI: • Daily implementation of the IP. • Plan, coordinate and implement surveys.

Strategy Component[6]	Description
	• Coordinate field monitoring, communications and daily reporting. • Advise 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 of 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 Scientific Monitoring Program. The strategy for each Scientific (Type II) Monitoring Study is provided in this section together with a reference to their respective implementation plans (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 the assessment of impacts to environmental sensitivities 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 and initiation and termination criteria of other scientific monitoring modules. • Contribute to publicly available hydrocarbon exposure thresholds so information can be utilized by the oil and gas industry 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 pool of resources under existing contracts (i.e., Stantec). 1b : PI has arrangement in place with vessel service provider. 1c : PI has arrangement in place with experienced ecotoxicology and NATA-accredited laboratory (e.g., ALS, Intertek).
2: Acquisition of hydrocarbon samples.	2a : When safe to do so (taking into consideration the volatility of hydrocarbon), MP to collect hydrocarbon and dispersant (if used in response) samples from the surface in proximity of the release. Field records stored / archived. 2b : CoC to confirm samples transported and received by laboratories, and Sample Receipt Notifications to confirm arrival at laboratories.
3: Determination of hydrocarbon exposure threshold.	3 : Report issued by ecotoxicology laboratory providing industry standard exposure thresholds for a number of relevant indicator organisms for hydrocarbon.
4. Characterisation of composition of released hydrocarbon.	4 : 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 to provide Environment Officer (or delegate) with Study Sc1 Final Report within 4 weeks of Ecotoxicology Laboratory Report. Environment Officer (or delegate) after consultation with DAWE, NOPSEMA and DoT to approve Study Sc1 Final Report within 4 weeks 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 reached agreement that the result of the testing provides a satisfactory exposure threshold for hydrocarbons.
Study Implementation Plan	Refer Implementation Plan Sc1.
Competencies	• PI will be an experienced and qualified eco-toxicologist with at least 10 years' experience in eco-toxicological assessment including hydrocarbons (or equivalent). • MP (field) to be experienced marine scientist or technicians 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) recognized 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 spill. • Ecotoxicology Laboratory Report of exposure hydrocarbon threshold and dispersed hydrocarbon threshold (if dispersant used in response) within 10 weeks of spill. • Study Sc1 Final Report within 2 weeks of receiving eco-toxicological laboratory report.
Review and Auditing	• Chain of Custody Documentation for Samples. • QA/QC sample analysis. • Validation and checking of laboratory results. • Annual internal review of Strategy Sc1 IP (methodology, procedures, processes, records, reporting and QA/QC) by Environment Officer (or delegate). • Any non-conformances recorded with follow-up by Environment Officer (or delegate) within 2 weeks.

Strategy Component	Description
Responsibilities	IC: • Overall responsibility for implementation of Study Sc1. Planning Officer: • Facilitate in 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 with respect to 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 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, 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 a 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 Sc2 program.	1a : PI and MP to be sourced from pool of resources under existing contracts (i.e., Stantec). 1b : PI has arrangement in place with vessel service provider.
2: Appropriate collection, transport and analysis of water samples.	2a : MP to 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 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 3 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 at sensitive priority areas, commercial fishery areas, pelagic sites and reference sites as per the IP. MP store / archive 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). Environment Officer (or delegate) to approve within one week of submission and distribute to 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 : Collection and analysis of 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 3 months after the cessation of the hydrocarbon release. 5b : PI to provide a short report for each survey (within one week of receipt of Laboratory Analysis Report) to Environment Officer (or delegate). Environment Officer (or delegate) to approve within one week of submission and distribute to Planning Officer and other PIs.
5. Provision of hydrocarbon monitoring of marine waters dataset to Study Sc8 for Hind-cast Modelling.	6 : PI responsible for provision of Study Sc2 dataset to PI of Study Sc8 (Hind-cast Modelling Impact Assessment) to serve as a validation data of hydrocarbon and dispersant (if used in response) concentrations in marine waters at monitored sites within 4 weeks of cessation of unplanned hydrocarbon releases.
6: Revise IP for long-term monitoring phase of hydrocarbons in water after the cessation of the hydrocarbon release and carry out long-term monitoring phase.	7a : 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 hydrocarbons in marine waters after the cessation of the hydrocarbon release. Recommendation provided as a brief memorandum to participants for the Study Sc8 Hind-cast Modelling workshop within 3 months after cessation of hydrocarbon release. 7b : PI revises Sc2 IP for long-term monitoring phase of hydrocarbons in water within 3 months after cessation of hydrocarbon releases and provides to Environment Officer (or delegate). Environment Officer (or delegate) to approve revision to Sc2 IP for long-term monitoring phase of hydrocarbons in marine waters within 8 weeks of submission after consultation with DCCEEW, NOPSEMA and State authorities; and disseminates to MP. 7c : PI responsible for implementation of Long-Term Monitoring Phase of the Study Sc2 IP.
7: Assess impact of hydrocarbons in marine waters	8a : PI responsible to assess the impact of hydrocarbons and dispersant (if used in response) in marine waters within 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 4 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 dispersant (if used in response) in water are within natural variability of the baseline conditions and no longer pose a risk to environmental sensitivities. • 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 Implementation Plans Sc2A (Otway) and Sc2B (Gippsland).
Competencies	• PI to be an experienced and qualified water quality scientist with field experience in vessel-based water quality monitoring (or equivalent). • MP (field) to be experienced marine scientists or technicians with appropriate training and experienced in water quality sampling. • MP (office) to be experienced water quality analysts for Study Sc2 office-based analyses.

Strategy Component	Description
	• Laboratory services with NATA accreditation. • CVs to be kept on file. • Commercial certified / surveyed plant (vessels).
Reporting	PI and MP responsible for the preparation, and Environment Officer (or delegate) 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 (methodology, procedures, processes, records, reporting and QA/QC) by Environment Officer (or delegate). • Any non-conformances recorded with follow-up by Environment Officer (or delegate) within 2 weeks.
Responsibilities	IC: • Overall responsibility for implementation of the Study Sc2 Strategy and IP. Planning Officer: • Facilitation of water quality sampling in areas contacted by the hydrocarbon and dispersant (if used in response). Environment Officer (or delegate): • 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. PI (Stantec): • Daily implementation of this IP. • Plan, coordinate and implement daily water quality survey. • Review, approve and disseminate water quality monitoring information. • Daily communications between MP and Environment Officer (or delegate). • Review Water Survey Reports, Baseline Report, and Hydrocarbon Monitoring of Marine Waters Final Report. • Provide advice as required to Environment Officer (or delegate). MP: • Undertake water quality monitoring activities. • Coordinate laboratories. • Carry out data analyses. • Prepare reports, including water quality survey reports and final report. • Store and archive data.
Relevant References and Guidelines	Oil Spill Monitoring Handbook (Hook et al, 2016) 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 large pool of resources under existing contracts (i.e., Stantec). 1b : PI has arrangement in place with vessel service provider.
2: Appropriate collection, transport and analysis of sediment samples.	2a : MP to 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 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 3 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 store/archive field records and CoC. 3b : PI to provide Hydrocarbon in Sediments Survey (within 1 week of reactive baseline survey completion) to Environment Officer (or delegate). Environment Officer (or delegate) to approve within 1 week of submission, and distribute to 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 : Collection and analysis of hydrocarbon concentrations in sediments as prescribed in the Sc3 IP by MP during the hydrocarbon release and for 9 months after the cessation of hydrocarbon releases. 4b : PI to provide a short data report summarising each field survey (within 4 weeks of completion of each survey) to Environment Officer (or delegate). Environment Officer (or delegate) to approve within one week of submission, and distribute to 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 4 weeks of termination of unplanned hydrocarbon release.
6: Revise IP for long-term monitoring phase of hydrocarbons in sediments after the hydrocarbon release and carry out long-term monitoring phase.	6a : 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 hydrocarbons in sediments after cessation of the hydrocarbon release. 6b : PI revises Sc3 IP for long-term monitoring phase of hydrocarbons in sediments (within 4 weeks after Sc8 Final Report approval). Environment Officer (or delegate) to approve revision to Sc4 IP for long-term monitoring phase of hydrocarbons in sediments within 8 weeks of submission after consultation with DCCEEW, NOPSEMA and State authorities; and disseminates to MP. 6c : PI responsible for implementation of Long-Term Monitoring Phase of the Study Sc4 IP.
7: Assess impact of hydrocarbons in marine sediments.	7a : PI responsible to report survey results and to assess 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 to prepare and to provide Environment Officer (or delegate) with a Study Sc3 Chapter for Annual Reports by 1 October of each year and the Hydrocarbons in Marine Sediments Final Report within 8 weeks of field termination. Environment Officer (or delegate) after consultation with DCCEEW, NOPSEMA and State authorities to approve

Strategy Component	Description
	Final Hydrocarbons in Marine Sediments Report within 3 months of field termination for dissemination.
8: Regulatory compliance reporting	8a : Environment Officer (or delegate) to provide regulators (NOPSEMA, State authorities and DCCEEW) with Annual Scientific Monitoring Reports that includes a Study Sc3 chapter and the Final Study Sc3 Scientific Monitoring Report within 4 weeks of approval by the Environment Officer (or delegate).
Initiation Trigger	Module will be implemented following a Level 2 or Level 3 hydrocarbon release.
Termination Criteria	Field Study Termination: The Planning Officer or Environment Officer (or delegate) will terminate the study when, in consultation with NOPSEMA, DAWE 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 Implementation Plans Sc3A (Otway) and Sc3B (Gippsland).
Competencies	• PI with an experienced marine scientist with at least 5 years' experience in collecting marine sediment samples (or equivalent). • MP (field) will include experienced and qualified marine scientists with field experience in vessel-based sediment and water quality monitoring. • 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 responsible for the preparation, and Environment Officer (or delegate) 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 seeks 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 (methodology, procedures, processes, records, reporting and QA / QC) by Environment Officer (or delegate). • Any non-conformances recorded with follow-up by Environment Officer (or delegate) within 2 weeks.
Responsibilities	IC: • Overall responsibility for 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.

Strategy Component	Description
	• 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 Report, Sc4 Chapters in Annual Reports, revision of IP for Long term Monitoring Phase, 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 saltmarsh 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. • Determine the impact and recovery of the hydrocarbon release on those habitats.
Monitoring Performance Standards	**Measurement Criteria**
1: Readiness to implement Sc4 program.	1a : PI and MP to be sourced from large pool of resources under existing contracts (i.e., Stantec). 1b : PI has arrangement in place with vessel service provider. 1c : PI has arrangement in place for specialised monitoring equipment (e.g., video / drop cameras, side-scan sonar).
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 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 spill. • MP store/archive field records, photos, video and other data.

Strategy Component	Description
	2c : PI to provide Reactive Baseline Survey Chapter of Baseline Report (within 4 weeks of reactive baseline survey completion) to Environment Officer (or delegate). Environment Officer (or delegate) to approve within one week of submission and distribute to Planning Officer and other PIs.
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 Chapter of Baseline Report (within 8 weeks of hydrocarbon release) to Environment Officer (or delegate). Environment Officer (or delegate) to approve within 2 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 site 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 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 long-term monitoring phase of inter-tidal and sub-tidal benthic habitats after the hydrocarbon release and carry out 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 long-term monitoring phase of inter-tidal and sub-tidal benthic habitats (within 4 weeks after Study Sc8 Final Report is approved) and provides to Environment Officer (or delegate). Environment Officer (or delegate) to approve revision to Sc4 IP for long-term monitoring phase of inter-tidal and sub-tidal benthic habitats within 4 weeks of submission after consultation with DCCEEW, NOPSEMA and State authorities; and disseminates to MP. 5c : PI responsible for implementation of Long-Term Monitoring Phase Sc4 IP.
6: Assess impact of hydrocarbon release on inter-tidal and sub-tidal benthic habitats	6a : Assessment of potential impacts to inter-tidal and sub-tidal habitats based on methodology in the Sc4 IP and utilises Study Sc4 data. 6b : PI responsible to report data and to assess 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 to provide Environment Officer (or delegate) with a Sc4 Chapter for Annual Report as requested each year and the Intertidal and Sub-tidal Benthic Habitat Final Report within 8 weeks of field termination. After consultation with DCCEEW, NOPSEMA and State authorities, Environment Officer (or delegate) to approve Final Intertidal and Sub-tidal Benthic Habitat Report within 2 months of field termination for dissemination.
7: Regulatory compliance reporting	7a : Environment Officer (or delegate) to provide regulators (NOPSEMA, State authorities and DCCEEW) with Annual Scientific Monitoring Reports that includes 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	The IP will be implemented immediately following a Level 2 or Level 3 hydrocarbon release.
Termination Criteria	Field Study Termination: The Planning Officer of Environment Officer (or delegate) will terminate the study when, in consultation with NOPSEMA, DCCEEW and State authorities when: • Overall impacts to inter-tidal and sub-tidal benthic habitats from hydrocarbon exposure have been quantified; • Recovery of impacted benthic habitats have been evaluated; and • Agreement with relevant stakeholders and regulators, based upon the nature and scale of the spill impacts are no longer attributable to the spill. Study Termination: Submission and approval of Study Sc4 Final Report.
Study Implementation Plan	Refer Implementation Plans Sc4A (Otway) and Sc4B (Gippsland).
Competencies	• PI will be an experienced marine scientist with vessel-based marine benthic expertise (or equivalent).

Strategy Component	Description
	• 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) to 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 responsible for the preparation, and Environment Officer (or delegate) 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 2 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 review of Strategy Sc4 IP (methodology, procedures, processes, records, reporting and QA/QC) by Environment Officer (or delegate) with duration between reviews no longer than 3 months. • Any non-conformances recorded with follow-up by Environment Officer (or delegate) within 2 weeks.
Responsibilities	IC: • Overall responsibility for 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, Chapter Sc4 in Annual & 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. • Daily communications between MP and Environment Officer (or delegate). • Review all reporting (Survey Reports, Baseline Report, Sc4 Chapters in 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	• Edgara et al. (2000) Impact of the Iron Baron oil spill on sub-tidal reef assemblages in Tasmania.

Strategy Component	Description
	• 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 large pool of resources under existing contracts (i.e., Stantec). 1b : PI has arrangement in place with vessel service provider.
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 8 weeks of hydrocarbon release) to Environment Officer (or delegate). Environment Officer (or delegate) to approve within 2 weeks of chapter submission, and to distribute to 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 3 months after the cessation of the hydrocarbon release. MP store / archive field records at secure site. 3b : PI to provide a short data report summarising each field survey within 4 weeks of completion of each field survey to Environment Officer (or delegate). Environment Officer (or delegate) to approve within 1 week of submission and distribute to Planning Officer and other PIs.
4: Revise IP for long-term monitoring phase of shorebird and seabird populations after the hydrocarbon release and carry out 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 long-term monitoring phase of shorebird and seabird populations within 4 weeks after Study Sc8 Final Report approval and provides to Environment Officer (or delegate). Environment Officer (or delegate) to approve revision to Sc5 IP for long-term monitoring phase of shorebird and seabird populations within 4 weeks of submission after consultation with DAWE, NOPSEMA and State authorities; and disseminates to MP. 4c : PI responsible for 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 to assess and to report 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 to provide Environment Officer (or delegate) the Study Sc5 Chapter for Annual Reports as specified by the Environment Officer (or delegate) each year and the Shorebird and Seabird Population Monitoring Final Report within 8 weeks

Strategy Component	Description
	of field termination. After consultation with DAWE, NOPSEMA and State authorities, Environment Officer (or delegate) to approve Final Shorebird and Seabird Population Monitoring Report within 3 months of field termination for dissemination.
6: Regulatory compliance reporting	6a : Environment Officer (or delegate) to provide regulators (NOPSEMA, State authorities and DAWE) with Annual Scientific Monitoring Reports that includes a Study Sc5 Chapter and the Final Study Sc5 Scientific Monitoring Report within 4 weeks of approval by the Environment Officer (or delegate).
Initiation Trigger	This IP will be implemented following a Level 2 or Level 3 hydrocarbon release.
Termination Criteria	Field Study Termination: The Planning Officer or Environment Officer (or delegate) will terminate the study when, in consultation with NOPSEMA, DAWE and State authorities: • Impacts to 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 with relevant stakeholders and regulators, based upon the nature and scale of the spill impacts are no longer attributable to the spill. Study Termination: Submission and approval of Study Sc5 Final Report.
Study Implementation Plan	Refer Implementation Plans Sc5A (Otway) and Sc5B (Gippsland).
Competencies	• PI will be an experienced marine zoologist with at least 5 years coastal seabird experience (or equivalent); and • MP (vessel-based) will be qualified marine zoologists with experience in vessel-based monitoring activities. • MP (land-based) will be qualified 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 responsible for the preparation, and Environment Officer (or delegate) 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 Chapter for Annual Reports. • Study Sc5 Final Report one month after study termination.
Review and Auditing	• Annual internal review of Strategy Sc5 IP (methodology, procedures, processes, records, reporting and QA/QC) by Environment Officer (or delegate). • Any non-conformances recorded with follow-up by Environment Officer (or delegate) within 2 weeks.
Responsibilities	IC: • Overall responsibility for 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.

Strategy Component	Description
	• Approval and provision of any compliance reporting requirements. • Approve all reporting (Reactive Baseline Survey Report, Baseline Data Report, Final Report, Sc5 Chapter in 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, Sc5 Shorebird and Seabird Population Monitoring Final Report, Sc5 Chapter in 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 preparation of 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 pool of resources under existing contracts (i.e., Stantec). 1b : Cooper Energy has arrangement in place with vessel and aircraft service providers
2: Acquisition and dissemination of existing marine megafauna baseline data	2a : PI responsible for the acquisition of 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 8 weeks of hydrocarbon release) to Environment Officer (or delegate). Environment Officer (or delegate) to approve within 2 weeks of chapter submission, and to distribute to IC and other PIs.
3: Acquisition of marine megafauna survey data during the hydrocarbon release and for 3 months after the cessation of the hydrocarbon release	3a : Collection and analysis of 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. MP to store / archive field records. 3b : PI to provide a short data report summarising each field survey within 4 weeks of completion of survey to Environment Officer (or delegate). Environment Officer (or delegate) to approve within one week of submission and distribute to Planning Officer and other PIs.

Strategy Component	Description
4: Revise IP for long-term monitoring phase of marine megafauna surveys after the hydrocarbon release and carry out 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 marine megafauna after cessation of hydrocarbon release. 4b : PI revises Sc6 IP for long-term monitoring phase of marine megafauna within 4 weeks after Study Sc8 Final Report approval and provides to Environment Officer (or delegate). Environment Officer (or delegate) to approve revision to Sc6 IP for long-term monitoring phase of marine megafauna surveys within 4 weeks of submission after consultation with DCCEEW, NOPSEMA and State authorities; and disseminates to MP. 4c : PI responsible for implementation of revised long-term phase Sc6 IP.
5: Assess impact of hydrocarbon release on marine megafauna and provision of performance reporting	5a : PI responsible to assess and to report 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 to provide Environment Officer (or delegate) the Sc6 Chapter for Annual Reports as specified by the Environment Officer (or delegate) each year and the Marine Megafauna Monitoring Final Report within 8 weeks of final field survey. Environment Officer (or delegate) after consultation with DCCEEW, NOPSEMA and State authorities to approve Final Marine Megafauna Monitoring Report within 3 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 Chapter and the Final Study Sc6 Scientific Monitoring Report within 4 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 but within 48 hours of observation.
Initiation Trigger	This IP will be implemented following a Level 2 or Level 3 hydrocarbon release.
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. Study Termination: Submission and approval of Study Sc6 Final Report.
Study Implementation Plan	Refer Implementation Plans Sc6A (Otway) and Sc6B (Gippsland).
Competencies	• PI with post-graduate research in marine fauna management (or equivalent). Field experience in 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 at least five years' experience in surveys of marine mega-fauna. • MP (office) to be experienced marine mega-fauna analysts for Study Sc6 office-based analyses. • Commercial certified / surveyed plant (vessels and aircraft). • CVs to be kept on file.
Reporting	PI and MP responsible for the preparation, and the Environment Officer (or delegate) 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 Chapters for Annual Reports. • Study Sc6 Final Report.
Review and Auditing	• Annual internal review of Strategy Sc6 IP (methodology, procedures, processes, records, reporting and QA/QC) by Environment Officer (or delegate).

Strategy Component	Description
	• Any non-conformances recorded with follow-up by Environment Officer (or delegate) within 2 weeks.
Responsibilities	IC: • Overall responsibility for implementation of the Strategy and IP. Planning Officer: • Facilitation of 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 ASAP but within 48 hours of sighting. • Approval of Marine Megafauna Monitoring Final Report, Survey Reports, Baseline Data Report, Sc6 Chapter in 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 Marine Megafauna Monitoring Final Report, Survey Reports, Baseline Report, Sc6 Chapter in Annual Reports. • Review compliance reports. • Reporting any injuries or fatalities of marine megafauna to the relevant regulator within 48 hours of sighting. • 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 Environment Officer (or delegate) 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 to fisheries; seafood quality/safety and the fisheries recovery following a hydrocarbon release.
Monitoring Performance Standards	**Measurement Criteria**
1: Readiness to implement Sc7 program.	1a : PI and MP to be sourced from pool of resources under existing contracts (i.e., Stantec).

Strategy Component	Description
	1b : PI or Cooper Energy to have arrangement in place with vessel service provider. 1c : PI to have arrangement in place with accredited laboratory (e.g., NMI) for analysis of fish toxicological samples.
2: Acquisition and dissemination of existing commercial and recreational fish data	2a : PI responsible for the acquisition of existing commercial and recreation 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 3 months after the cessation of the hydrocarbon release. Where possible, samples will be obtained from commercial catches at point of landing. Cooper Energy will liaise with the Victorian Fisheries Authority (VFA), other State authorities (if required) and / or AFMA regarding sampling and analysis of commercial fish stock. MP to store/archive field records. 3b : Laboratory analysis of fish samples at accredited laboratory (e.g., NMI). CoC to confirm sample collection, transport to appropriate laboratories, and sample receipt notification from the accredited laboratory to confirm arrival of fish samples within holding times. Documents stored / archived at secure site by MP. 3c : Laboratory Analysis Report issued by accredited laboratory with analysis techniques as defined in IP (within 3 weeks of sample collection) and stored / archived by MP. 3d : PI to provide a short report for each Survey (within 4 weeks of completion of field survey) to Environment Officer (or delegate). Environment Officer (or delegate) to approve within one week of submission and distribute to Planning Officer and other PIs.
4: Revise IP for long-term monitoring phase of hydrocarbon monitoring of representative commercial and recreational fish species after the hydrocarbon release and carry out 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 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 4 weeks after cessation of hydrocarbon release and provides to Environment Officer (or delegate). Environment Officer (or delegate) to approve revision to Sc7 IP for long-term monitoring phase within 4 weeks of submission after consultation with DCCEEW, NOPSEMA, VFA, other State authorities (if required) and AFMA; and disseminates to MP. 4c : PI responsible for implementation of revised long-term phase Sc7 IP.
5: Assess impact of hydrocarbon release on representative commercial and recreational fish species and performance reporting	5a : PI responsible to assess and to report 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 to provide Environment Officer (or delegate) the Sc7 Chapter for Annual Reports as specified by the Environment Officer (or delegate) each year and the Final Report within 8 weeks of field termination. After consultation with DCCEEW, NOPSEMA, VFA, other State authorities (if required) and AFMA, Environment Officer to approve Final Report within 3 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 includes a Study Sc7 Chapter and the Final Study Sc7 Scientific Monitoring Report within 4 weeks of approval by the Environment Officer (or delegate).
Initiation Trigger	This IP will be implemented following a Level 2 or Level 3 hydrocarbon release.
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;

Strategy Component	Description
	• 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 and hydrocarbon levels in representative commercial and recreational fishing tissue are below relevant seafood standards for marine waters and pose minimal risk. Study Termination: Submission and approval of Study Sc7 Final Report.
Study Implementation Plan	Refer Implementation Plan Sc7.
Competencies	• PI will be a fisheries scientist with at least 5 years 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 in the collection of fish samples. • Olfactory analysis must be led by a scientist experienced in the use of the duo-trio method. • MP (office) to be experienced fish analysts for Study Sc7 office-based analyses. • CVs to be kept on file. • Laboratory services will be NATA accredited.
Reporting	PI and MP responsible for the preparation, and Environment Officer (or delegate) responsible for the approval and dissemination of the following: • Study Sc7 IP. • Study Sc7 Baseline Data Report. • Study Sc7 Survey Reports. • Revised Study Sc7 IP for Long-term Monitoring Phase. • Study Sc7 Chapter for Annual Reports. • Study Sc70 Final Report.
Review and Auditing	• Annual internal review of Strategy Sc7 IP (methodology, procedures, processes, records, reporting and QA/QC) by Environment Officer (or delegate). • Any non-conformances recorded with follow-up by Environment Officer (or delegate) within 2 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, Sc7 Chapter in Annual Reports, IP) and the revision of the IP for the Long-term Monitoring Phase. • Provide advice with 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.

Strategy Component	Description
	• Review all reporting (Survey Reports, Baseline Report, Hydrocarbon Monitoring in Representative Commercial and Recreational Fish Species Final Report, Study Sc7 Chapter in Annual Reports). • Revise the IP for 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 environmental sensitivities affected by the hydrocarbon spill.
Monitoring Performance Standards	**Measurement Criteria**
1: Readiness to implement Op1 forecast modelling within 3 months of acceptance of EP and OPEP	1a : Environment Officer (or delegate) to extend existing ongoing contract with modelling service provider (RPS) for 6 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 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 : PIs of relevant studies 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 4 weeks after cessation of Study Op1 (Operational Forecast Modelling). 2b : IC to provide RPS with pertinent information / data regarding response measures implemented during the incident in digital format with accompanying meta-data document within 4 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 3 months after cessation of Study Op1 (Operational Forecast Modelling).

Strategy Component	Description
3: Refined post-incident impact assessment informs long-term monitoring specifications	3a : Provision of report to PIs of Studies Sc2-Sc7 to inform modelling assessment of hydrocarbon distributions from incident to be considered in the long-term monitoring specifications (e.g., locations, frequency). 3b : RPS to run workshop with PIs from Studies Sc2-Sc7 and Environment Officer (or delegate) to provide subsequent Workshop Report on recommendations based on hind-cast modelling of long-term modelling specifications within 4 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	Planning Officer or Environment Officer (or delegate) approves Hind-cast Modelling Impact Assessment Modelling Report submitted by RPS and the Hind-cast Modelling Impact Assessment Workshop is conducted.
Study Implementation Plan	Refer Implementation Plan Study Sc8.
Competencies	RPS is the recognized industry leader in hind-cast modelling of hydrocarbon incidents; no competency test and training anticipated.
Reporting	RPS responsible for the preparation, and Environment Officer (or delegate) is responsible for the approval and dissemination of the following: • RPS to provide Study Sc8 IP updates within one week after cessation of Study Op1 (Operational Forecast Modelling). • Final Hind-cast Modelling Impact Assessment Report within 6 months of study initiation.
Review and Auditing	• Internal review of Study Sc8 'readiness' after termination of Study Op1 (Operational Forecast Modelling) by Environment Officer (or delegate). • Annual internal review of Op1 Strategy and Study IP methodology, procedures, processes and records by Environment Officer (or delegate). Non-conformances recorded with follow-up by Environment Officer (or delegate) within 2 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 Final Hind-cast Modelling Impact Assessment Report to 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), Sc7 (Hydrocarbon Monitoring of Fish) to assist in refinements to their long-term monitoring specifications. • Coordinate Hind-cast Modelling Impact Assessment workshop (led by RPS) for PIs (Sc2-Sc7) • Provide advice with respect to environmental issues as required to the Environment Officer (or delegate). PI (RPS): • Ensure modelling 'readiness' within 1 week of study initiation • Lead the Hind-cast Modelling Impact Assessment workshop, organized by the Environment Officer (or delegate) for the PIs of Studies Sc2 –Sc7.

Strategy Component	Description
	• Provide hind-cast modelling after cessation of Study Op1 (Operation Forecast Modelling) and associated reporting to estimate the impacts from the hydrocarbon spill to inform the long-term scientific monitoring program. PIs of Studies Op2, Op4, Sc2 and Sc3 are responsible for: • Provision of validation data and meta-data document for hind-cast modelling to RPS. PIs of Studies Sc2-Sc7 are responsible for: • Preparation and attendance at 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 outcomes for this study is to carry out socio-economic monitoring studies to assess socio-economic impacts and subsequent recovery pathways following a Level 2/3 hydrocarbon spill.
Monitoring Performance Standards	**Measurement Criteria**
1: Readiness to implement Sc9 program.	1a : PI and MP to be sourced from pool of resources under existing contract (i.e., Stantec).
2: Acquisition and dissemination of existing socioeconomic baseline data	2a : PI responsible for the acquisition of existing socioeconomic data from various sources (e.g., Councils REMPLAN) as per the procedure in the Sc9 IP to establish the baseline dataset. 2b : PI to provide Study Sc9 Baseline Data Report within 8 weeks of hydrocarbon release to Environment Officer (or delegate). Environment Officer (or delegate) to approve within 2 weeks of submission, and to distribute to Planning Officer and other PIs.
3: Acquisition of data for socio-economic monitoring during the hydrocarbon release and for 3 months after the cessation of the hydrocarbon release	3a : Collection and analysis of 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 3 months after the cessation of the hydrocarbon release. MP to store/archive field records. 3b : PI to provide a short report for each Survey (within 4 weeks of completion of field survey) to Environment Officer (or delegate). Environment Officer (or delegate) to approve within one week of submission and distribute to Planning Officer and other PIs.
4: Revise IP for long-term monitoring phase of socio-economic recovery and carry out 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 socio-economic impacts after cessation of the hydrocarbon release. 4b : PI revises Sc9 IP for long-term monitoring phase of socio-economic impact within 4 weeks after cessation of hydrocarbon release and provides to Environment Officer (or delegate). Environment Officer (or delegate) to approve revision to Sc9 IP for long-term monitoring phase within 4 weeks of submission after consultation with NOPSEMA, DTP and other State authorities. 4c : PI responsible for implementation of revised long-term phase Sc9 IP.
5: Assess impact of hydrocarbon release socio-economic indicators and performance reporting	5a : PI responsible to assess and to report 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 to provide Environment Officer (or delegate) the Sc9 Chapter for Annual Reports as specified by the Environment Officer (or delegate) each year and the Final Report within 8 weeks of field termination. After consultation with NOPSEMA and other State authorities, the Environment Officer (or delegate) to approve Final Report within 3 months of field termination for dissemination.
6: Regulatory compliance reporting	6a : Environment Officer (or delegate) to provide regulators (NOPSEMA, other State authorities) with Annual Scientific Monitoring Reports that includes a Study Sc9 Chapter

Strategy Component	Description
	and the Final Study Sc9 Scientific Monitoring Report within 4 weeks of approval by the Environment Officer (or delegate).
Initiation Trigger	The study will be implemented following a Level 2 or Level 3 hydrocarbon release.
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 to 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 Implementation Plans Sc9A (Otway) and Sc9B (Gippsland).
Competencies	• PI with an experienced economist with at least 5 years' experience in collecting and analysing socio-economic data (or equivalent). • MP (office) to be experienced economists with experience in the collection and analysis of socio-economic data. • CVs to be kept on file.
Reporting	PI and MP responsible for the preparation, and Environment Officer (or delegate) responsible for the approval and dissemination of the following: • Study Sc9 IP. • 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 (methodology, procedures, processes, records, reporting and QA/QC) by Environment Officer (or delegate). • Any non-conformances recorded with follow-up by Environment Officer (or delegate) within 2 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 GMO 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 Chapter in Annual Reports). • Revise the IP for Long-term Monitoring Phase. • Review of data provided for inputs into Study Sc8 Hind-cast Modelling.

Strategy Component	Description
	• 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 Chapter in Annual Report and Final Report. • Store and archive data.
Relevant References and Guidelines	N/A