ENVIRONMENT PLAN APPENDICES

Thylacine Subsea Installation & Commissioning (T/L2 and T/L4)

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Appendix A

Fair Ocean Access Information Sheet

Fair Ocean Access

Minimising fishing impacts from offshore operations

Information Sheet | May 2021

Introduction

Licenced commercial fishers and petroleum title holders have lawful rights and obligations to carry out their activities safely and without interference. Beach is committed to *Fair Ocean Access* by minimising impacts from its offshore activities to commercial fishers.

Beach's *Fair Ocean Access Procedure* sets out commitments by Beach to genuine consultation with fishers to understand and minimise safety, environmental and economic impacts.

Where impacts cannot be minimised by Beach, and a fisher has acted to avoid risks and impacts to a Beach project, Beach's *Fair Ocean Access Procedure* includes a simple and fair process for a fisher to claim compensation for an economic loss, and a rapid approval and payment process.

Safety

Safety is Beach's first priority and operating safely will sometimes require restricted access for relatively small offshore areas over short periods. Beach will consult with fishers to seek to minimise potential disturbance to areas that are regular fishing grounds and where the fisher has no alternative fishing options.

Environmental Protection

Beach's projects are subject to stringent assessment and mitigation of potential environmental impacts. Beach must prepare Environment Plans for its offshore projects. These identify all environmental and socio-economic impacts and set out mitigation measures to reduce impacts, so they are "as low as reasonably practicable" and acceptable by regulators. Mitigation measures may include compensation where impacts on the commercial fishing industry cannot be minimised and where these impacts cause an economic loss.

Assessment of impacts includes identifying State and Commonwealth commercial fisheries that are actively fished in Beach's project areas and any biological or economic impacts to those fisheries. Consultation with commercial fishers is an important part of Beach's environmental assessment process.

Genuine consultation

Beach will consult with openness, transparency and mutual respect with fishers who may be directly impacted by Beach's projects. Beach will use its best endeavours to consult with all potentially impacted fishers during preparation of its Environment Plan for a project, and before projects commence.

Respecting the representative role of fishing associations, Beach will seek engagement with potentially impacted fishers via the relevant association. Beach will also engage directly with a fisher if they are not a member of an association, or where they request direct engagement with Beach.

Where a fishing association or fisher believes they will be impacted by a Beach project, Beach will share its fishing impact assessments, validate that with fishers, and discuss their specific circumstances with the objective of minimising potential impacts.

If project avoidance and impact minimisation is not possible, Beach will provide a copy of its full *Fair Ocean Access Procedure* and discuss mitigation options set out in the procedure, as appropriate to the individual fisher or association.

Economic loss

Beach is committed to the principle that a fisher should not suffer an economic loss as a direct result of a Beach project. Losses may occur for different reasons such as:

- reduced catch from fishing in a new area in order to avoid a Beach project
- reduced catch due to impacts to a fishery from the project activities
- steaming costs to avoid a Beach project area
- costs to repair or replace fishing gear.

Acting in good faith

Beach is committed to a fair, simple and transparent process for a fisher to claim compensation, where the fisher has consulted with Beach in good faith before a project, and provided the fisher has:

- acted to avoid risks and impacts to a Beach project
- acted to mitigate any economic losses to their business that may arise from avoiding risks and impacts to a Beach project
- evidence of fishing in the Beach project area during the same time of year as the project timing, for at least three years within the last five years, unless there are genuine fishery or fishing practice reasons for lesser periods
- historical and current catch and effort evidence and the ability to demonstrate an economic loss, as set out in Beach's *Fair Ocean Access Procedure*.

Making a claim

The *Fair Ocean Access Procedure* sets out a simple claim form and describes the evidence required for a claim, such as historical catch and effort records, current catch and effort records, and fish prices.

Claims must be made within 60 days of completion of a Beach project unless there is evidence that the project has caused an impact to the fishery which has impacted future catch and caused an economic loss.

The *Fair Ocean Access Procedure* sets out timeframes for the rapid assessment and payment of successful claims and for ensuring the fisher is kept informed.

Beach will nominate a single point of contact at Beach for a fisher to liaise with.

Claims and evidence will be managed in accordance with Beach's Privacy Policy which can be found on Beach's website.

If a claim is not approved, Beach will provide written reasons for the decision.

Resolving disagreements

Where a fisher and Beach cannot agree on a fisher's claim, the *Fair Ocean Access Procedure* includes steps for appointing an independent expert to resolve the matter. Beach will pay the reasonable costs of the independent expert, as set out in the *Fair Ocean Access Procedure*.

We welcome your questions and feedback

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beach

Appendix B

EPBC Act Protected Matters Search Reports

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Please see the caveat for interpretation of information provided here.

Report created: 17-Aug-2022

Activity Area EMBA

Summary

Matters of National Environment Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance (Ramsar	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	1
Listed Threatened Ecological Communities:	None
Listed Threatened Species:	37
Listed Migratory Species:	39

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at http://www.environment.gov.au/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Lands:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	59
Whales and Other Cetaceans:	27
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have

State and Territory Reserves:	None
Regional Forest Agreements:	None
Nationally Important Wetlands:	None
EPBC Act Referrals:	15
Key Ecological Features (Marine):	1
Biologically Important Areas:	18
Bioregional Assessments:	None
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

Commonwealth Marine Area [Resource Information]

Approval is required for a proposed activity that is located within the Commonwealth Marine Area which has, will have, or is likely to have a significant impact on the environment. Approval may be required for a proposed action taken outside a Commonwealth Marine Area but which has, may have or is likely to have a significant impact on the environment in the Commonwealth Marine Area.

Feature Name	Buffer Status
EEZ and Territorial Sea	In feature area

Listed Threatened Species [Resource Information]

Status of Conservation Dependent and Extinct are not MNES under the EPBC Act.
Number is the current name ID.

Scientific Name	Threatened Category	Presence Text	Buffer Status
BIRD			
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat may occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Halobaena caerulea Blue Petrel [1059]	Vulnerable	Species or species habitat may occur within area	In feature area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In feature area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area	In feature area
Pachyptila turtur subantarctica Fairy Prion (southern) [64445]	Vulnerable	Species or species habitat may occur within area	In feature area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Pterodroma leucoptera leucoptera Gould's Petrel, Australian Gould's Petrel [26033]	Endangered	Species or species habitat may occur within area	In feature area
Pterodroma mollis Soft-plumaged Petrel [1036]	Vulnerable	Species or species habitat may occur within area	In feature area
Sternula nereis nereis Australian Fairy Tern [82950]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche bulleri platei Northern Buller's Albatross, Pacific Albatross [82273]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche chrysostoma Grey-headed Albatross [66491]	Endangered	Species or species habitat may occur within area	In feature area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
FISH			
Hoplostethus atlanticus Orange Roughy, Deep-sea Perch, Red Roughy [68455]	Conservation Dependent	Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Seriolella brama			
Blue Warehou [69374]	Conservation Dependent	Species or species habitat known to occur within area	In feature area
Thunnus maccoyii			
Southern Bluefin Tuna [69402]	Conservation Dependent	Species or species habitat likely to occur within area	In feature area
MAMMAL			
Balaenoptera borealis			
Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Balaenoptera musculus			
Blue Whale [36]	Endangered	Foraging, feeding or related behaviour known to occur within area	In feature area
Balaenoptera physalus			
Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Eubalaena australis			
Southern Right Whale [40]	Endangered	Species or species habitat known to occur within area	In feature area
REPTILE			
Caretta caretta			
Loggerhead Turtle [1763]	Endangered	Species or species habitat likely to occur within area	In feature area
Chelonia mydas			
Green Turtle [1765]	Vulnerable	Species or species habitat may occur within area	In feature area
Dermochelys coriacea			
Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat likely to occur within area	In feature area
SHARK			
Carcharodon carcharias			
White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Centrophorus zeehaani			
Southern Dogfish, Endeavour Dogfish, Little Gulper Shark [82679]	Conservation Dependent	Species or species habitat likely to occur within area	In feature area
Galeorhinus galeus			
School Shark, Eastern School Shark, Snapper Shark, Tope, Soupfin Shark [68453]	Conservation Dependent	Species or species habitat may occur within area	In feature area

Listed Migratory Species [Resource Information]

Scientific Name	Threatened Category	Presence Text	Buffer Status
Migratory Marine Birds			
Ardenna carneipes			
Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Species or species habitat likely to occur within area	In feature area
Ardenna grisea			
Sooty Shearwater [82651]		Species or species habitat may occur within area	In feature area
Diomedea antipodensis			
Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea epomophora			
Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea exulans			
Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea sanfordi			
Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Macronectes giganteus			
Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche chrysostoma Grey-headed Albatross [66491]	Endangered	Species or species habitat may occur within area	In feature area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area

Migratory Marine Species

Scientific Name	Threatened Category	Presence Text	Buffer Status
Balaenoptera bonaerensis Antarctic Minke Whale, Dark-shoulder Minke Whale [67812]		Species or species habitat likely to occur within area	In feature area
Balaenoptera borealis Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Balaenoptera musculus Blue Whale [36]	Endangered	Foraging, feeding or related behaviour known to occur within area	In feature area
Balaenoptera physalus Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Caperea marginata Pygmy Right Whale [39]		Foraging, feeding or related behaviour may occur within area	In feature area
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat known to occur within area	In feature area
Caretta caretta Loggerhead Turtle [1763]	Endangered	Species or species habitat likely to occur within area	In feature area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat may occur within area	In feature area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat likely to occur within area	In feature area
Eubalaena australis as Balaena glacialis australis Southern Right Whale [40]	Endangered	Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Isurus oxyrinchus Shortfin Mako, Mako Shark [79073]		Species or species habitat likely to occur within area	In feature area
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat likely to occur within area	In feature area
Lamna nasus Porbeagle, Mackerel Shark [83288]		Species or species habitat likely to occur within area	In feature area
Megaptera novaeangliae Humpback Whale [38]		Species or species habitat likely to occur within area	In feature area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat likely to occur within area	In feature area
Physeter macrocephalus Sperm Whale [59]		Species or species habitat may occur within area	In feature area
Migratory Wetlands Species			
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area	In feature area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat may occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Numenius madagascariensis			
Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area	In feature area

Other Matters Protected by the EPBC Act

Listed Marine Species			[Resource Information]
Scientific Name	Threatened Category	Presence Text	Buffer Status
Bird			
Actitis hypoleucos			
Common Sandpiper [59309]		Species or species habitat may occur within area	In feature area
Ardenna carneipes as Puffinus carneipes			
Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Species or species habitat likely to occur within area	In feature area
Ardenna grisea as Puffinus griseus			
Sooty Shearwater [82651]		Species or species habitat may occur within area	In feature area
Calidris acuminata			
Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area	In feature area
Calidris canutus			
Red Knot, Knot [855]	Endangered	Species or species habitat may occur within area overfly marine area	In feature area
Calidris ferruginea			
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area overfly marine area	In feature area
Calidris melanotos			
Pectoral Sandpiper [858]		Species or species habitat may occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Halobaena caerulea Blue Petrel [1059]	Vulnerable	Species or species habitat may occur within area	In feature area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In feature area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area	In feature area
Pachyptila turtur Fairy Prion [1066]		Species or species habitat may occur within area	In feature area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Pterodroma mollis Soft-plumaged Petrel [1036]	Vulnerable	Species or species habitat may occur within area	In feature area
Stercorarius skua as Catharacta skua Great Skua [823]		Species or species habitat may occur within area	In feature area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche bulleri platei as Thalassarche sp. nov. Northern Buller's Albatross, Pacific Albatross [82273]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche chrysostoma Grey-headed Albatross [66491]	Endangered	Species or species habitat may occur within area	In feature area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Fish			
Heraldia nocturna Upside-down Pipefish, Eastern Upside-down Pipefish, Eastern Upside-down Pipefish [66227]		Species or species habitat may occur within area	In feature area
Hippocampus abdominalis Big-belly Seahorse, Eastern Potbelly Seahorse, New Zealand Potbelly Seahorse [66233]		Species or species habitat may occur within area	In feature area
Hippocampus breviceps Short-head Seahorse, Short-snouted Seahorse [66235]		Species or species habitat may occur within area	In feature area
Histiogamphelus briggsii Crested Pipefish, Briggs' Crested Pipefish, Briggs' Pipefish [66242]		Species or species habitat may occur within area	In feature area
Histiogamphelus cristatus Rhino Pipefish, Macleay's Crested Pipefish, Ring-back Pipefish [66243]		Species or species habitat may occur within area	In feature area
Hypselognathus rostratus Knifesnout Pipefish, Knife-snouted Pipefish [66245]		Species or species habitat may occur within area	In feature area
Kaupus costatus Deepbody Pipefish, Deep-bodied Pipefish [66246]		Species or species habitat may occur within area	In feature area
Leptoichthys fistularius Brushtail Pipefish [66248]		Species or species habitat may occur within area	In feature area
Lissocampus caudalis Australian Smooth Pipefish, Smooth Pipefish [66249]		Species or species habitat may occur within area	In feature area
Lissocampus runa Javelin Pipefish [66251]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Maroubra perserrata Sawtooth Pipefish [66252]		Species or species habitat may occur within area	In feature area
Mitotichthys semistriatus Halfbanded Pipefish [66261]		Species or species habitat may occur within area	In feature area
Mitotichthys tuckeri Tucker's Pipefish [66262]		Species or species habitat may occur within area	In feature area
Notiocampus ruber Red Pipefish [66265]		Species or species habitat may occur within area	In feature area
Phycodurus eques Leafy Seadragon [66267]		Species or species habitat may occur within area	In feature area
Phyllopteryx taeniolatus Common Seadragon, Weedy Seadragon [66268]		Species or species habitat may occur within area	In feature area
Pugnaso curtirostris Pugnose Pipefish, Pug-nosed Pipefish [66269]		Species or species habitat may occur within area	In feature area
Solegnathus robustus Robust Pipehorse, Robust Spiny Pipehorse [66274]		Species or species habitat may occur within area	In feature area
Solegnathus spinosissimus Spiny Pipehorse, Australian Spiny Pipehorse [66275]		Species or species habitat may occur within area	In feature area
Stigmatopora argus Spotted Pipefish, Gulf Pipefish, Peacock Pipefish [66276]		Species or species habitat may occur within area	In feature area
Stigmatopora nigra Widebody Pipefish, Wide-bodied Pipefish, Black Pipefish [66277]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Stipecampus cristatus Ringback Pipefish, Ring-backed Pipefish [66278]		Species or species habitat may occur within area	In feature area
Urocampus carinirostris Hairy Pipefish [66282]		Species or species habitat may occur within area	In feature area
Vanacampus margaritifer Mother-of-pearl Pipefish [66283]		Species or species habitat may occur within area	In feature area
Vanacampus phillipi Port Phillip Pipefish [66284]		Species or species habitat may occur within area	In feature area
Vanacampus poecilolaemus Longsnout Pipefish, Australian Long-snout Pipefish, Long-snouted Pipefish [66285]		Species or species habitat may occur within area	In feature area
Mammal			
Arctocephalus forsteri Long-nosed Fur-seal, New Zealand Fur-seal [20]		Species or species habitat may occur within area	In feature area
Arctocephalus pusillus Australian Fur-seal, Australo-African Fur-seal [21]		Species or species habitat may occur within area	In feature area
Reptile			
Caretta caretta Loggerhead Turtle [1763]	Endangered	Species or species habitat likely to occur within area	In feature area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat may occur within area	In feature area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat likely to occur within area	In feature area

Whales and Other Cetaceans [Resource Information]

Current Scientific Name	Status	Type of Presence	Buffer Status
Mammal			

Current Scientific Name	Status	Type of Presence	Buffer Status
Balaenoptera acutorostrata Minke Whale [33]		Species or species habitat may occur within area	In feature area
Balaenoptera bonaerensis Antarctic Minke Whale, Dark-shoulder Minke Whale [67812]		Species or species habitat likely to occur within area	In feature area
Balaenoptera borealis Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Balaenoptera musculus Blue Whale [36]	Endangered	Foraging, feeding or related behaviour known to occur within area	In feature area
Balaenoptera physalus Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Berardius arnuxii Arnoux's Beaked Whale [70]		Species or species habitat may occur within area	In feature area
Caperea marginata Pygmy Right Whale [39]		Foraging, feeding or related behaviour may occur within area	In feature area
Delphinus delphis Common Dolphin, Short-beaked Common Dolphin [60]		Species or species habitat may occur within area	In feature area
Eubalaena australis Southern Right Whale [40]	Endangered	Species or species habitat known to occur within area	In feature area
Globicephala macrorhynchus Short-finned Pilot Whale [62]		Species or species habitat may occur within area	In feature area

Current Scientific Name	Status	Type of Presence	Buffer Status
Globicephala melas Long-finned Pilot Whale [59282]		Species or species habitat may occur within area	In feature area
Grampus griseus Risso's Dolphin, Grampus [64]		Species or species habitat may occur within area	In feature area
Kogia breviceps Pygmy Sperm Whale [57]		Species or species habitat may occur within area	In feature area
Kogia sima as Kogia simus Dwarf Sperm Whale [85043]		Species or species habitat may occur within area	In feature area
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat likely to occur within area	In feature area
Lissodelphis peronii Southern Right Whale Dolphin [44]		Species or species habitat may occur within area	In feature area
Megaptera novaeangliae Humpback Whale [38]		Species or species habitat likely to occur within area	In feature area
Mesoplodon bowdoini Andrew's Beaked Whale [73]		Species or species habitat may occur within area	In feature area
Mesoplodon densirostris Blainville's Beaked Whale, Dense-beaked Whale [74]		Species or species habitat may occur within area	In feature area
Mesoplodon hectori Hector's Beaked Whale [76]		Species or species habitat may occur within area	In feature area
Mesoplodon layardii Strap-toothed Beaked Whale, Strap-toothed Whale, Layard's Beaked Whale [25556]		Species or species habitat may occur within area	In feature area

Current Scientific Name	Status	Type of Presence	Buffer Status
Mesoplodon mirus True's Beaked Whale [54]		Species or species habitat may occur within area	In feature area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat likely to occur within area	In feature area
Physeter macrocephalus Sperm Whale [59]		Species or species habitat may occur within area	In feature area
Pseudorca crassidens False Killer Whale [48]		Species or species habitat likely to occur within area	In feature area
Tursiops truncatus s. str. Bottlenose Dolphin [68417]		Species or species habitat may occur within area	In feature area
Ziphius cavirostris Cuvier's Beaked Whale, Goose-beaked Whale [56]		Species or species habitat may occur within area	In feature area

Extra Information

EPBC Act Referrals				[Resource Information]
Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Controlled action				
Otway Development	2002/621	Controlled Action	Post-Approval	In feature area
VICP61 2D Marine Seismic Survey	2008/4075	Controlled Action	Completed	In feature area
Not controlled action				
INDIGO Central Submarine Telecommunications Cable	2017/8127	Not Controlled Action	Completed	In feature area
Not controlled action (particular manner)				
3D marine seismic survey near King Island	2004/1461	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Astrolabe 3D Marine Seismic Survey	2011/6048	Not Controlled Action	Post-Approval	In feature area

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action (particular manner)				
		(Particular Manner)		
Deepwater Sorell Basin 2001 Non-Exclusive 2D Seismic Survey	2001/156	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Drill and Profile Exploration Well Somerset 1, License Area T34P	2009/5037	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Geographe-A gas exploration well	2000/82	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
INDIGO Marine Cable Route Survey (INDIGO)	2017/7996	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
La Bella 3D Marine Seismic Survey, Otway Basin, VIC	2012/6683	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Otway Astrolabe 3D Marine Seismic Survey, Otway Basin	2012/6421	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Otway Basin Exploration Drilling Campaign, Vic	2011/6125	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Thylacine-A Exploration Well	2000/81	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Undertake a three dimensional marine seismic survey	2010/5700	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Referral decision				
VICP61 2D Marine Seismic Survey	2008/3975	Referral Decision	Completed	In feature area

Key Ecological Features [Resource Information]

Key Ecological Features are the parts of the marine ecosystem that are considered to be important for the biodiversity or ecosystem functioning and integrity of the Commonwealth Marine Area.

Name	Region	Buffer Status
West Tasmania Canyons	South-east	In feature area

Biologically Important Areas

Scientific Name	Behaviour	Presence	Buffer Status
Seabirds			
Ardenna pacifica Wedge-tailed Shearwater [84292]	Foraging	Likely to occur	In feature area
Ardenna tenuirostris Short-tailed Shearwater [82652]	Foraging	Known to occur	In feature area
Diomedea exulans (sensu lato) Wandering Albatross [1073]	Foraging	Known to occur	In feature area
Diomedea exulans antipodensis Antipodean Albatross [82269]	Foraging	Known to occur	In feature area
Pelecanoides urinatrix Common Diving-petrel [1018]	Foraging	Known to occur	In feature area
Thalassarche bulleri Bullers Albatross [64460]	Foraging	Known to occur	In feature area
Thalassarche cauta cauta Shy Albatross [82345]	Foraging likely	Likely to occur	In feature area
Thalassarche chlororhynchos bassi Indian Yellow-nosed Albatross [85249]	Foraging	Known to occur	In feature area
Thalassarche melanophris Black-browed Albatross [66472]	Foraging	Known to occur	In feature area
Thalassarche melanophris impavida Campbell Albatross [82449]	Foraging	Known to occur	In feature area
Sharks			
Carcharodon carcharias White Shark [64470]	Distribution	Known to occur	In feature area
Carcharodon carcharias White Shark [64470]	Distribution	Likely to occur	In feature area
Carcharodon carcharias White Shark [64470]	Distribution (low density)	Likely to occur	In feature area

Scientific Name	Behaviour	Presence	Buffer Status
Carcharodon carcharias			
White Shark [64470]	Known distribution	Known to occur	In feature area
Whales			
Balaenoptera musculus brevicauda			
Pygmy Blue Whale [81317]	Distribution	Known to occur	In feature area
Balaenoptera musculus brevicauda			
Pygmy Blue Whale [81317]	Foraging	Likely to be present	In feature area
Balaenoptera musculus brevicauda			
Pygmy Blue Whale [81317]	Foraging (annual high use area)	Known to occur	In feature area
Eubalaena australis			
Southern Right Whale [40]	Known core range	Known to occur	In feature area

Caveat

1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data are available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance

3 DATA SOURCES

Threatened ecological communities

For threatened ecological communities where the distribution is well known, maps are generated based on information contained in recovery plans, State vegetation maps and remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species

Threatened, migratory and marine species distributions have been discerned through a variety of methods. Where distributions are well known and if time permits, distributions are inferred from either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc.) together with point locations and described habitat; or modelled (MAXENT or BIOCLIM habitat modelling) using

Where little information is available for a species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc.).

In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More detailed distribution mapping methods are used to update these distributions

4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

The following groups have been mapped, but may not cover the complete distribution of the species:

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded
- seals which have only been mapped for breeding sites near the Australian continent

The breeding sites may be important for the protection of the Commonwealth Marine environment.

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact Us page.

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EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Please see the caveat for interpretation of information provided here.

Report created: 19-Aug-2022

Underwater noise EMBA

Summary

Matters of National Environment Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance (Ramsar	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	1
Listed Threatened Ecological Communities:	None
Listed Threatened Species:	37
Listed Migratory Species:	39

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at http://www.environment.gov.au/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Lands:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	59
Whales and Other Cetaceans:	27
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have

State and Territory Reserves:	None
Regional Forest Agreements:	None
Nationally Important Wetlands:	None
EPBC Act Referrals:	15
Key Ecological Features (Marine):	1
Biologically Important Areas:	18
Bioregional Assessments:	None
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

Commonwealth Marine Area [Resource Information]

Approval is required for a proposed activity that is located within the Commonwealth Marine Area which has, will have, or is likely to have a significant impact on the environment. Approval may be required for a proposed action taken outside a Commonwealth Marine Area but which has, may have or is likely to have a significant impact on the environment in the Commonwealth Marine Area.

Feature Name	Buffer Status
EEZ and Territorial Sea	In feature area

Listed Threatened Species [Resource Information]

Status of Conservation Dependent and Extinct are not MNES under the EPBC Act.
Number is the current name ID.

Scientific Name	Threatened Category	Presence Text	Buffer Status
BIRD			
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat may occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Halobaena caerulea Blue Petrel [1059]	Vulnerable	Species or species habitat may occur within area	In feature area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In feature area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area	In feature area
Pachyptila turtur subantarctica Fairy Prion (southern) [64445]	Vulnerable	Species or species habitat may occur within area	In feature area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Pterodroma leucoptera leucoptera Gould's Petrel, Australian Gould's Petrel [26033]	Endangered	Species or species habitat may occur within area	In feature area
Pterodroma mollis Soft-plumaged Petrel [1036]	Vulnerable	Species or species habitat may occur within area	In feature area
Sternula nereis nereis Australian Fairy Tern [82950]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche bulleri platei Northern Buller's Albatross, Pacific Albatross [82273]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche chrysostoma Grey-headed Albatross [66491]	Endangered	Species or species habitat may occur within area	In feature area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
FISH			
Hoplostethus atlanticus Orange Roughy, Deep-sea Perch, Red Roughy [68455]	Conservation Dependent	Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Seriolella brama			
Blue Warehou [69374]	Conservation Dependent	Species or species habitat known to occur within area	In feature area
Thunnus maccoyii			
Southern Bluefin Tuna [69402]	Conservation Dependent	Species or species habitat likely to occur within area	In feature area
MAMMAL			
Balaenoptera borealis			
Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Balaenoptera musculus			
Blue Whale [36]	Endangered	Foraging, feeding or related behaviour known to occur within area	In feature area
Balaenoptera physalus			
Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Eubalaena australis			
Southern Right Whale [40]	Endangered	Species or species habitat known to occur within area	In feature area
REPTILE			
Caretta caretta			
Loggerhead Turtle [1763]	Endangered	Species or species habitat likely to occur within area	In feature area
Chelonia mydas			
Green Turtle [1765]	Vulnerable	Species or species habitat may occur within area	In feature area
Dermochelys coriacea			
Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat likely to occur within area	In feature area
SHARK			
Carcharodon carcharias			
White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Centrophorus zeehaani			
Southern Dogfish, Endeavour Dogfish, Little Gulper Shark [82679]	Conservation Dependent	Species or species habitat likely to occur within area	In feature area
Galeorhinus galeus			
School Shark, Eastern School Shark, Snapper Shark, Tope, Soupfin Shark [68453]	Conservation Dependent	Species or species habitat may occur within area	In feature area

Listed Migratory Species [Resource Information]

Scientific Name	Threatened Category	Presence Text	Buffer Status
Migratory Marine Birds			
Ardenna carneipes			
Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Species or species habitat likely to occur within area	In feature area
Ardenna grisea			
Sooty Shearwater [82651]		Species or species habitat may occur within area	In feature area
Diomedea antipodensis			
Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea epomophora			
Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea exulans			
Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea sanfordi			
Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Macronectes giganteus			
Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche chrysostoma Grey-headed Albatross [66491]	Endangered	Species or species habitat may occur within area	In feature area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area

Migratory Marine Species

Scientific Name	Threatened Category	Presence Text	Buffer Status
Balaenoptera bonaerensis Antarctic Minke Whale, Dark-shoulder Minke Whale [67812]		Species or species habitat likely to occur within area	In feature area
Balaenoptera borealis Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Balaenoptera musculus Blue Whale [36]	Endangered	Foraging, feeding or related behaviour known to occur within area	In feature area
Balaenoptera physalus Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Caperea marginata Pygmy Right Whale [39]		Foraging, feeding or related behaviour may occur within area	In feature area
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat known to occur within area	In feature area
Caretta caretta Loggerhead Turtle [1763]	Endangered	Species or species habitat likely to occur within area	In feature area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat may occur within area	In feature area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat likely to occur within area	In feature area
Eubalaena australis as Balaena glacialis australis Southern Right Whale [40]	Endangered	Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Isurus oxyrinchus Shortfin Mako, Mako Shark [79073]		Species or species habitat likely to occur within area	In feature area
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat likely to occur within area	In feature area
Lamna nasus Porbeagle, Mackerel Shark [83288]		Species or species habitat likely to occur within area	In feature area
Megaptera novaeangliae Humpback Whale [38]		Species or species habitat likely to occur within area	In feature area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat likely to occur within area	In feature area
Physeter macrocephalus Sperm Whale [59]		Species or species habitat may occur within area	In feature area
Migratory Wetlands Species			
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area	In feature area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat may occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Numenius madagascariensis			
Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area	In feature area

Other Matters Protected by the EPBC Act

Listed Marine Species			[Resource Information]
Scientific Name	Threatened Category	Presence Text	Buffer Status
Bird			
Actitis hypoleucos			
Common Sandpiper [59309]		Species or species habitat may occur within area	In feature area
Ardenna carneipes as Puffinus carneipes			
Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Species or species habitat likely to occur within area	In feature area
Ardenna grisea as Puffinus griseus			
Sooty Shearwater [82651]		Species or species habitat may occur within area	In feature area
Calidris acuminata			
Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area	In feature area
Calidris canutus			
Red Knot, Knot [855]	Endangered	Species or species habitat may occur within area overfly marine area	In feature area
Calidris ferruginea			
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area overfly marine area	In feature area
Calidris melanotos			
Pectoral Sandpiper [858]		Species or species habitat may occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Halobaena caerulea Blue Petrel [1059]	Vulnerable	Species or species habitat may occur within area	In feature area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In feature area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area	In feature area
Pachyptila turtur Fairy Prion [1066]		Species or species habitat may occur within area	In feature area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Pterodroma mollis Soft-plumaged Petrel [1036]	Vulnerable	Species or species habitat may occur within area	In feature area
Stercorarius skua as Catharacta skua Great Skua [823]		Species or species habitat may occur within area	In feature area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche bulleri platei as Thalassarche sp. nov. Northern Buller's Albatross, Pacific Albatross [82273]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche chrysostoma Grey-headed Albatross [66491]	Endangered	Species or species habitat may occur within area	In feature area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Fish			
Heraldia nocturna Upside-down Pipefish, Eastern Upside-down Pipefish, Eastern Upside-down Pipefish [66227]		Species or species habitat may occur within area	In feature area
Hippocampus abdominalis Big-belly Seahorse, Eastern Potbelly Seahorse, New Zealand Potbelly Seahorse [66233]		Species or species habitat may occur within area	In feature area
Hippocampus breviceps Short-head Seahorse, Short-snouted Seahorse [66235]		Species or species habitat may occur within area	In feature area
Histiogamphelus briggsii Crested Pipefish, Briggs' Crested Pipefish, Briggs' Pipefish [66242]		Species or species habitat may occur within area	In feature area
Histiogamphelus cristatus Rhino Pipefish, Macleay's Crested Pipefish, Ring-back Pipefish [66243]		Species or species habitat may occur within area	In feature area
Hypselognathus rostratus Knifesnout Pipefish, Knife-snouted Pipefish [66245]		Species or species habitat may occur within area	In feature area
Kaupus costatus Deepbody Pipefish, Deep-bodied Pipefish [66246]		Species or species habitat may occur within area	In feature area
Leptoichthys fistularius Brushtail Pipefish [66248]		Species or species habitat may occur within area	In feature area
Lissocampus caudalis Australian Smooth Pipefish, Smooth Pipefish [66249]		Species or species habitat may occur within area	In feature area
Lissocampus runa Javelin Pipefish [66251]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Maroubra perserrata Sawtooth Pipefish [66252]		Species or species habitat may occur within area	In feature area
Mitotichthys semistriatus Halfbanded Pipefish [66261]		Species or species habitat may occur within area	In feature area
Mitotichthys tuckeri Tucker's Pipefish [66262]		Species or species habitat may occur within area	In feature area
Notiocampus ruber Red Pipefish [66265]		Species or species habitat may occur within area	In feature area
Phycodurus eques Leafy Seadragon [66267]		Species or species habitat may occur within area	In feature area
Phyllopteryx taeniolatus Common Seadragon, Weedy Seadragon [66268]		Species or species habitat may occur within area	In feature area
Pugnaso curtirostris Pugnose Pipefish, Pug-nosed Pipefish [66269]		Species or species habitat may occur within area	In feature area
Solegnathus robustus Robust Pipehorse, Robust Spiny Pipehorse [66274]		Species or species habitat may occur within area	In feature area
Solegnathus spinosissimus Spiny Pipehorse, Australian Spiny Pipehorse [66275]		Species or species habitat may occur within area	In feature area
Stigmatopora argus Spotted Pipefish, Gulf Pipefish, Peacock Pipefish [66276]		Species or species habitat may occur within area	In feature area
Stigmatopora nigra Widebody Pipefish, Wide-bodied Pipefish, Black Pipefish [66277]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Stipecampus cristatus Ringback Pipefish, Ring-backed Pipefish [66278]		Species or species habitat may occur within area	In feature area
Urocampus carinirostris Hairy Pipefish [66282]		Species or species habitat may occur within area	In feature area
Vanacampus margaritifer Mother-of-pearl Pipefish [66283]		Species or species habitat may occur within area	In feature area
Vanacampus phillipi Port Phillip Pipefish [66284]		Species or species habitat may occur within area	In feature area
Vanacampus poecilolaemus Longsnout Pipefish, Australian Long-snout Pipefish, Long-snouted Pipefish [66285]		Species or species habitat may occur within area	In feature area
Mammal			
Arctocephalus forsteri Long-nosed Fur-seal, New Zealand Fur-seal [20]		Species or species habitat may occur within area	In feature area
Arctocephalus pusillus Australian Fur-seal, Australo-African Fur-seal [21]		Species or species habitat may occur within area	In feature area
Reptile			
Caretta caretta Loggerhead Turtle [1763]	Endangered	Species or species habitat likely to occur within area	In feature area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat may occur within area	In feature area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat likely to occur within area	In feature area

Whales and Other Cetaceans [Resource Information]

Current Scientific Name	Status	Type of Presence	Buffer Status
Mammal			

Current Scientific Name	Status	Type of Presence	Buffer Status
Balaenoptera acutorostrata Minke Whale [33]		Species or species habitat may occur within area	In feature area
Balaenoptera bonaerensis Antarctic Minke Whale, Dark-shoulder Minke Whale [67812]		Species or species habitat likely to occur within area	In feature area
Balaenoptera borealis Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Balaenoptera musculus Blue Whale [36]	Endangered	Foraging, feeding or related behaviour known to occur within area	In feature area
Balaenoptera physalus Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Berardius arnuxii Arnoux's Beaked Whale [70]		Species or species habitat may occur within area	In feature area
Caperea marginata Pygmy Right Whale [39]		Foraging, feeding or related behaviour may occur within area	In feature area
Delphinus delphis Common Dolphin, Short-beaked Common Dolphin [60]		Species or species habitat may occur within area	In feature area
Eubalaena australis Southern Right Whale [40]	Endangered	Species or species habitat known to occur within area	In feature area
Globicephala macrorhynchus Short-finned Pilot Whale [62]		Species or species habitat may occur within area	In feature area

Current Scientific Name	Status	Type of Presence	Buffer Status
Globicephala melas Long-finned Pilot Whale [59282]		Species or species habitat may occur within area	In feature area
Grampus griseus Risso's Dolphin, Grampus [64]		Species or species habitat may occur within area	In feature area
Kogia breviceps Pygmy Sperm Whale [57]		Species or species habitat may occur within area	In feature area
Kogia sima as Kogia simus Dwarf Sperm Whale [85043]		Species or species habitat may occur within area	In feature area
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat likely to occur within area	In feature area
Lissodelphis peronii Southern Right Whale Dolphin [44]		Species or species habitat may occur within area	In feature area
Megaptera novaeangliae Humpback Whale [38]		Species or species habitat likely to occur within area	In feature area
Mesoplodon bowdoini Andrew's Beaked Whale [73]		Species or species habitat may occur within area	In feature area
Mesoplodon densirostris Blainville's Beaked Whale, Dense-beaked Whale [74]		Species or species habitat may occur within area	In feature area
Mesoplodon hectori Hector's Beaked Whale [76]		Species or species habitat may occur within area	In feature area
Mesoplodon layardii Strap-toothed Beaked Whale, Strap-toothed Whale, Layard's Beaked Whale [25556]		Species or species habitat may occur within area	In feature area

Current Scientific Name	Status	Type of Presence	Buffer Status
Mesoplodon mirus True's Beaked Whale [54]		Species or species habitat may occur within area	In feature area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat likely to occur within area	In feature area
Physeter macrocephalus Sperm Whale [59]		Species or species habitat may occur within area	In feature area
Pseudorca crassidens False Killer Whale [48]		Species or species habitat likely to occur within area	In feature area
Tursiops truncatus s. str. Bottlenose Dolphin [68417]		Species or species habitat may occur within area	In feature area
Ziphius cavirostris Cuvier's Beaked Whale, Goose-beaked Whale [56]		Species or species habitat may occur within area	In feature area

Extra Information

EPBC Act Referrals				[Resource Information]
Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Controlled action				
Otway Development	2002/621	Controlled Action	Post-Approval	In feature area
VICP61 2D Marine Seismic Survey	2008/4075	Controlled Action	Completed	In feature area
Not controlled action				
INDIGO Central Submarine Telecommunications Cable	2017/8127	Not Controlled Action	Completed	In feature area
Not controlled action (particular manner)				
3D marine seismic survey near King Island	2004/1461	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Astrolabe 3D Marine Seismic Survey	2011/6048	Not Controlled Action	Post-Approval	In feature area

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action (particular manner)				
		(Particular Manner)		
Deepwater Sorell Basin 2001 Non-Exclusive 2D Seismic Survey	2001/156	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Drill and Profile Exploration Well Somerset 1, License Area T34P	2009/5037	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Geographe-A gas exploration well	2000/82	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
INDIGO Marine Cable Route Survey (INDIGO)	2017/7996	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
La Bella 3D Marine Seismic Survey, Otway Basin, VIC	2012/6683	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Otway Astrolabe 3D Marine Seismic Survey, Otway Basin	2012/6421	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Otway Basin Exploration Drilling Campaign, Vic	2011/6125	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Thylacine-A Exploration Well	2000/81	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Undertake a three dimensional marine seismic survey	2010/5700	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Referral decision				
VICP61 2D Marine Seismic Survey	2008/3975	Referral Decision	Completed	In feature area

Key Ecological Features [Resource Information]

Key Ecological Features are the parts of the marine ecosystem that are considered to be important for the biodiversity or ecosystem functioning and integrity of the Commonwealth Marine Area.

Name	Region	Buffer Status
West Tasmania Canyons	South-east	In feature area

Biologically Important Areas

Scientific Name	Behaviour	Presence	Buffer Status
Seabirds			
Ardenna pacifica Wedge-tailed Shearwater [84292]	Foraging	Likely to occur	In feature area
Ardenna tenuirostris Short-tailed Shearwater [82652]	Foraging	Known to occur	In feature area
Diomedea exulans (sensu lato) Wandering Albatross [1073]	Foraging	Known to occur	In feature area
Diomedea exulans antipodensis Antipodean Albatross [82269]	Foraging	Known to occur	In feature area
Pelecanoides urinatrix Common Diving-petrel [1018]	Foraging	Known to occur	In feature area
Thalassarche bulleri Bullers Albatross [64460]	Foraging	Known to occur	In feature area
Thalassarche cauta cauta Shy Albatross [82345]	Foraging likely	Likely to occur	In feature area
Thalassarche chlororhynchos bassi Indian Yellow-nosed Albatross [85249]	Foraging	Known to occur	In feature area
Thalassarche melanophris Black-browed Albatross [66472]	Foraging	Known to occur	In feature area
Thalassarche melanophris impavida Campbell Albatross [82449]	Foraging	Known to occur	In feature area
Sharks			
Carcharodon carcharias White Shark [64470]	Distribution	Known to occur	In feature area
Carcharodon carcharias White Shark [64470]	Distribution	Likely to occur	In feature area
Carcharodon carcharias White Shark [64470]	Distribution (low density)	Likely to occur	In feature area

Scientific Name	Behaviour	Presence	Buffer Status
Carcharodon carcharias			
White Shark [64470]	Known distribution	Known to occur	In feature area
Whales			
Balaenoptera musculus brevicauda			
Pygmy Blue Whale [81317]	Distribution	Known to occur	In feature area
Balaenoptera musculus brevicauda			
Pygmy Blue Whale [81317]	Foraging	Likely to be present	In feature area
Balaenoptera musculus brevicauda			
Pygmy Blue Whale [81317]	Foraging (annual high use area)	Known to occur	In feature area
Eubalaena australis			
Southern Right Whale [40]	Known core range	Known to occur	In feature area

Caveat

1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data are available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance

3 DATA SOURCES

Threatened ecological communities

For threatened ecological communities where the distribution is well known, maps are generated based on information contained in recovery plans, State vegetation maps and remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species

Threatened, migratory and marine species distributions have been discerned through a variety of methods. Where distributions are well known and if time permits, distributions are inferred from either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc.) together with point locations and described habitat; or modelled (MAXENT or BIOCLIM habitat modelling) using

Where little information is available for a species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc.).

In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More detailed distribution mapping methods are used to update these distributions

4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

The following groups have been mapped, but may not cover the complete distribution of the species:

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded
- seals which have only been mapped for breeding sites near the Australian continent

The breeding sites may be important for the protection of the Commonwealth Marine environment.

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact Us page.

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EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Please see the caveat for interpretation of information provided here.

Report created: 19-Aug-2022

Light EMBA

Summary

Matters of National Environment Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance (Ramsar	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	1
Listed Threatened Ecological Communities:	None
Listed Threatened Species:	38
Listed Migratory Species:	39

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at http://www.environment.gov.au/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Lands:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	60
Whales and Other Cetaceans:	27
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have

State and Territory Reserves:	None
Regional Forest Agreements:	None
Nationally Important Wetlands:	None
EPBC Act Referrals:	19
Key Ecological Features (Marine):	1
Biologically Important Areas:	18
Bioregional Assessments:	None
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

Commonwealth Marine Area [Resource Information]

Approval is required for a proposed activity that is located within the Commonwealth Marine Area which has, will have, or is likely to have a significant impact on the environment. Approval may be required for a proposed action taken outside a Commonwealth Marine Area but which has, may have or is likely to have a significant impact on the environment in the Commonwealth Marine Area.

Feature Name	Buffer Status
EEZ and Territorial Sea	In feature area

Listed Threatened Species [Resource Information]

Status of Conservation Dependent and Extinct are not MNES under the EPBC Act.
Number is the current name ID.

Scientific Name	Threatened Category	Presence Text	Buffer Status
BIRD			
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat may occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Halobaena caerulea Blue Petrel [1059]	Vulnerable	Species or species habitat may occur within area	In feature area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In feature area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Neophema chrysogaster Orange-bellied Parrot [747]	Critically Endangered	Migration route likely to occur within area	In buffer area only
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area	In feature area
Pachyptila turtur subantarctica Fairy Prion (southern) [64445]	Vulnerable	Species or species habitat may occur within area	In feature area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Pterodroma leucoptera leucoptera Gould's Petrel, Australian Gould's Petrel [26033]	Endangered	Species or species habitat may occur within area	In feature area
Pterodroma mollis Soft-plumaged Petrel [1036]	Vulnerable	Species or species habitat may occur within area	In feature area
Sternula nereis nereis Australian Fairy Tern [82950]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche bulleri platei Northern Buller's Albatross, Pacific Albatross [82273]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche chrysostoma Grey-headed Albatross [66491]	Endangered	Species or species habitat may occur within area	In feature area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
FISH			
Hoplostethus atlanticus Orange Roughy, Deep-sea Perch, Red Roughy [68455]	Conservation Dependent	Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Seriolella brama			
Blue Warehou [69374]	Conservation Dependent	Species or species habitat known to occur within area	In feature area
Thunnus maccoyii			
Southern Bluefin Tuna [69402]	Conservation Dependent	Species or species habitat likely to occur within area	In feature area
MAMMAL			
Balaenoptera borealis			
Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Balaenoptera musculus			
Blue Whale [36]	Endangered	Foraging, feeding or related behaviour known to occur within area	In feature area
Balaenoptera physalus			
Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Eubalaena australis			
Southern Right Whale [40]	Endangered	Species or species habitat known to occur within area	In feature area
REPTILE			
Caretta caretta			
Loggerhead Turtle [1763]	Endangered	Species or species habitat likely to occur within area	In feature area
Chelonia mydas			
Green Turtle [1765]	Vulnerable	Species or species habitat may occur within area	In feature area
Dermochelys coriacea			
Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat likely to occur within area	In feature area
SHARK			
Carcharodon carcharias			
White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Centrophorus zeehaani Southern Dogfish, Endeavour Dogfish, Little Gulper Shark [82679]	Conservation Dependent	Species or species habitat likely to occur within area	In feature area
Galeorhinus galeus School Shark, Eastern School Shark, Snapper Shark, Tope, Soupfin Shark [68453]	Conservation Dependent	Species or species habitat may occur within area	In feature area

Listed Migratory Species [Resource Information]

Scientific Name	Threatened Category	Presence Text	Buffer Status
Migratory Marine Birds			
Ardenna carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Foraging, feeding or related behaviour likely to occur within area	In feature area
Ardenna grisea Sooty Shearwater [82651]		Species or species habitat may occur within area	In feature area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche chrysostoma Grey-headed Albatross [66491]	Endangered	Species or species habitat may occur within area	In feature area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area

Migratory Marine Species

Scientific Name	Threatened Category	Presence Text	Buffer Status
Balaenoptera bonaerensis Antarctic Minke Whale, Dark-shoulder Minke Whale [67812]		Species or species habitat likely to occur within area	In feature area
Balaenoptera borealis Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Balaenoptera musculus Blue Whale [36]	Endangered	Foraging, feeding or related behaviour known to occur within area	In feature area
Balaenoptera physalus Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Caperea marginata Pygmy Right Whale [39]		Foraging, feeding or related behaviour may occur within area	In feature area
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat known to occur within area	In feature area
Caretta caretta Loggerhead Turtle [1763]	Endangered	Species or species habitat likely to occur within area	In feature area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat may occur within area	In feature area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat likely to occur within area	In feature area
Eubalaena australis as Balaena glacialis australis Southern Right Whale [40]	Endangered	Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Isurus oxyrinchus Shortfin Mako, Mako Shark [79073]		Species or species habitat likely to occur within area	In feature area
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat likely to occur within area	In feature area
Lamna nasus Porbeagle, Mackerel Shark [83288]		Species or species habitat likely to occur within area	In feature area
Megaptera novaeangliae Humpback Whale [38]		Species or species habitat likely to occur within area	In feature area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat likely to occur within area	In feature area
Physeter macrocephalus Sperm Whale [59]		Species or species habitat may occur within area	In feature area
Migratory Wetlands Species			
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area	In feature area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat may occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Numenius madagascariensis			
Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area	In feature area

Other Matters Protected by the EPBC Act

Listed Marine Species			[Resource Information]
Scientific Name	Threatened Category	Presence Text	Buffer Status
Bird			
Actitis hypoleucos			
Common Sandpiper [59309]		Species or species habitat may occur within area	In feature area
Ardenna carneipes as Puffinus carneipes			
Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Foraging, feeding or related behaviour likely to occur within area	In feature area
Ardenna grisea as Puffinus griseus			
Sooty Shearwater [82651]		Species or species habitat may occur within area	In feature area
Calidris acuminata			
Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area	In feature area
Calidris canutus			
Red Knot, Knot [855]	Endangered	Species or species habitat may occur within area overfly marine area	In feature area
Calidris ferruginea			
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area overfly marine area	In feature area
Calidris melanotos			
Pectoral Sandpiper [858]		Species or species habitat may occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Halobaena caerulea Blue Petrel [1059]	Vulnerable	Species or species habitat may occur within area	In feature area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In feature area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Neophema chrysogaster Orange-bellied Parrot [747]	Critically Endangered	Migration route likely to occur within area overfly marine area	In buffer area only
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area	In feature area
Pachyptila turtur Fairy Prion [1066]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Pterodroma mollis Soft-plumaged Petrel [1036]	Vulnerable	Species or species habitat may occur within area	In feature area
Stercorarius skua as Catharacta skua Great Skua [823]		Species or species habitat may occur within area	In feature area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche bulleri platei as Thalassarche sp. nov. Northern Buller's Albatross, Pacific Albatross [82273]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche chrysostoma Grey-headed Albatross [66491]	Endangered	Species or species habitat may occur within area	In feature area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Fish			
Heraldia nocturna Upside-down Pipefish, Eastern Upside-down Pipefish, Eastern Upside-down Pipefish [66227]		Species or species habitat may occur within area	In feature area
Hippocampus abdominalis Big-belly Seahorse, Eastern Potbelly Seahorse, New Zealand Potbelly Seahorse [66233]		Species or species habitat may occur within area	In feature area
Hippocampus breviceps Short-head Seahorse, Short-snouted Seahorse [66235]		Species or species habitat may occur within area	In feature area
Histiogamphelus briggsii Crested Pipefish, Briggs' Crested Pipefish, Briggs' Pipefish [66242]		Species or species habitat may occur within area	In feature area
Histiogamphelus cristatus Rhino Pipefish, Macleay's Crested Pipefish, Ring-back Pipefish [66243]		Species or species habitat may occur within area	In feature area
Hypselognathus rostratus Knifesnout Pipefish, Knife-snouted Pipefish [66245]		Species or species habitat may occur within area	In feature area
Kaupus costatus Deepbody Pipefish, Deep-bodied Pipefish [66246]		Species or species habitat may occur within area	In feature area
Leptoichthys fistularius Brushtail Pipefish [66248]		Species or species habitat may occur within area	In feature area
Lissocampus caudalis Australian Smooth Pipefish, Smooth Pipefish [66249]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Lissocampus runa Javelin Pipefish [66251]		Species or species habitat may occur within area	In feature area
Maroubra perserrata Sawtooth Pipefish [66252]		Species or species habitat may occur within area	In feature area
Mitotichthys semistriatus Halfbanded Pipefish [66261]		Species or species habitat may occur within area	In feature area
Mitotichthys tuckeri Tucker's Pipefish [66262]		Species or species habitat may occur within area	In feature area
Notiocampus ruber Red Pipefish [66265]		Species or species habitat may occur within area	In feature area
Phycodurus eques Leafy Seadragon [66267]		Species or species habitat may occur within area	In feature area
Phyllopteryx taeniolatus Common Seadragon, Weedy Seadragon [66268]		Species or species habitat may occur within area	In feature area
Pugnaso curtirostris Pugnose Pipefish, Pug-nosed Pipefish [66269]		Species or species habitat may occur within area	In feature area
Solegnathus robustus Robust Pipehorse, Robust Spiny Pipehorse [66274]		Species or species habitat may occur within area	In feature area
Solegnathus spinosissimus Spiny Pipehorse, Australian Spiny Pipehorse [66275]		Species or species habitat may occur within area	In feature area
Stigmatopora argus Spotted Pipefish, Gulf Pipefish, Peacock Pipefish [66276]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Stigmatopora nigra Widebody Pipefish, Wide-bodied Pipefish, Black Pipefish [66277]		Species or species habitat may occur within area	In feature area
Stipecampus cristatus Ringback Pipefish, Ring-backed Pipefish [66278]		Species or species habitat may occur within area	In feature area
Urocampus carinirostris Hairy Pipefish [66282]		Species or species habitat may occur within area	In feature area
Vanacampus margaritifer Mother-of-pearl Pipefish [66283]		Species or species habitat may occur within area	In feature area
Vanacampus phillipi Port Phillip Pipefish [66284]		Species or species habitat may occur within area	In feature area
Vanacampus poecilolaemus Longsnout Pipefish, Australian Long-snout Pipefish, Long-snouted Pipefish [66285]		Species or species habitat may occur within area	In feature area
Mammal			
Arctocephalus forsteri Long-nosed Fur-seal, New Zealand Fur-seal [20]		Species or species habitat may occur within area	In feature area
Arctocephalus pusillus Australian Fur-seal, Australo-African Fur-seal [21]		Species or species habitat may occur within area	In feature area
Reptile			
Caretta caretta Loggerhead Turtle [1763]	Endangered	Species or species habitat likely to occur within area	In feature area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat may occur within area	In feature area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat likely to occur within area	In feature area

Whales and Other Cetaceans			[Resource Information]
Current Scientific Name	Status	Type of Presence	Buffer Status
Mammal			
Balaenoptera acutorostrata Minke Whale [33]		Species or species habitat may occur within area	In feature area
Balaenoptera bonaerensis Antarctic Minke Whale, Dark-shoulder Minke Whale [67812]		Species or species habitat likely to occur within area	In feature area
Balaenoptera borealis Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Balaenoptera musculus Blue Whale [36]	Endangered	Foraging, feeding or related behaviour known to occur within area	In feature area
Balaenoptera physalus Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Berardius arnuxii Arnoux's Beaked Whale [70]		Species or species habitat may occur within area	In feature area
Caperea marginata Pygmy Right Whale [39]		Foraging, feeding or related behaviour may occur within area	In feature area
Delphinus delphis Common Dolphin, Short-beaked Common Dolphin [60]		Species or species habitat may occur within area	In feature area
Eubalaena australis Southern Right Whale [40]	Endangered	Species or species habitat known to occur within area	In feature area
Globicephala macrorhynchus Short-finned Pilot Whale [62]		Species or species habitat may occur within area	In feature area

Current Scientific Name	Status	Type of Presence	Buffer Status
Globicephala melas Long-finned Pilot Whale [59282]		Species or species habitat may occur within area	In feature area
Grampus griseus Risso's Dolphin, Grampus [64]		Species or species habitat may occur within area	In feature area
Kogia breviceps Pygmy Sperm Whale [57]		Species or species habitat may occur within area	In feature area
Kogia sima as Kogia simus Dwarf Sperm Whale [85043]		Species or species habitat may occur within area	In feature area
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat likely to occur within area	In feature area
Lissodelphis peronii Southern Right Whale Dolphin [44]		Species or species habitat may occur within area	In feature area
Megaptera novaeangliae Humpback Whale [38]		Species or species habitat likely to occur within area	In feature area
Mesoplodon bowdoini Andrew's Beaked Whale [73]		Species or species habitat may occur within area	In feature area
Mesoplodon densirostris Blainville's Beaked Whale, Dense-beaked Whale [74]		Species or species habitat may occur within area	In feature area
Mesoplodon hectori Hector's Beaked Whale [76]		Species or species habitat may occur within area	In feature area
Mesoplodon layardii Strap-toothed Beaked Whale, Strap-toothed Whale, Layard's Beaked Whale [25556]		Species or species habitat may occur within area	In feature area

Current Scientific Name	Status	Type of Presence	Buffer Status
Mesoplodon mirus True's Beaked Whale [54]		Species or species habitat may occur within area	In feature area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat likely to occur within area	In feature area
Physeter macrocephalus Sperm Whale [59]		Species or species habitat may occur within area	In feature area
Pseudorca crassidens False Killer Whale [48]		Species or species habitat likely to occur within area	In feature area
Tursiops truncatus s. str. Bottlenose Dolphin [68417]		Species or species habitat may occur within area	In feature area
Ziphius cavirostris Cuvier's Beaked Whale, Goose-beaked Whale [56]		Species or species habitat may occur within area	In feature area

Extra Information

EPBC Act Referrals				[Resource Information]
Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Controlled action				
Otway Development	2002/621	Controlled Action	Post-Approval	In feature area
VICP61 2D Marine Seismic Survey	2008/4075	Controlled Action	Completed	In feature area
Not controlled action				
INDIGO Central Submarine Telecommunications Cable	2017/8127	Not Controlled Action	Completed	In feature area
Not controlled action (particular manner)				
2D Marine Seismic Survey	2005/2295	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
2D Seismic Survey	2003/1214	Not Controlled Action	Post-Approval	In buffer area only

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action (particular manner)				
		(Particular Manner)		
3D marine seismic survey near King Island	2004/1461	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Astrolabe 3D Marine Seismic Survey	2011/6048	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
BHPBilliton Otway 3D Seismic Survey	2007/3443	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Deepwater Sorell Basin 2001 Non-Exclusive 2D Seismic Survey	2001/156	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Drill and Profile Exploration Well Somerset 1, License Area T34P	2009/5037	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Geographe-A gas exploration well	2000/82	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
INDIGO Marine Cable Route Survey (INDIGO)	2017/7996	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
La Bella 3D Marine Seismic Survey, Otway Basin, VIC	2012/6683	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Otway Astrolabe 3D Marine Seismic Survey, Otway Basin	2012/6421	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Otway Basin Exploration Drilling Campaign, Vic	2011/6125	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Thylacine-A Exploration Well	2000/81	Not Controlled Action (Particular Manner)	Post-Approval	In feature area

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action (particular manner)				
Undertake a three dimensional marine seismic survey	2010/5700	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Vic-P51 and Vic-P52 2D seismic survey	2002/811	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Referral decision				
VICP61 2D Marine Seismic Survey	2008/3975	Referral Decision	Completed	In feature area

Key Ecological Features [Resource Information]

Key Ecological Features are the parts of the marine ecosystem that are considered to be important for the biodiversity or ecosystem functioning and integrity of the Commonwealth Marine Area.

Name	Region	Buffer Status
West Tasmania Canyons	South-east	In feature area

Biologically Important Areas

Scientific Name	Behaviour	Presence	Buffer Status
Seabirds			
Ardenna pacifica Wedge-tailed Shearwater [84292]	Foraging	Likely to occur	In feature area
Ardenna tenuirostris Short-tailed Shearwater [82652]	Foraging	Known to occur	In feature area
Diomedea exulans (sensu lato) Wandering Albatross [1073]	Foraging	Known to occur	In feature area
Diomedea exulans antipodensis Antipodean Albatross [82269]	Foraging	Known to occur	In feature area
Pelecanoides urinatrix Common Diving-petrel [1018]	Foraging	Known to occur	In feature area
Thalassarche bulleri Bullers Albatross [64460]	Foraging	Known to occur	In feature area
Thalassarche cauta cauta Shy Albatross [82345]	Foraging likely	Likely to occur	In feature area

Scientific Name	Behaviour	Presence	Buffer Status
Thalassarche chlororhynchos bassi Indian Yellow-nosed Albatross [85249]	Foraging	Known to occur	In feature area
Thalassarche melanophris Black-browed Albatross [66472]	Foraging	Known to occur	In feature area
Thalassarche melanophris impavida Campbell Albatross [82449]	Foraging	Known to occur	In feature area
Sharks			
Carcharodon carcharias White Shark [64470]	Distribution	Known to occur	In feature area
Carcharodon carcharias White Shark [64470]	Distribution	Likely to occur	In feature area
Carcharodon carcharias White Shark [64470]	Distribution (low density)	Likely to occur	In feature area
Carcharodon carcharias White Shark [64470]	Known distribution	Known to occur	In feature area
Whales			
Balaenoptera musculus brevicauda Pygmy Blue Whale [81317]	Distribution	Known to occur	In feature area
Balaenoptera musculus brevicauda Pygmy Blue Whale [81317]	Foraging	Likely to be present	In feature area
Balaenoptera musculus brevicauda Pygmy Blue Whale [81317]	Foraging (annual high use area)	Known to occur	In feature area
Eubalaena australis Southern Right Whale [40]	Known core range	Known to occur	In feature area

Caveat

1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data are available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance

3 DATA SOURCES

Threatened ecological communities

For threatened ecological communities where the distribution is well known, maps are generated based on information contained in recovery plans, State vegetation maps and remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species

Threatened, migratory and marine species distributions have been discerned through a variety of methods. Where distributions are well known and if time permits, distributions are inferred from either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc.) together with point locations and described habitat; or modelled (MAXENT or BIOCLIM habitat modelling) using

Where little information is available for a species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc.).

In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More detailed distribution mapping methods are used to update these distributions

4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

The following groups have been mapped, but may not cover the complete distribution of the species:

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded
- seals which have only been mapped for breeding sites near the Australian continent

The breeding sites may be important for the protection of the Commonwealth Marine environment.

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact Us page.

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Australian Government

Department of Climate Change, Energy, the Environment and Water

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Please see the caveat for interpretation of information provided here.

Report created: 11-Nov-2022

Socio-economic EMBA

Summary

Matters of National Environment Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	None
National Heritage Places:	1
Wetlands of International Importance (Ramsar	1
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	1
Listed Threatened Ecological Communities:	6
Listed Threatened Species:	83
Listed Migratory Species:	58

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at https://www.dcceew.gov.au/parks-heritage/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Lands:	5
Commonwealth Heritage Places:	1
Listed Marine Species:	94
Whales and Other Cetaceans:	29
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	3
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have

State and Territory Reserves:	22
Regional Forest Agreements:	2
Nationally Important Wetlands:	8
EPBC Act Referrals:	53
Key Ecological Features (Marine):	1
Biologically Important Areas:	29
Bioregional Assessments:	None
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

National Heritage Places [Resource Information]

Name	State	Legal Status
Historic		
Great Ocean Road and Scenic Environs	VIC	Listed place

Wetlands of International Importance (Ramsar Wetlands) [Resource Information]

Ramsar Site Name	Proximity
Lavinia	Within Ramsar site

Commonwealth Marine Area [Resource Information]

Approval is required for a proposed activity that is located within the Commonwealth Marine Area which has, will have, or is likely to have a significant impact on the environment. Approval may be required for a proposed action taken outside a Commonwealth Marine Area but which has, may have or is likely to have a significant impact on the environment in the Commonwealth Marine Area.

Feature Name
EEZ and Territorial Sea

Listed Threatened Ecological Communities [Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.
Status of Vulnerable, Disallowed and Ineligible are not MNES under the EPBC Act.

Community Name	Threatened Category	Presence Text
Assemblages of species associated with open-coast salt-wedge estuaries of western and central Victoria ecological community	Endangered	Community likely to occur within area
Giant Kelp Marine Forests of South East Australia	Endangered	Community may occur within area
Natural Damp Grassland of the Victorian Coastal Plains	Critically Endangered	Community may occur within area
Subtropical and Temperate Coastal Saltmarsh	Vulnerable	Community likely to occur within area
Tasmanian Forests and Woodlands dominated by black gum or Brookers gum (Eucalyptus ovata / E. brookeriana)	Critically Endangered	Community likely to occur within area
Tasmanian white gum (Eucalyptus viminalis) wet forest	Critically Endangered	Community may occur within area

Listed Threatened Species [Resource Information]

Status of Conservation Dependent and Extinct are not MNES under the EPBC Act.
Number is the current name ID.

Scientific Name	Threatened Category	Presence Text
BIRD		
Acanthiza pusilla magnirostris listed as Acanthiza pusilla archibaldi		
King Island Brown Thornbill, Brown Thornbill (King Island) [91709]	Endangered	Species or species habitat known to occur within area
Acanthornis magna greeniana		
King Island Scrubtit, Scrubtit (King Island) [82329]	Critically Endangered	Species or species habitat likely to occur within area
Anthochaera phrygia		
Regent Honeyeater [82338]	Critically Endangered	Species or species habitat may occur within area
Aquila audax fleayi		
Tasmanian Wedge-tailed Eagle, Wedge-tailed Eagle (Tasmanian) [64435]	Endangered	Species or species habitat may occur within area
Botaurus poiciloptilus		
Australasian Bittern [1001]	Endangered	Species or species habitat known to occur within area
Calidris canutus		
Red Knot, Knot [855]	Endangered	Species or species habitat may occur within area
Calidris ferruginea		
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
Callocephalon fimbriatum		
Gang-gang Cockatoo [768]	Endangered	Species or species habitat known to occur within area
Ceyx azureus diemenensis		
Tasmanian Azure Kingfisher [25977]	Endangered	Species or species habitat known to occur within area
Charadrius leschenaultii		
Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Species or species habitat known to occur within area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat may occur within area
Fregetta grallaria grallaria White-bellied Storm-Petrel (Tasman Sea), White-bellied Storm-Petrel (Australasian) [64438]	Vulnerable	Species or species habitat likely to occur within area
Halobaena caerulea Blue Petrel [1059]	Vulnerable	Species or species habitat may occur within area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
Limosa lapponica baueri Nunivak Bar-tailed Godwit, Western Alaskan Bar-tailed Godwit [86380]	Vulnerable	Species or species habitat known to occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Neophema chrysogaster Orange-bellied Parrot [747]	Critically Endangered	Species or species habitat known to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat likely to occur within area
Pachyptila turtur subantarctica Fairy Prion (southern) [64445]	Vulnerable	Species or species habitat known to occur within area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area
Platycercus caledonicus brownii Green Rosella (King Island) [67041]	Vulnerable	Species or species habitat known to occur within area
Pterodroma leucoptera leucoptera Gould's Petrel, Australian Gould's Petrel [26033]	Endangered	Species or species habitat may occur within area
Pterodroma mollis Soft-plumaged Petrel [1036]	Vulnerable	Species or species habitat may occur within area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
Sternula nereis nereis Australian Fairy Tern [82950]	Vulnerable	Species or species habitat known to occur within area
Strepera fuliginosa colei Black Currawong (King Island) [67113]	Vulnerable	Breeding likely to occur within area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche bulleri platei Northern Buller's Albatross, Pacific Albatross [82273]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Thalassarche chrysostoma Grey-headed Albatross [66491]	Endangered	Species or species habitat may occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area

Scientific Name	Threatened Category	Presence Text
Thalassarche steadi		
White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Thinornis cucullatus cucullatus		
Eastern Hooded Plover, Eastern Hooded Plover [90381]	Vulnerable	Species or species habitat known to occur within area
FISH		
Galaxiella pusilla		
Eastern Dwarf Galaxias, Dwarf Galaxias [56790]	Vulnerable	Species or species habitat may occur within area
Hoplostethus atlanticus		
Orange Roughy, Deep-sea Perch, Red Roughy [68455]	Conservation Dependent	Species or species habitat likely to occur within area
Nannoperca obscura		
Yarra Pygmy Perch [26177]	Vulnerable	Species or species habitat may occur within area
Prototroctes maraena		
Australian Grayling [26179]	Vulnerable	Species or species habitat known to occur within area
Seriolella brama		
Blue Warehou [69374]	Conservation Dependent	Species or species habitat known to occur within area
Thunnus maccoyii		
Southern Bluefin Tuna [69402]	Conservation Dependent	Species or species habitat likely to occur within area
FROG		
Litoria raniformis		
Growling Grass Frog, Southern Bell Frog, Green and Golden Frog, Warty Swamp Frog, Golden Bell Frog [1828]	Vulnerable	Species or species habitat likely to occur within area
MAMMAL		
Antechinus minimus maritimus		
Swamp Antechinus (mainland) [83086]	Vulnerable	Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
Balaenoptera borealis Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Balaenoptera musculus Blue Whale [36]	Endangered	Foraging, feeding or related behaviour known to occur within area
Balaenoptera physalus Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Dasyurus maculatus maculatus (SE mainland population) Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat known to occur within area
Eubalaena australis Southern Right Whale [40]	Endangered	Breeding known to occur within area
Isoodon obesulus obesulus Southern Brown Bandicoot (eastern), Southern Brown Bandicoot (south-eastern) [68050]	Endangered	Species or species habitat known to occur within area
Mastacomys fuscus mordicus Broad-toothed Rat (mainland), Tooarrana [87617]	Vulnerable	Species or species habitat known to occur within area
Miniopterus orianae bassanii Southern Bent-wing Bat [87645]	Critically Endangered	Roosting known to occur within area
Neophoca cinerea Australian Sea-lion, Australian Sea Lion [22]	Endangered	Species or species habitat may occur within area
Petauroides volans Greater Glider (southern and central) [254]	Endangered	Species or species habitat may occur within area
Petaurus australis australis Yellow-bellied Glider (south-eastern) [87600]	Vulnerable	Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
[Potorous tridactylus trisulcatus](#) Long-nosed Potoroo (southern mainland) [86367]	Vulnerable	Species or species habitat known to occur within area
[Pseudomys fumeus](#) Smoky Mouse, Konoom [88]	Endangered	Species or species habitat may occur within area
[Pteropus poliocephalus](#) Grey-headed Flying-fox [186]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
PLANT		
[Eucalyptus strzeleckii](#) Strzelecki Gum [55400]	Vulnerable	Species or species habitat likely to occur within area
[Glycine latrobeana](#) Clover Glycine, Purple Clover [13910]	Vulnerable	Species or species habitat may occur within area
[Hiya distans listed as Hypolepis distans](#) Scrambling Ground-fern [92548]	Endangered	Species or species habitat likely to occur within area
[Lepidium hyssopifolium](#) Basalt Pepper-cress, Peppercress, Rubble Pepper-cress, Pepperweed [16542]	Endangered	Species or species habitat may occur within area
[Prasophyllum spicatum](#) Dense Leek-orchid [55146]	Vulnerable	Species or species habitat likely to occur within area
[Pterostylis chlorogramma](#) Green-striped Greenhood [56510]	Vulnerable	Species or species habitat may occur within area
[Pterostylis cucullata](#) Leafy Greenhood [15459]	Vulnerable	Species or species habitat known to occur within area
[Pterostylis tenuissima](#) Swamp Greenhood, Dainty Swamp Orchid [13139]	Vulnerable	Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
Pterostylis ziegeleri		
Grassland Greenhood, Cape Portland Greenhood [64971]	Vulnerable	Species or species habitat may occur within area
Senecio psilocarpus		
Swamp Fireweed, Smooth-fruited Groundsel [64976]	Vulnerable	Species or species habitat likely to occur within area
Thelymitra epipactoides		
Metallic Sun-orchid [11896]	Endangered	Species or species habitat likely to occur within area
Xerochrysum palustre		
Swamp Everlasting, Swamp Paper Daisy [76215]	Vulnerable	Species or species habitat may occur within area
REPTILE		
Caretta caretta		
Loggerhead Turtle [1763]	Endangered	Species or species habitat known to occur within area
Chelonia mydas		
Green Turtle [1765]	Vulnerable	Species or species habitat may occur within area
Dermochelys coriacea		
Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Foraging, feeding or related behaviour known to occur within area
SHARK		
Carcharodon carcharias		
White Shark, Great White Shark [64470]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Centrophorus zeehaani		
Southern Dogfish, Endeavour Dogfish, Little Gulper Shark [82679]	Conservation Dependent	Species or species habitat likely to occur within area
Galeorhinus galeus		
School Shark, Eastern School Shark, Snapper Shark, Tope, Soupfin Shark [68453]	Conservation Dependent	Species or species habitat likely to occur within area

Listed Migratory Species		[Resource Information]
Scientific Name	Threatened Category	Presence Text
Migratory Marine Birds		

Scientific Name	Threatened Category	Presence Text
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardenna carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Foraging, feeding or related behaviour likely to occur within area
Ardenna grisea Sooty Shearwater [82651]		Species or species habitat may occur within area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
Sternula albifrons Little Tern [82849]		Species or species habitat may occur within area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Thalassarche chrysostoma Grey-headed Albatross [66491]	Endangered	Species or species habitat may occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Migratory Marine Species		
Balaenoptera bonaerensis Antarctic Minke Whale, Dark-shoulder Minke Whale [67812]		Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
Balaenoptera borealis Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Balaenoptera musculus Blue Whale [36]	Endangered	Foraging, feeding or related behaviour known to occur within area
Balaenoptera physalus Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Caperea marginata Pygmy Right Whale [39]		Foraging, feeding or related behaviour may occur within area
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Caretta caretta Loggerhead Turtle [1763]	Endangered	Species or species habitat known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat may occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Foraging, feeding or related behaviour known to occur within area
Eubalaena australis as Balaena glacialis australis Southern Right Whale [40]	Endangered	Breeding known to occur within area
Isurus oxyrinchus Shortfin Mako, Mako Shark [79073]		Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat likely to occur within area
Lamna nasus Porbeagle, Mackerel Shark [83288]		Species or species habitat likely to occur within area
Megaptera novaeangliae Humpback Whale [38]		Species or species habitat known to occur within area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat likely to occur within area
Physeter macrocephalus Sperm Whale [59]		Species or species habitat may occur within area
Migratory Terrestrial Species		
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat may occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area
Migratory Wetlands Species		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
[Arenaria interpres](#) Ruddy Turnstone [872]		Species or species habitat known to occur within area
[Calidris acuminata](#) Sharp-tailed Sandpiper [874]		Species or species habitat known to occur within area
[Calidris alba](#) Sanderling [875]		Species or species habitat known to occur within area
[Calidris canutus](#) Red Knot, Knot [855]	Endangered	Species or species habitat may occur within area
[Calidris ferruginea](#) Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
[Calidris melanotos](#) Pectoral Sandpiper [858]		Species or species habitat known to occur within area
[Calidris ruficollis](#) Red-necked Stint [860]		Species or species habitat known to occur within area
[Charadrius bicinctus](#) Double-banded Plover [895]		Species or species habitat known to occur within area
[Charadrius leschenaultii](#) Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat likely to occur within area
[Charadrius mongolus](#) Lesser Sand Plover, Mongolian Plover [879]	Endangered	Species or species habitat known to occur within area
[Gallinago hardwickii](#) Latham's Snipe, Japanese Snipe [863]		Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
Limosa lapponica		
Bar-tailed Godwit [844]		Species or species habitat known to occur within area
Numenius madagascariensis		
Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat likely to occur within area
Pandion haliaetus		
Osprey [952]		Species or species habitat known to occur within area
Pluvialis fulva		
Pacific Golden Plover [25545]		Species or species habitat known to occur within area
Tringa nebularia		
Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area
Tringa stagnatilis		
Marsh Sandpiper, Little Greenshank [833]		Species or species habitat known to occur within area

Other Matters Protected by the EPBC Act

Commonwealth Lands [Resource Information]

The Commonwealth area listed below may indicate the presence of Commonwealth land in this vicinity. Due to the unreliability of the data source, all proposals should be checked as to whether it impacts on a Commonwealth area, before making a definitive decision. Contact the State or Territory government land department for further information.

Commonwealth Land Name	State
Unknown	
Commonwealth Land - [60111]	TAS
Commonwealth Land - [21492]	VIC
Commonwealth Land - [21583]	VIC
Commonwealth Land - [60112]	TAS
Commonwealth Land - [60114]	TAS

Commonwealth Heritage Places [Resource Information]

Name	State	Status
Historic		

Name	State	Status
Cape Wickham Lighthouse	TAS	Listed place

Listed Marine Species [Resource Information]

Scientific Name	Threatened Category	Presence Text
Bird		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area
Ardenna carneipes as Puffinus carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Foraging, feeding or related behaviour likely to occur within area
Ardenna grisea as Puffinus griseus Sooty Shearwater [82651]		Species or species habitat may occur within area
Arenaria interpres Ruddy Turnstone [872]		Species or species habitat known to occur within area
Bubulcus ibis as Ardea ibis Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat known to occur within area
Calidris alba Sanderling [875]		Species or species habitat known to occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat may occur within area overfly marine area

Scientific Name	Threatened Category	Presence Text
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area overfly marine area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat known to occur within area overfly marine area
Calidris ruficollis Red-necked Stint [860]		Species or species habitat known to occur within area overfly marine area
Charadrius bicinctus Double-banded Plover [895]		Species or species habitat known to occur within area overfly marine area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat likely to occur within area
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Species or species habitat known to occur within area
Charadrius ruficapillus Red-capped Plover [881]		Species or species habitat known to occur within area overfly marine area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area

Scientific Name	Threatened Category	Presence Text
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Eudyptula minor Little Penguin [1085]		Breeding known to occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat known to occur within area overfly marine area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Breeding known to occur within area
Halobaena caerulea Blue Petrel [1059]	Vulnerable	Species or species habitat may occur within area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area overfly marine area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat likely to occur within area overfly marine area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area

Scientific Name	Threatened Category	Presence Text
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat may occur within area overfly marine area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area overfly marine area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area overfly marine area
Neophema chrysogaster Orange-bellied Parrot [747]	Critically Endangered	Species or species habitat known to occur within area overfly marine area
Neophema chrysostoma Blue-winged Parrot [726]		Species or species habitat known to occur within area overfly marine area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat likely to occur within area
Pachyptila turtur Fairy Prion [1066]		Species or species habitat known to occur within area
Pandion haliaetus Osprey [952]		Species or species habitat known to occur within area
Phalacrocorax fuscescens Black-faced Cormorant [59660]		Breeding known to occur within area

Scientific Name	Threatened Category	Presence Text
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area
Pluvialis fulva Pacific Golden Plover [25545]		Species or species habitat known to occur within area
Pterodroma mollis Soft-plumaged Petrel [1036]	Vulnerable	Species or species habitat may occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area overfly marine area
Rostratula australis as Rostratula benghalensis (sensu lato) Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area overfly marine area
Stercorarius skua as Catharacta skua Great Skua [823]		Species or species habitat may occur within area
Sternula albifrons as Sterna albifrons Little Tern [82849]		Species or species habitat may occur within area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche bulleri platei as Thalassarche sp. nov. Northern Buller's Albatross, Pacific Albatross [82273]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Thalassarche chrysostoma Grey-headed Albatross [66491]	Endangered	Species or species habitat may occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Thinornis cucullatus as Thinornis rubricollis Hooded Plover, Hooded Dotterel [87735]		Species or species habitat known to occur within area overfly marine area
Thinornis cucullatus cucullatus as Thinornis rubricollis rubricollis Eastern Hooded Plover, Eastern Hooded Plover [90381]	Vulnerable	Species or species habitat known to occur within area overfly marine area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area overfly marine area

Scientific Name	Threatened Category	Presence Text
[Tringa stagnatilis](#) Marsh Sandpiper, Little Greenshank [833]		Species or species habitat known to occur within area overfly marine area
Fish		
[Heraldia nocturna](#) Upside-down Pipefish, Eastern Upside-down Pipefish, Eastern Upside-down Pipefish [66227]		Species or species habitat may occur within area
[Hippocampus abdominalis](#) Big-belly Seahorse, Eastern Potbelly Seahorse, New Zealand Potbelly Seahorse [66233]		Species or species habitat may occur within area
[Hippocampus breviceps](#) Short-head Seahorse, Short-snouted Seahorse [66235]		Species or species habitat may occur within area
[Hippocampus minotaur](#) Bullneck Seahorse [66705]		Species or species habitat may occur within area
[Histiogamphelus briggsii](#) Crested Pipefish, Briggs' Crested Pipefish, Briggs' Pipefish [66242]		Species or species habitat may occur within area
[Histiogamphelus cristatus](#) Rhino Pipefish, Macleay's Crested Pipefish, Ring-back Pipefish [66243]		Species or species habitat may occur within area
[Hypselognathus rostratus](#) Knifesnout Pipefish, Knife-snouted Pipefish [66245]		Species or species habitat may occur within area
[Kaupus costatus](#) Deepbody Pipefish, Deep-bodied Pipefish [66246]		Species or species habitat may occur within area
[Kimblaeus bassensis](#) Trawl Pipefish, Bass Strait Pipefish [66247]		Species or species habitat may occur within area
[Leptoichthys fistularius](#) Brushtail Pipefish [66248]		Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Lissocampus caudalis Australian Smooth Pipefish, Smooth Pipefish [66249]		Species or species habitat may occur within area
Lissocampus runa Javelin Pipefish [66251]		Species or species habitat may occur within area
Maroubra perserrata Sawtooth Pipefish [66252]		Species or species habitat may occur within area
Mitotichthys mollisoni Mollison's Pipefish [66260]		Species or species habitat may occur within area
Mitotichthys semistriatus Halfbanded Pipefish [66261]		Species or species habitat may occur within area
Mitotichthys tuckeri Tucker's Pipefish [66262]		Species or species habitat may occur within area
Notiocampus ruber Red Pipefish [66265]		Species or species habitat may occur within area
Phycodurus eques Leafy Seadragon [66267]		Species or species habitat may occur within area
Phyllopteryx taeniolatus Common Seadragon, Weedy Seadragon [66268]		Species or species habitat may occur within area
Pugnaso curtirostris Pugnose Pipefish, Pug-nosed Pipefish [66269]		Species or species habitat may occur within area
Solegnathus robustus Robust Pipehorse, Robust Spiny Pipehorse [66274]		Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Solegnathus spinosissimus Spiny Pipehorse, Australian Spiny Pipehorse [66275]		Species or species habitat may occur within area
Stigmatopora argus Spotted Pipefish, Gulf Pipefish, Peacock Pipefish [66276]		Species or species habitat may occur within area
Stigmatopora nigra Widebody Pipefish, Wide-bodied Pipefish, Black Pipefish [66277]		Species or species habitat may occur within area
Stipecampus cristatus Ringback Pipefish, Ring-backed Pipefish [66278]		Species or species habitat may occur within area
Urocampus carinirostris Hairy Pipefish [66282]		Species or species habitat may occur within area
Vanacampus margaritifer Mother-of-pearl Pipefish [66283]		Species or species habitat may occur within area
Vanacampus phillipi Port Phillip Pipefish [66284]		Species or species habitat may occur within area
Vanacampus poecilolaemus Longsnout Pipefish, Australian Long-snout Pipefish, Long-snouted Pipefish [66285]		Species or species habitat may occur within area
Mammal		
Arctocephalus forsteri Long-nosed Fur-seal, New Zealand Fur-seal [20]		Species or species habitat may occur within area
Arctocephalus pusillus Australian Fur-seal, Australo-African Fur-seal [21]		Species or species habitat likely to occur within area
Neophoca cinerea Australian Sea-lion, Australian Sea Lion [22]	Endangered	Species or species habitat may occur within area
Reptile		

Scientific Name	Threatened Category	Presence Text
Caretta caretta Loggerhead Turtle [1763]	Endangered	Species or species habitat known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat may occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Foraging, feeding or related behaviour known to occur within area

Whales and Other Cetaceans		[Resource Information]
Current Scientific Name	Status	Type of Presence
Mammal		
Balaenoptera acutorostrata Minke Whale [33]		Species or species habitat may occur within area
Balaenoptera bonaerensis Antarctic Minke Whale, Dark-shoulder Minke Whale [67812]		Species or species habitat likely to occur within area
Balaenoptera borealis Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Balaenoptera musculus Blue Whale [36]	Endangered	Foraging, feeding or related behaviour known to occur within area
Balaenoptera physalus Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Berardius arnuxii Arnoux's Beaked Whale [70]		Species or species habitat may occur within area

Current Scientific Name	Status	Type of Presence
[Caperea marginata](#) Pygmy Right Whale [39]		Foraging, feeding or related behaviour may occur within area
[Delphinus delphis](#) Common Dolphin, Short-beaked Common Dolphin [60]		Species or species habitat may occur within area
[Eubalaena australis](#) Southern Right Whale [40]	Endangered	Breeding known to occur within area
[Globicephala macrorhynchus](#) Short-finned Pilot Whale [62]		Species or species habitat may occur within area
[Globicephala melas](#) Long-finned Pilot Whale [59282]		Species or species habitat may occur within area
[Grampus griseus](#) Risso's Dolphin, Grampus [64]		Species or species habitat may occur within area
[Kogia breviceps](#) Pygmy Sperm Whale [57]		Species or species habitat may occur within area
[Kogia sima as Kogia simus](#) Dwarf Sperm Whale [85043]		Species or species habitat may occur within area
[Lagenorhynchus obscurus](#) Dusky Dolphin [43]		Species or species habitat likely to occur within area
[Lissodelphis peronii](#) Southern Right Whale Dolphin [44]		Species or species habitat may occur within area
[Megaptera novaeangliae](#) Humpback Whale [38]		Species or species habitat known to occur within area

Current Scientific Name	Status	Type of Presence
Mesoplodon bowdoini Andrew's Beaked Whale [73]		Species or species habitat may occur within area
Mesoplodon densirostris Blainville's Beaked Whale, Dense-beaked Whale [74]		Species or species habitat may occur within area
Mesoplodon grayi Gray's Beaked Whale, Scamperdown Whale [75]		Species or species habitat may occur within area
Mesoplodon hectori Hector's Beaked Whale [76]		Species or species habitat may occur within area
Mesoplodon layardii Strap-toothed Beaked Whale, Strap-toothed Whale, Layard's Beaked Whale [25556]		Species or species habitat may occur within area
Mesoplodon mirus True's Beaked Whale [54]		Species or species habitat may occur within area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat likely to occur within area
Physeter macrocephalus Sperm Whale [59]		Species or species habitat may occur within area
Pseudorca crassidens False Killer Whale [48]		Species or species habitat likely to occur within area
Tursiops aduncus Indian Ocean Bottlenose Dolphin, Spotted Bottlenose Dolphin [68418]		Species or species habitat likely to occur within area
Tursiops truncatus s. str. Bottlenose Dolphin [68417]		Species or species habitat may occur within area

Current Scientific Name	Status	Type of Presence
Ziphius cavirostris Cuvier's Beaked Whale, Goose-beaked Whale [56]		Species or species habitat may occur within area

Australian Marine Parks	[Resource Information]
Park Name	Zone & IUCN Categories
Apollo	Multiple Use Zone (IUCN VI)
Zeehan	Multiple Use Zone (IUCN VI)
Zeehan	Special Purpose Zone (IUCN VI)

Extra Information

State and Territory Reserves		[Resource Information]
Protected Area Name	Reserve Type	State
Aire River	Heritage River	VIC
Aire River W.R.	Natural Features Reserve	VIC
Badger Box Creek	Nature Reserve	TAS
Cape Wickham	Conservation Area	TAS
Cape Wickham	State Reserve	TAS
Cataraqui Point	Conservation Area	TAS
Christmas Island	Nature Reserve	TAS
Currie Lightkeepers Residence	Historic Site	TAS
Disappointment Bay	State Reserve	TAS
Great Otway	National Park	VIC
Lavinia	State Reserve	TAS
New Year Island	Game Reserve	TAS
Porky Beach	Conservation Area	TAS
Port Campbell	National Park	VIC
Princetown W.R	Natural Features Reserve	VIC
Sandfly Beach	Conservation Covenant	TAS

Protected Area Name	Reserve Type	State
Seal Rocks	State Reserve	TAS
Seal Rocks	Conservation Area	TAS
Stokes Point	Conservation Area	TAS
Stony Creek (Otways)	Reference Area	VIC
Twelve Apostles	Marine National Park	VIC
Wicks Road Nugara	Conservation Covenant	TAS

Regional Forest Agreements [Resource Information]

Note that all areas with completed RFAs have been included.

RFA Name	State
Tasmania RFA	Tasmania
West Victoria RFA	Victoria

Nationally Important Wetlands [Resource Information]

Wetland Name	State
Aire River	VIC
Lake Flannigan	TAS
Lower Aire River Wetlands	VIC
Pearshape Lagoon 1	TAS
Pearshape Lagoon 2	TAS
Pearshape Lagoon 3	TAS
Pearshape Lagoon 4	TAS
Princetown Wetlands	VIC

EPBC Act Referrals [Resource Information]

Title of referral	Reference	Referral Outcome	Assessment Status
Controlled action			
Alston-1 petroleum exploration well, permit VIC/P44	2003/1315	Controlled Action	Post-Approval
Casino Gas Field Development	2003/1295	Controlled Action	Post-Approval
Otway Development	2002/621	Controlled Action	Post-Approval
Schomberg 3D Marine Seismic Survey	2007/3754	Controlled Action	Completed

Title of referral	Reference	Referral Outcome	Assessment Status
Controlled action			
Strike Oil Gas Exploration Well, Otway Basin (VIC/P44)	2000/97	Controlled Action	Completed
VICP61 2D Marine Seismic Survey	2008/4075	Controlled Action	Completed
Not controlled action			
construction of pump station for pump diversion from the Barham River	2003/1242	Not Controlled Action	Completed
Exploration drilling for liquid/gaseous hydrocarbons	2004/1681	Not Controlled Action	Completed
Gas Field Development	2006/2635	Not Controlled Action	Completed
Henry-1 Exploration Well, Petroleum Permit Area VIC/P44	2005/2147	Not Controlled Action	Completed
Huxley Hill Wind Farm expansion	2005/2499	Not Controlled Action	Completed
Huxley Hill Wind Farm Expansion	2002/570	Not Controlled Action	Completed
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed
INDIGO Central Submarine Telecommunications Cable	2017/8127	Not Controlled Action	Completed
Offshore exploration drilling within permit area VIC/P 37(v)	2004/1466	Not Controlled Action	Completed
Track construction - Great Ocean Walk	2002/793	Not Controlled Action	Completed
VIC-P44 Stage 2 Gas Field Development	2007/3767	Not Controlled Action	Completed
Not controlled action (particular manner)			
'Moonlight Head' 3D seismic survey, VIC/P38(V), VIC/P43 and VIC/RL8	2005/2236	Not Controlled Action (Particular Manner)	Post-Approval
2D Marine Seismic Survey	2005/2295	Not Controlled Action (Particular Manner)	Post-Approval
2D Marine Seismic Survey in Permit Areas T/32P and T/33P	2002/845	Not Controlled Action (Particular Manner)	Post-Approval

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action (particular manner)			
2D Seismic Survey	2003/1214	Not Controlled Action (Particular Manner)	Post-Approval
3D marine seismic survey near King Island	2004/1461	Not Controlled Action (Particular Manner)	Post-Approval
3D Marine Seismic Survey within Torquay Sub-basin off sthn Victoria	2012/6256	Not Controlled Action (Particular Manner)	Post-Approval
3D seismic program VIC/P38(v), VIC/P43 and VIC/RL8	2003/1137	Not Controlled Action (Particular Manner)	Post-Approval
Astrolabe 3D Marine Seismic Survey	2011/6048	Not Controlled Action (Particular Manner)	Post-Approval
BHPBilliton Otway 3D Seismic Survey	2007/3443	Not Controlled Action (Particular Manner)	Post-Approval
Construct private dwelling	2008/4234	Not Controlled Action (Particular Manner)	Post-Approval
Deepwater Sorell Basin 2001 Non-Exclusive 2D Seismic Survey	2001/156	Not Controlled Action (Particular Manner)	Post-Approval
Drill and Profile Exploration Well Somerset 1, License Area T34P	2009/5037	Not Controlled Action (Particular Manner)	Post-Approval
Enterprise Three-dimensional Transition Zone Seismic Survey, Victoria	2016/7800	Not Controlled Action (Particular Manner)	Post-Approval
Geographe-A gas exploration well	2000/82	Not Controlled Action (Particular Manner)	Post-Approval
INDIGO Marine Cable Route Survey (INDIGO)	2017/7996	Not Controlled Action (Particular	Post-Approval

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action (particular manner)			
		Manner)	
La Bella 3D Marine Seismic Survey, Otway Basin, VIC	2012/6683	Not Controlled Action (Particular Manner)	Post-Approval
OTE10 2D Marine Seismic Survey	2009/5223	Not Controlled Action (Particular Manner)	Post-Approval
Otway Astrolabe 3D Marine Seismic Survey, Otway Basin	2012/6421	Not Controlled Action (Particular Manner)	Post-Approval
Otway Basin Exploration Drilling Campaign, Vic	2011/6125	Not Controlled Action (Particular Manner)	Post-Approval
Santos Otway 3d Seismic VIC/P44	2007/3367	Not Controlled Action (Particular Manner)	Post-Approval
Schomberg 3D Marine Seismic survey	2007/3868	Not Controlled Action (Particular Manner)	Post-Approval
Southern Margins T/35P and T/36P 3D Seismic Surveys	2007/3817	Not Controlled Action (Particular Manner)	Post-Approval
Strike Oil NL Seismic Surveys	2000/107	Not Controlled Action (Particular Manner)	Post-Approval
Surface Geochemical Exploration Program, TAS	2010/5780	Not Controlled Action (Particular Manner)	Post-Approval
The Enterprise 3D Seismic Acquisition Survey, Otway Basin, Vic	2012/6565	Not Controlled Action (Particular Manner)	Post-Approval
Thylacine-A Exploration Well	2000/81	Not Controlled Action (Particular Manner)	Post-Approval

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action (particular manner)			
Torquay Sub-basin (VIC/P62) OTE12-3D Seismic Survey	2012/6655	Not Controlled Action (Particular Manner)	Post-Approval
Undertake a three dimensional marine seismic survey	2010/5700	Not Controlled Action (Particular Manner)	Post-Approval
Vic/P37(v) and Vic/P44 3D marine seismic survey	2003/1102	Not Controlled Action (Particular Manner)	Post-Approval
VIC P44 Gas Exploration Wells	2002/662	Not Controlled Action (Particular Manner)	Post-Approval
Vic-P51 and Vic-P52 2D seismic survey	2002/811	Not Controlled Action (Particular Manner)	Post-Approval
Wolseley 3D seismic acquisition survey	2010/5703	Not Controlled Action (Particular Manner)	Post-Approval
Referral decision			
3D Marine Seismic Survey	2011/6156	Referral Decision	Completed
The Enterprise 3D Seismic Acquisition Survey, Otway Basin, VIC	2012/6545	Referral Decision	Completed
VICP61 2D Marine Seismic Survey	2008/3975	Referral Decision	Completed
Wolseley 3D Seismic Acquisition Survey in Permit T/32P	2010/5291	Referral Decision	Completed

Key Ecological Features [Resource Information]

Key Ecological Features are the parts of the marine ecosystem that are considered to be important for the biodiversity or ecosystem functioning and integrity of the Commonwealth Marine Area.

Name	Region
West Tasmania Canyons	South-east

Biologically Important Areas

Scientific Name	Behaviour	Presence
Seabirds		

Scientific Name	Behaviour	Presence
Ardenna pacifica Wedge-tailed Shearwater [84292]	Foraging	Likely to occur
Ardenna tenuirostris Short-tailed Shearwater [82652]	Breeding	Known to occur
Ardenna tenuirostris Short-tailed Shearwater [82652]	Foraging	Known to occur
Diomedea exulans (sensu lato) Wandering Albatross [1073]	Foraging	Known to occur
Diomedea exulans antipodensis Antipodean Albatross [82269]	Foraging	Known to occur
Eudyptula minor Little Penguin [1085]	Breeding	Known to occur
Eudyptula minor Little Penguin [1085]	Foraging	Known to occur
Pelagodroma marina White-faced Storm-petrel [1016]	Foraging	Known to occur
Pelecanoides urinatrix Common Diving-petrel [1018]	Foraging	Known to occur
Phalacrocorax fuscescens Black-faced Cormorant [59660]	Breeding	Known to occur
Phalacrocorax fuscescens Black-faced Cormorant [59660]	Foraging	Known to occur
Thalassarche bulleri Bullers Albatross [64460]	Foraging	Known to occur
Thalassarche cauta cauta Shy Albatross [82345]	Foraging likely	Likely to occur
Thalassarche chlororhynchos bassi Indian Yellow-nosed Albatross [85249]	Foraging	Known to occur

Scientific Name	Behaviour	Presence
Thalassarche melanophris Black-browed Albatross [66472]	Foraging	Known to occur
Thalassarche melanophris impavida Campbell Albatross [82449]	Foraging	Known to occur
Sharks		
Carcharodon carcharias White Shark [64470]	Distribution	Known to occur
Carcharodon carcharias White Shark [64470]	Distribution	Likely to occur
Carcharodon carcharias White Shark [64470]	Distribution (low density)	Likely to occur
Carcharodon carcharias White Shark [64470]	Foraging	Known to occur
Carcharodon carcharias White Shark [64470]	Known distribution	Known to occur
Whales		
Balaenoptera musculus brevicauda Pygmy Blue Whale [81317]	Distribution	Known to occur
Balaenoptera musculus brevicauda Pygmy Blue Whale [81317]	Foraging	Likely to be present
Balaenoptera musculus brevicauda Pygmy Blue Whale [81317]	Foraging (annual high use area)	Known to occur
Balaenoptera musculus brevicauda Pygmy Blue Whale [81317]	Known Foraging Area	Known to occur
Eubalaena australis Southern Right Whale [40]	Aggregation	Known to occur
Eubalaena australis Southern Right Whale [40]	Connecting habitat	Known to occur
Eubalaena australis Southern Right Whale [40]	Known core range	Known to occur

Scientific Name	Behaviour	Presence
Eubalaena australis		
Southern Right Whale [40]	Migration and resting on migration	Known to occur

Caveat

1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data are available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance

3 DATA SOURCES

Threatened ecological communities

For threatened ecological communities where the distribution is well known, maps are generated based on information contained in recovery plans, State vegetation maps and remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species

Threatened, migratory and marine species distributions have been discerned through a variety of methods. Where distributions are well known and if time permits, distributions are inferred from either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc.) together with point locations and described habitat; or modelled (MAXENT or BIOCLIM habitat modelling) using

Where little information is available for a species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc.).

In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More detailed distribution mapping methods are used to update these distributions

4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

The following groups have been mapped, but may not cover the complete distribution of the species:

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded
- seals which have only been mapped for breeding sites near the Australian continent

The breeding sites may be important for the protection of the Commonwealth Marine environment.

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

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Appendix C

Acoustic Modelling Report

JASCO APPLIED SCIENCES

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Technical Memo

DATE: 24 August 2022

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FROM: Sam Welch, Matthew Koessler, Craig McPherson (JASCO Applied Sciences (Australia) Pty Ltd)

TO: Phil Wemyss (Beach Energy), Chris Ryan (Aventus Consulting)

Subject: Beach Otway Project, Consideration of Alternative Vessels

JASCO Applied Sciences (JASCO) performed additional modelling of underwater sound levels associated with the Beach Energy Otway Project, Development and Operations, to supplement drilling and construction results previously presented in Koessler and McPherson (2021), Koessler et al. (2020), Matthews et al. (2020) and Matthews et al. (2021).

The results have been revised due to better definition of the vessels and operations involved in the project. The method considered here closely follows the method outlined by Koessler and McPherson (2021) which was based on the finding in McPherson et al. (2021). A significant finding of the McPherson et al. (2021) study was lack of a thin layer of sand overlying the carbonate seabed structure near Artisan-1, which has a significant influence on propagation loss leading to higher decay rates than those initially predicted in Koessler et al. (2020) and Matthews et al. (2020)

Estimated underwater acoustic levels are presented as sound pressure levels (SPL, L_p), and as accumulated sound exposure levels (SEL, L_E) as appropriate for non-impulsive (continuous) noise sources. For the non-time dependent scenarios, marine mammal behavioural threshold based on the current interim NOAA (2019) criterion for marine mammals of 120 dB re 1 µPa (SPL; L_p) for non-impulsive sound sources are summarised in Section 2.

For the time-dependent scenarios, the modelled maximum distances to permanent threshold shift (PTS) and temporary threshold shift (TTS) criteria for low-frequency cetaceans Southall et al. (2019)., which are based on SEL accumulated over a period of time are summarised in Section 2.

Summary tables of results are provided in Table 1 and 2 below.

Table 1. Maximum (Rmax) horizontal distances (in km) to sound pressure level (SPL) for the NOAA (2019) behaviuoral response threshold from the most appropriate location for considered sources per scenario. OSV: Offshore Supply Vessel, PLV: Pipelay Vessel, WHP: Well Head Platform

Scenario number	Well Area	Description	R_{max} (km)
1 & 2	Thylacine North-1	WHP + OSV under DP (Resupply Ops)	2.31
3 & 4		WHP + OSV under Transit	0.89
5 & 6		THY - Pipelay Vessel under DP	3.65

Table 2. Summary: Maximum (R_{max}) horizontal distances (in km) for the frequency-weighted LF-cetacean SEL_{24h} TTS thresholds based on Southall et al. (2019) from the most appropriate location for considered sources per scenario. OSV: Offshore Supply Vessel, PLV: Pipelay Vessel, WHP: Well Head Platform

Scenario number	Well Area	Description	R_{max} (km)
1	Thylacine North-1	WHP + OSV under DP (Resupply Ops) (OSV DP 2 hrs)	0.26
2		WHP + OSV under DP (Resupply Ops) (OSV DP 8 hrs)	0.42
3		WHP + OSV under Transit (Standby 8 hrs)	0.04
4		WHP + OSV under Transit (Standby 24 hrs)	0.04
5		THY - Pipelay Vessel Stationary under DP	0.86
6		THY - Pipelay Vessel Laying Pipe	1.66

1. Acoustic Modelling Scenario Details

The scenarios considered within this additional modelling are detailed below and in Table 3, with the associated modelled sites provided in Table 4. An overview of the considered scenarios is as follows:

1. OSV vessel resupply at Thylacine platform for periods of 2, and 8 hrs.
2. OSV vessel on standby at Thylacine platform for periods of 8 and 24 hrs
3. Pipelay vessel (PLV) both stationary and laying pipe at Thylacine North-1 operating at 20% of its Maximum Continuous Rating (MCR).

Table 3.Description of modelled scenarios, OSV: Offshore Supply Vessel, PLV: Pipelay Vessel, WHP: Well Head Platform, THY: Thylacine North-1 operations

Scenario	Site	Location	Operation Description
1	1, 2, 3	Thylacine North-1	WHP + OSV under DP (Resupply Ops) (OSV DP 2 hrs)
2			WHP + OSV under DP (Resupply Ops) (OSV DP 8 hrs)
3	1, 3		WHP + OSV under Transit (Standby 8 hrs)
4			WHP + OSV under Transit (Standby 24 hrs)
5	4		THY - Pipelay Vessel Stationary under DP
6			THY - Pipelay Vessel Laying Pipe

Table 4 Location details for the modelled sites. OSV: Offshore Supply Vessel, PLV: Pipelay Vessel, WHP: Well Head Platform

Well	Site	Source	Latitude (S)	Longitude (E)	MGA (GDA94), Zone 54		Water depth (m))
					X (m)	Y (m)	
Thylacine A	1	WHP	39° 14.40200'	142° 54.60100'	664838	5654848	102.4
	2	OSV (resupply)	39° 14.40059'	142° 54.64574'	664902	5654849	102.3
	3	OSV (standby)	39° 12.50986'	142° 52.54039'	661946	5658410	99.2
Thylacine North-1	4	PLV	39° 12.51001'	142° 52.49601'	663882	5658408	99.1

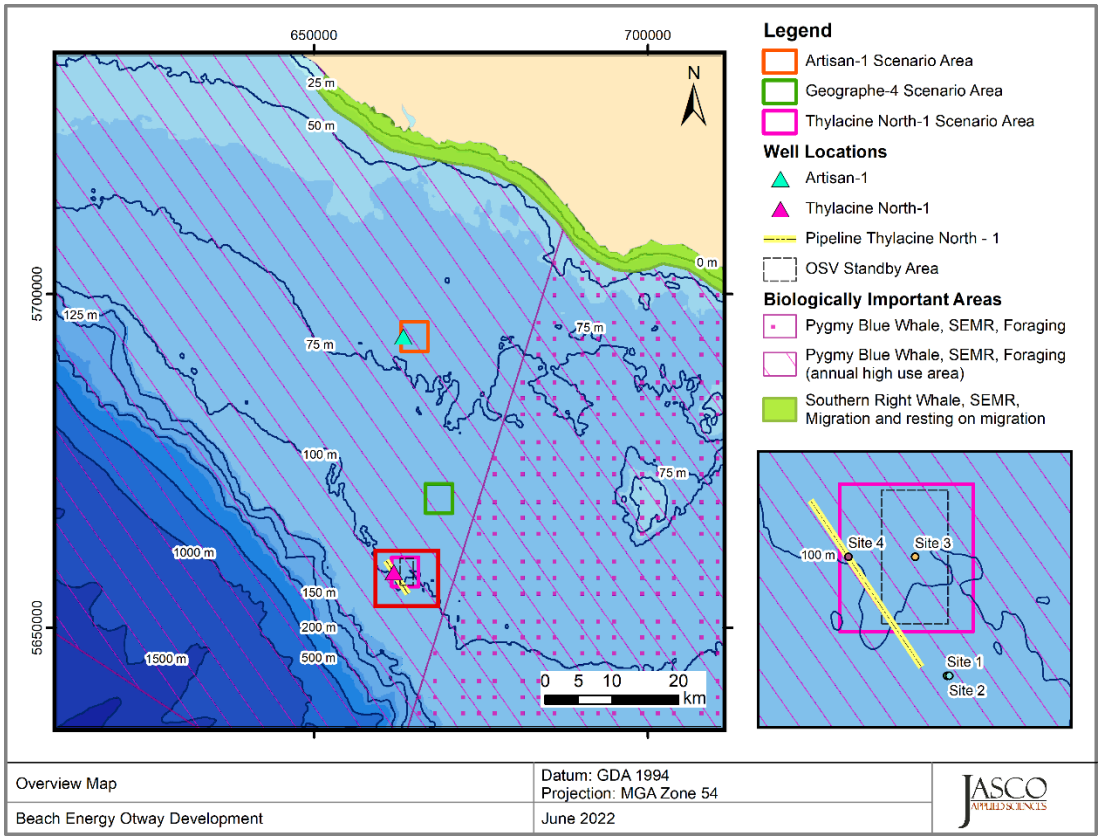

Figure 1 Overview map of the Beach Otway development

2. Noise Effect Criteria

To assess the potential effects of a sound-producing activity, it is necessary to establish exposure criteria (thresholds) for which sound levels may be expected to have a negative effect on animals. Whether acoustic exposure levels might injure or disturb marine fauna is an active research topic. Since 2007, several expert groups have developed SEL-based assessment approaches for evaluating auditory injury, with key works including Southall et al. (2007), Finneran and Jenkins (2012), Popper et al. (2014), United States National Marine Fisheries Service (NMFS 2018) and Southall et al. (2019). The number of studies that investigate the level of behavioural disturbance to marine fauna by anthropogenic sound has also increased substantially.

Two sound level metrics, SPL, and SEL, are commonly used to evaluate non-impulsive noise and its effects on marine life. In this report, the duration of the SEL accumulation is defined as integrated over a 24 h time period. Appropriate subscripts indicate any applied frequency weighting applied. The acoustic metrics in this report reflect the updated ANSI and ISO standards for acoustic terminology, ANSI S1.1 (2013) and ISO 18405:2017 (2017).

The following thresholds and guidelines for this study were chosen because they represent the best available science, and sound levels presented in literature for fauna with no defined thresholds:

4. Frequency-weighted accumulated sound exposure levels (SEL; $L_{E,24h}$) from Southall et al. (2019) for the onset of permanent threshold shift (PTS) and temporary threshold shift (TTS) in marine mammals for non-impulsive sources.
5. Marine mammal behavioural threshold based on the current interim U.S. National Oceanic and Atmospheric Administration (NOAA) (2019) criterion for marine mammals of 120 dB re 1 µPa (SPL; L_p) for non-impulsive sound sources.

6. Sound exposure guidelines for fish, fish eggs, and larvae (Popper et al. 2014).
7. Frequency-weighted accumulated sound exposure levels (SEL; $L_{E,24h}$) from Finneran et al. (2017) for the onset of PTS and TTS in turtles for non-impulsive sources.

Additional detail on thresholds, guidelines and weighting functions can be found in Koessler et al. (2020), Matthews et al. (2020) and Matthews et al. (2021).

3. Methods

3.1. Vessel and Platform Noise Sources

Figure 2 presents a summary plot of considered source spectra; additional detail is provided in Sections 3.1.1–3.1.3.

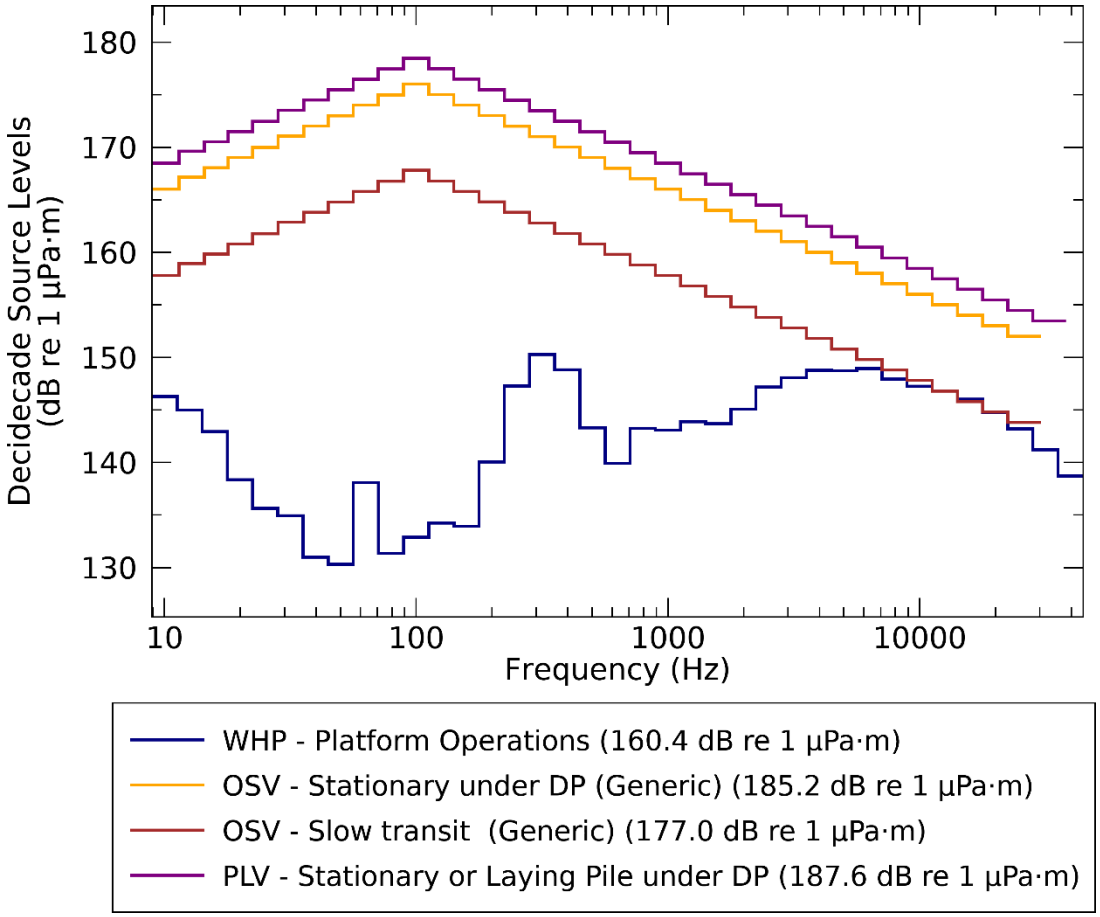

Figure 2. Energy source level (ESL) spectra (in decidecade frequency-band) for all sound sources.

3.1.1. Generic Offshore Vessel Source Spectrum

OSV and PLV vessels, other than those previously measured Seim AHTS measured in McPherson et al. (2021) and modelled in Koessler and McPherson (2021), may be used during various stages of the Otway development project. As the specific vessels have not been finalised, a generic source level has been considered for the OSV performing the activities described above (Section 1).

The generic vessel was based on the following specifications: an 89 m overall length, 20 m breadth, 7.6 m maximum draft and the percent of Maximum Continuous Rating (MCR) for the vessel operating at during typical DP operations, as nominally indicated by some potential vessel operators.

A main propulsion system is this generic vessel comprised of the following specifications.

Two stern propellers with:

- 3.2 m propeller diameter,
- 165 rpm nominal propeller speed,
- 2200 kW maximum continuous power input,
- Typical DP operation at 26% MRC, and
- Typical low speed transit operations 10% MCR.

Additional thruster modules active during DP operations may include bow tunnel thrusters and a bow azimuth thruster. The two bow tunnel thrusters for the generic vessel were comprised of:

- 2.0 m propeller diameter,
- 318 rpm nominal propeller speed,
- 1000 kW maximum continuous power input, and
- Typical DP operation at 17% MRC.

The bow azimuth thruster generic vessel was comprised of:

- 1.65 m propeller diameter,
- 373 rpm nominal propeller speed,
- 830 kW maximum continuous power input, and
- Typical DP operation at 21% MRC

Estimates of the acoustic source levels were based on the parameters of the propulsion system together with the method descripted in Appendix A.1.1.

These were estimated by scaling the spectrum based on the maximum utilised thruster power. The modelled source levels were adjusted using Equation (1).

$$\mathrm{SL} = \mathrm{SL}_{\mathrm{ref}} + 10 \log_{10} \left(\frac{P}{P_{\mathrm{ref}}} \right) \quad (1)$$

Here the modelled broadband source level (SL) is estimated from the broadband source level of the generic source ($\mathrm{SL}_{\mathrm{ref}}$) and the utilised thruster powers of the modelled and generic sources (P and P_{ref}, respectively).

3.1.2. Offshore Support and Pipelay Vessels

The source spectrum for the generic OSV considered here for modelling did not contain any scaling based on power ratios (Equation (1)) because vessel details were not know. However, it is notable that the source levels of the large offshore vessels can vary significantly and can be louder than those considered here. Parameters that correlate with a vessel's source level, particulary while under DP, are installed power, number of thrusters and thruster types (Quijano et al. 2018, McPherson et al. 2021). The specific details of these parameters are all unknown and a more generic approach has been taken herein.

For modelling purposes, the Skandi Acergy was nominated as a construction and pile lay vessel (Figure 3). The estimates of the source levels for the PLV were based on a total installed thruster power rating of 16840 kW, and overall length, beam and draft of 156.9 m, 27.0 m and 8.5 m respectively. The propulsion system of the Skandi Acergy contains the following:

- 2x 1,920 kW tunnel thrusters,

- 2x 1,500 kW retractable azimuths,
- 2x 3,000 kW contra-rotating azimuths,

1 x 4,000 kW shaft propeller + rudder, However, while under DP the single rear main is not likely to be in use; therefore its contribution for power scaling was omitted. The total maximum thruster power while the PLV was on DP of 12840 kW was used with Equation (1) for scaling. Resulting in the PLV vessel having the largest source level for the considered scenarios.

Figure 3. Photo of the Skandi Acergy considered for an Pipelay Vessel (PLV).

3.1.3. Platform Operations

Fixed structures such as the WHP have lower radiated sound levels than floating platforms (Spence et al. 2007). Equipment operating onboard floating platforms can contribute to marine environment sound however, airborne and structure-borne (vibration) pathways are considered more significant on these facilities, where equipment can be located below the water line. Underwater noise produced from platforms standing on metal jack-up legs is relatively low given the small surface areas available for sound transmission and also given the location of machinery above the waterline. It is therefore expected that the dominant pathway for sound generation is structure-borne (i.e., vibration from machinery passing through the legs) (Spence et al. 2007).

Koessler and McPherson (2021) provided some detail and supporting information citing a study involving the Endeavour Jack-up Rig, operating in Cook Inlet (Illingworth and Rodkin Inc. 2014) during drilling activities. Considering the similarities between a Jack-up Rig and a static WHP the decidecade band spectrum from Illingworth and Rodkin Inc. (2014) was used for the WHP at the Thylacine A location.

4. Results

Results below are presented in two froms, tables of distances to isopleth contours (Section 4.1) and sound footprint maps (Section 4.2).

4.1. Tabulated Results

Table 5. *All Scenarios:* Maximum (R_{max}) and 95% ($R_{95\%}$) horizontal distances (in km) to sound pressure level (SPL) from the most appropriate location for considered sources per scenario. A dash indicates the level was not reached within the limits of the modelling resolution (20 m). OSV: Offshore Supply Vessel, DP: Dynamic Positioning.

SPL (L_p; dB re 1 µPa)	Scenario 1 & 2 Platform with OSV Under DP (Resupply)		Scenario 3 & 4 Platform with OSV Under Light Transit (Standby)		Scenario 5 & 6 Pipelay Vessel Stationary/Laying Pipe	
	R_{max} (km)	$R_{95\%}$ (km)	R_{max} (km)	$R_{95\%}$ (km)	R_{max} (km)	$R_{95\%}$ (km)
180	–	–	–	–	–	–
170[A]	–	–	–	–	–	–
160	0.08	0.08	–	–	0.04	0.04
158[B]	0.08	0.08	–	–	0.05	0.05
150	0.09	0.09	–	–	0.19	0.19
140	0.32	0.31	0.17	0.16	0.45	0.44
130	0.94	0.84	0.33	0.31	1.33	1.13
120[C]	2.31	2.03	0.89	0.85	3.65	3.13
110	6.05	4.91	2.27	2.02	9.76	8.31

[A] 48 h threshold for recoverable injury for fish with a swim bladder involved in hearing (Popper et al. 2014).
[B] 12 h threshold for TTS for fish with a swim bladder involved in hearing (Popper et al. 2014).
[C] Threshold for marine mammal behavioural response to continuous noise from NOAA (2019).

Table 6. *Platform Operations:* Maximum (R_{max}) horizontal distances (in km) to frequency-weighted SEL_{24h} PTS and TTS thresholds based on Southall et al. (2019) and Finneran et al. (2017) from the most appropriate location for considered sources per scenario, and ensonified area (km^2). A dash indicates the level was not reached within the limits of the modelling resolution (20 m). A slash indicates that the area is less than an area associated with the modelled resolution (0.0013 km^2).

Hearing group	Frequency-weighted SEL_{24h} threshold ($L_{E,24h}$; dB re 1 $\mu Pa^2 \cdot s$)	Scenario 1 Platform with OSV Under DP (Resupply 2 hrs)		Scenario 2 Platform with OSV Under DP (Resupply 8 hrs)		Scenario 3 Platform with OSV Under Light Transit (Standby 8 hrs)		Scenario 4 Platform with OSV Under Light Transit (Standby 24 hrs)	
		R_{max} (km)	Area (km^2)	R_{max} (km)	Area (km^2)	R_{max} (km)	Area (km^2)	R_{max} (km)	Area (km^2)
PTS									
Low-Frequency (LF) cetaceans	199	0.05	/	0.06	/	0.02	/	0.02	/
High-frequency (HF) cetaceans	198	0.05	/	0.05	/	0.02	/	0.02	/
Very High-frequency (VHF) cetaceans	173	0.05	0.01	0.08	0.01	0.03	/	0.03	0.12
Otariid seals	219	–	–	–	–	–	–	–	–
Turtles	220	0.03	/	0.03	/	–	–	–	–
TTS									
Low-Frequency (LF) cetaceans	179	0.26	0.17	0.42	0.49	0.04	0.12	0.04	0.12
High-frequency (HF) cetaceans	178	0.05	/	0.06	0.01	0.03	/	0.03	0.12
Very High-frequency (VHF) cetaceans	153	0.37	0.38	0.47	0.66	0.30	0.39	0.30	0.44
Otariid seals	199	0.05	/	0.05	/	0.02	/	0.02	/
Turtles	200	0.05	/	0.06	0.01	0.02	/	0.02	/

Table 7. *Pipelay Operations:* Maximum (R_{max}) horizontal distances (in km) to frequency-weighted SEL_{24h} PTS and TTS thresholds based on Southall et al. (2019) and Finneran et al. (2017) from the source or pipelay track, and ensonified area (km^2). A dash indicates the level was not reached within the limits of the modelling resolution (20 m). A slash indicates that the area is less than an area associated with the modelled resolution (0.0013 km^2).

Hearing group	Frequency-weighted SEL_{24h} threshold ($L_{E,24h}$; dB re 1 $\mu Pa^2 \cdot s$)	Scenario 5 Pipelay Vessel Stationary Under DP		Scenario 5 Pipelay Vessel Laying Pipe	
		R_{max} (km)	Area (km^2)	R_{max} (km)	Area (km^2)
PTS					
Low-Frequency (LF) cetaceans	199	0.08	0.02	0.03	0.33
High-frequency (HF) cetaceans	198	0.02	/	0.01	0.06
Very High-frequency (VHF) cetaceans	173	0.12	0.04	0.05	0.52
Otariid seals	219	–	–	–	–
Turtles	220	0.02	/	0.01	0.02
TTS					
Low-Frequency (LF) cetaceans	179	0.86	2.18	1.66	20.48
High-frequency (HF) cetaceans	178	0.08	0.02	0.03	0.31
Very High-frequency (VHF) cetaceans	153	0.98	2.67	1.24	16.07
Otariid seals	199	0.02	/	0.02	0.18
Turtles	200	0.14	0.04	0.04	0.51

4.2. Sound Field Maps

Maps of the estimated sound fields, threshold contours, and isopleths of interest for SPL (Section 4.2.1) and SEL_{24h} (Section 4.2.2) sound fields are presented below.

4.2.1. SPL Maps

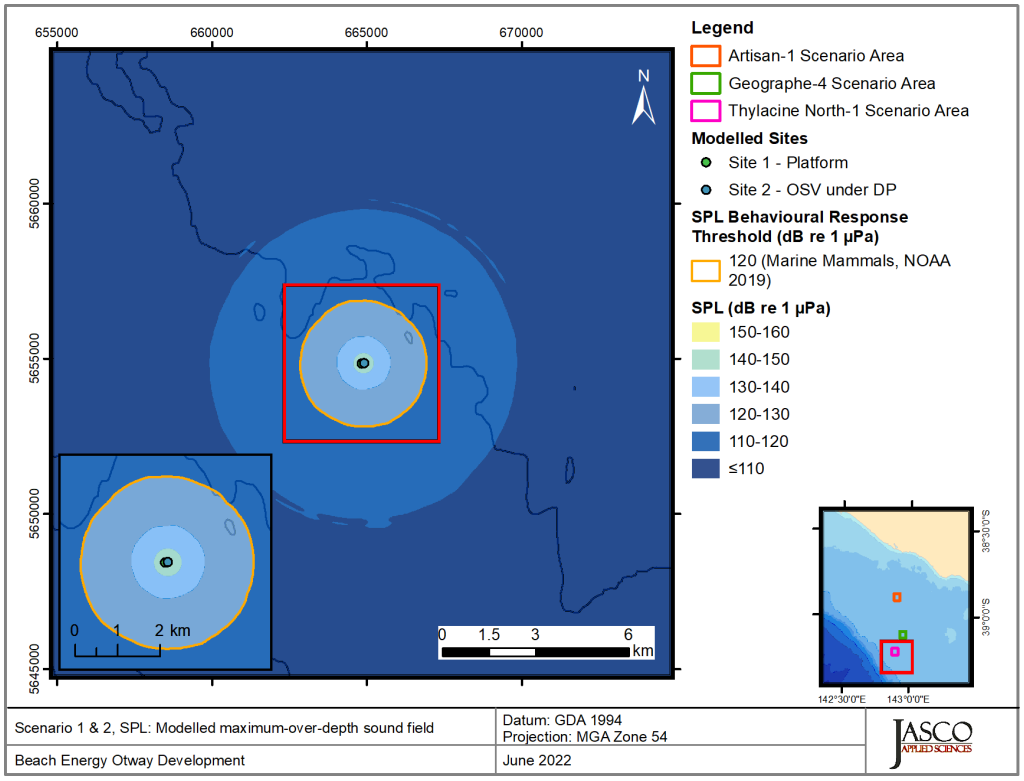

Figure 4. *Thylacine North-1, Platform Operations and OSV under DP*, SPL: Sound level contour map of unweighted maximum-over-depth sound field in 10 dB steps, and the isopleths for behavioural response thresholds for marine mammals.

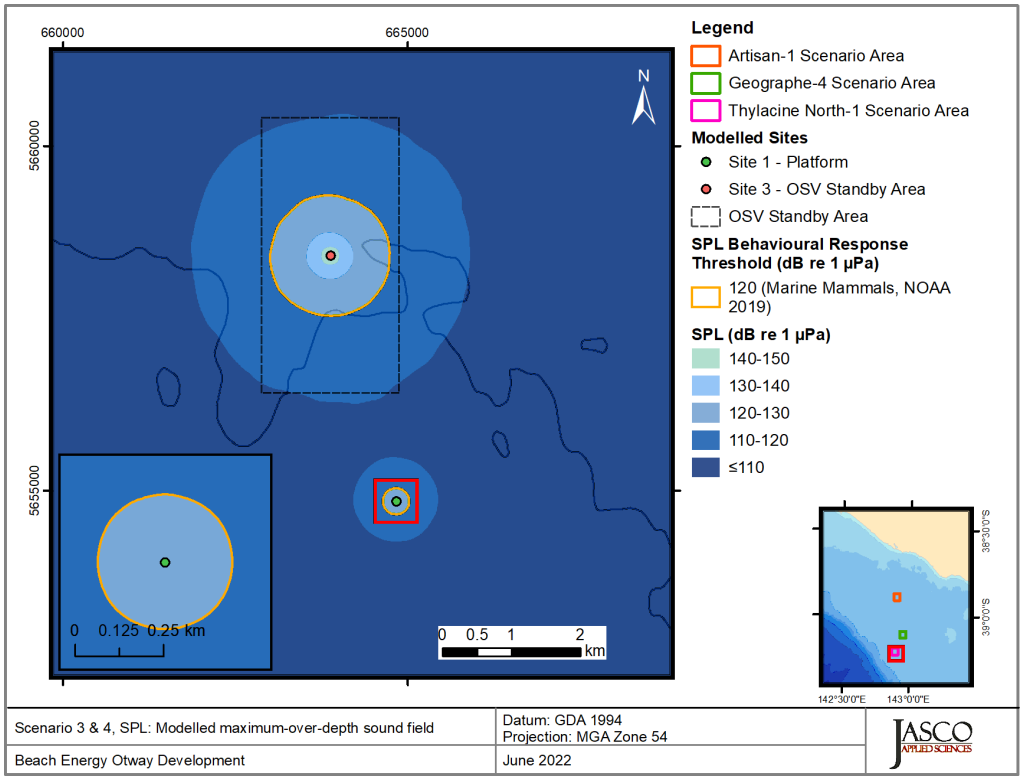

Figure 5. *Thylacine North-1, Platform Operations and OSV on Standby*, SPL: Sound level contour map of unweighted maximum-over-depth sound field in 10 dB steps, and the isopleths for behavioural response thresholds for marine mammals.

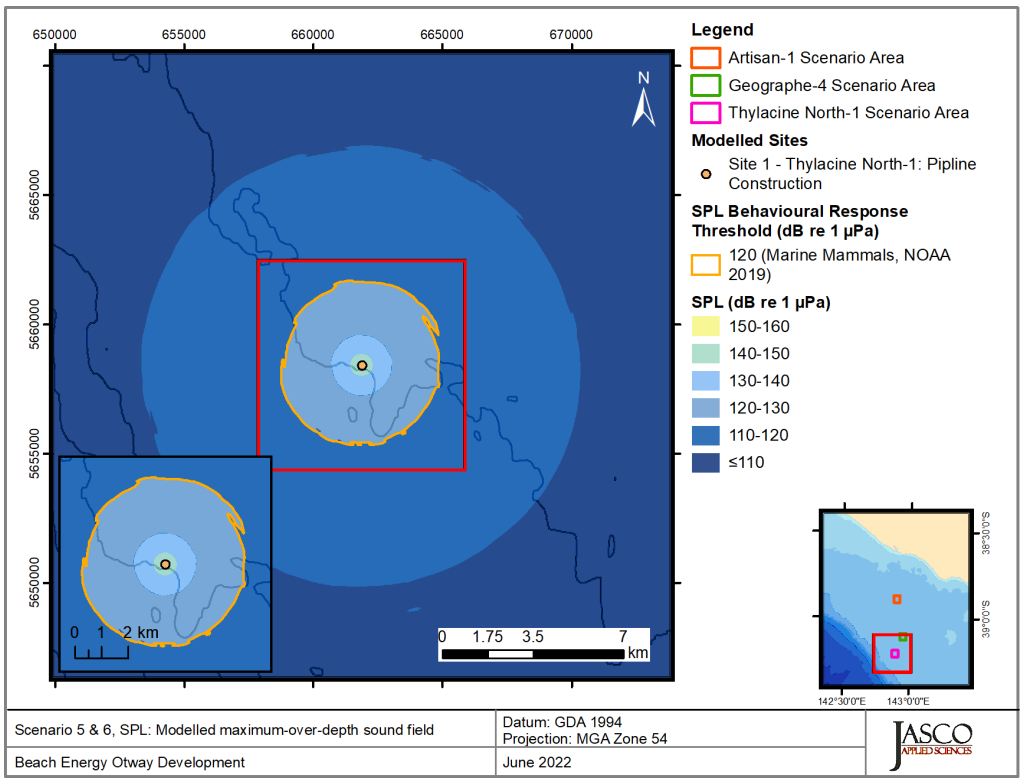

Figure 6. *Thylacine North-1, Pipelay Operations*, SPL: Sound level contour map of unweighted maximum-over-depth sound field in 10 dB steps, and the isopleths for behavioural response thresholds for marine mammals.

4.2.2. Accumulated SEL_{24h} Maps

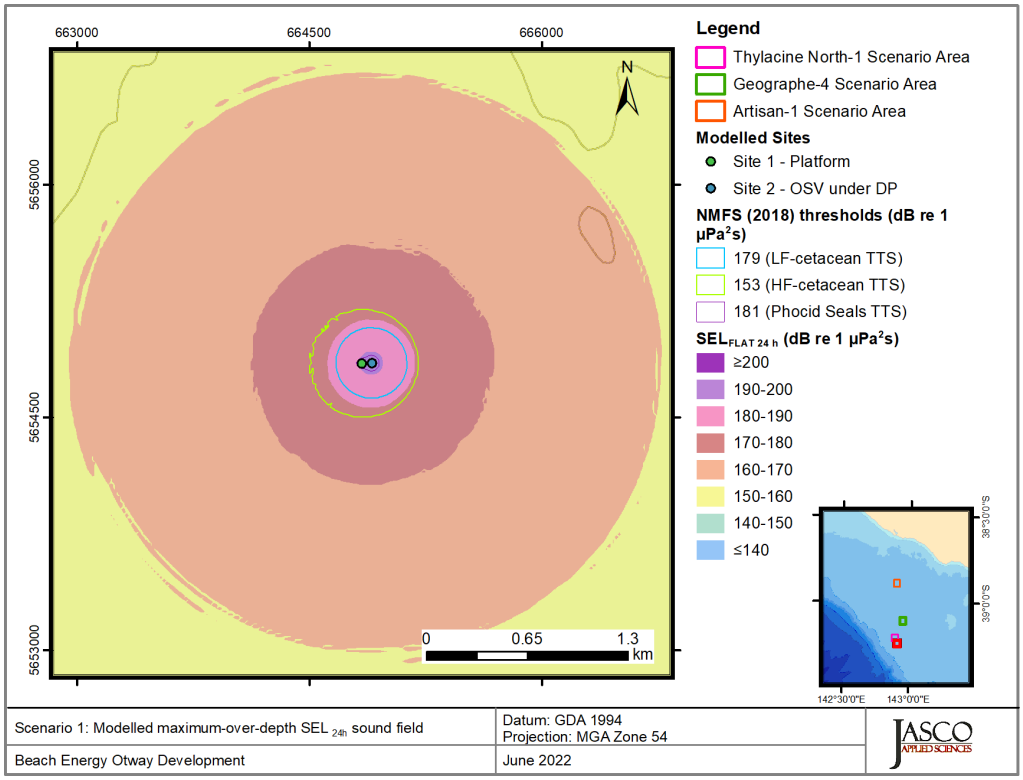

Figure 7. *Thylacine A, Scenario 1, Platform Operations and OSV under DP*, sound level contour map of unweighted maximum-over-depth SEL_{24h} results, along with isopleths for TTS thresholds. Thresholds for PTS and some thresholds for TTS were either not reached or were small enough such they could not be displayed on a map.

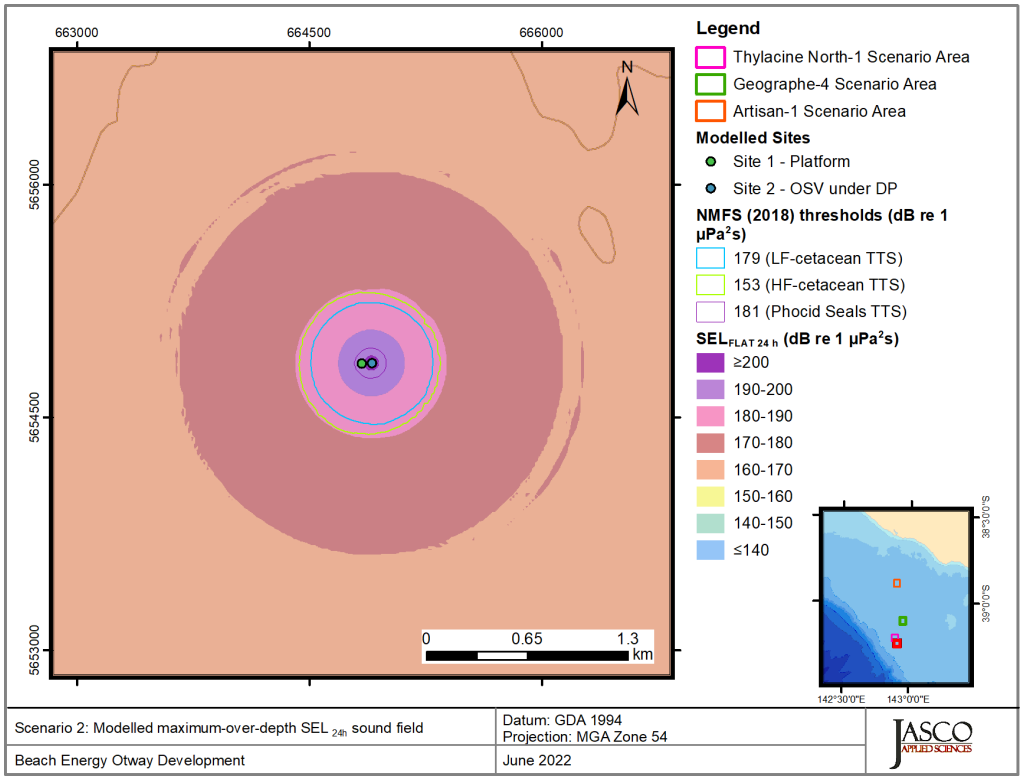

Figure 8. *Thylacine A, Scenario 2, Platform Operations and OSV under DP*, sound level contour map of unweighted maximum-over-depth SEL_{24h} results, along with isopleths for TTS thresholds. Thresholds for PTS and some thresholds for TTS were either not reached or were small enough such they could not be displayed on a map.

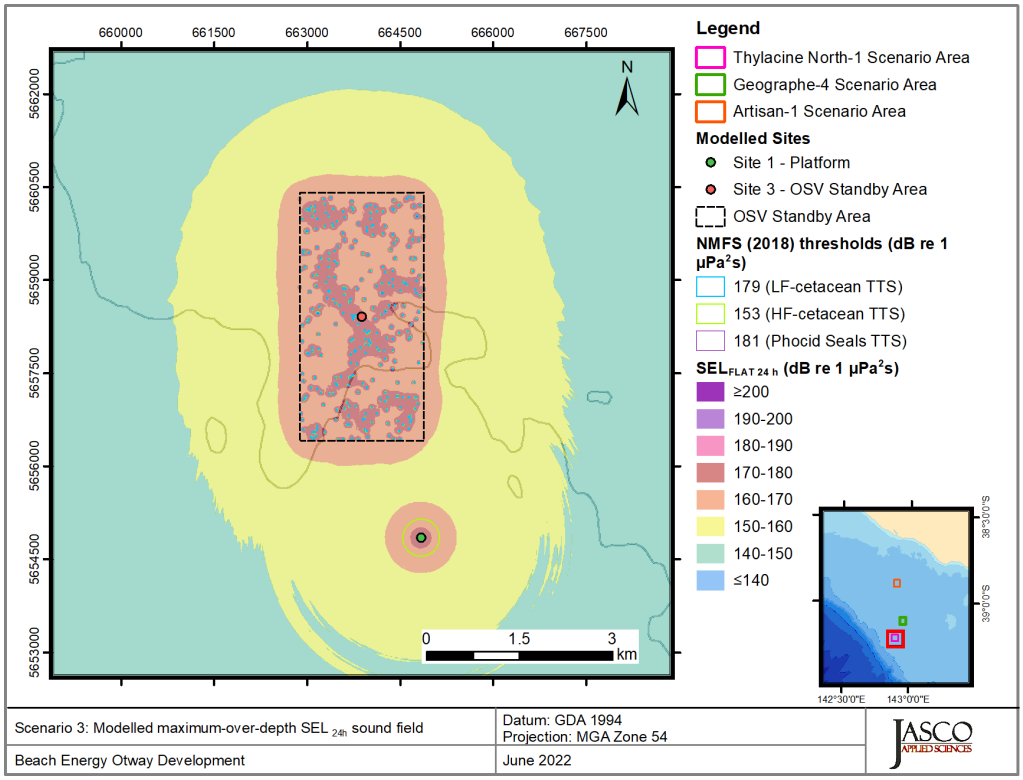

Figure 9. *Thylacine A, Scenario 3, Platform Operations and OSV on Standby*, sound level contour map of unweighted maximum-over-depth SEL_{24h} results, along with isopleths for TTS thresholds. Thresholds for PTS and some thresholds for TTS were either not reached or were small enough such they could not be displayed on a map.

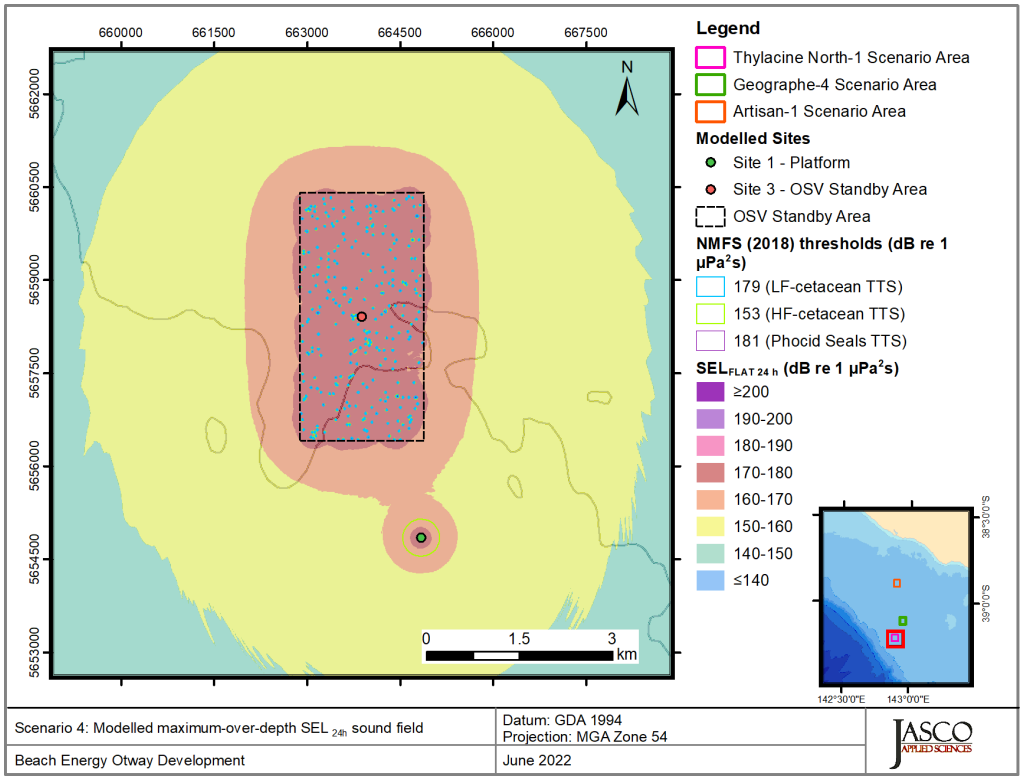

Figure 10. *Thylacine A, Scenario 4, Platform Operations and OSV on Standby*, sound level contour map of unweighted maximum-over-depth SEL_{24h} results, along with isopleths for TTS thresholds. Thresholds for PTS and some thresholds for TTS were either not reached or were small enough such they could not be displayed on a map.

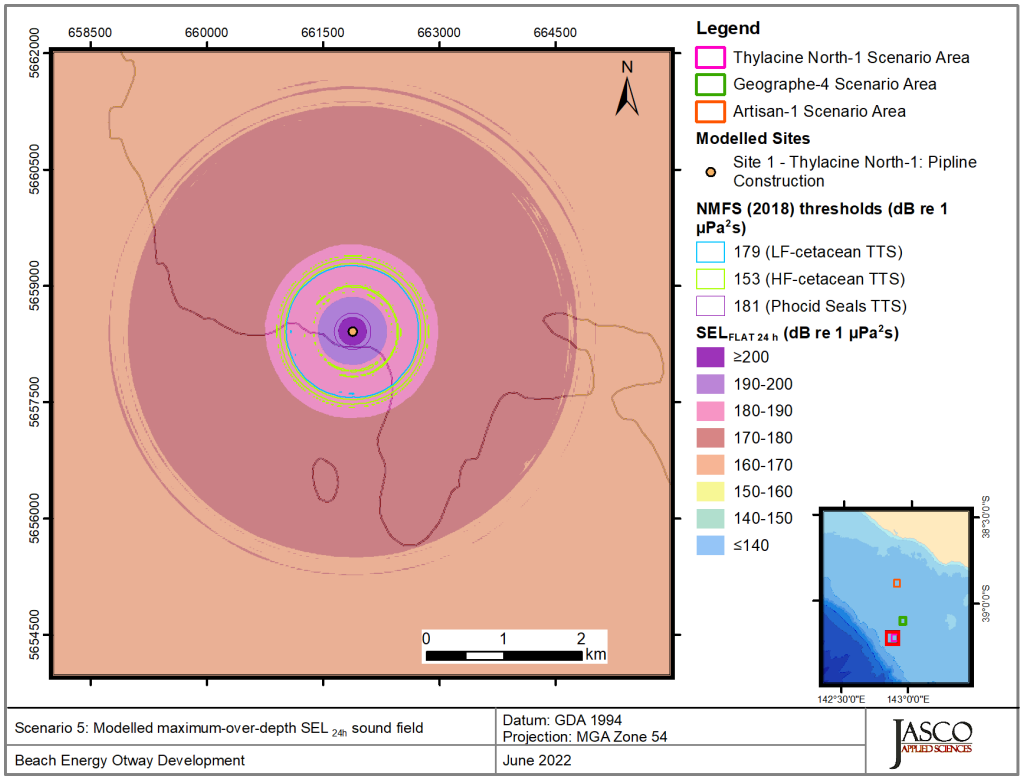

Figure 11. *Thylacine A, Scenario 5, Pipelay Operations*, sound level contour map of unweighted maximum-over-depth SEL_{24h} results, along with isopleths for TTS thresholds. Thresholds for PTS and some thresholds for TTS were either not reached or were small enough such they could not be displayed on a map.

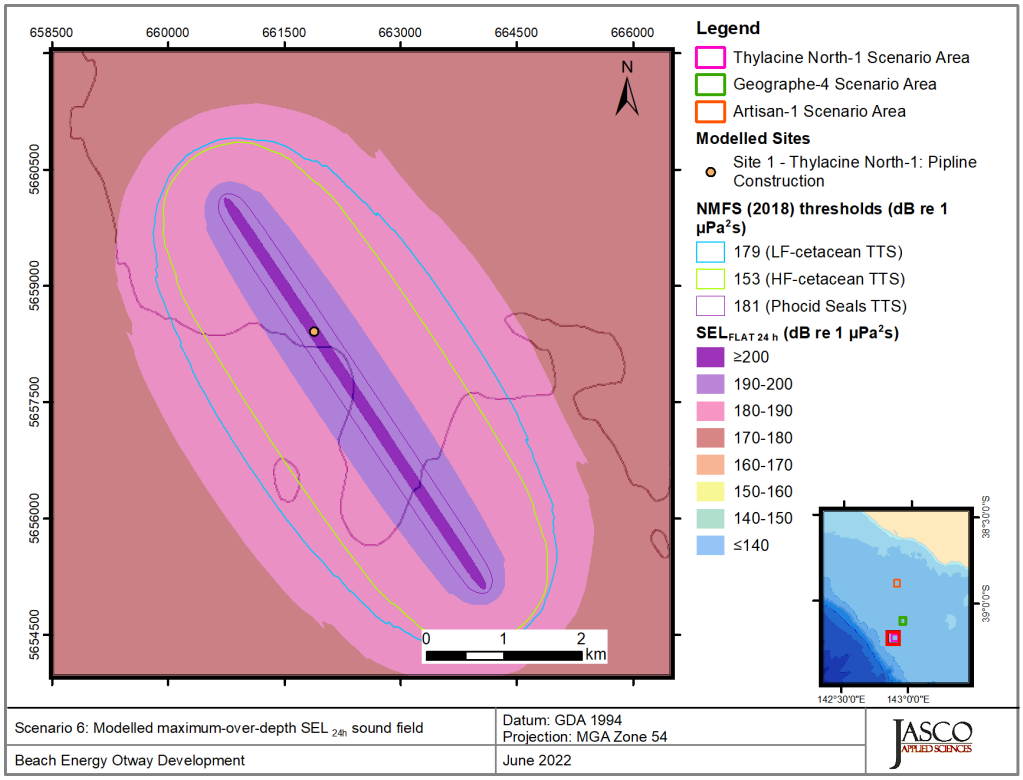

Figure 12. *Thylacine A, Scenario 6, Pipelay Operations*, sound level contour map of unweighted maximum-over-depth SEL_{24h} results, along with isopleths for TTS thresholds. Thresholds for PTS and some thresholds for TTS were either not reached or were small enough such they could not be displayed on a map

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Appendix A. Source Levels

A.1.1. Thruster Source Level Estimation

A vessel equipped with propellers/thrusters has two primary sources of sound that propagate from the unit: the machinery and the propellers. For thrusters operating in the heavily loaded conditions, the acoustic energy generated by the cavitation processes on the propeller blades dominates (Leggat et al. 1981). The sound power from the propellers is proportional to the number of blades, the propeller diameter, and the propeller tip speed.

Based on an analysis of acoustic data, Ross (1976) provided the following formula for the sound levels from a vessel's propeller, operating in calm, open ocean conditions:

$$L_{100} = 155 + 60\log(u/25) + 10\log(B/4)\,, \qquad \text{(A-1)}$$

where L_{100} is the spectrum level at 100 Hz, u is the propeller tip speed (m/s), and B is the number of propeller blades. Equation A-1 gives the total energy produced by the propeller cavitation at frequencies between 100 Hz and 10 kHz. This equation is valid for a propeller tip speed between 15 and 50 m/s. The spectrum is assumed to be flat below 100 Hz. Its level is assumed to fall off at a rate of −6 dB per octave above 100 Hz (Figure A-1).

Another method of predicting the source level of a propeller was suggested by Brown (1977). For propellers operating in heavily loaded conditions, the formula for the sound spectrum level is:

$$\mathrm{SL}_B = 163 + 40\log D + 30\log N + 10\log B + 20\log f + 10\log(A_c/A_D)\,, \qquad \text{(A-2)}$$

where D is the propeller diameter (m), N is the propeller revolution rate per second, B is the number of blades, A_C is the area of the blades covered by cavitation, and A_D is the total propeller disc area. Similar to Ross's approach, the spectrum below 100 Hz is assumed to be flat. The tests with a naval propeller operating at off-design heavily loaded conditions showed that Equation A-2 should be used with a value of $(A_c/A_D) = 1$ (Leggat et al. 1981).

The combined source level for multiple thrusters operating together can be estimated using the formula:

$$\mathrm{SL}_{\mathrm{total}} = 10\log_{10}\sum_i 10^{\frac{SL_i}{10}}, \qquad \text{(A-3)}$$

where $\mathrm{SL}_{1,\ldots,N}$ are the source levels of individual thrusters. If the vessel is equipped with the same type of thrusters, the combined source level can be estimated using the formula:

$$\mathrm{SL}_N = \mathrm{SL} + 10\log N \qquad \text{(A-4)}$$

where N is the total number of thrusters of the same type.

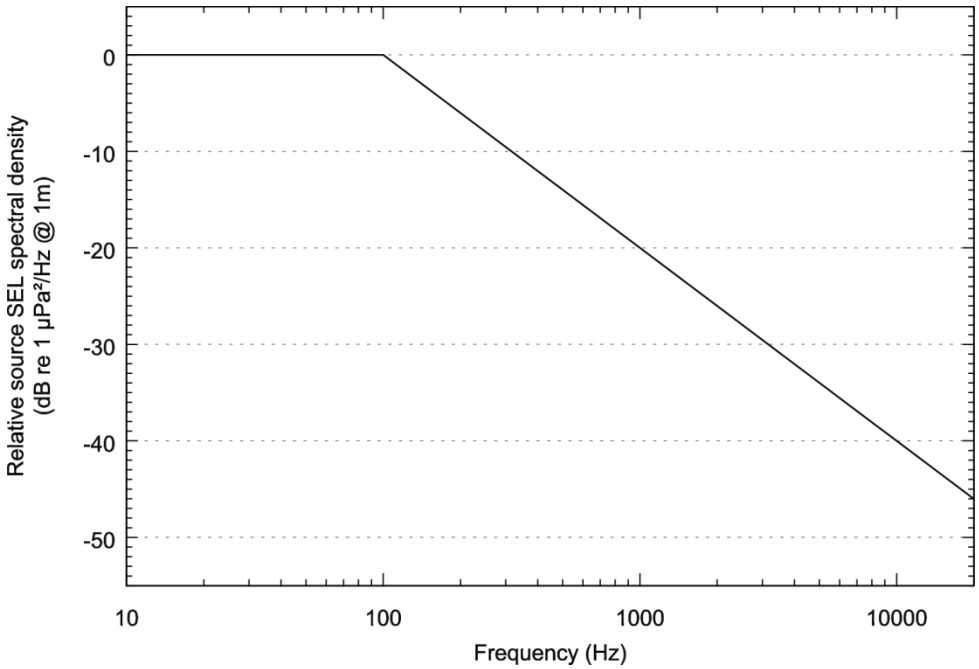

Figure A-1. Estimated sound spectrum from cavitating propeller (Leggat et al. 1981).

Appendix D

Oil Spill Trajectory Modelling Report

THYLACINE INSTALLATION AND COMMISSIONING – PHASE 5

Oil Spill Modelling – Variation 1

MAQ1217J
Thylacine Installation and Commissioning – Phase 5
Rev0
2 November 2022

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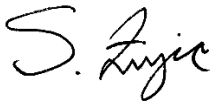
Dr. Sasha Zigic  9 November 2022

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TERMS AND ABBREVIATIONS

AMP	Australian Marine Park
ANZECC	Australian and New Zealand Environment and Conservation Council
API	American Petroleum Institute gravity. A measure of how heavy or light a petroleum liquid is compared to water.
ARMCANZ	Agriculture and Resource Management Council of Australia and New Zealand
ASTM	American Society for Testing and Materials
BIA	Biologically Important Areas
Bonn Agreement	An agreement for cooperation in dealing with pollution of the North Sea by oil and other harmful substances, 1983, includes: Governments of the Kingdom of Belgium, the Kingdom of Denmark, the French Republic, the Federal Republic of Germany, the Republic of Ireland, the Kingdom of the Netherlands, the Kingdom of Norway, the Kingdom of Sweden, the United Kingdom of Great Britain and Northern Ireland and the European Union.
BP	Boiling point. The temperature at which the vapor pressure of the liquid is equal to the pressure exerted on it by the surrounding atmosphere
BTEX	Benzene, Toluene, Ethylbenzene, and Xylenes
CFSR	Climate Forecast System Reanalysis
Decay	The process where oil components are changed either chemically or biologically (biodegradation) to another compound. It includes breakdown to simpler organic carbon compounds by bacteria and other organisms, photo-oxidation by solar energy, and other chemical reactions.
Deterministic oil spill modelling	Oil spill modelling involving a computer simulation of a single hypothetical oil spill event subject to a single sequence of wind, current and other sea conditions over time. Single oil spill modelling, also referred to as “deterministic modelling” provides a simulation of one possible outcome of a given spill scenario, subject to the metocean conditions that are imposed. Single oil spill modelling is commonly used to consider the fate and effects of ‘worst-case’ oil spill scenarios that are carefully selected in consideration of the nature and scale of the offshore petroleum activity and the local environment (NOPSEMA, 2017). Because the outcomes of a single oil spill simulation can only represent the outcome of that scenario under one sequence of metocean conditions, worst-case conditions are often identified from stochastic modelling. It is impossible to calculate the likelihood of any outcome from a single oil spill simulation. Single oil spill modelling is generally used for response planning, preparedness planning and for supporting oil spill response operations in the event of an actual spill
Dynamic viscosity	The dynamic viscosity of a fluid expresses its resistance to shearing flows, where adjacent layers move parallel to each other with different speeds.
Floating oil exposure	Contact by floating oil on the sea surface at concentrations equal to or exceeding defined threshold concentrations. The consequence will vary depending on the threshold and the receptors
GODAE	Global Ocean Data Assimilation Experiment
HYCOM	Hybrid Coordinate Ocean Model. A data-assimilative, three-dimensional ocean model
HYDROMAP	Advanced ocean/coastal tidal model used to predict tidal water levels, current speed and current direction.
IBRA	Interim Biogeographic Regionalisation for Australia bioregions
IMCRA	Integrated marine and coastal regionalisation areas
IOA	Index of Agreement
ITOPF	International Tanker Owners Pollution Federation Limited
KEF	Key Ecological Feature
LGA	Local Government Areas
MAE	Mean Absolute Error
MAHs	Monoaromatic Hydrocarbons
MDO	Marine diesel oil
MEG	Mono-Ethylene Glycol
MNP	Marine National Park

MP	Marine Park
MS	Marine Sanctuary
NASA	National Aeronautics and Space Administration (USA)
NCEP	National Centres for Environmental Prediction (USA)
NOAA	National Oceanic and Atmospheric Administration (USA)
NOPSEMA	National Offshore Petroleum Safety and Environmental Management Authority
NP	National Park
NR	Nature Reserve
PAH	Polynuclear Aromatic Hydrocarbons
Pour Point	The pour point of a liquid is the temperature below which the liquid loses its flow characteristics
ppb	Parts per billion (concentration)
psu	Practical salinity units
Ramsar site	A site listed under the Ramsar Convention on wetlands which is an international intergovernmental treaty that provides the framework for the conservation and wise use of wetlands and their resources.
RSB	Reefs, Shoals and Banks
Shoreline accumulation	Arrival of oil at or near shorelines at on-water concentrations equal to or exceeding defined threshold concentrations. Shoreline contact is judged for floating oil arriving within a 2 km buffer zone from any shoreline as a conservative measure
SIMAP	Spill Impact Model Application Package. SIMAP is designed to simulate the fate and effects of spilled hydrocarbons for surface or subsea releases
SRTM	Shuttle Radar Topography Mission
State Waters	Low water mark seaward for three nautical miles
Stochastic oil spill modelling	Stochastic oil spill modelling is created by overlaying and statistically analysing the outcomes of many single oil-spill simulations of a defined spill scenario, where each simulation was subject to a different sequence of metocean conditions, selected objectively (typically by random selection) from a long sequence of historic conditions for the study area. Analysis of this larger set of simulations provides a more accurate indication of the environment that maybe affected (EMBA) and indicates which locations are more likely to be affected (as well as other statistics). Stochastic oil spill modelling avoids biases that affect single oil spill modelling (due to the reliance on only one possible sequence of conditions). However, when interpreting stochastic modelling, which is based on a wide range of potential conditions that might happen to occur, it is essential to understand that calculations will encompass a much larger area than could be affected in any single spill event, where a more limited set of conditions will occur. Consequently, it is misleading to imply that the region derived from stochastic modelling indicate the outcomes expected from a single spill event (NOPSEMA, 2017) Stochastic modelling is generally used for risk assessment and preparedness planning by indicating locations that could be exposed and may require response or subsequent impact assessment
Sub-LGA	Sub-Local Government Areas
TOPEX/Poseidon	A joint satellite mission between NASA and CNES to map ocean surface topography using an array of satellites equipped with detailed altimeters
US EPA	United States Environmental Protection Agency
US CG	United States Coast Guard
World Ocean Atlas	A collection of physicochemical parameters (e.g. temperature, salinity, oxygen, phosphate, silicate, and nitrate) based on profile data from the World Ocean Database (NCEI, 2021) established by NOAA's National Centers for Environmental Information (NCEI)
WGS 1984	World Geodetic System 1984 (WGS84); reference coordinate system

EXECUTIVE SUMMARY

Background

Beach Energy (Operations) Limited (Beach) plans to tie-in production from four new wells in the Thylacine field (T/L2) to the existing Otway Gas Production Pipeline (OGPP) and to extend the Mono-Ethylene Glycol (MEG) and control systems from the Thylacine Wellhead Platform (WHP) to the new wells.

The construction support vessel (CSV), *Acergy Skandi*, will be used for the installation and commissioning activities in Q1 2023. The largest marine diesel oil (MDO) fuel tank on the CSV is 603.7 m^3, however Beach has been in discussion with the operator of this vessel to fill the tanks only partially to either 200 or 300 m^3.

The locations of the well head platforms (WHP) and wells are shown in Table 1-1. Installation activities will require a buffer around these infrastructure components, thus for the purposes of this modelling study, an Activity Area was established using the infrastructure locations and the position closest to shore was selected as the release location for the modelling study.

In order to inform the offshore environmental impact and risk assessments Beach commissioned a detailed oil spill modelling study assessing the following hypothetical scenarios:

- **Scenario 1**: A 300 m^3 surface release of marine diesel oil over 6 hours following a vessel collision; and
- **Scenario 2**: A 200 m^3 surface release of marine diesel oil over 6 hours following a vessel collision.

The modelling assessment was undertaken on a seasonal basis as follows:

- Summer (November through to March); and
- Winter (April to October)

The purpose of the modelling is to provide an understanding of a conservative 'outer envelope' of the potential area that may be affected in the unlikely event of hydrocarbon spill. The modelling does not take into consideration any of the spill prevention, mitigation and response capabilities that would be implemented in response to the spill. Therefore, the modelling results represent the maximum extent that the released hydrocarbon may influence.

The spill modelling was performed using an advanced three-dimensional trajectory and fates model; Spill Impact Model Application Program (SIMAP). The SIMAP model calculates the transport, spreading, entrainment and evaporation of spilled hydrocarbons over time, based on the prevailing wind and current conditions and the physical and chemical properties.

Methodology

The modelling study was carried out in several stages. Firstly, a ten-year wind and current dataset (2010–2019) was generated and the currents included the combined influence of three-dimensional large-scale ocean currents and tidal currents. Secondly, the currents, winds and detailed hydrocarbon characteristics were used as inputs in the three-dimensional oil spill model (SIMAP) to simulate the drift, spread, weathering and fate of the spilled oil.

As spills can occur during any set of wind and current conditions, modelling was conducted using a stochastic (random or non-deterministic) approach, which involved running 100 randomly selected single trajectory simulations per season, with each simulation having the same spill information (spill volume, duration and composition of hydrocarbons) but varying start times from the selected location closest to shore based on the location of Beach's Thylacine operations activity area. This ensured that each spill simulation was subject to a unique set of wind and current conditions

The SIMAP system, the methods and analysis presented herein, use modelling algorithms which have been anonymously peer reviewed and published in international journals. Further, RPS warrants that this work meets and exceeds the ASTM Standard F2067-13 "*Standard Practice for Development and Use of Oil Spill Models*".

Oil Properties

The MDO has an API of 37.6 and a density of 829.1 kg/m^3 (at 25ºC) with a viscosity value (4.0 cP) classifying it as a Group II (light-persistent) oil according to the International Tankers Owners Pollution Federation (ITOPF, 2014) and US EPA/USCG classifications. Six percent of the oil mass should evaporate within the first 12 hours (BP < 180 C), a further 34.6% should evaporate within the first 24 hours (180°C < BP < 160°C) and a further 54.4% should evaporate over several days (160°C < BP < 380°C). Approximately 5.0% of the oil is shown to be persistent.

Results

Scenario: 300 m³ loss of containment caused by vessel collision

- The maximum distance from the release location to the low (1–10 g/m^2), moderate (10–50 g/m^2) and high (> 50 g/m^2) exposure zones was 39.3 km (east-southeast) during summer conditions, 15.3 km (east-southeast) during winter conditions and 2.7 km (west-southwest) during winter conditions, respectively.
- The probability of accumulation to any shoreline at, or above, the low level (10 g/m^2) threshold was 0% during summer conditions and 5% during winter conditions. The minimum time before oil accumulation at, or above, the low threshold was 7.58 days winter conditions.
- The maximum total volume ashore for a single spill trajectory during winter conditions was 4.3 m^3, and the maximum length of shoreline accumulation at the low threshold was 11 km. No shoreline accumulation was observed for the summer season nor the moderate or high thresholds for winter.
- A total of 14 BIAs were shown to be exposed to dissolved hydrocarbons above the low and moderate thresholds during both the summer and winter conditions. During the summer and winter conditions the maximum dissolved aromatic concentrations at any given receptor(s) was predicted to be 57 ppb and 58 ppb, respectively, which occurred within receptors containing the release location.
- During both summer and winter conditions entrained hydrocarbon exposures at, or above, the low threshold was predicted for AMP, BIA, IBRA, IMCRA, KEF, MNP, RSB, nearshore waters (LGA and sub-LGA) and State Water receptors. The maximum entrained hydrocarbon concentration predicted during the summer and winter conditions was 6,323 ppb and 7,007 ppb, respectively, which occurred within the receptors containing the release location.

Scenario: 200 m³ loss of containment caused by vessel collision

- The maximum distance from the release location to the low (1–10 g/m^2), moderate (10–50 g/m^2) and high (> 50 g/m^2) exposure zones was 36.5 km (east-southeast) during summer conditions, 9.4 km (southeast) during winter conditions and 0.5 km (southwest) during winter conditions, respectively.
- The probability of accumulation to any shoreline at, or above, the low level (10 g/m^2) threshold was 0% during summer conditions and 2% during winter conditions.
- The minimum time before oil accumulation at, or above, the low threshold was 8.13 days during the winter conditions. The maximum total volume ashore for a single spill trajectory during the winter conditions was 2.7 m^3, and the maximum length of shoreline accumulation at the low threshold was 5 km. No shoreline accumulation was observed for the summer season nor the moderate or high thresholds for winter.
- A total of 14 BIAs were shown to be exposed to dissolved hydrocarbons above the low threshold during both the summer and winter conditions. During the summer and winter conditions the maximum dissolved aromatic concentrations at any given receptor(s) was predicted to be 45 ppb and 43 ppb, respectively, which occurred within receptors containing the release location.
- During both summer and winter conditions entrained hydrocarbon exposures at, or above, the low and high threshold was predicted for AMP, BIA, IBRA, IMCRA, KEF, MNP, RSB, nearshore waters (LGA and sub-LGA) and State Water receptors. The maximum entrained hydrocarbon concentration predicted during the summer and winter conditions was 4,243 ppb and 4,604 ppb, respectively, which occurred within receptors containing the release location.

1 INTRODUCTION

1.1 Background

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The spill modelling was performed using an advanced three-dimensional trajectory and fates model; Spill Impact Model Application Program (SIMAP). The SIMAP model calculates the transport, spreading, entrainment and evaporation of spilled hydrocarbons over time, based on the prevailing wind and current conditions and the physical and chemical properties.

Note that the oil spill model, the method and analysis presented herein uses modelling algorithms which have been anonymously peer reviewed and published in international journals. Furthermore, RPS warrants that this work meets and exceeds the American Society for Testing and Materials (ASTM) Standard F2067-13 "*Standard Practice for Development and Use of Oil Spill Models*".

Table 1-1 Location of Thylacine operations infrastructure used to define the Activity Area.

Infrastructure	Latitude	Longitude
Thylacine-A WHP	39º 14.241' S	142º 54.126' E
Thylacine North-1 (TN-1) well	39° 12.510' S	142° 52.496' E
Thylacine North-2 (TN-2) well	39° 12.284' S	142° 51.557' E
Thylacine West-1 (TW-1) well	39° 13.338' S	142° 50.318' E
Thylacine West-2 (TW-2) well	39° 13.332' S	142° 50.310' E

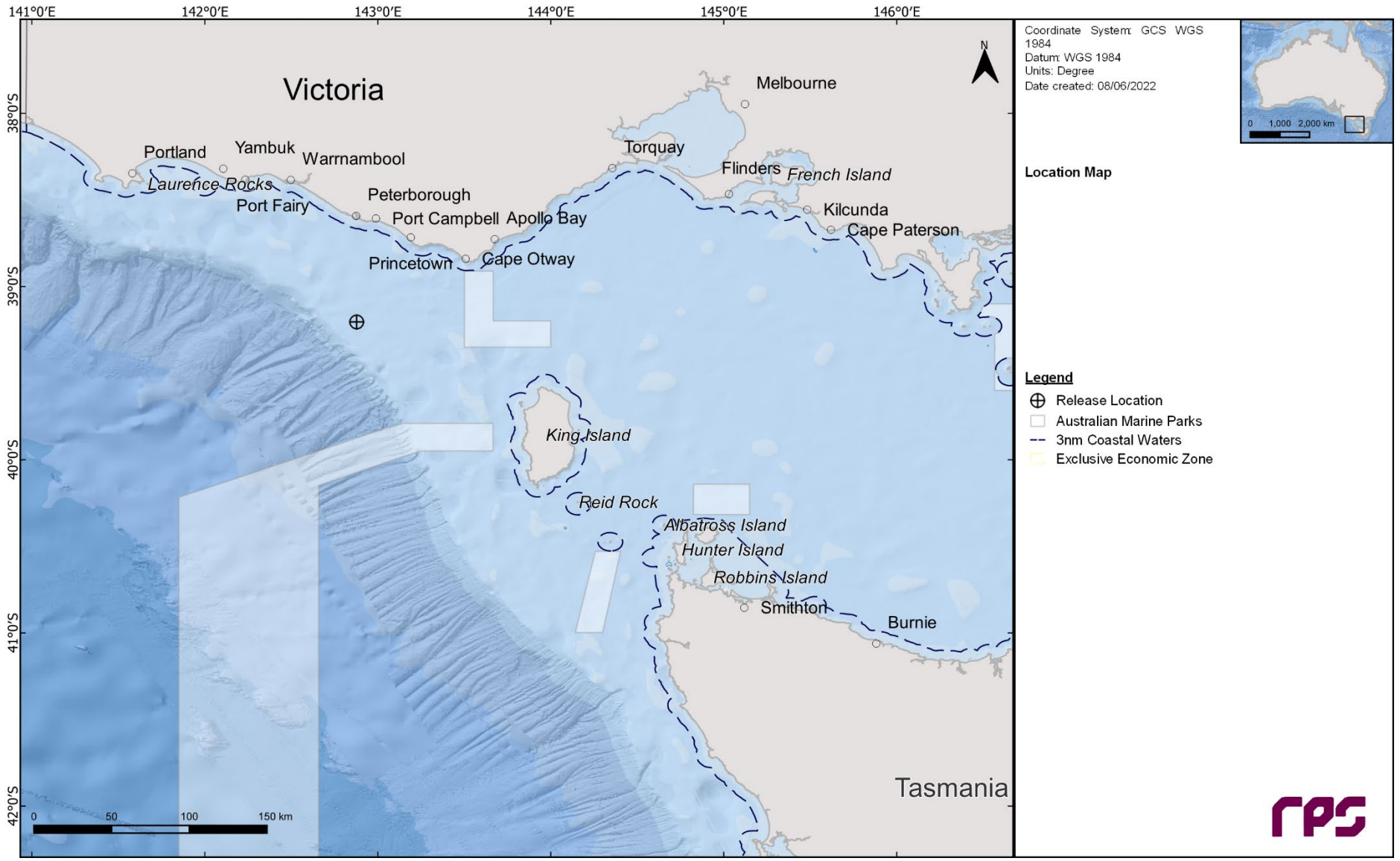

Figure 1-1 Map of the Thylacine Activity Area release location.

1.2 What is Oil Spill Modelling?

Oil spill modelling is a valuable tool widely used for risk assessment, emergency response and contingency planning where it can be particularly helpful to proponents and decision makers. By modelling a series of the most likely oil spill scenarios, decisions concerning suitable response measures and strategic locations for deploying equipment and materials can be made, and the locations at most risk can be identified. The two types of oil spill modelling often used are stochastic (Section 1.2.1) and deterministic (Section 1.2.2) modelling.

1.2.1 Stochastic Modelling (Multiple Spill Simulations)

Stochastic oil spill modelling is created by overlaying a great number (often hundreds) of individual, computer-simulated hypothetical spills (NOPSEMA, 2018; Figure 1.2).

Stochastic modelling is a common means of assessing the potential risks from oil spills related to new projects and facilities. Stochastic modelling typically utilises hydrodynamic data for the location in combination with historic wind data. Typically, 100 iterations of the model will be run utilising the data that is most relevant to the season or timing of the project.

The outcomes are often presented as a probability of exposure and is primarily used for risk assessment purposes in view to understand the range of environments that may be affected or impacted by a spill. Elements of the stochastic modelling can also be used in oil spill preparedness and planning.

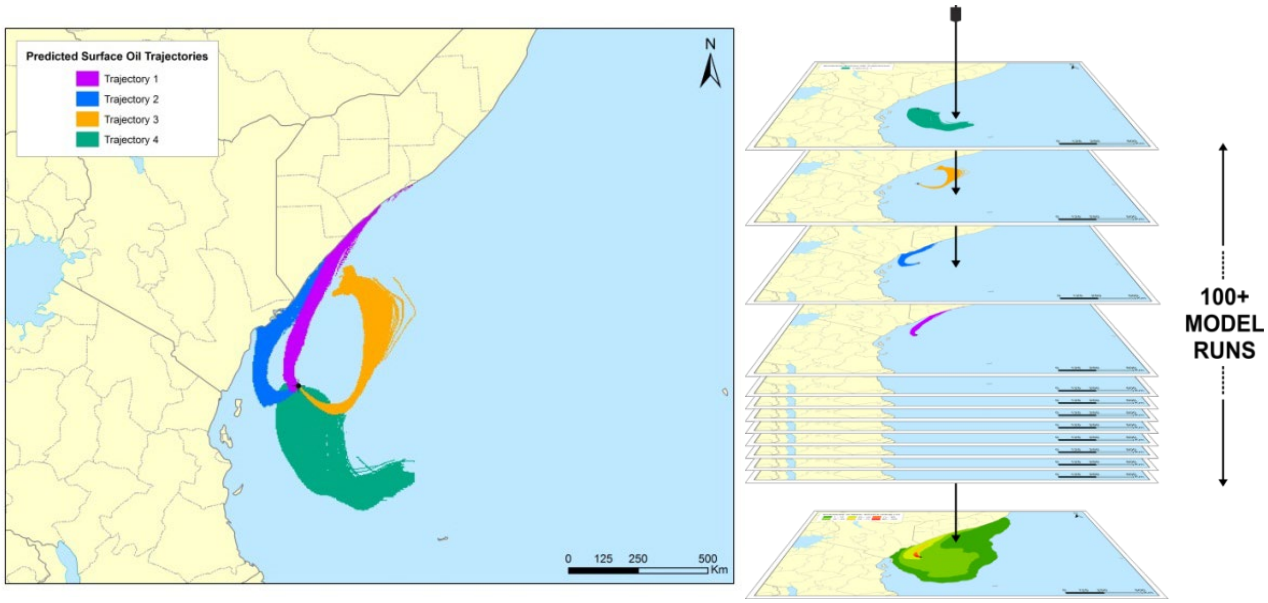

Figure 1-2 Examples of four individual spill trajectories (four replicate simulations) predicted by SIMAP for a spill scenario. The frequency of contact with given locations is used to calculate the probability of impacts during a spill. Essentially, all model runs are overlain (shown as the stacked runs on the right) and the number of times that trajectories contact a given location at a concentration is used to calculate the probability.

1.2.2 Deterministic Modelling (Single Spill Simulation)

Deterministic modelling is the predictive modelling of a single incident subject to a single sample of wind and weather conditions over time (NOPSEMA, 2018; Figure 1-3).

Deterministic modelling is often paired with stochastic modelling to place the large stochastic footprint into perspective. This deterministic analysis is generally a single run selected from the stochastic analysis and serves as the basis for developing the plans and equipment needs for a realistic spill response. Deterministic spills can be selected on several basis such as minimum time to shoreline, largest swept area, maximum volume ashore, longest length of shoreline contacted by oil or largest area of entrained or dissolved hydrocarbons.

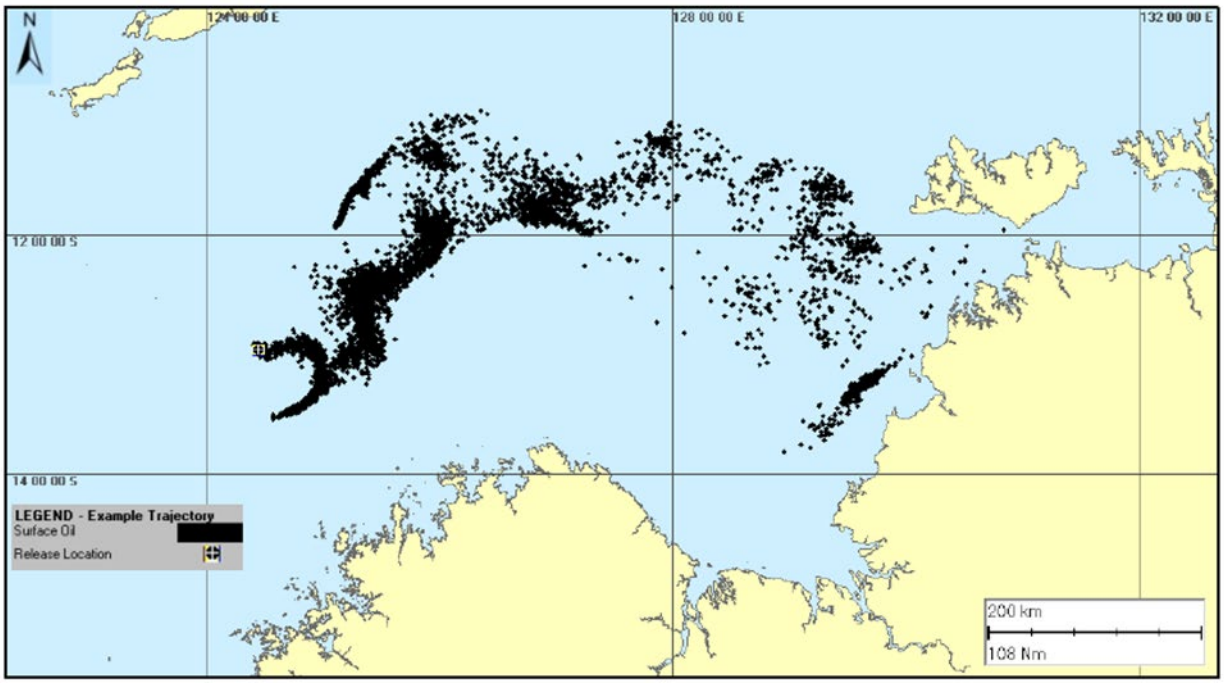

Figure 1-3 Example of an individual spill trajectory predicted by SIMAP for a spill scenario. Note, this image represents surface oil as spillets and do not take any thresholds into consideration.

2 SCOPE OF WORK

The scope of work included the following components:

- Generate 10 years of winds and three-dimensional currents from 2010 to 2019 (inclusive). The currents included the combined influence of tidal and ocean currents;
- Include the wind and current data and characteristics of the MDO as input into the three-dimensional oil spill model (SIMAP), to model the movement, spreading, weathering and shoreline contact by hydrocarbons over time;
- Use SIMAP's stochastic model (also known as a probability model) to calculate exposure to surround waters and shorelines. This involved running 100 randomly selected single trajectory simulations per season, with each simulation having the same spill information (spill volume, duration and composition of hydrocarbons) but varying start times from the selected location closest to shore based on the location of Beach's Thylacine operations Activity Area (see Figure 1-1 and Table 1-1). This ensured that each spill simulation was subject to a unique set of wind and current conditions;
- Results were assessed to determine the exposure to waters and contact to shorelines based upon the NOPSEMA thresholds; and
- The stochastic modelling results were reviewed, and the "worst case" deterministic runs were identified and presented based on the following criteria (if applicable):
    a. Largest volume of oil ashore;
    b. Longest length of oil accumulation on shorelines above 100 g/m^2;
    c. minimum time before shoreline contact above 10 g/m^2.

3 REGIONAL CURRENTS

Bass Strait is a body of water separating Tasmania from the southern Australian mainland, specifically the state of Victoria. The strait is a relatively shallow area of the continental shelf, connecting the southeast Indian Ocean with the Tasman Sea. Currents within the straight are primarily driven by tides, winds, incident continental shelf waves and density driven flows; high winds and strong tidal currents are frequent within the area (Jones, 1980).

The varied geography and bathymetry of the region, in addition to the forcing of the south-eastern Indian Ocean and local meteorology lead to complex shelf and slope circulation patterns (Middleton & Bye, 2007). Figure 3-1 displays seasonal current trends within the Bass Strait. During winter there is a strong eastward water flow due to the strengthening of the South Australian Current (fed by the Leeuwin Current in the Northwest Shelf), which bifurcates with one extension moving though the Bass Strait, and another forming the Zeehan Current off western Tasmania (Sandery & Kämpf, 2007). During summer, water flow reverses off Tasmania, King Island and the Otway Basin travelling eastward, as the coastal current develops due to south-easterly winds.

To accurately describe the variability in currents between the inshore and offshore region, a hybrid regional dataset was developed by combining deep ocean predictions obtained from HYCOM (Hybrid Coordinate Ocean Model) with surface tidal currents developed by RPS. The following sections provide a summary of the hybrid regional dataset.

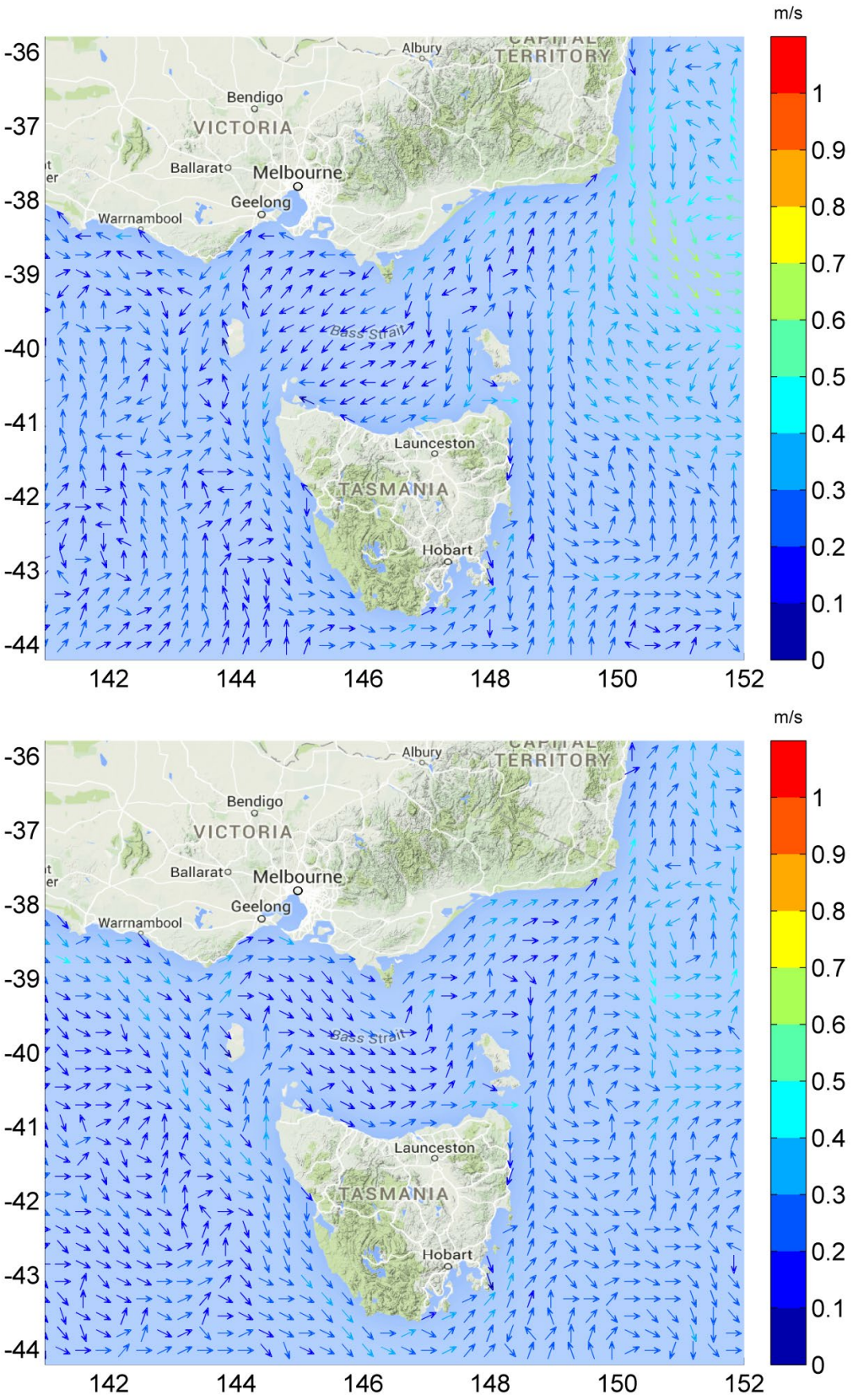

Figure 3-1 HYCOM averaged seasonal surface drift currents during summer (upper image) and winter (lower image).

3.1 Tidal currents

Tidal current data was generated using RPS's advanced ocean/coastal model, HYDROMAP. The HYDROMAP model has been thoroughly tested and verified through field measurements throughout the world for more than 30 years (Isaji & Spaulding, 1984; Isaji, et al., 2001; Zigic, et al., 2003). HYDROMAP tidal current data has been used as input to forecast (in the future) and hindcast (in the past) pollutant spills in Australian waters and forms part of the Australian National Oil Spill Emergency Response System operated by AMSA (Australian Maritime Safety Authority).

HYDROMAP employs a sophisticated sub-gridding strategy, which supports up to six levels of spatial resolution, halving the grid cell size as each level of resolution is employed. The sub-gridding allows for higher resolution of currents within areas of greater bathymetric and coastline complexity, and/or of interest to a study.

The numerical solution methodology follows that of Davies (1977a and 1977b) with further developments for model efficiency by Owen (1980) and Gordon (1982). A more detailed presentation of the model can be found in Isaji and Spaulding (1984) and Isaji et al. (2001).

3.1.1 Grid Setup

The tidal model domain is sub-gridded to a resolution of 500 m for shallow and coastal regions, starting from an offshore (or deep water) resolution of 8 km. The finer grids are progressively allocated in a step-wise fashion to more accurately resolve flows along the coastline, around islands and over regions with more complex bathymetry. Figure 3-2 shows the tidal model grid covering the study domain.

A combination of datasets was used and merged to describe the shape of the seabed within the grid domain (Figure 3-3). These included spot depths and contours which were digitised from nautical charts released by the hydrographic offices as well as Geoscience Australia database and depths extracted from the Shuttle Radar Topography Mission (SRTM30_PLUS) Plus dataset (see Becker et al., 2009).

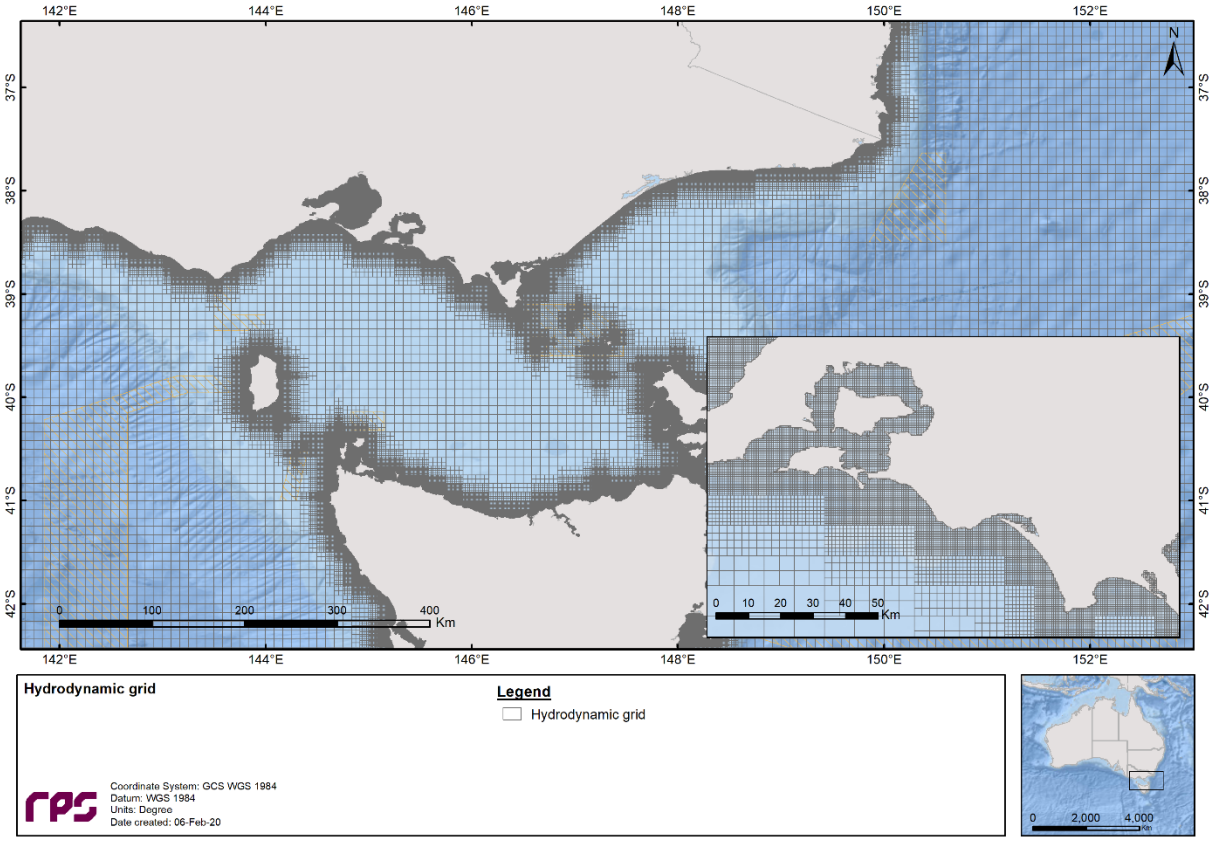

Figure 3-2 Sample of the model grid used to generate the tidal currents for the study region. Higher resolution areas are shown by the denser mesh.

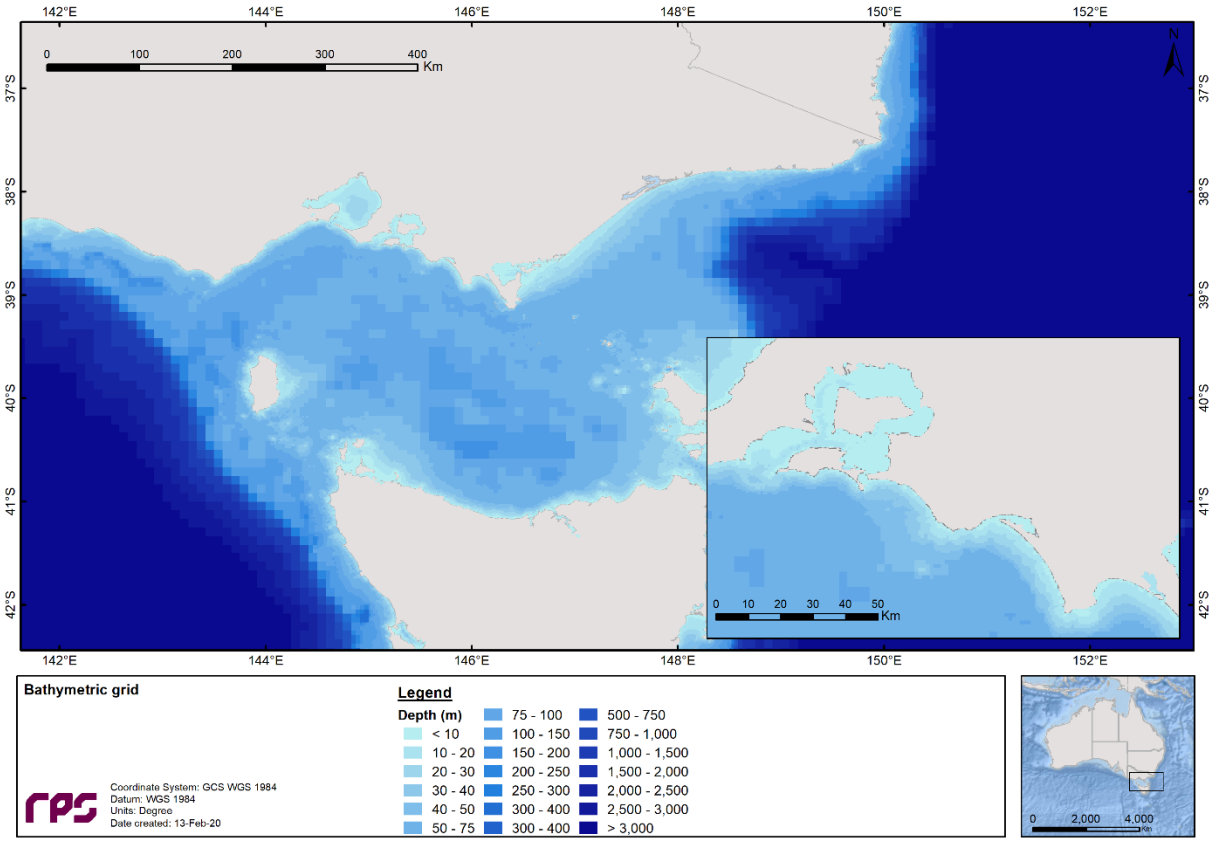

Figure 3-3 Bathymetry defined throughout the tidal model domain.

3.1.2 Tidal Conditions

The ocean boundary data for the regional model was obtained from satellite measured altimetry data (TOPEX/Poseidon 8.0) which provided estimates of the eight dominant tidal constituents at a horizontal scale of approximately 0.25 degrees. The eight major tidal constituents used were K_2, S_2, M_2, N_2, K_1, P_1, O_1 and Q_1. Using the tidal data, time series surface heights were calculated along the open boundaries for the simulation period.

The Topex/Poseidon satellite data has a resolution of 0.25 degrees globally, with higher resolution in coastal regions, and is produced and quality controlled by NASA (National Aeronautics and Space Administration). The data capturing satellites, equipped with two altimeters capable of taking sea level measurements accurate to less than ± 5 cm, measured oceanic surface elevations (and the resultant tides) for the period 1992–2005. In total these satellites carried out 62,000 orbits of the planet. The Topex/Poseidon tidal data has been widely used amongst the oceanographic community, being refereced in more than 2,100 research publications (e.g. Andersen, 1995; Ludicone et al., 1998; Matsumoto et al., 2000; Kostianoy et al., 2003; Yaremchuk & Tangdong, 2004; Qiu & Chen 2010). The Topex/Poseidon tidal data is considered suitably accurate for this study.

3.1.3 Surface Elevation Validation

To ensure that tidal predictions were accurate, predicted surface elevations were compared to data observed at a location situated within the study area (Figure 3-4).

To provide a statistical measure of the model performance, the Index of Agreement (IOA – Willmott, 1981) and the Mean Absolute Error (MAE – Willmott, 1982; Willmott & Matsuura, 2005) were used.

The MAE (Eq.1) is simply the average of the absolute values of the difference between the model-predicted (P) and observed (O) variables. It is a more natural measure of the average error (Willmott and Matsuura, 2005) and more readily understood. The MAE is determined by:

$$MAE = N^{-1} \sum_{i=1}^{N} |P_i - O_i| \qquad \text{Eq.1}$$

Where: N = Number of observations

P_i = Model predicted surface elevation

O_i = Observed surface elevation

The Index of Agreement (IOA; Eq. 2) in contrast, gives a non-dimensional measure of model accuracy or performance. A perfect agreement between the model predicted and observed surface elevations exists if the index gives an agreement value of 1, and complete disagreement between model and observed surface elevations will produce an index measure of 0 (Wilmott, 1981). Willmott et al. (1985) also suggests that values larger than 0.5 may represent good model performance. The IOA is determined by:

$$IOA = 1 - \frac{\sum |X_{model} - X_{obs}|^2}{\sum (|X_{model} - \overline{X_{obs}}| + |X_{obs} - \overline{X_{obs}}|)^2} \qquad \text{Eq.2}$$

Where: X_{model} = Model predicted surface elevation

X_{obs} = Observed surface elevation

Clearly, a greater IOA and lower MAE represent a better model performance.

Figure 3-5 and Figure 3-6 illustrate a comparison of the predicted and observed surface elevations in February 2017. As shown on the graph, the model accurately reproduced the phase and amplitudes throughout the spring and neap tidal cycles.

Table 3-1 shows the IOA and MAE values for the selected tide station locations indicating that the model is performing well.

Table 3-1 Statistical comparison between the observed and HYDROMAP predicted surface elevations.

Tide Station	IOA	MAE (m)
Gabo Island	0.98	0.08
Port MacDonnell	0.98	0.05
Port Welshpool	0.92	0.30
Portland	0.97	0.07
Stack Island	0.96	0.22

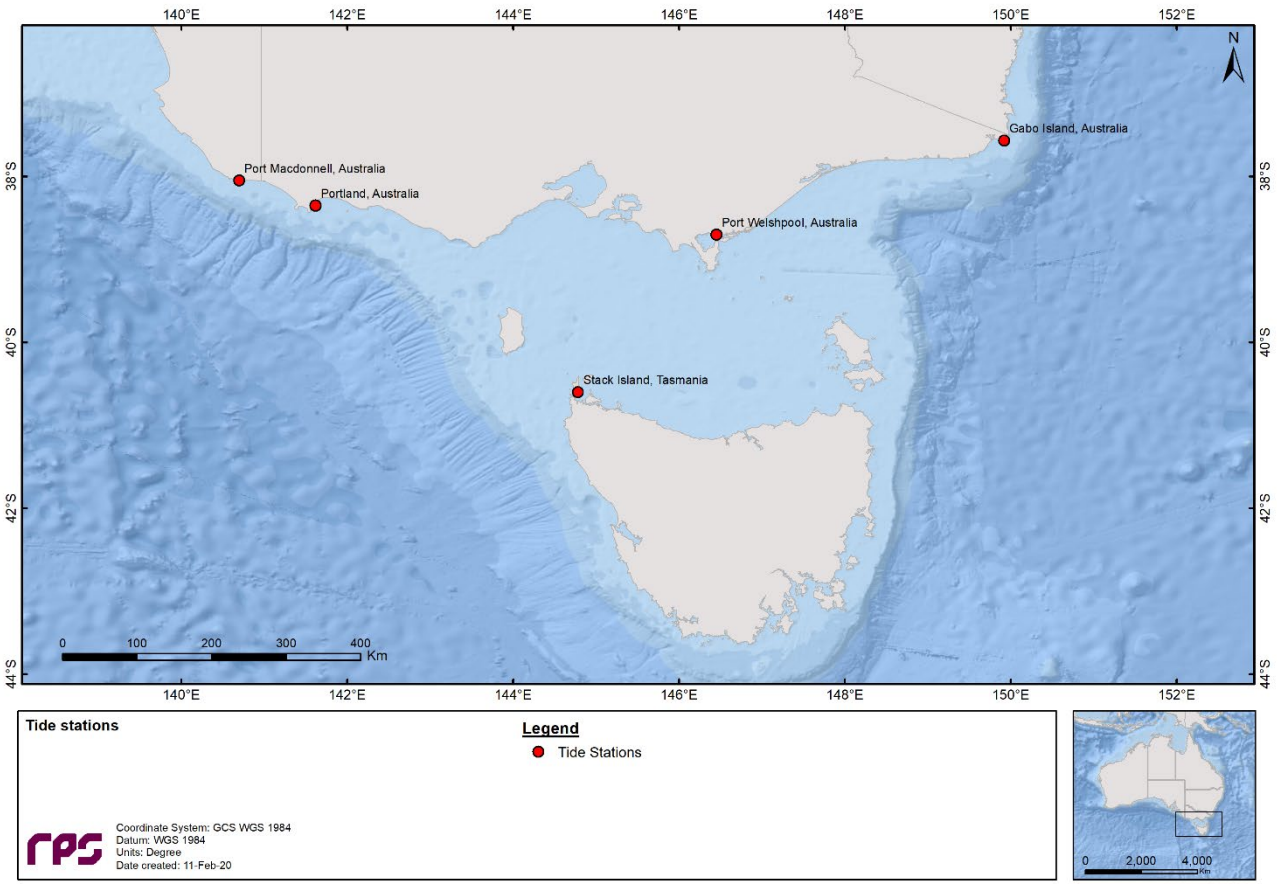

Figure 3-4 Location of the tide stations used in the surface elevation validation.

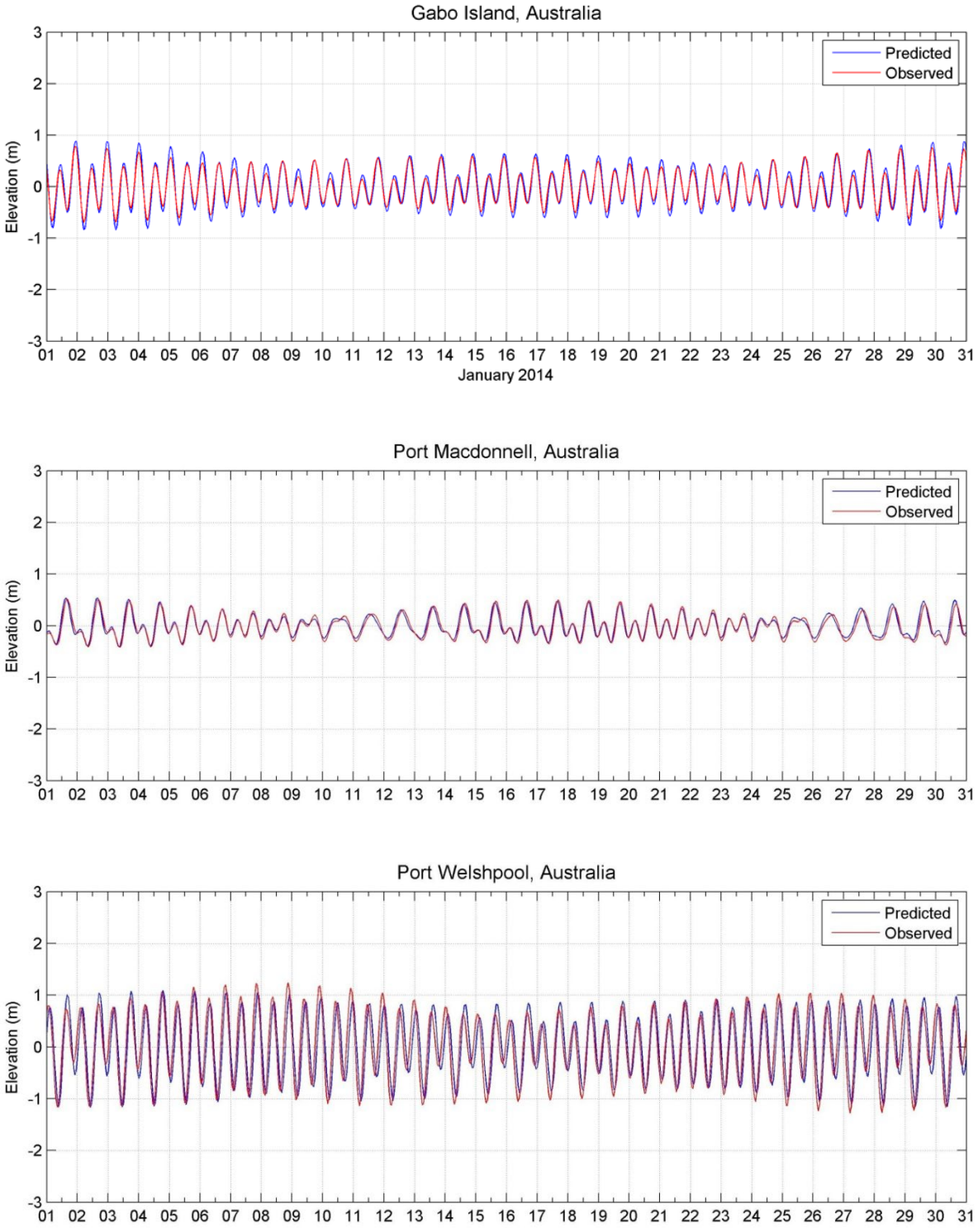

Figure 3-5 Comparison between HYDROMAP predicted (blue line) and observed (red line) surface elevation at tidal stations Gabo Island (upper image), Port MacDonnell (middle image) and Port Welshpool (lower image).

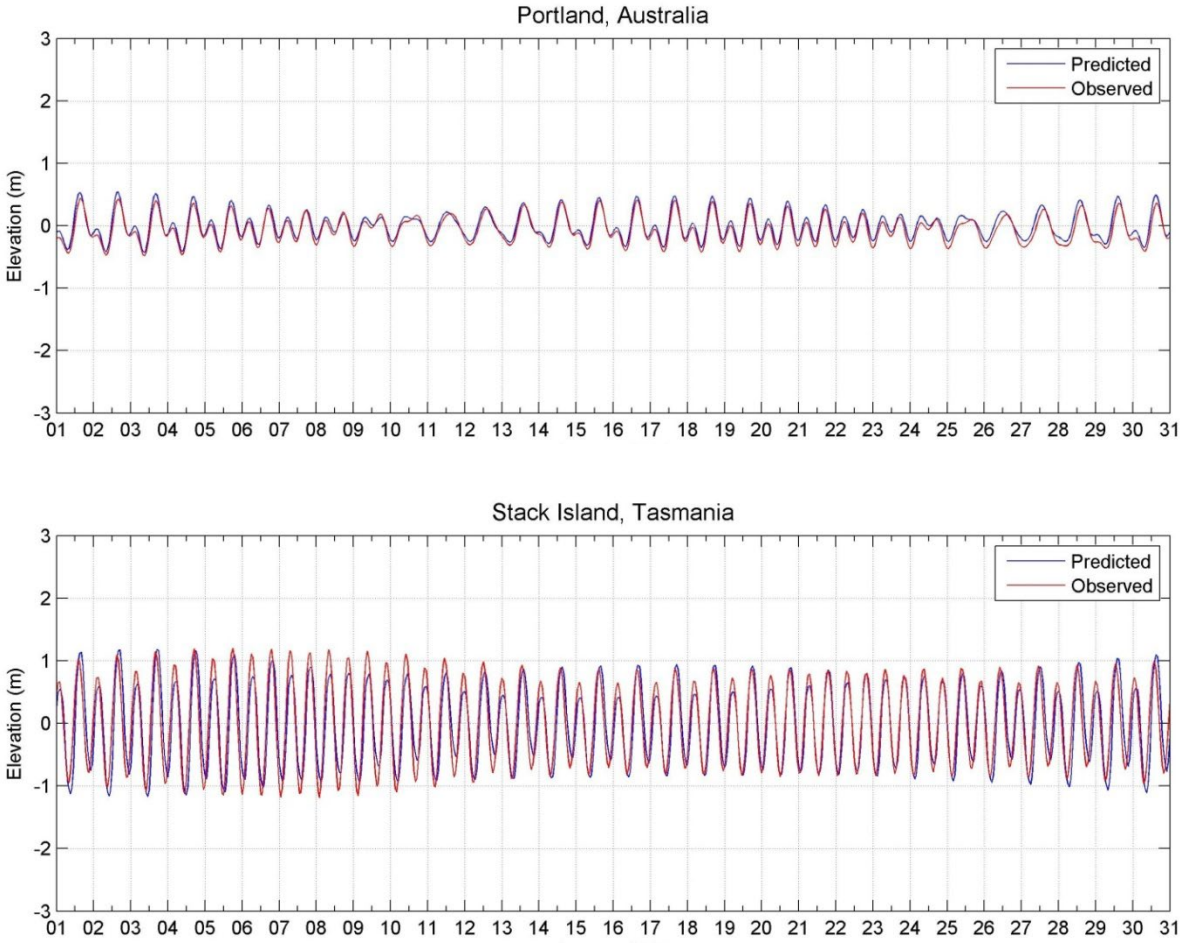

Figure 3-6 Comparison between HYDROMAP predicted (blue line) and observed (red line) surface elevation at tidal stations Portland (upper image) and Stack Island (lower image).

3.2 Ocean Currents

Data describing the flow of ocean currents for the years 2010 to 2019 (inclusive) was obtained from HYCOM (Hybrid Coordinate Ocean Model, (Chassignet et al., 2007), which is operated by the HYCOM Consortium, sponsored by the Global Ocean Data Assimilation Experiment (GODAE). HYCOM is a data-assimilative, three-dimensional ocean model that is run as a hindcast (for a past period), assimilating time-varying observations of sea surface height, sea surface temperature and in-situ temperature and salinity measurements (Chassignet et al., 2009). The HYCOM predictions for drift currents are produced at a horizontal spatial resolution of approximately 8.25 km (1/12th of a degree) over the region, at a frequency of once per day. HYCOM uses isopycnal layers in the open, stratified ocean, but uses the layered continuity equation to make a dynamically smooth transition to a terrain-following coordinate in shallow coastal regions, and to z-level coordinates in the mixed layer and/or unstratified seas. Figure 3-7 illustrates the spatial resolution of HYCOM currents.

For this study, the HYCOM hindcast currents were obtained.

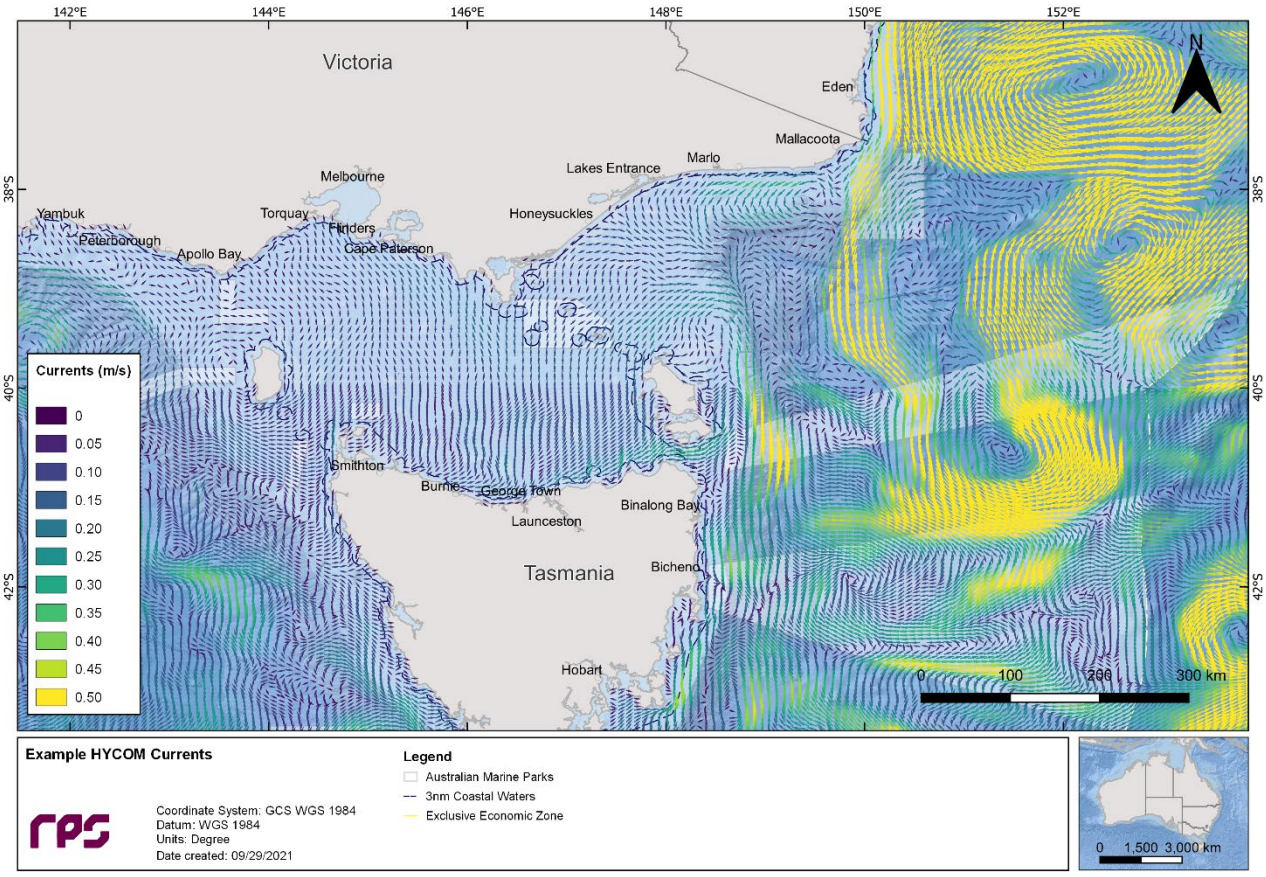

Figure 3-7 Map illustrating the spatial resolution of HYCOM currents.

3.3 Surface Currents

Table 3-2 presents the average and maximum net surface current speeds nearby the release location by combining the ocean and tidal currents. Current speeds varied throughout the year with peak current speeds ranging between approximately 0.81 m/s (October) and 1.15 m/s (August). The dominant surface current directions throughout the year were identified as (towards) east-southeast and west-northwest.

Figure 3-8 and Figure 3-9 show the monthly and total surface current rose distributions for the selected location.

Note the convention for defining current direction is the direction the current flows towards, which is used to reference current direction throughout this report. Each branch of the rose represents the currents flowing to that direction, with north to the top of the diagram. Sixteen directions are used. The branches are divided into segments of different colour, which represent the current speed ranges for each direction. Speed intervals of 0.1 m/s are predominantly used in these current roses. The length of each coloured segment is relative to the proportion of currents flowing within the corresponding speed and direction.

Table 3-2 Predicted monthly average and maximum surface current speeds for the selected location. The data was derived by combining the HYCOM ocean data and HYDROMAP tidal data from 2010–2019 (inclusive).

Month	Average current speed (m/s)	Maximum current speed (m/s)	General direction(s) (Towards)
January	0.20	0.90	East-northeast and West-southwest
February	0.21	1.00	East-northeast and West-southwest
March	0.22	1.14	East-northeast and West-southwest
April	0.22	0.90	East
May	0.27	1.03	East
June	0.25	0.99	East
July	0.29	0.94	East
August	0.26	1.15	East
September	0.23	0.98	East
October	0.22	0.81	East
November	0.21	0.83	East
December	0.22	0.82	East-northeast and West-southwest
Minimum	**0.20**	**0.81**	
Maximum	**0.29**	**1.15**	

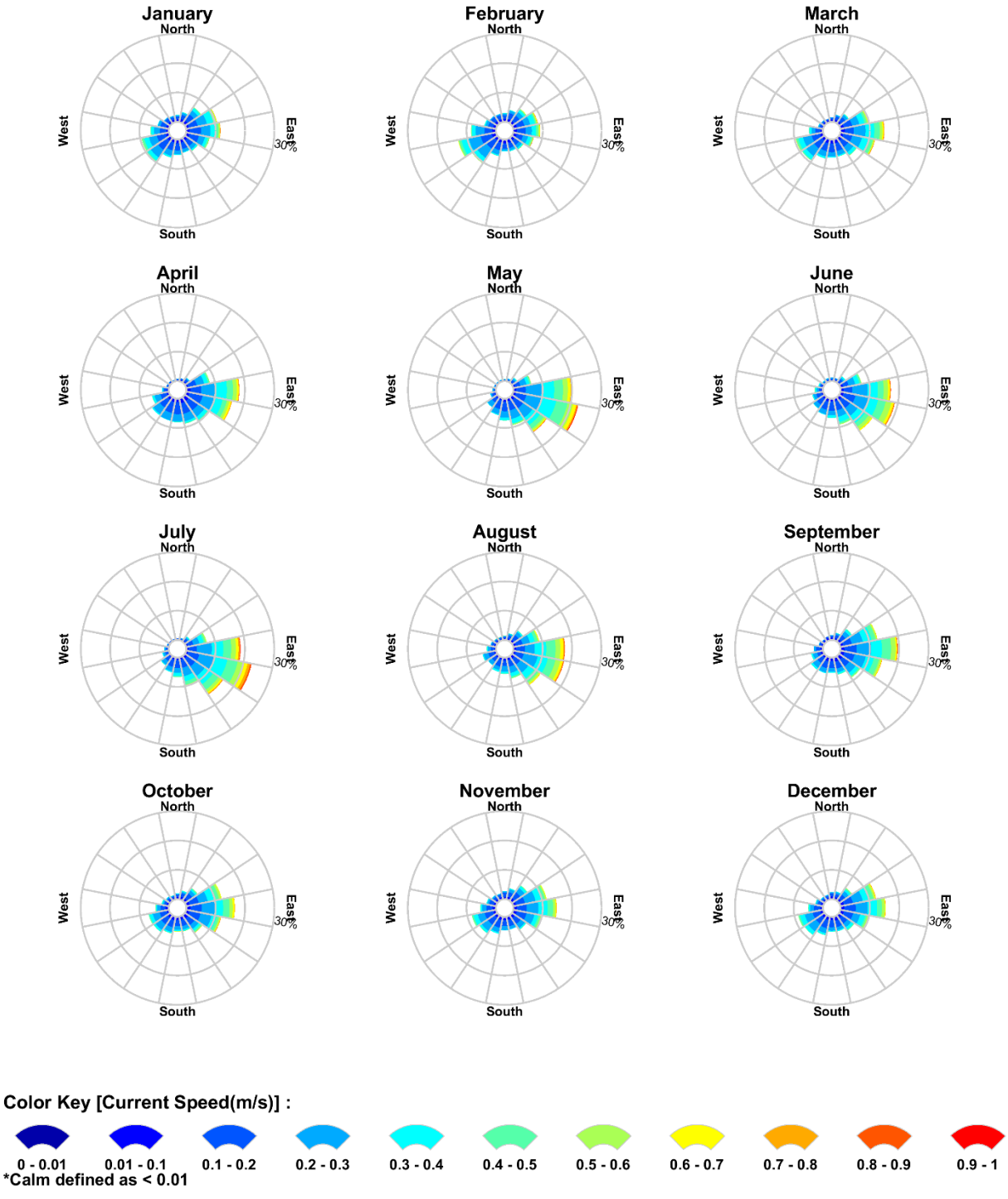

Figure 3-8 Monthly surface current rose plots nearby the release location (derived by combining the HYDROMAP tidal currents and HYCOM ocean currents for 2010–2019 (inclusive).

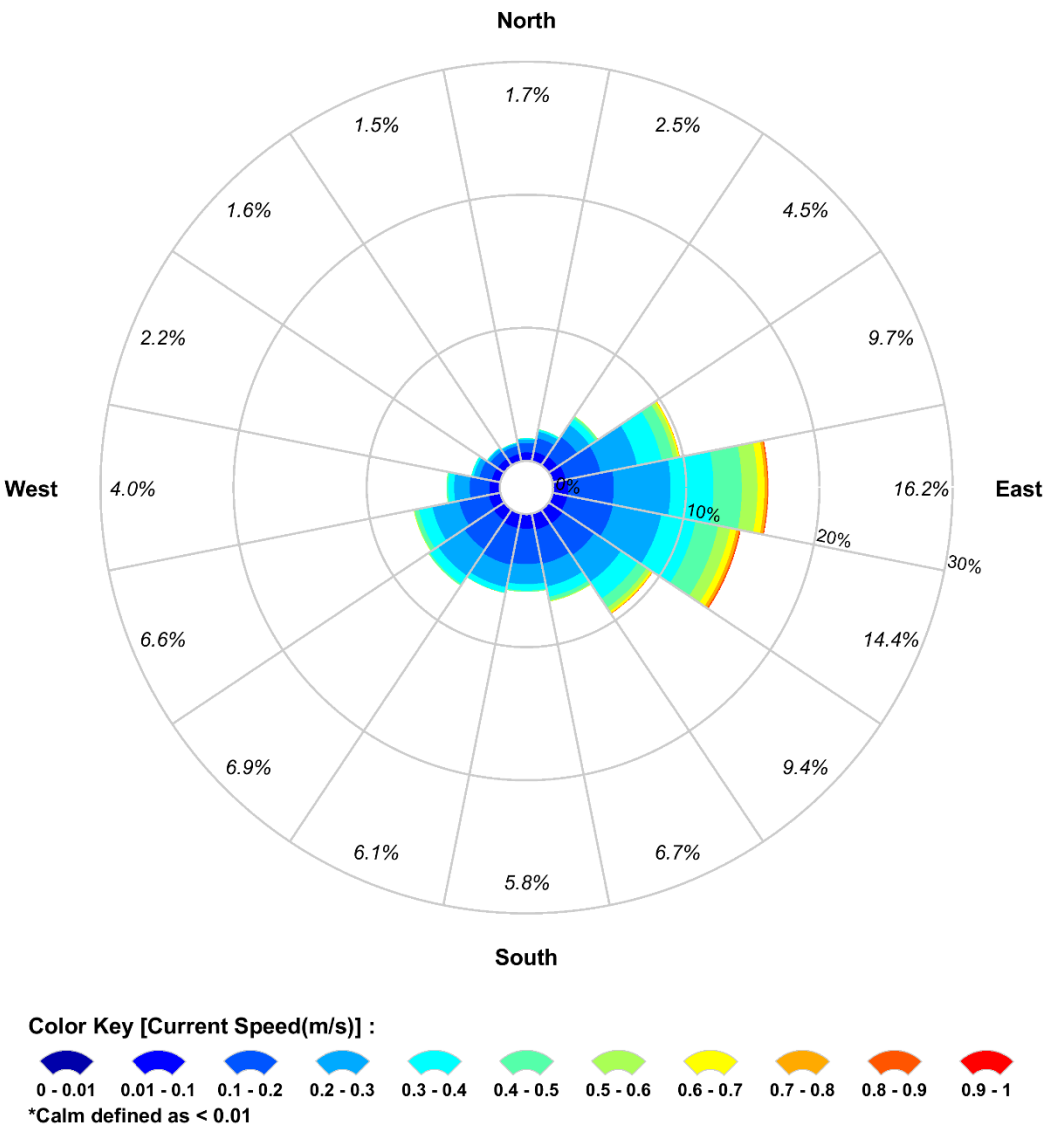

Figure 3-9 Total surface current rose plot nearby the release location (derived by combining the HYDROMAP tidal currents and HYCOM ocean currents for 2010–2019 (inclusive).

4 WIND DATA

High resolution wind data for the years 2010 to 2019 (inclusive) was sourced from the National Centre for Environmental Prediction (NCEP) Climate Forecast System Reanalysis dataset (CFSR; see Saha et al., 2010). The CFSR wind model is a fully coupled, data-assimilative hindcast model representing the interaction between the earth's oceans, land and atmosphere. The gridded wind data output is available at ¼ of a degree resolution (~33 km) and 1-hourly time intervals. Figure 4-1 shows the spatial resolution of the wind field used as input into the oil spill model.

Table 4-1 presents the monthly average and maximum winds derived from a CFSR wind node nearby the release location. The wind data demonstrated average monthly wind speeds ranging from 14.2 knots (January) to 20.1 knots (July) with maximums ranging between 58.9 knots (February) and 65.8 knots (December. The dominant wind direction throughout the year was from the west, whilst maximum wind speeds were typically associated with westerly winds during all months of the year.

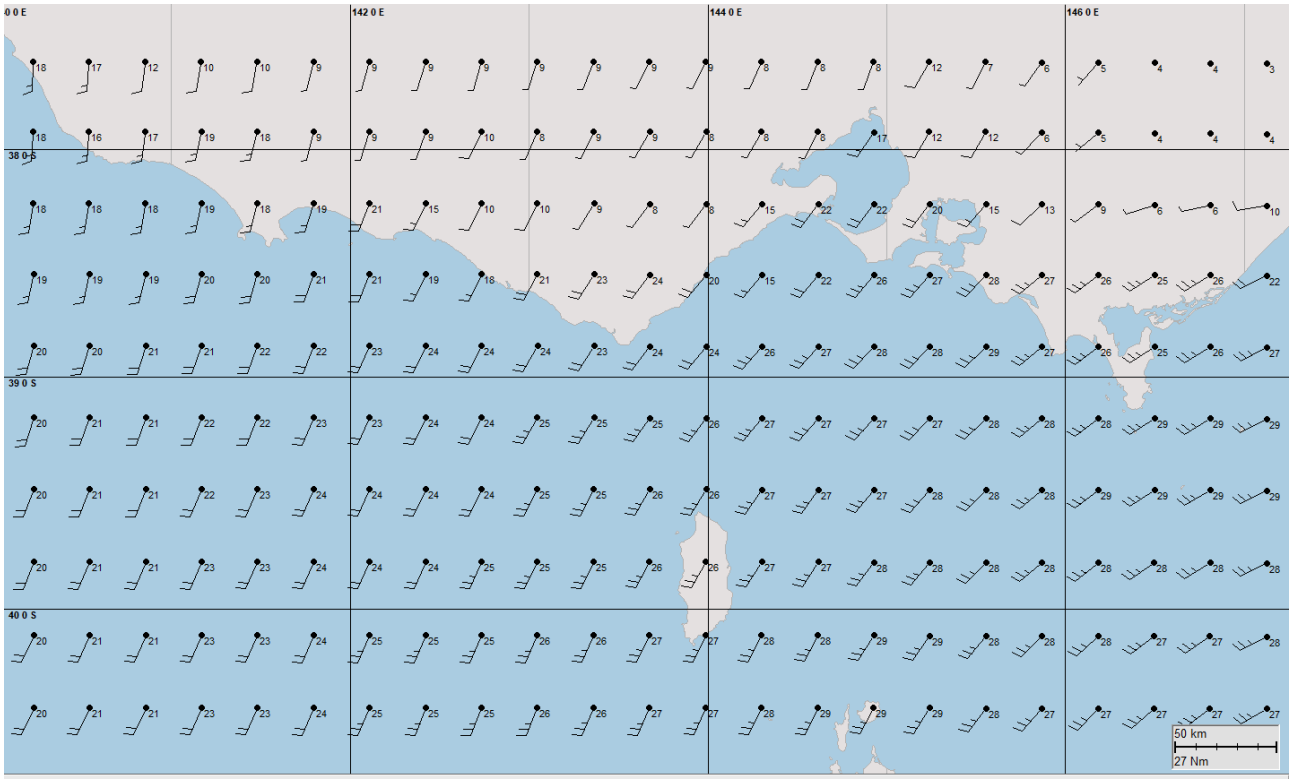

Figure 4-1 Spatial resolution of the CFSR modelled wind data used as input into the oil spill model.

Figure 4-2 and Figure 4-3 show the monthly and total wind rose distributions derived from the CFSR data for the selected node nearby the release location.

Note that the atmospheric convention for defining wind direction, that is, the direction the wind blows from, is used to reference wind direction throughout this report. Each branch of the rose represents wind coming from that direction, with north to the top of the diagram. Sixteen directions are used. The branches are divided into segments of different colour, which represent wind speed ranges from that direction. Speed ranges of 3 knots are predominantly used in these wind roses. The length of each segment within a branch is proportional to the frequency of winds blowing within the corresponding range of speeds from that direction.

Table 4-1 Predicted average and maximum winds representative for the selected node nearby the release location. Data derived from CFSR hindcast model from 2010–2019 (inclusive).

Month	Average wind speed (knots)	Maximum wind speed (knots)	General direction(s) (From)
January	14.2	62.8	East-southeast and West-southwest
February	14.8	58.9	Southeast
March	14.8	64.7	East and West
April	14.6	61.2	West
May	17.3	62.2	West
June	17.5	60.5	West to North
July	20.1	60.5	West to North
August	19.5	65.1	West to North
September	17.4	60.8	West
October	16.4	61.8	West
November	15.3	60.8	West
December	14.9	65.8	West and East-southeast
Minimum	**14.2**	**58.9**	
Maximum	**20.1**	**65.8**	

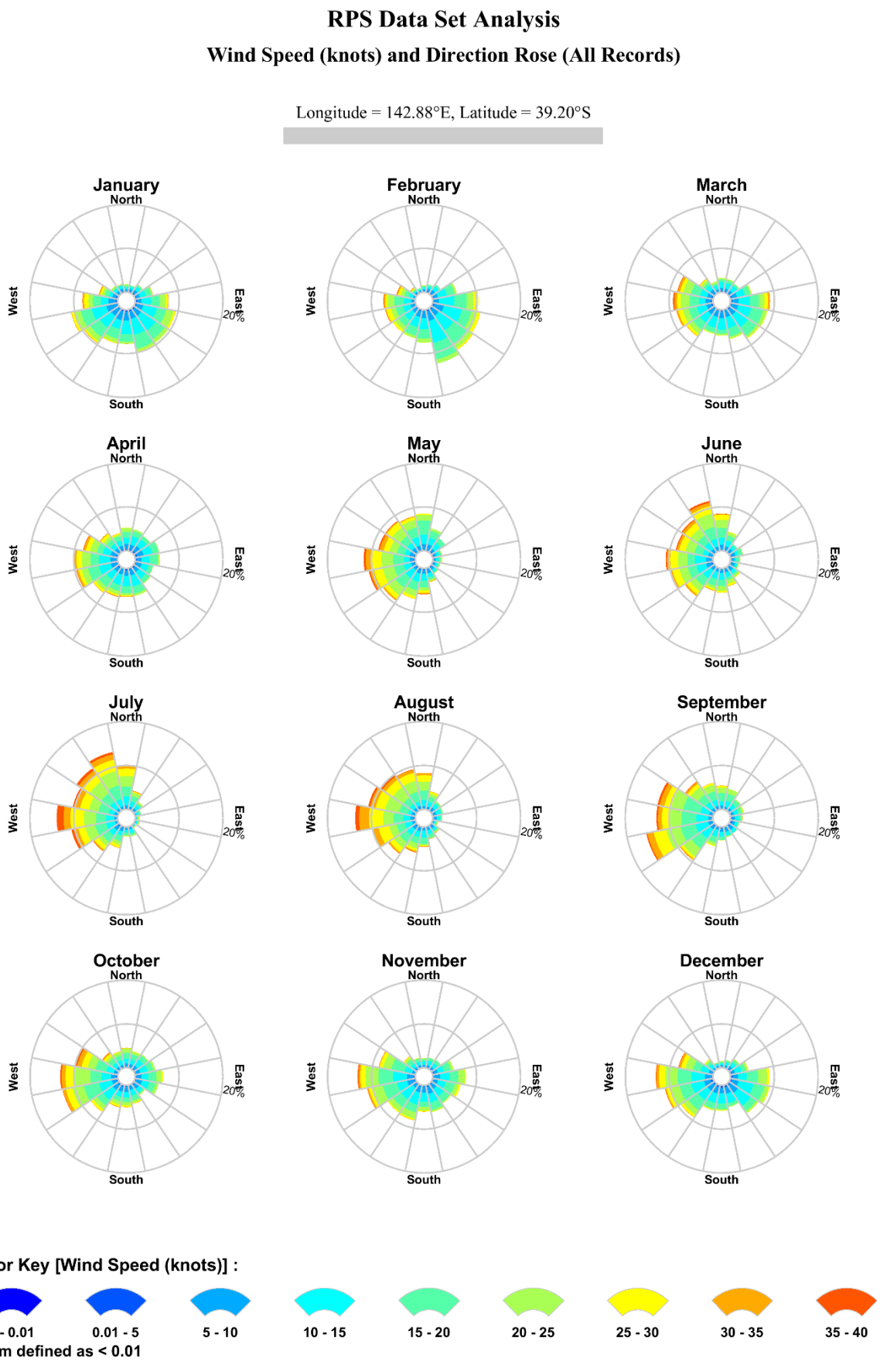

Figure 4-2 Modelled monthly wind rose distributions from 2010–2019 (inclusive) for the node nearby the release location.

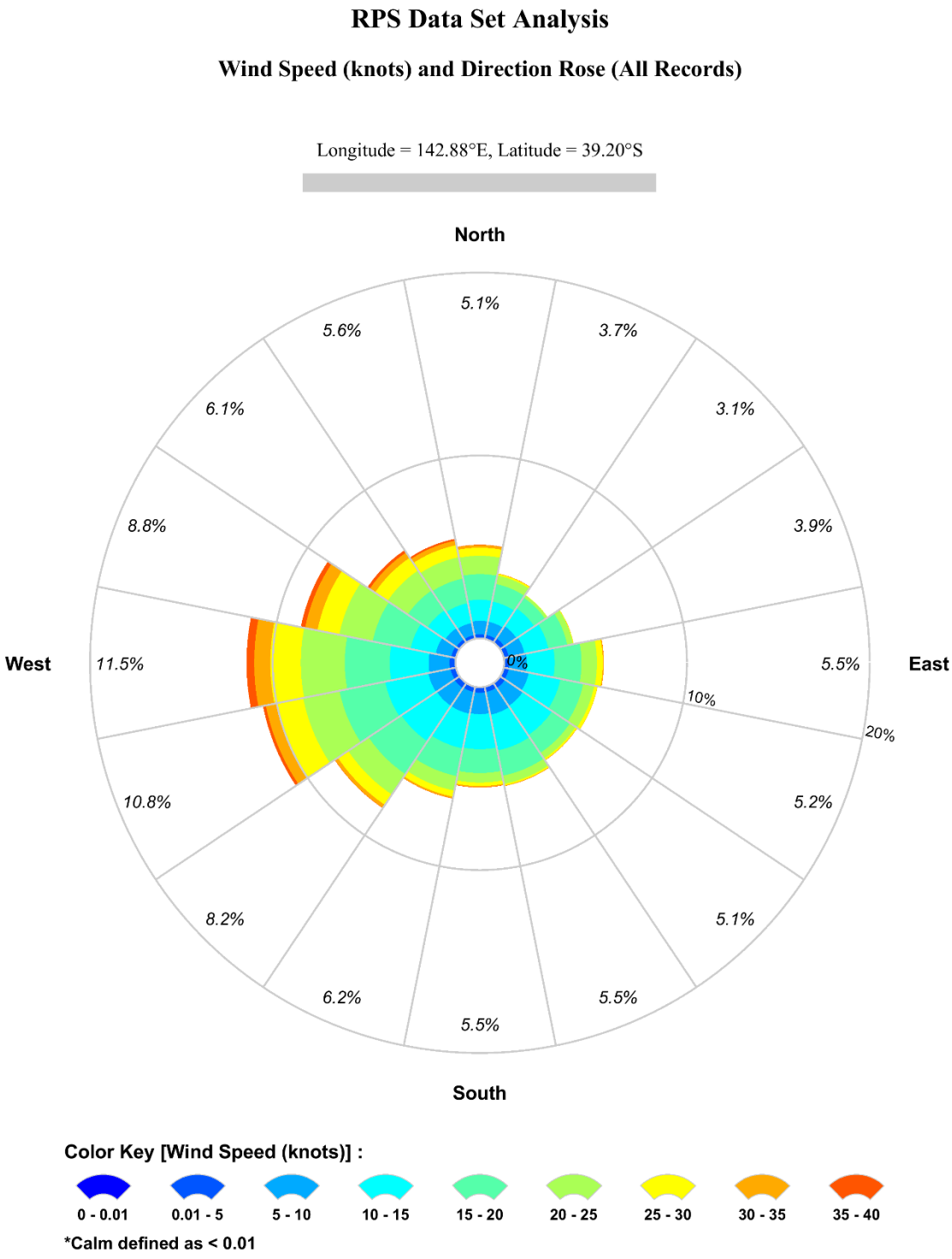

Figure 4-3 Modelled total wind rose distributions from 2010–2019 (inclusive) for the node nearby the release location.

5 WATER TEMPERATURE AND SALINITY

The monthly sea temperature and salinity profiles of the water column within the study was obtained from the World Ocean Atlas 2013 database produced by the National Oceanographic Data Centre (National Oceanic and Atmospheric Administration) and its co-located World Data Center for Oceanography (see Levitus et al., 2013). These parameters were used as factors to inform the weathering, movement and evaporative loss of hydrocarbon spills in the surface and sub-surface layers.

Figure 5-1 illustrates the vertical profile of sea temperature and salinity nearby the release location.

Table 5-1 presents the sea temperature and salinity of the surface layer nearby the selected location. The monthly average sea surface temperatures ranged between 13.2°C (September) and 17.8°C (March). The monthly average salinity values remain relatively consistent ranging between 35.1 psu (February) and 35.6 psu (July).

Table 5-1 Monthly average sea surface temperature and salinity in the study area.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Temperature (°C)	17.7	17.2	17.8	16.3	16.0	16.0	14.8	13.5	13.2	14.3	14.3	15.9
Salinity (psu)	35.3	35.1	35.4	35.3	35.3	35.4	35.6	35.3	35.3	35.4	35.4	35.4

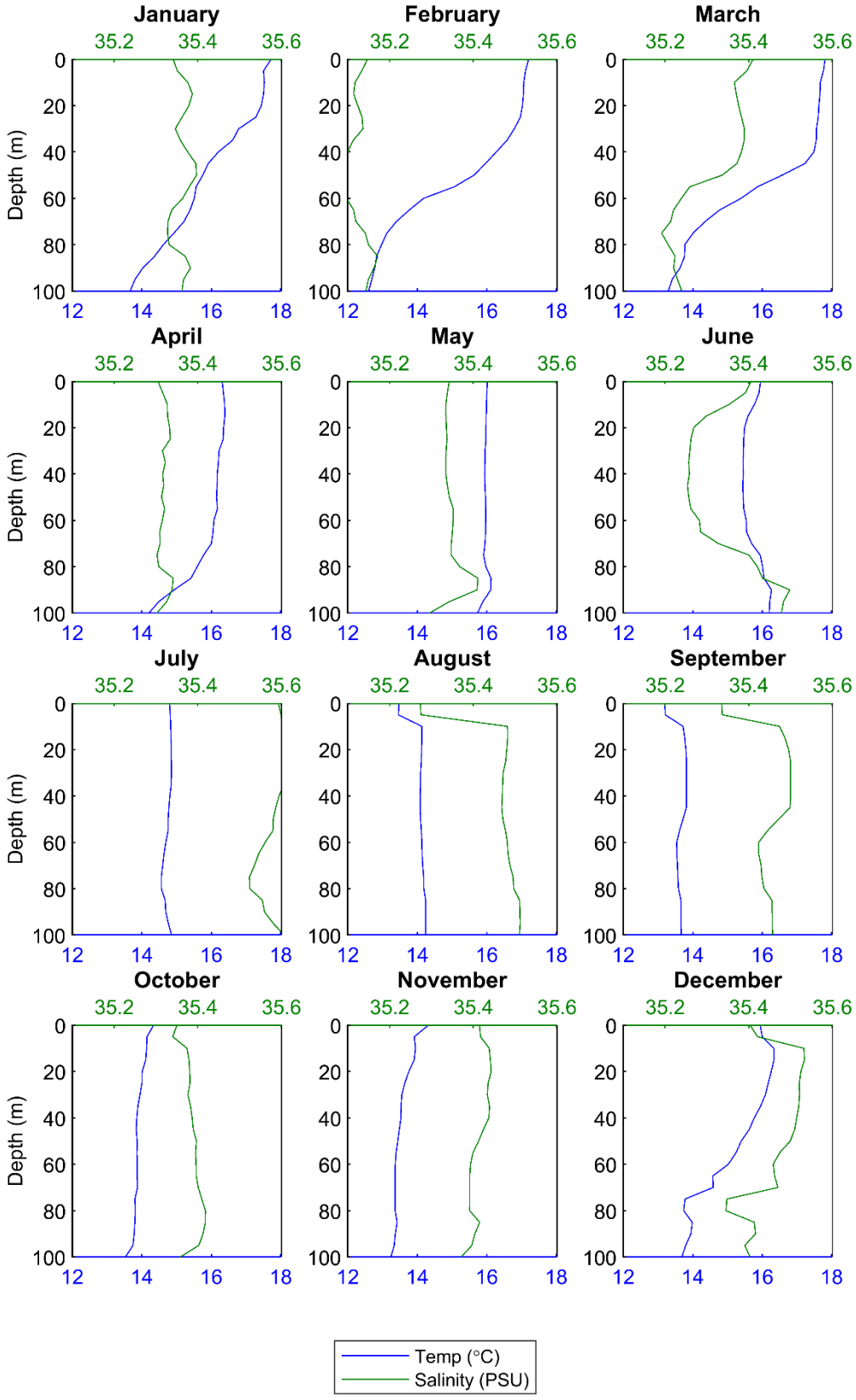

Figure 5-1 Temperature and salinity profiles nearby the selected location within the study area.

6 OIL SPILL MODEL – SIMAP

Modelling of the fate of oil was performed using the Spill Impact Mapping Analysis Program (SIMAP). SIMAP is designed to simulate the fate and effects of spilled hydrocarbons for both the surface and subsurface releases (Spaulding et al., 1994; French et al., 1999; French-McCay, 2003, 2004; French-McCay et al., 2004).

SIMAP has been used to predict the weathering and fate of oil spills during and after major incidents including: Montara (Australia) well blowout August 2009 in the Timor Sea (Asia-Pacific ASA, 2010); Macondo (USA) well blowout April 2010 in the Gulf of Mexico; Bohai Bay (China) oil spill August 2011; and the pipeline oil spill July 2013 in the Gulf of Thailand.

The SIMAP model calculates the transport, spreading, entrainment, evaporation and decay of surface hydrocarbon slicks as well as the entrained and dissolved oil components in the water column, either from surface slicks or from oil discharged subsea. The movement and weathering of the spilled oil is calculated for specific oil types. Input specifications for oil mixtures include the density, viscosity, pour point, distillation curve (volume lost versus temperature) and the aromatic/aliphatic component ratios within given boiling point (BP) ranges.

SIMAP is a three-dimensional model that allows for various response actions to be modelled including oil removal from skimming, burning, or collection booms, and surface and subsurface dispersant application.

The SIMAP oil spill model includes advanced weathering algorithms, specifically focussed on unique oils that tend to form emulsions and/or tar balls. The weathering algorithms are based on 5 years of extensive research conducted in response to the Deepwater Horizon oil spill in the Gulf of Mexico (French-McCay et al., 2015).

Biodegradation is included in the oil spill model. In the model, SIMAP, degradation is calculated for the surface slick, deposited oil on the shore, the entrained oil and dissolved constituents in the water column, and oil in the sediments. For surface oil, water column oil and sedimented oil a first order degradation rate is specified. Biodegradation rates are relatively high for hydrocarbons in dissolved state or in dispersed small droplets.

6.1 Stochastic Modelling

For the stochastic modelling presented herein, **200 oil spills** (100 per season) were modelled for the scenario using the same spill information (release location, spill volume, duration and oil type) but with varied start dates. During each simulation, the model records whether any grid cells are exposed to any oil concentrations, the concentrations involved and the elapsed time before exposure. The results of all 100 oil spill simulations per season were analysed to determine the following statistics for every grid cell:

- Exposure load (concentrations and volumes);
- Minimum time before exposure;
- Probability of contact above defined concentrations;
- Volume of oil that may accumulate on shorelines from any single simulation;
- Concentration that might occur on sections of individual shorelines;
- Exposure (instantaneous and/or over a specified duration) to dissolved hydrocarbons in the water column; and
- Exposure (instantaneous and/or over a specified duration) to entrained hydrocarbons in the water column.

6.1 Floating, Shoreline and In-Water Thresholds

The thresholds and their relationship to exposure for the sea surface, shoreline and water column (entrained and dissolved hydrocarbons) are presented in Sections 6.1.1 to 6.1.3. Supporting justifications of the adopted thresholds applied during the study and additional context relating to the area of influence are also provided. It is important to note that the thresholds herein are based on NOPSEMA (2019).

6.1.1 Floating Oil Exposure Thresholds

The modelling results can be presented to any levels; therefore, thresholds have been specified (based on scientific literature) to record floating oil exposure to the sea-surface at meaningful levels only, described in the following paragraphs.

The low threshold to assess the potential for floating oil exposure, was 1 g/m^2, which equates approximately to an average thickness of 1 µm, referred to as visible oil. Oil of this thickness is described as rainbow sheen in appearance, according to the Bonn Agreement Oil Appearance Code (Bonn Agreement, 2009; AMSA, 2014) (see Table 6-1). Figure 6-1 shows photographs highlighting the difference in appearance between a silvery sheen, rainbow sheen and metallic sheen. This threshold is considered below levels which would cause environmental harm and it is more indicative of the areas perceived to be affected due to its visibility on the sea surface and potential to trigger temporary closures of areas (i.e. fishing grounds) as a precautionary measure. Table 6-1 provides a description of the appearance in relation to exposure zone thresholds used to classify the zones of floating oil exposure.

Ecological impact has been estimated to occur at 10 g/m^2 (a film thickness of approximately 10 µm or 0.01 mm) according to French et al. (1996) and French-McCay (2009) as this level of fresh oiling has been observed to mortally impact some birds through adhesion of oil to their feathers, exposing them to secondary effects such as hypothermia. The appearance of oil at this average thickness has been described as a metallic sheen (Bonn Agreement, 2009).

Scholten et al. (1996) and Koops et al. (2004) indicated that at oil concentrations on the sea surface of 25 g/m^2 (or greater), would be harmful for all birds that have landed in an oil film due to potential contamination of their feathers, with secondary effects such as loss of temperature regulation and ingestion of oil through preening. The appearance of oil at this thickness is also described as metallic sheen (Bonn Agreement, 2009). For this study the high exposure threshold was set to 50 g/m^2 and above based on NOPSEMA (2019). This threshold can also be used to inform response planning.

Table 6-2 defines the thresholds used to classify the zones of floating oil exposure reported herein.

Table 6-1 The Bonn Agreement Oil Appearance Code.

Code	Description Appearance	Layer Thickness Interval (g/m^2 or µm)	Litres per km^2
1	Sheen (silvery/grey)	0.04 – 0.30	40 – 300
2	Rainbow	0.30 – 5.0	300 – 5,000
3	Metallic	5.0 – 50	5,000 – 50,000
4	Discontinuous True Oil Colour	50 – 200	50,000 – 200,000
5	Continuous True Oil Colour	≥ 200	≥ 200,000

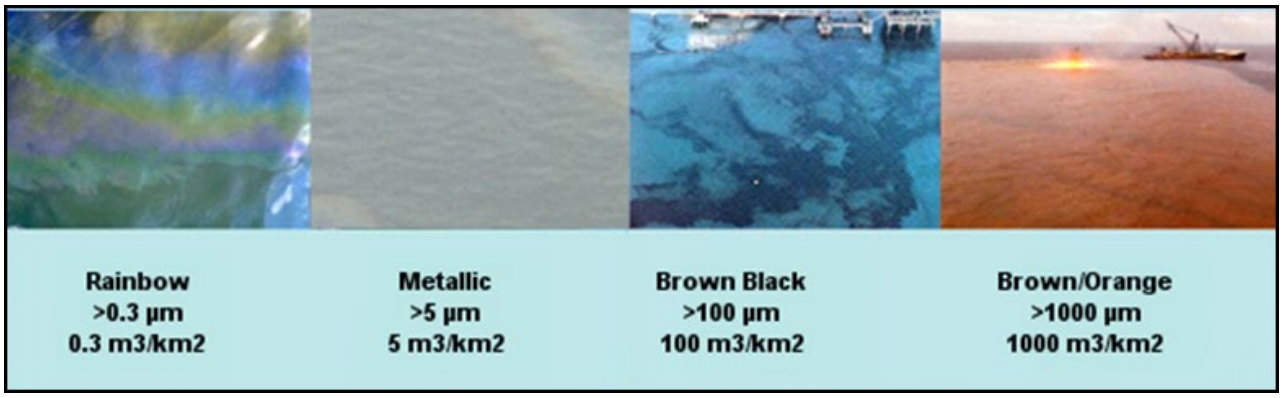

Figure 6-1 Photographs showing the difference between oil colour and thickness on the sea surface (source: adapted from Oil Spill Solutions, 2015).

Table 6-2 Floating oil exposure thresholds used in this report (in alignment with NOPSEMA (2019)).

Threshold level	Floating oil (g/m^2)	Description
Low	1	Approximates range of socioeconomic effects and establishes planning area for scientific monitoring
Moderate	10	Approximates lower limit for harmful exposures to birds and marine mammals
High	50	Approximates surface oil slick and informs response planning

6.1.2 Shoreline Accumulation Thresholds

There are many different types of shorelines, ranging from cliffs, rocky beaches, sandy beaches, mud flats and mangroves, and each of these influences the volume of oil that can remain stranded ashore and its thickness before the shoreline saturation point occurs. For instance, a sandy beach may allow oil to percolate through the sand, thus increasing its ability to hold more oil ashore over tidal cycles and various wave actions than an equivalent area of water; hence oil can increase in thickness onshore over time. A sandy beach shoreline was assumed as the default shoreline type for the modelling herein, as it allows for the highest carrying capacity of oil (of the available open/exposed shoreline types). Hence the results contained herein would be indicative of a worst-case scenario, where the highest volume of oil may be stranded on the shoreline (when compared to other shoreline types, such as exposed rocky shores).

In previous risk assessment studies, French-McCay et al. (2005a; 2005b) used a threshold of 10 g/m^2 to assess the potential for shoreline accumulation. This is a conservative threshold used to define regions of socio-economic impact, such as triggering temporary closures of adjoining fisheries or the need for shore clean-up on beaches or man-made features/amenities (breakwaters, jetties, marinas, etc.). It would equate to approximately 2 teaspoons of hydrocarbon per square meter of shoreline accumulation. The appearance is described as a stain/film. On that basis, the 10 g/m^2 shoreline accumulation threshold has been selected to define the zone of potential “low shoreline accumulation”.

French et al. (1996) and French-McCay (2009) define a shoreline oil accumulation threshold of 100 g/m^2, or above, would potentially harm shorebirds and wildlife (furbearing aquatic mammals and marine reptiles on or along the shore) based on studies for sub-lethal and lethal impacts. This threshold has been used in previous environmental risk assessment studies (see French-McCay, 2003; French-McCay et al., 2004, French-McCay et al., 2011; 2012; NOAA, 2013). Additionally, a shoreline concentration of 100 g/m^2, or above, is the minimum limit that the oil can be effectively cleaned according to the AMSA (2015) guideline. This threshold equates to approximately ½ a cup of oil per square meter of shoreline accumulation. The appearance is described as a thin oil coat. Therefore, 100 g/m^2 has been selected to define the zone of potential “moderate shoreline accumulation”.

Observations by Lin & Mendelssohn (1996), demonstrated that loadings of more than 1,000 g/m^2 of hydrocarbon during the growing season would be required to impact marsh plants significantly. Similar thresholds have been found in studies assessing hydrocarbon impacts on mangroves (Grant et al., 1993; Suprayogi & Murray, 1999). Hence, 1,000 g/m^2 has been selected to define the zone of potential "high shoreline accumulation". It equates to approximately 1 litre of hydrocarbon per square meter of shoreline accumulation. The appearance is described as a hydrocarbon cover.

It is worth noting that the shoreline accumulation thresholds derived from extensive literature review (outlined in Table 6-3) agree with the commonly used threshold values for oil spill modelling specified in NOPSEMA (2019).

Table 6-3 Thresholds used to assess shoreline accumulation.

Threshold level	Shoreline loading (g/m^2)	Description
Low (socioeconomic/sublethal)	10	Predicts potential for some socio-economic impact
Moderate	100	Loading predicts area likely to require clean-up effort
High	> 1,000	Loading predicts area likely to require intensive clean-up effort

6.1.3 In-water Exposure Thresholds

Oil is a mixture of thousands of hydrocarbons of varying physical, chemical, and toxicological characteristics, and therefore, demonstrate varying fates and impacts on organisms. As such, for in-water exposure, the SIMAP model provides separate outputs for dissolved and entrained hydrocarbons from oil droplets. The consequences of exposure to dissolved and entrained components will differ because they have different modes and magnitudes of effect.

Entrained hydrocarbon concentrations were calculated based on oil droplets that are suspended in the water column, though not dissolved. The composition of this oil would vary with the state of weathering (oil age) and may contain soluble hydrocarbons when the oil is fresh. Calculations for dissolved hydrocarbons specifically calculates oil components which are dissolved in water, which are known to be the primary source of toxicity exerted by oil.

6.1.3.1 Dissolved Hydrocarbons

Laboratory studies have shown that dissolved hydrocarbons exert most of the toxic effects of oil on aquatic biota (Carls et al., 2008; Nordtug et al., 2011; Redman, 2015). The mode of action is a narcotic effect, which is positively related to the concentration of soluble hydrocarbons in the body tissues of organisms (French-McCay, 2002). Dissolved hydrocarbons are taken up by organisms directly from the water column by absorption through external surfaces and gills, as well as through the digestive tract. Thus, soluble hydrocarbons are termed "bioavailable".

Hydrocarbon compounds vary in water-solubility and the toxicity exerted by individual compounds is inversely related to solubility, however bioavailability will be modified by the volatility of individual compounds (Nirmalakhandan & Speece, 1988; Blum & Speece, 1990; McCarty, 1986; McCarty et al., 1992a, 1992b; Mackay et al., 1992; McCarty & Mackay, 1993; Verhaar et al., 1992, 1999; Swartz et al., 1995; French-McCay, 2002; McGrath and Di Toro, 2009). Of the soluble compounds, the greatest contributor to toxicity for water-column and benthic organisms are the lower-molecular-weight aromatic compounds, which are both volatile and soluble in water. Although they are not the most water-soluble hydrocarbons within most oil types, the polynuclear aromatic hydrocarbons (PAHs) containing 2-3 aromatic ring structures typically exert the largest narcotic effects because they are semi-soluble and not highly volatile, so they persist in the environment long enough for significant accumulation to occur (Anderson et al., 1974, 1987; Neff & Anderson, 1981; Malins & Hodgins, 1981; McAuliffe, 1987; NRC, 2003). The monoaromatic hydrocarbons (MAHs), including the BTEX compounds (benzene, toluene, ethylbenzene, and xylenes), and the soluble alkanes (straight chain hydrocarbons) also contribute to toxicity, but these compounds are highly volatile, so

that their contribution will be low when oil is exposed to evaporation and higher when oil is discharged at depth where volatilisation does not occur (French-McCay, 2002).

French-McCay (2002) reviewed available toxicity data, where marine biota was exposed to dissolved hydrocarbons prepared from oil mixtures, finding that 95% of species and life stages exhibited 50% population mortality (LC_{50}) between 6 and 400 ppb total PAH concentration after 96 hrs exposure, with an average of 50 ppb. Hence, concentrations lower than 6 ppb total PAH value should be protective of 97.5% of species and life stages even with exposure periods of days (at least 96 hours). Early life-history stages of fish appear to be more sensitive than older fish stages and invertebrates.

Exceedances of 10, 50 or 400 ppb over a 1 hour timestep (see Table 6-4) was applied to indicate increasing potential for sub-lethal to lethal toxic effects (or low to high), based on NOPSEMA (2019).

6.1.3.2 Entrained Hydrocarbons

Entrained hydrocarbons consist of oil droplets that are suspended in the water column and insoluble. As such, insoluble compounds in oil cannot be absorbed from the water column by aquatic organisms, hence are not bioavailable through absorption of compounds from the water. Exposure to these compounds would require routes of uptake other than absorption of soluble compounds. The route of exposure of organisms to whole oil alone include direct contact with tissues of organisms and uptake of oil by direct consumption, with potential for biomagnification through the food chain (NRC, 2005).

The 10 ppb threshold represents the very lowest concentration and corresponds generally with the lowest trigger levels for chronic exposure for entrained hydrocarbons in the ANZECC & ARMCANZ (2000) water quality guidelines. Due to the requirement for relatively long exposure times (> 24 hours) for these concentrations to be significant, they are likely to be more meaningful for juvenile fish, larvae and planktonic organisms that might be entrained (or otherwise moving) within the entrained plumes, or when entrained hydrocarbons adhere to organisms or trapped against a shoreline for periods of several days or more.

This exposure zone is not considered to be of significant biological impact and is therefore outside the adverse exposure zone. This exposure zone represents the area contacted by the spill. This area does not define the area of influence as it is considered that the environment will not be affected by the entrained hydrocarbon at this level.

Thresholds of 10 ppb and 100 ppb were applied over a 1 hour time exposure (Table 6-4), to cover the range of thresholds outlined in ANZECC & ARMCANZ (2000) water quality guidelines, the incremental change for greater potential effect and is per NOPSEMA (2019).

A complicating factor that should be considered when assessing the consequence of dissolved and entrained oil distributions is that there will be some areas where both physically entrained oil droplets and dissolved hydrocarbons co-exist. Higher concentrations of each will tend to occur close to the source where sea conditions can force mixing of relatively unweathered oil into the water column, resulting in more rapid dissolution of soluble compounds.

Table 6-4 Dissolved and entrained hydrocarbon exposure values assessed over a 1-hour time step, as per NOPSEMA (2019).

Threshold level	Dissolved hydrocarbon concentration (ppb)	Entrained hydrocarbon concentrations (ppb)
Low	10	10
Moderate	50	-
High	400	100

7 MARINE DIESEL PROPERTIES

7.1 Physical Properties

Table 7-1 and Table 7-2 present the physical properties and boiling point ranges of the MDO used in this study.

Table 7-1 Physical properties for MDO.

Characteristic	Marine Diesel Oil (MDO)
Density (kg/m^3)	829.1 (at 25 °C)
API	37.6
Dynamic viscosity (cP)	4.0 (at 25 °C)
Pour point (°C)	-14
Hydrocarbon property category	Group II
Hydrocarbon property classification	Light - Persistent

Table 7-2 Boiling point ranges for MDO.

Oil Type	Component	Volatile (%)	Semi-volatile (%)	Low-volatility (%)	Residual (%)
	Boiling point (°C)	<180 C_4 to C_{10}	180-265 C_{11} to C_{15}	265-380 C_{16} to C_{20}	>380 >C_{20}
MDO	% of total	6.0	34.6	54.4	5.0

The BP are dictated by the length of the carbon chains, with the longer and more complex compounds having a higher boiling point, and therefore lower volatility and evaporation rate.

Typical evaporation times once the hydrocarbons reach the surface and are exposed to the atmosphere are:

- Up to 12 hours for the C_4 to C_{10} compounds (or less than 180°C BP).
- Up to 24 hours for the C_{11} to C_{15} compounds (180-265°C BP).
- Several days for the C_{16} to C_{20} compounds (265-380°C BP).
- Not applicable for the residual compounds (BP > 380°C), which will resist evaporation, persist in the marine environment for longer periods, and be subject to relatively slow degradation.

The actual fate of oil will depend greatly on the amount that reaches the surface.

The MDO has an API of 37.6 and a density of 829.1 kg/m^3 (at 25ºC) with a viscosity value (4.0 cP) classifying it as a Group II (light-persistent) oil according to the International Tankers Owners Pollution Federation (ITOPF, 2014) and US EPA/USCG classifications.

The MDO is a mixture of volatile and persistent hydrocarbons with high proportions of volatile and semi- to low-volatile components. In favourable evaporation conditions, about 6.0% of the oil mass should evaporate within the first 12 hours (BP < 180°C), a further 34.6% should evaporate within the first 24 hours (180°C < BP < 265°C) and a further 54.4% should evaporate over several days (265°C < BP < 380°C). Approximately 5.0% of the oil is shown to be persistent.

7.2 Weathering Properties

A series of model weather tests were conducted to illustrate the potential behaviour of the MDO when exposed to idealised and representative environmental conditions:

- A 50 m^3 surface release over 1-hour under calm wind conditions (constant 5 knots), assuming low seasonal water temperature (15°C) and ambient tidal and drift currents.
- A 50 m^3 surface release over 1-hour under variable wind conditions (1-12 knots, drawn from representative data files), assuming low seasonal water temperature (15°C) and ambient tidal and drift currents.

The first case is indicative conditions that would not generate entrainment, while the second case may represent conditions that could cause a minor degree of entrainment. Both scenarios provide examples of potential behaviour during a spill once the oil reaches the surface.

The mass balance for the MDO under the constant 5 knot (~2.5 m/s) wind case (Figure 7-1) shows that 40.3% of the oil is predicted to evaporate within 24 hours. Under calm conditions, the majority of the remaining oil on the water surface will weather at a slower rate due to being comprised of the longer-chain compounds with higher boiling points. Evaporation shall cease when the residual compounds remain, and they will be subject to more gradual decay through biological and photochemical processes.

Under the variable-wind case (Figure 7-2), where the winds are of greater strength on average, entrainment of MDO into the water column is predicted to increase. Approximately 24 hours after the spill, 60.1% of the oil mass is forecast to have entrained and a further 38.4% is forecast to have evaporated, leaving only a small proportion of the oil floating on the water surface (<0.1%).

The increased level of entrainment in the variable-wind case result in a higher percentage decaying at an approximate rate of 1.5% per day with or ~10.5% after 7 days, compared to <0.1% per day and a total of 0.9% after 7 days for the constant-wind case. Given the proportion of entrained oil and the tendency for it to remain mixed in the water column, the remaining hydrocarbons will decay over time scales of several weeks.

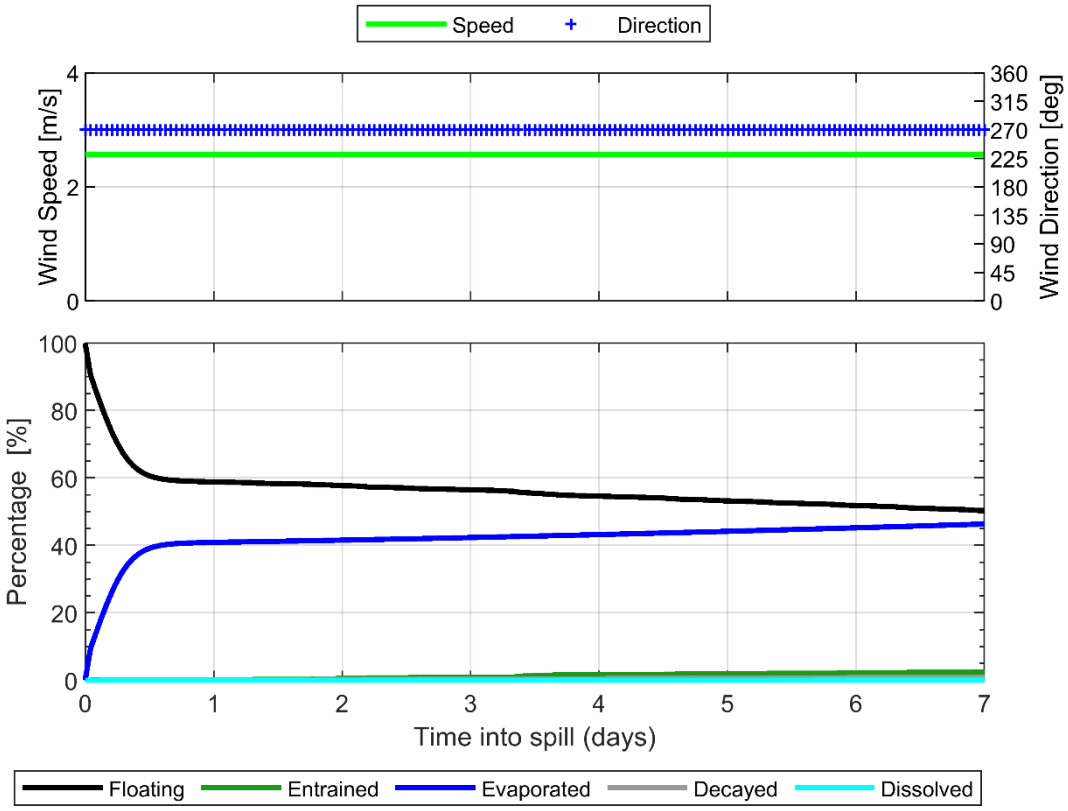

Figure 7-1 Proportional mass balance plot representing the weathering of MDO spilled onto the water surface over 1 hour and subject to a constant 5 knots (2.6 m/s) wind speed at 15°C water temperature and 20°C air temperature.

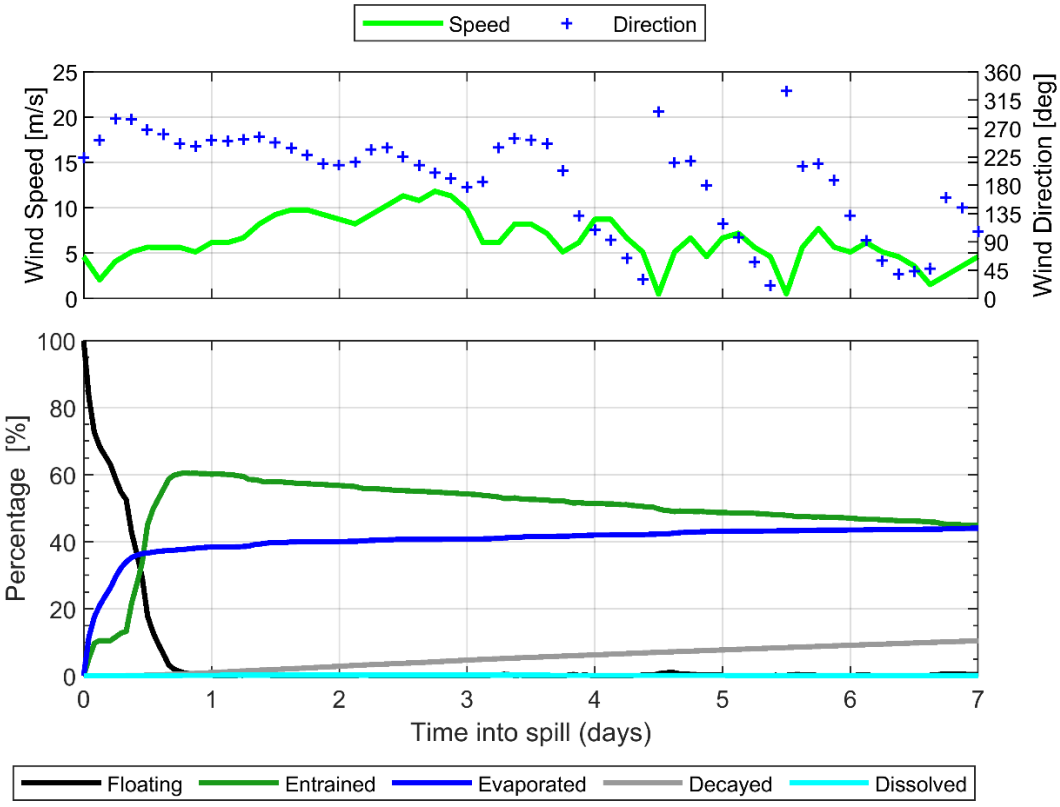

Figure 7-2 Proportional mass balance plot representing the weathering of MDO spilled onto the water over 1 hour and subject to variable wind speeds (1-12 knots) at 15°C water temperature and 20°C air temperature.

8 MODEL SETTINGS

Table 8-1 provides a summary of the oil spill model settings.

Table 8-1 Summary of the oil spill model settings and thresholds used in this assessment.

Parameter	Scenario 1	Scenario 2
Description	Vessel collision	Vessel collision
Number of randomly selected spill start times	200 (100 per season)	200 (100 per season)
Model period	Summer (November through to March) Winter (April to October)	
Oil type	MDO	MDO
Spill volume (m^3)	300	200
Release type	Surface	
Release duration	6 hours	
Simulation length (days)	30	
Surface oil concentration thresholds and exposure risk (g/m^2) ^	1 (low); 10 (moderate); 50 (high)	
Shoreline oil accumulation thresholds and exposure risk (g/m^2) ^	10 (low); 100 (moderate); 1,000 (high)	
Dissolved hydrocarbon concentrations and exposure risk (ppb) ^	10 (low); 50 (moderate); 400 (high)	
Entrained hydrocarbon concentrations and exposure risk (ppb) ^	10 (low); 100 (high)	

^Thresholds based on NOPSEMA (2019)

9 PRESENTATION AND INTERPRETION OF MODEL RESULTS

The results from the modelling study are presented in a number of tables and figures, which aim to provide an understanding of the predicted sea-surface and water column (subsurface) exposure and shoreline accumulation (if predicted).

9.1 Annual Analysis

9.1.1 Statistics

The statistics are based on the following principles:

- The ***greatest distance travelled by a spill trajectory*** – is determined by a) recording the maximum and b) second greatest distance travelled (or 99th percentile) by a single trajectory, within a scenario, from the release location to the identified exposure thresholds.
- The ***probability of oil exposure to a receptor*** – is determined by recording the number of spill trajectories to reach a specified sea surface or subsea threshold within a receptor polygon, divided by the total number of spill trajectories within that scenario.
- The ***minimum time before oil exposure to a receptor*** – is determined by ranking the elapsed time before sea surface exposure, at a specified threshold, to grid cells within a receptor polygon and recording the minimum value.
- The ***probability of oil accumulation at a receptor*** – is determined by recording the number of spill trajectories to reach a specified shoreline accumulation threshold within a receptor polygon, divided by the total number of spill trajectories within that scenario.
- The ***maximum potential oil loading within a receptor*** – is determined by identifying the maximum loading to any grid cell within a receptor polygon, for a scenario.
- The ***dissolved and entrained hydrocarbon exposure*** – is determined by recording the maximum instantaneous concentrations at each grid cell.

9.2 Deterministic Trajectories

The stochastic modelling results were assessed for each scenario, and the deterministic runs were identified and are presented in the result section based on the following criteria;

a. Largest volume of oil ashore;

b. Longest length of oil accumulation above 100 g/m^2;

c. Minimum time before shoreline accumulation above 10 g/m^2;

9.2.1 Receptors Assessed

A range of environmental receptors and shorelines were assessed for floating oil exposure, shoreline accumulation and water column exposure as part of the study (see Figure 9-1 to Figure 9-10). Receptor categories (see Table 9-1) include sections of shorelines which are defined by local government areas (LGAs), sub-LGAs and offshore islands. All other sensitive receptors other than submerged reefs, shoals and banks (RSB) were sourced from Australian Government Department of Agriculture, Water and the Environment (http://www.environment.gov.au/). Risks of exposure were separately calculated for each sensitive receptor area and have been tabulated. Note, due to the volume and geographical extent of Biologically Important Areas (BIAs) predicted to receive potential impacts from spilled hydrocarbon, it is

recommended to use the following website to obtain detailed maps on all BIAs assessed: http://www.environment.gov.au/webgis-framework/apps/ncva/ncva.jsf.

Table 9-2 summarises the receptors that the release locations reside within.

Table 9-1 Summary of receptors used to assess floating oil, shoreline and in-water exposure to hydrocarbons.

Receptor Category	Acronym	Hydrocarbon Exposure Assessment		
		Water Column	Floating oil	Shoreline
Australian Marine Park	AMP	✓	✓	×
Biologically Important Areas	BIA	✓	✓	×
Interim Biogeographic Regionalisation for Australia bioregions	IBRA	✓	✓	×
Integrated marine and coastal regionalisation areas	IMCRA	✓	✓	×
Marine National Park	MNP	✓	✓	×
Marine Park	MP	✓	✓	×
Marine Sanctuary	MS	✓	✓	×
Nature Reserve	NR	✓	✓	×
Ramsar Sites	Ramsar	✓	✓	×
Reefs, Shoals and Banks	RSB	✓	✓	×
Key Ecological Feature	KEF	✓	✓	×
State Waters	State Waters	✓	✓	×
Local and Sub-Local Government Area	LGA and Sub-LGA	✓ (Reported as: Nearshore Waters)	✓ (Reported as: Nearshore Waters)	✓ (Reported as: Shore)

Table 9-2 Summary of the receptors that the release locations reside within.

Acronym	Receptor
BIA	Antipodean Albatross - Foraging
	Black-browed Albatross - Foraging
	Bullers Albatross - Foraging
	Campbell Albatross - Foraging
	Common Diving-petrel - Foraging
	Indian Yellow-nosed Albatross - Foraging
	Pygmy Blue Whale – Distribution
	Pygmy Blue Whale - Foraging
	Short-tailed Shearwater - Foraging
	Shy Albatross - Foraging
	Southern Right Whale - Migration
	Wandering Albatross - Foraging
	Wedge-tailed Shearwater - Foraging
	White Shark - Distribution
IMCRA	Otway

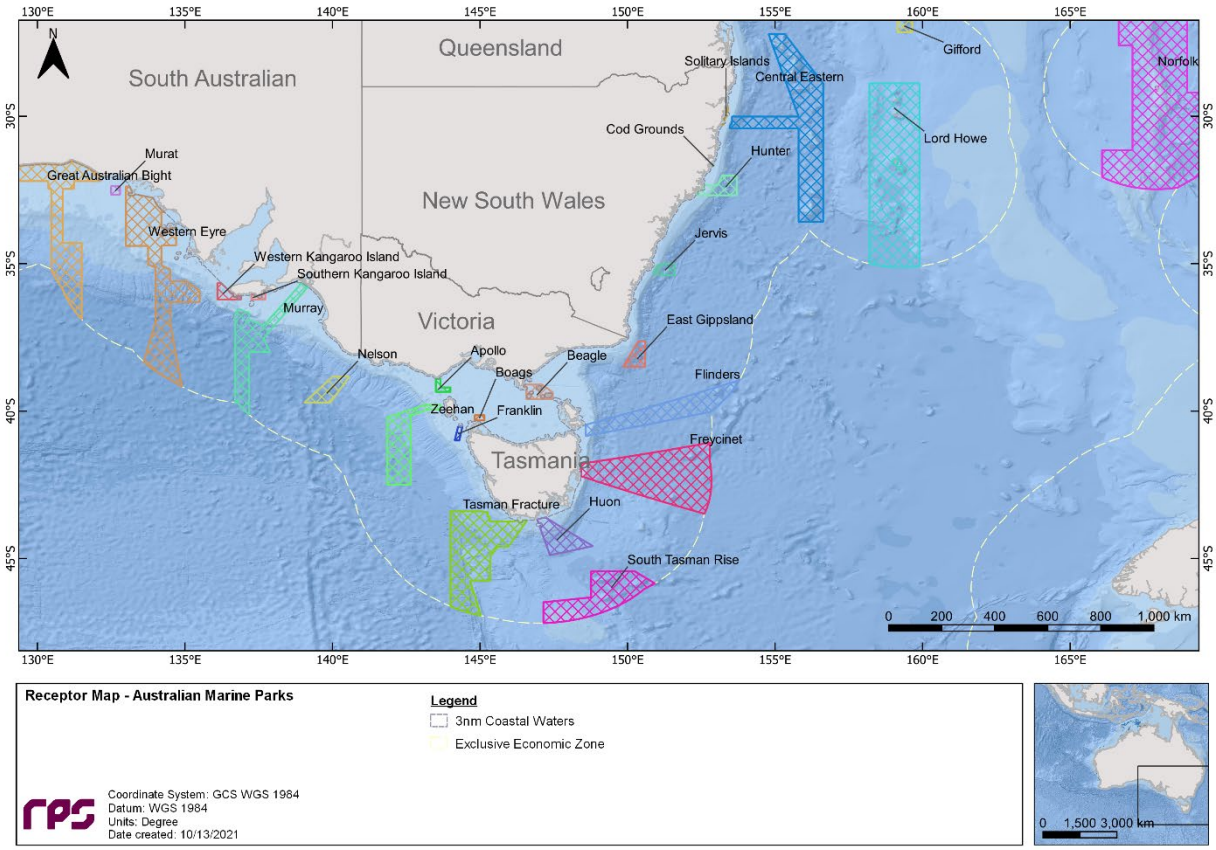

Figure 9-1 Receptor map for Australian Marine Parks (AMP).

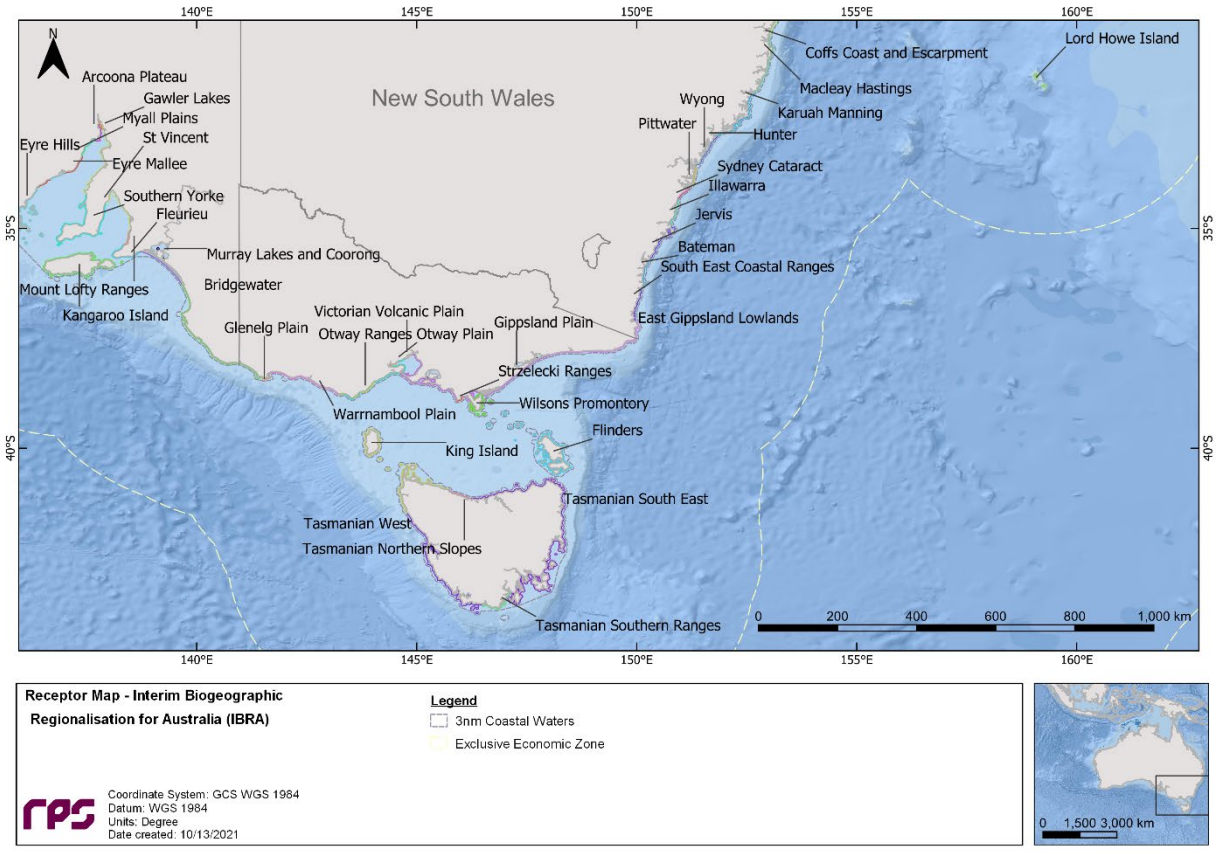

Figure 9-2 Receptor map for the Interim Biogeographic Regionalisation for Australia (IBRA) bioregions.

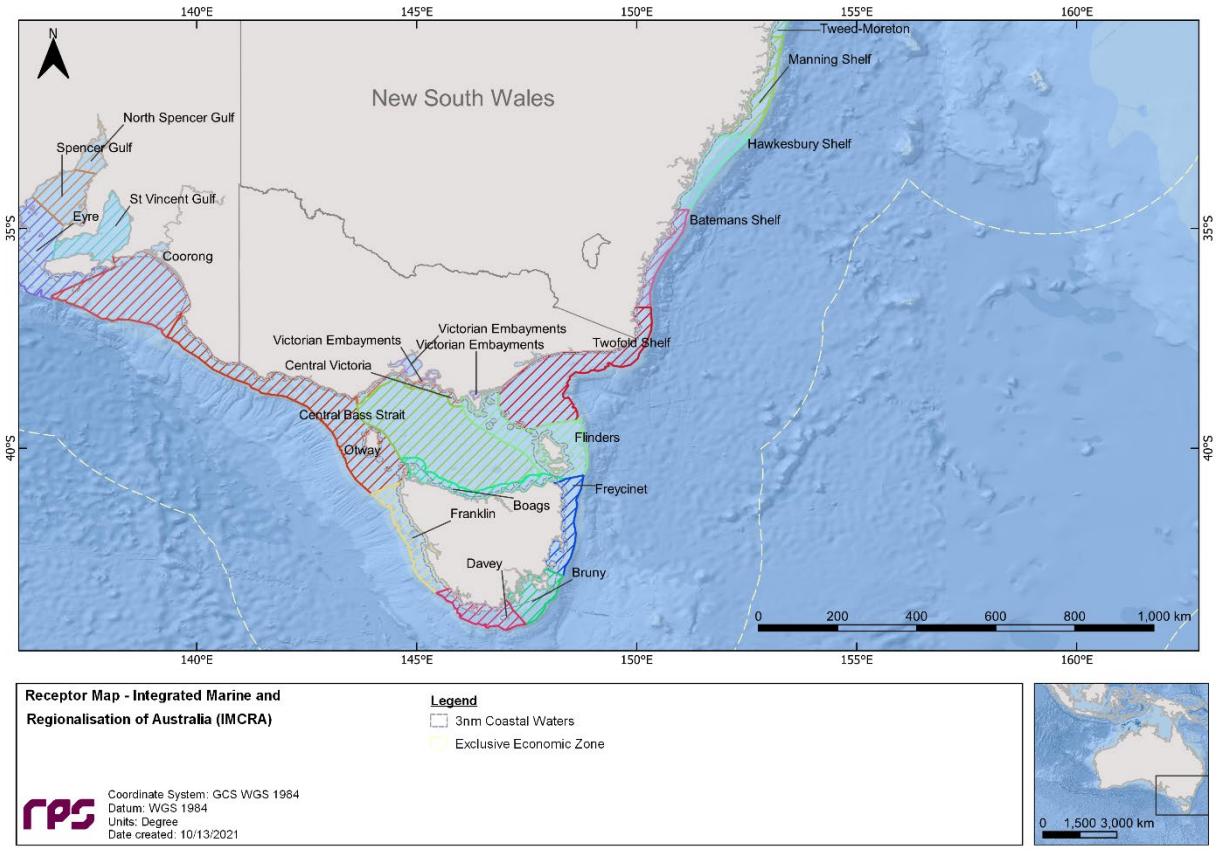

Figure 9-3 Receptor map for integrated marine and coastal regionalisation (IMCRA) areas.

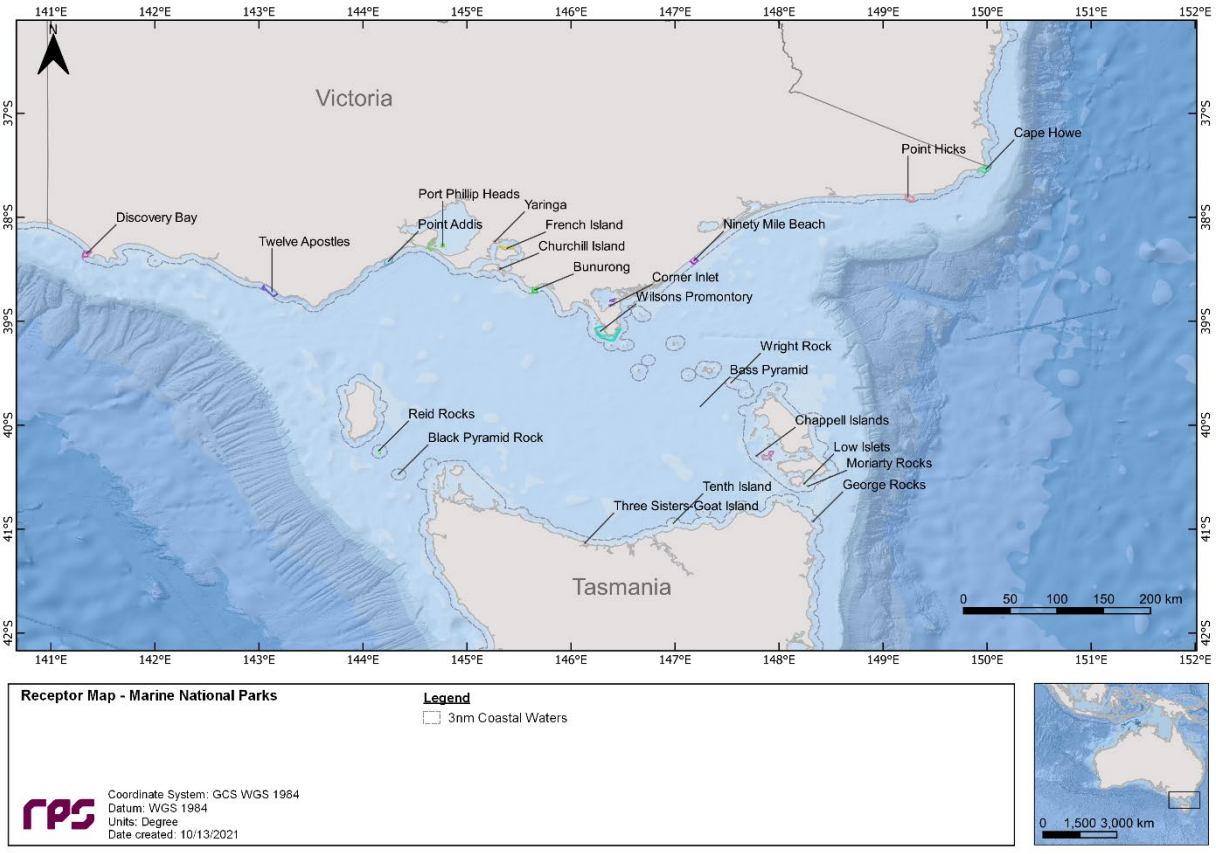

Figure 9-4 Receptor map for Marine National Parks (MNP).

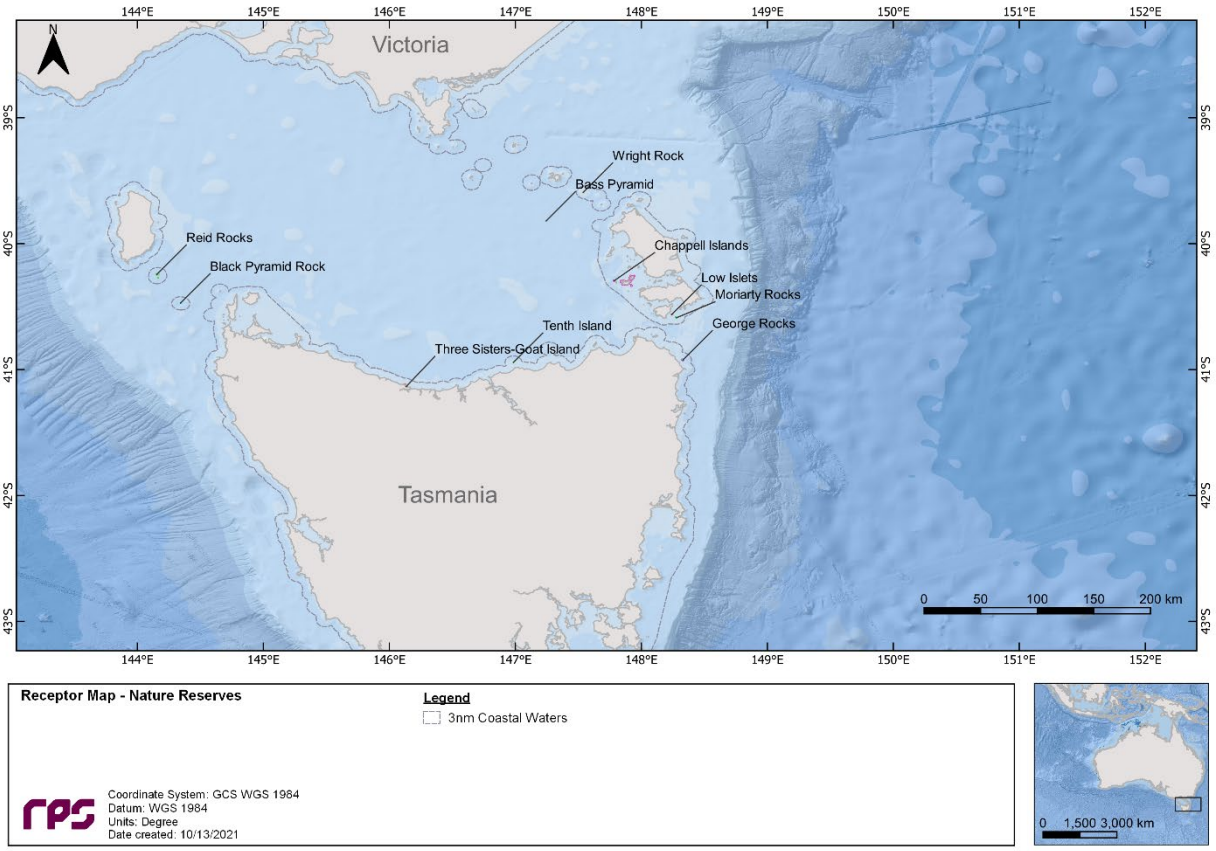

Figure 9-5 Receptor map for Nature Reserves (NR).

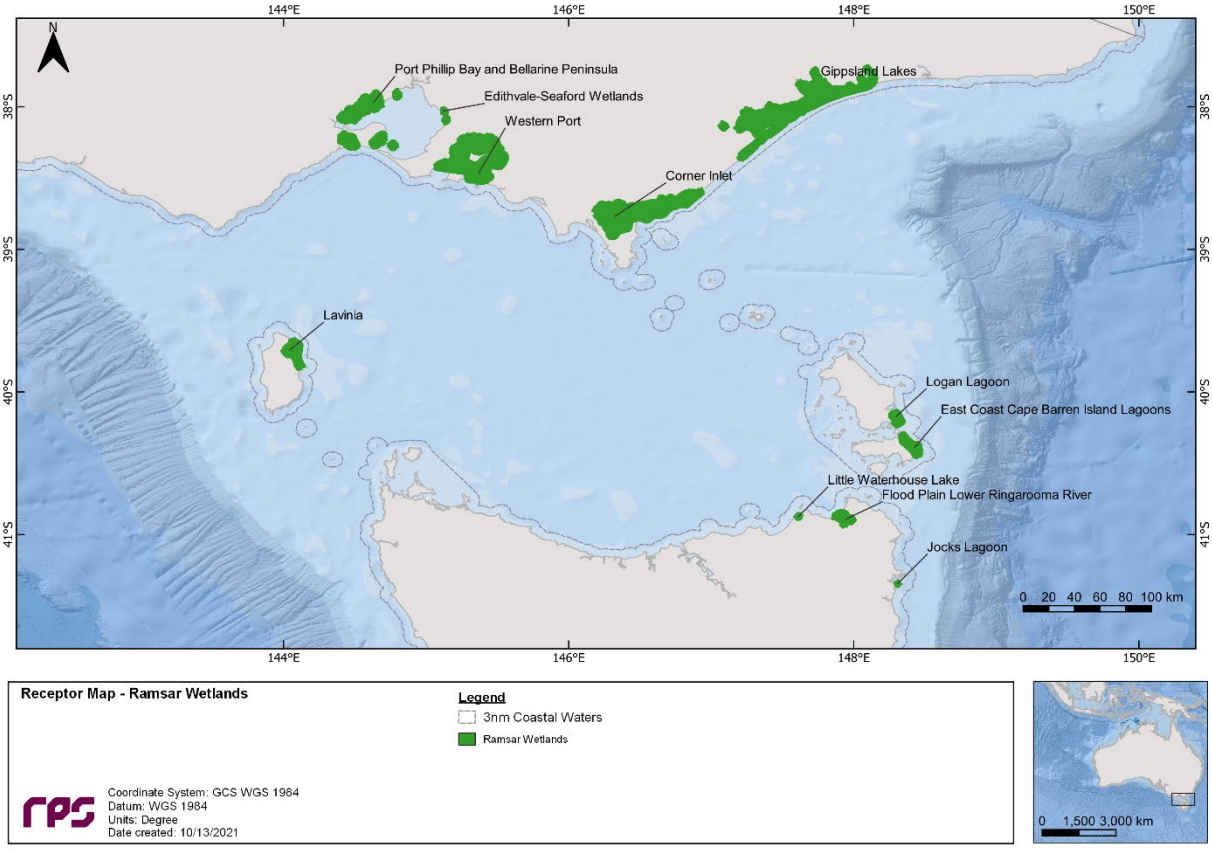

Figure 9-6 Receptor map for Ramsar Sites (Ramsar).

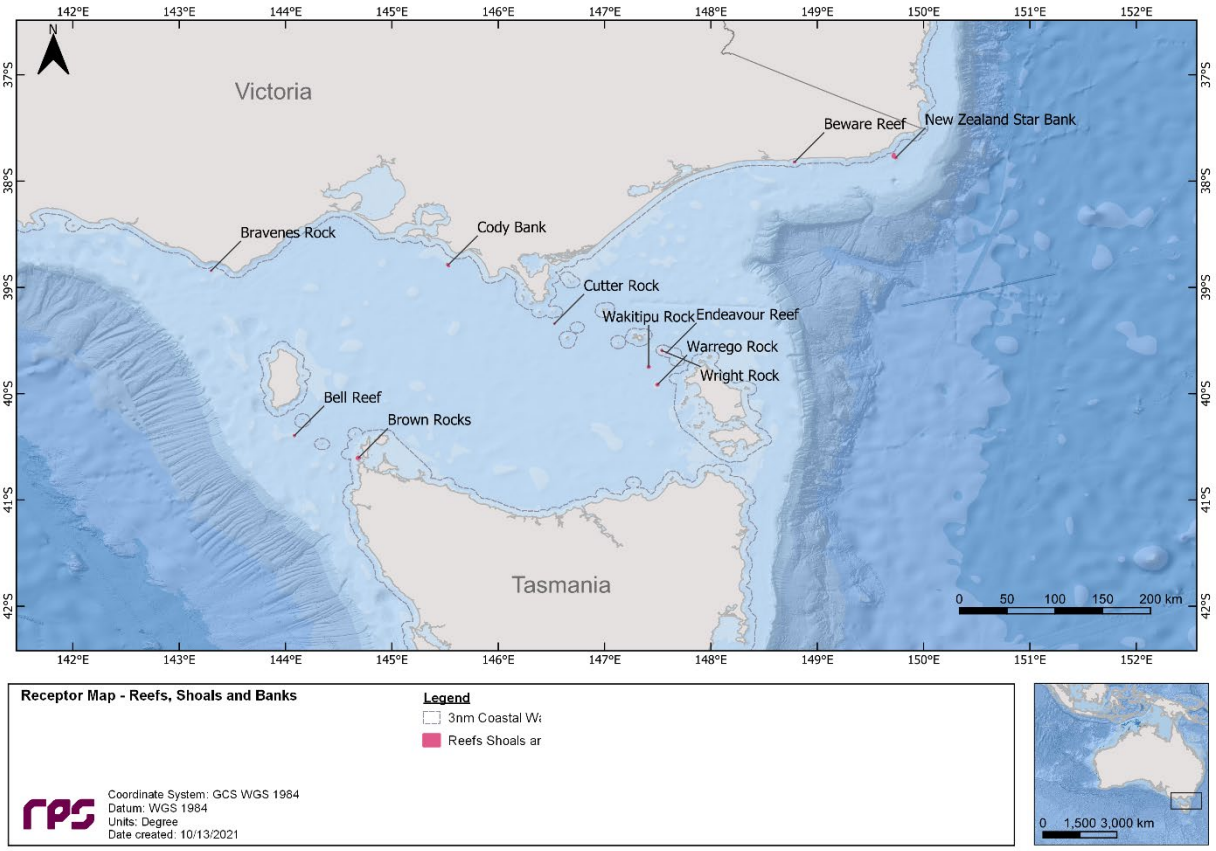

Figure 9-7 Receptor map for Reefs, Shoals and Banks (RSB).

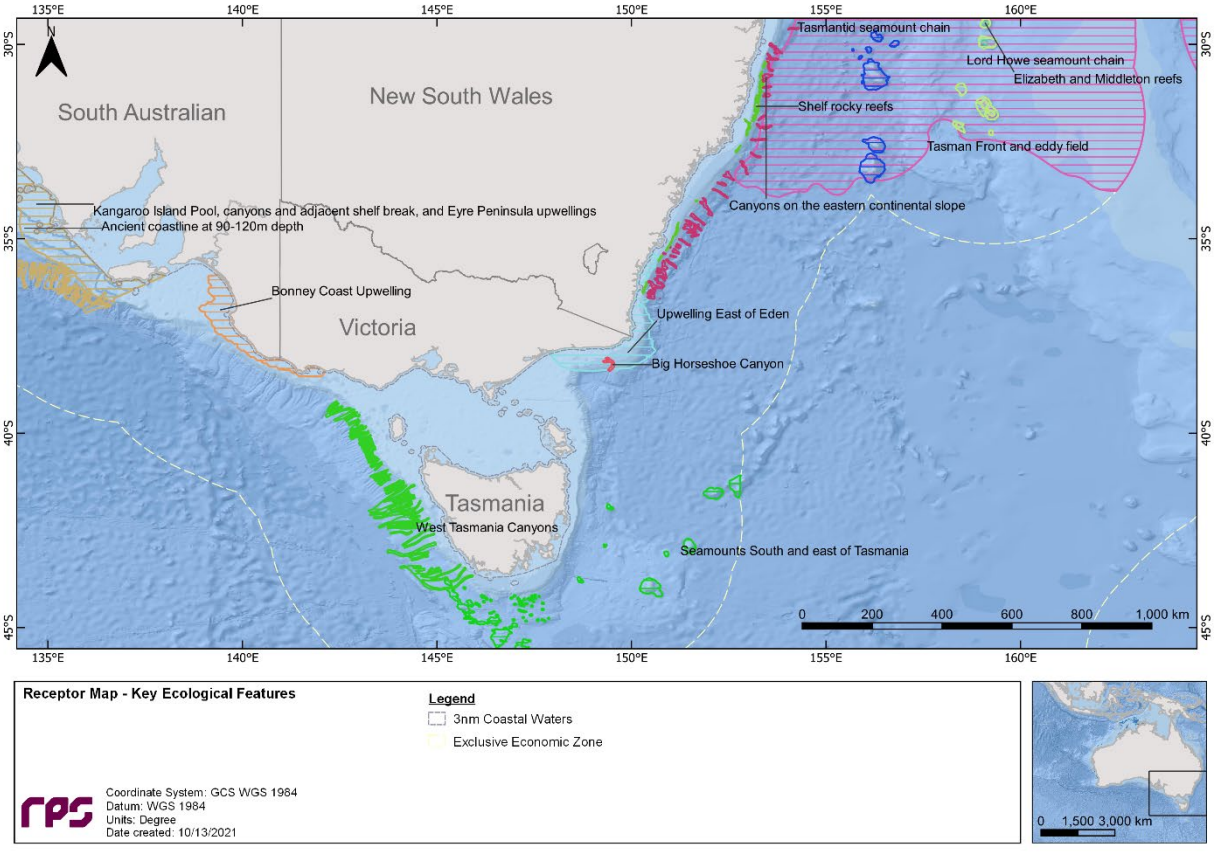

Figure 9-8 Receptor map for Key Ecological Features (KEF).

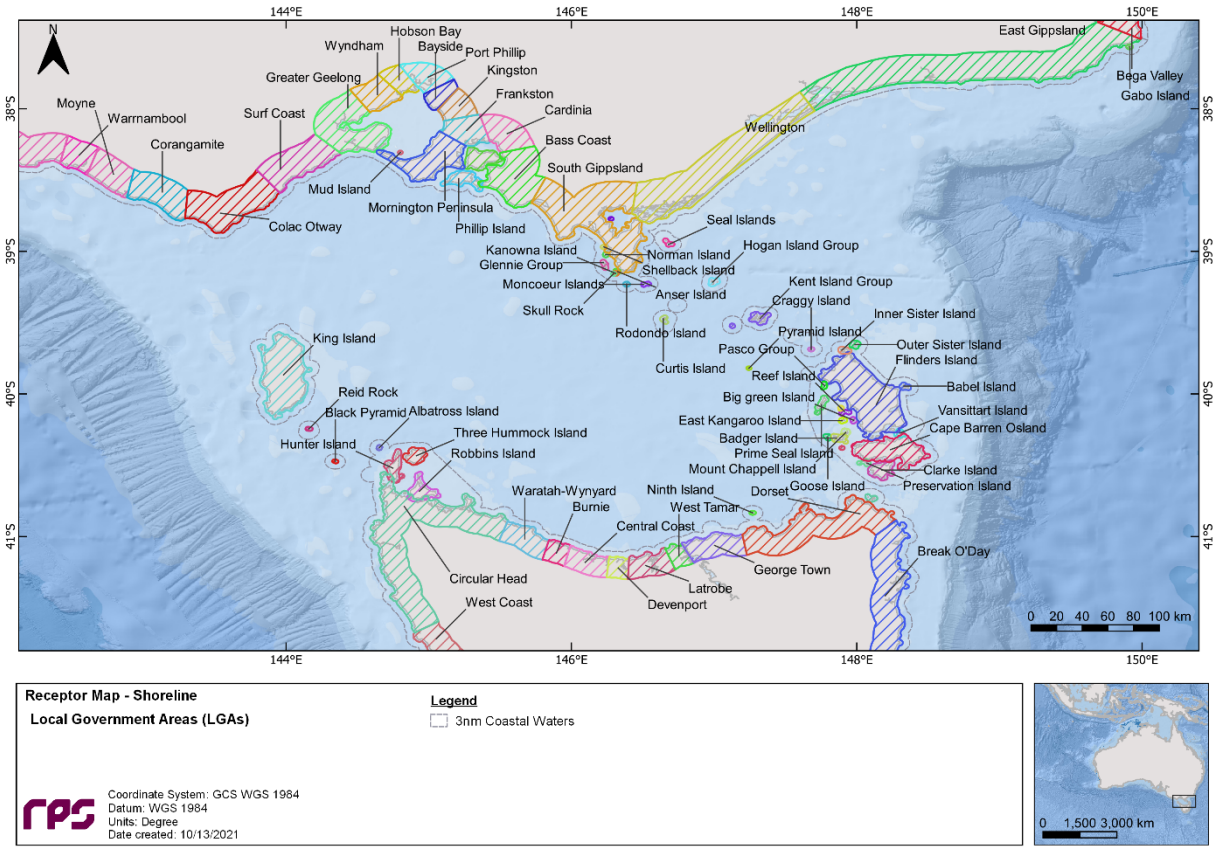

Figure 9-9 Receptor map for Local Government Areas (LGA).

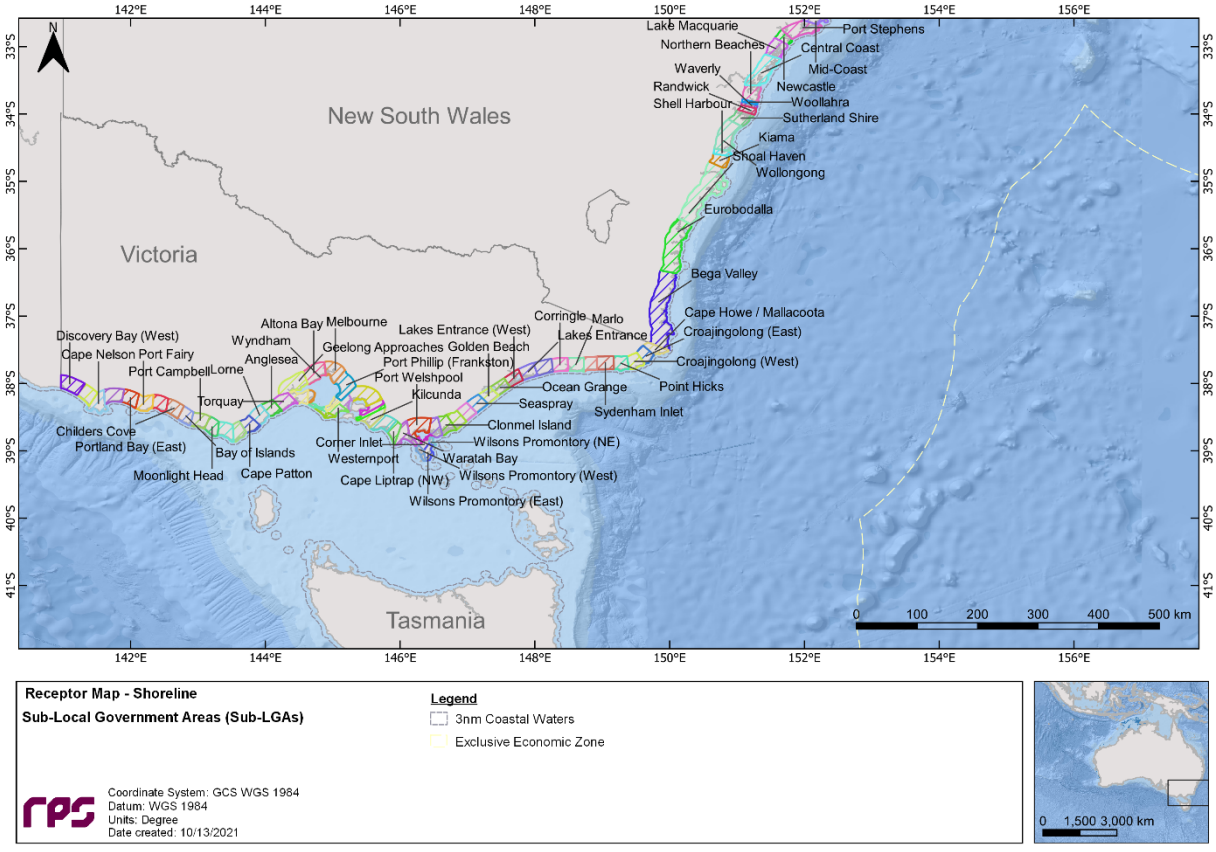

Figure 9-10 Receptor map for Sub Local Government Areas (Sub-LGA).

10 RESULTS – 300 m³ LOSS OF CONTAINMENT CAUSED BY VESSEL COLLISION

This scenario examined a 300 m^3 surface release of MDO over 6 hours to represent a loss of containment caused by vessel collision. A total of 200 spill simulations were run (i.e. 100 spills per season) and tracked for 30 days. The results for all 100 simulations per season were combined and are presented on a seasonal basis (i.e. summer and winter).

Sections 10.1 and 10.2 present the annual stochastic analysis and deterministic analysis results, respectively.

10.1 Stochastic Analysis

10.1.1 Environment that may be affected (EMBA)

Figure 10-1 presents the low threshold environment that maybe affected (EMBA) produced by overlaying the results from all 200 simulations (i.e. 100 per season) during summer and winter conditions.

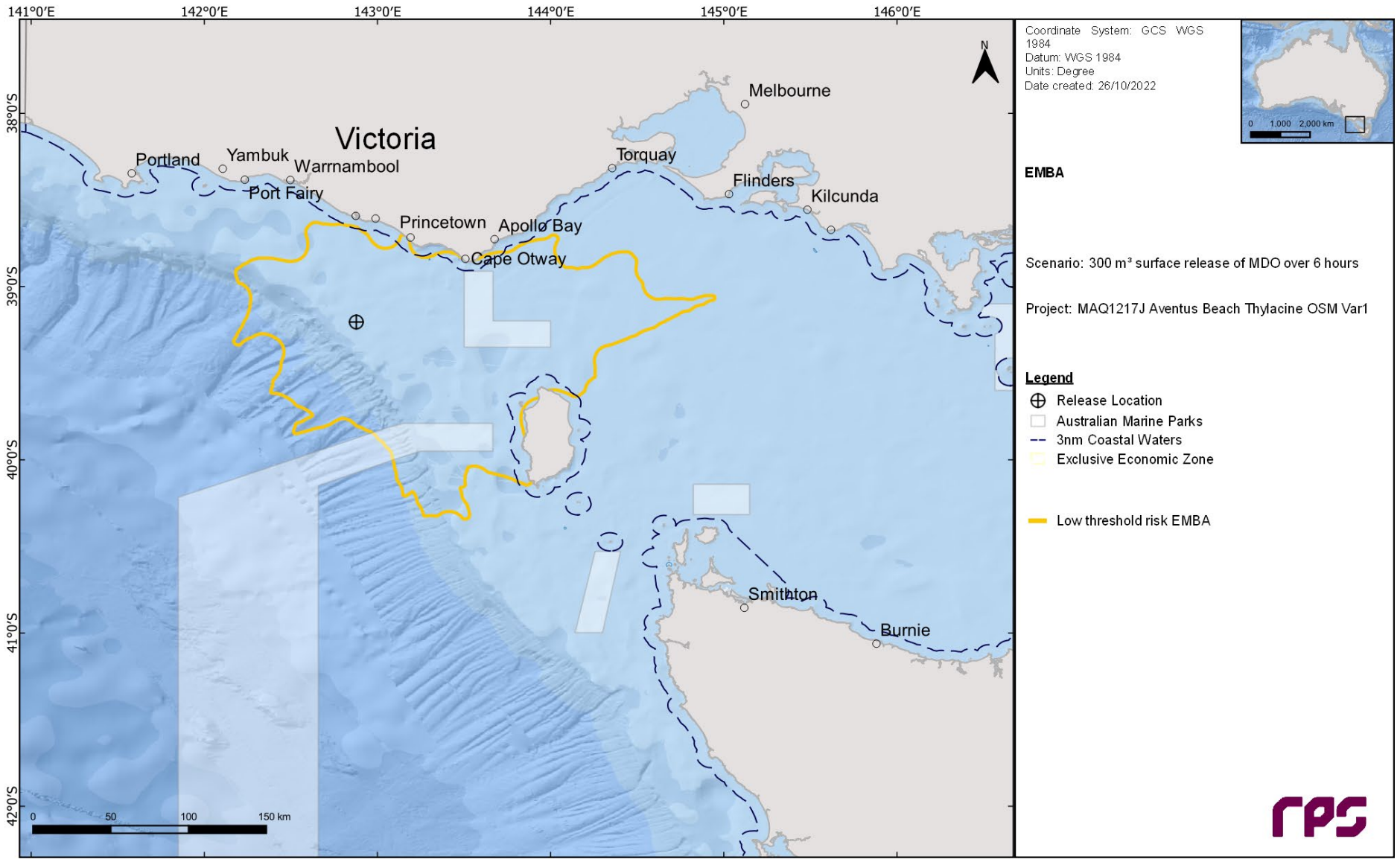

Figure 10-1 Predicted low threshold risk EMBA produced by overlaying the results from all 200 simulations, resulting from a 300 m³ surface release of MDO over 6 hours during summer and winter conditions.

10.1.2 Floating Oil Exposure

Table 10-1 summarises the maximum distance travelled by floating oil on the sea surface at each threshold. The maximum distance from the release location to the low (1–10 g/m^2), moderate (10–50 g/m^2) and high (> 50 g/m^2) exposure zones was 39.3 km (east-southeast) during summer conditions, 15.3 km (east-southeast) during winter conditions and 2.7 km (west-southwest) during winter conditions, respectively.

Table 10-2 summarises the potential floating oil exposure to individual receptors during the summer and winter conditions.

A total of 14 BIAs were shown to be exposed to floating oil at, or above, the low threshold during the summer and winter conditions. Additionally, the Otway IMCRA was shown to be exposed to floating oil at, or above, the low threshold during both summer and winter conditions (see Table 10-2). The release locations reside within all 16 receptors listed in Table 10-2.

Figure 10-2 and Figure 10-3 present the zones of potential floating oil exposure for all thresholds under summer and winter conditions, respectively.

Table 10-1 Maximum distance and direction from the release location to the edge of floating oil exposure. Results are based on a 300 m^3 surface release of MDO over 6 hours, tracked for 30 days. The results were calculated from 100 spill simulations per season.

Season	Distance and direction travelled	Zones of potential floating oil exposure		
		Low	Moderate	High
Summer	Maximum distance (km) from release location	39.3	11.7	1.4
	Maximum distance (km) from release location (99th percentile)	37.6	11	1.4
	Direction	East-southeast	Southeast	West-southwest
Winter	Maximum distance (km) from release location	33.1	15.3	2.7
	Maximum distance (km) from release location (99th percentile)	31.1	13.8	2.7
	Direction	Southeast	East-southeast	West-southwest

Table 10-2 Summary of the potential floating oil exposure to individual receptors. Results are based on a 300 m^3 surface release of MDO over 6 hours, tracked for 30 days. The results were calculated from 100 spill simulations per season.

Receptor		Summer (November through to March)						Winter (April to October)					
		Probability of floating oil exposure (%)			Minimum time before floating oil exposure (hours)			Probability of floating oil exposure (%)			Minimum time before floating oil exposure (hours)		
		Low	Moderate	High	Low	Moderate	High	Low	Moderate	High	Low	Moderate	High
BIA	Antipodean Albatross – Foraging*	100	100	9	1	1	3	100	100	11	1	1	2
	Black-browed Albatross – Foraging*	100	100	9	1	1	3	100	100	11	1	1	2
	Bullers Albatross – Foraging*	100	100	9	1	1	3	100	100	11	1	1	2
	Campbell Albatross – Foraging*	100	100	9	1	1	3	100	100	11	1	1	2
	Common Diving-petrel – Foraging*	100	100	9	1	1	3	100	100	11	1	1	2
	Indian Yellow-nosed Albatross – Foraging*	100	100	9	1	1	3	100	100	11	1	1	2
	Pygmy Blue Whale – Distribution*	100	100	9	1	1	3	100	100	11	1	1	2
	Pygmy Blue Whale – Foraging*	100	100	9	1	1	3	100	100	11	1	1	2
	Short-tailed Shearwater – Foraging*	100	100	9	1	1	3	100	100	11	1	1	2
	Shy Albatross – Foraging*	100	100	9	1	1	3	100	100	11	1	1	2
	Southern Right Whale – Migration*	100	100	9	1	1	3	100	100	11	1	1	2
	Wandering Albatross – Foraging*	100	100	9	1	1	3	100	100	11	1	1	2
	Wedge-tailed Shearwater – Foraging*	100	100	9	1	1	3	100	100	11	1	1	2
	White Shark – Distribution*	100	100	9	1	1	3	100	100	11	1	1	2
EEZ	Australian Exclusive Economic Zone*	100	100	9	1	1	3	100	100	11	1	1	2
IMCRA	Otway*	100	100	9	1	1	3	100	100	11	1	1	2

*The release location resides within the receptor boundaries.

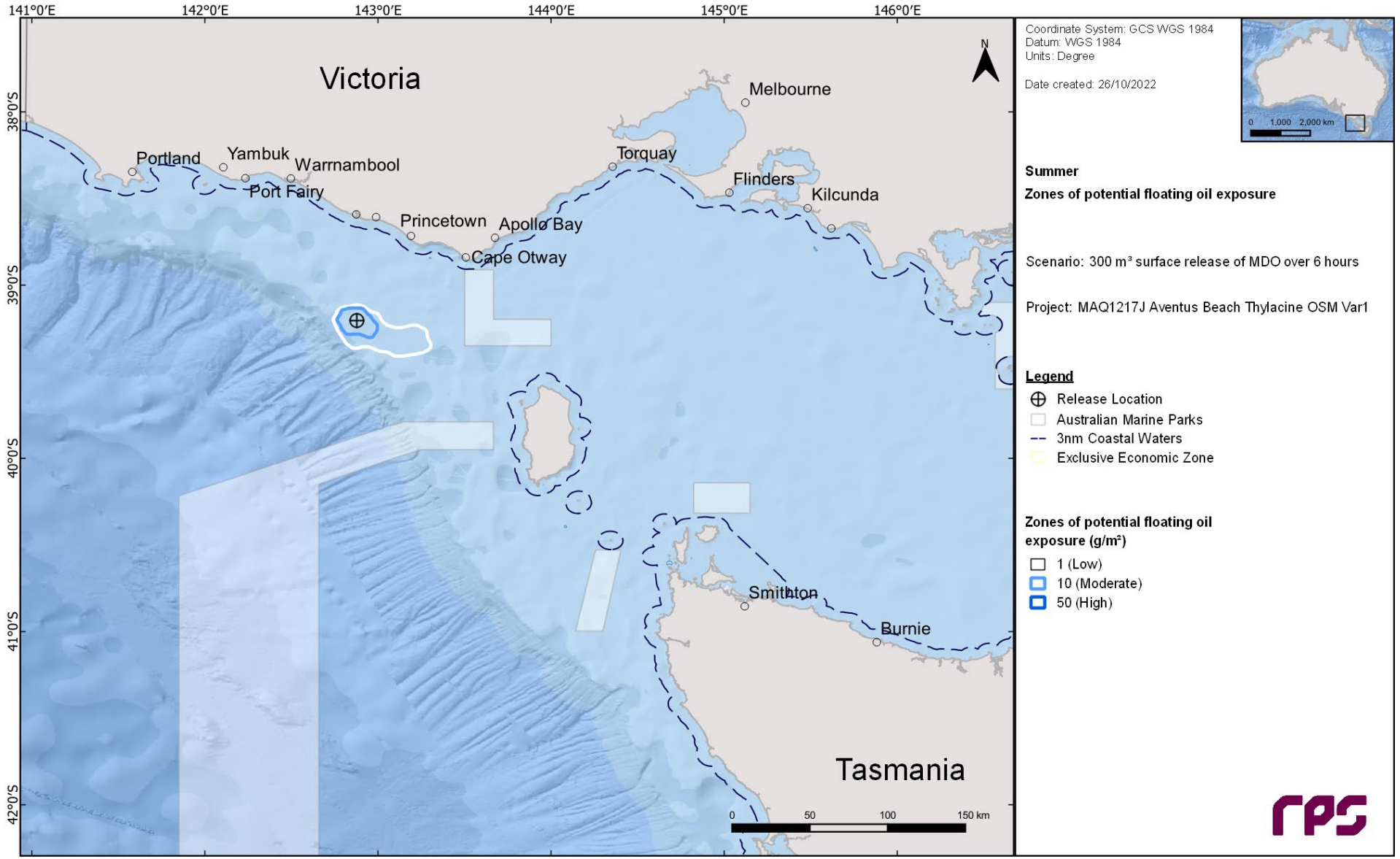

Figure 10-2 Zones of potential floating oil exposure in the event of a 300 m³ of MDO containment loss over 6 hours tracked for 30 days. The results were calculated from 100 spill simulations during summer conditions.

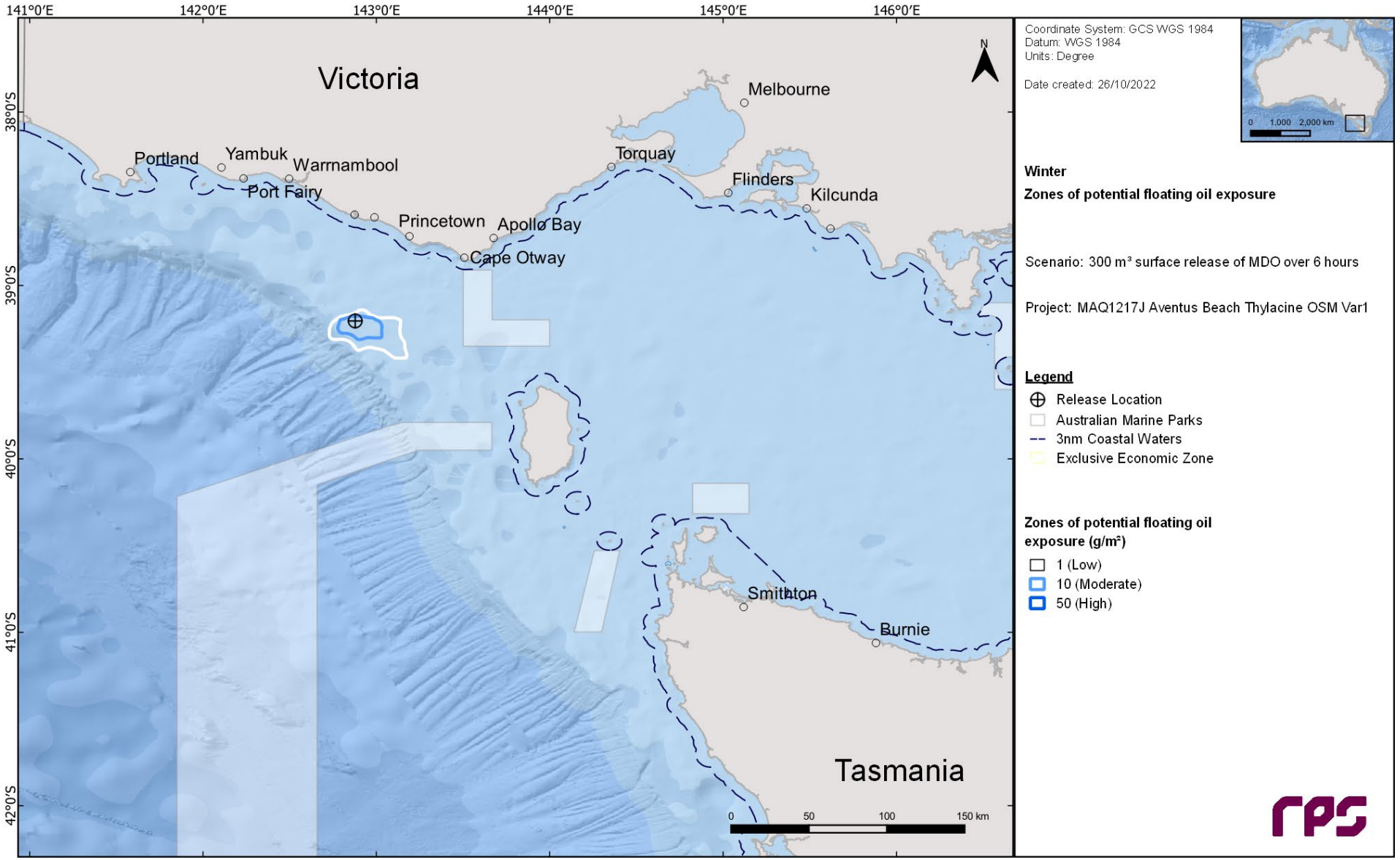

Figure 10-3 Zones of potential floating oil exposure in the event of a 300 m³ of MDO containment loss over 6 hours tracked for 30 days. The results were calculated from 100 spill simulations during winter conditions.

10.1.3 Shoreline Accumulation

Table 10-3 presents a summary of the predicted potential shoreline accumulation during the summer and winter conditions. The probability of accumulation to any shoreline at, or above, the low level (10 g/m^2) threshold was 0% during summer conditions and 5% during winter conditions. The minimum time before oil accumulation at, or above, the low threshold was 7.58 days winter conditions. The maximum total volume ashore for a single spill trajectory during winter conditions was 4.3 m^3, and the maximum length of shoreline accumulation at the low threshold was 11 km. No shoreline accumulation was observed for the summer season nor the moderate or high thresholds for winter.

Table 10-4 summarises the shoreline accumulation on individual receptors during the summer and winter conditions. During winter conditions one sub-LGA shorelines was shown to have shoreline accumulation above the low threshold with probability of 1%. The minimum time for low threshold shoreline accumulation was 7.58 days for King Island, where the maximum shoreline accumulation (4.3 m^3) also occurred.

The maximum potential shoreline loading above the low shoreline thresholds for winter conditions are presented in Figure 10-4.

Table 10-3 Summary of oil accumulation across all shorelines. Results are based on a 300 m^3 surface release of MDO over 6 hours, tracked for 30 days. The results were calculated from 100 spill simulations per season.

Shoreline Statistics	Summer	Winter
Probability of accumulation on any shoreline (%)	0	5
Absolute minimum time for visible oil to shore (days)	-	7.58
Maximum total volume of hydrocarbons ashore (m^3)	-	4.3
Average total volume of hydrocarbons ashore (m^3)	-	0.4
Maximum length of the shoreline at **10 g/m^2** (km)	-	11
Average shoreline length (km) at **10 g/m^2** (km)	-	3.6
Maximum length of the shoreline at **100 g/m^2** (km)	-	-
Average shoreline length (km) at **100 g/m^2** (km)	-	-
Maximum length of the shoreline at **1,000 g/m^2** (km)	-	-
Average shoreline length (km) at **1,000 g/m^2** (km)	-	-

Table 10-4 Summary of oil accumulation on individual shoreline receptors. Results are based on a 300 m^3 surface release of MDO over 6 hours, tracked for 30 days. The results were calculated from 100 spill simulations per season.

Shoreline Receptor		Summer																Winter													
		Maximum probability of shoreline loading (%)			Minimum time before shoreline accumulation (days)			Load on shoreline (g/m^2)		Volume on shoreline (m^3)		Mean length of shoreline accumulation (km)			Maximum length of shoreline accumulation (km)			Maximum probability of shoreline loading (%)			Minimum time before shoreline accumulation (days)			Load on shoreline (g/m^2)		Volume on shoreline (m^3)		Mean length of shoreline accumulation (km)			Maximum length of shoreline accumulation (km)		
		Low	Mod	High	Low	Mod	High	Mean	Peak	Mean	Peak	Low	Mod	High	Low	Mod	High	Low	Mod	High	Low	Mod	High	Mean	Peak	Mean	Peak	Low	Mod	High	Low	Mod	High
LGA	Colac Otway	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	9.92	-	-	1	15	< 0.1	0.5	1	-	-	1	-	-
	King Island	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	-	-	7.58	-	-	2	48	< 0.1	4.3	4.3	-	-	11	-	-
Sub-LGA	Cape Otway West	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	9.92	-	-	1	15	< 0.1	0.4	1	-	-	1	-	-

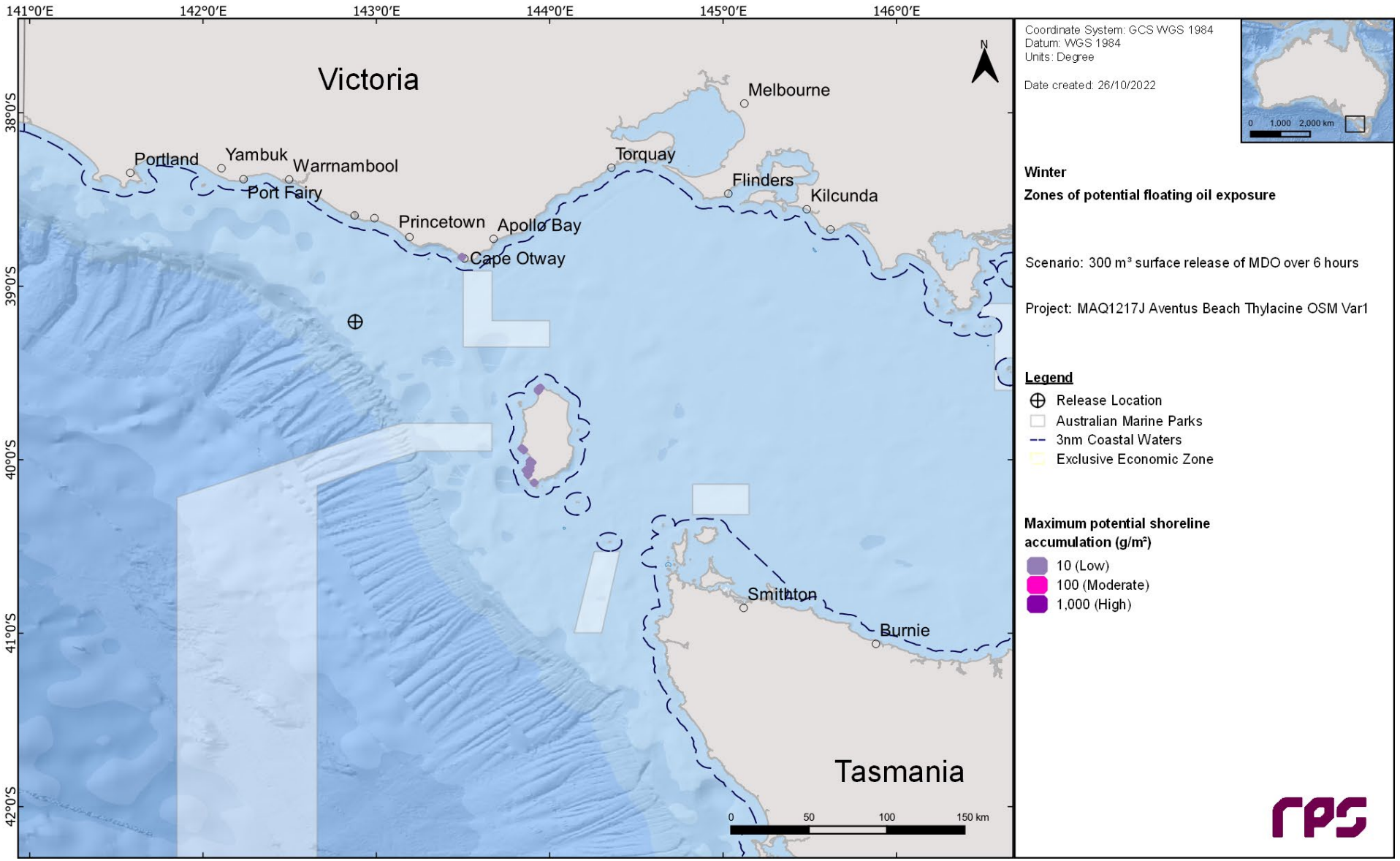

Figure 10-4 Maximum potential shoreline loading in the event of a 300 m³ of MDO containment loss over 6 hours tracked for 30 days. The results were calculated from 100 spill simulations during winter conditions.

10.1.4 In-water exposure

10.1.4.1 Dissolved Hydrocarbons

Table 10-5 summarises the probability of exposure to individual receptors from dissolved hydrocarbons in the 0-10 m layer during the summer and winter conditions.

A total of 14 BIAs were shown to be exposed to dissolved hydrocarbons above the low and moderate thresholds during both the summer and winter conditions. Furthermore, the Apollo AMP, the Otway IMCRA and the West Tasmania Canyons KEF were also predicted to be exposed above the low threshold during both summer and winter conditions. The maximum probability of exposure for the low threshold for any receptor during either summer and winter was 60% and 58%, respectively. During the summer and winter conditions the maximum dissolved aromatic concentrations at any given receptor(s) was predicted to be 57 ppb and 58 ppb, respectively, which occurred within receptors containing the release location.

Figure 10-5 and Figure 10-6 presents the zones of potential dissolved hydrocarbon exposure for the 0-10 m depth layer, for each threshold assessed under summer and winter conditions.

Table 10-5 Probability of dissolved hydrocarbons exposure to marine based receptors in the 0–10 m dept. Results are based on a 300 m^3 surface release of MDO over 6 hours, tracked for 30 days. The results were calculated from 100 spill simulations per season.

Receptor		Summer (November through to March)				Winter (April to October)			
		Maximum instantaneous dissolved hydrocarbon exposure	Probability of instantaneous dissolved hydrocarbon exposure			Maximum instantaneous dissolved hydrocarbon exposure	Probability of instantaneous dissolved hydrocarbon exposure		
			Low	Moderate	High		Low	Moderate	High
AMP	Apollo	21	1	0	0	15	1	0	0
BIA	Antipodean Albatross – Foraging*	60	57	1	0	64	58	2	0
	Black-browed Albatross – Foraging*	60	57	1	0	64	58	2	0
	Bullers Albatross – Foraging*	60	57	1	0	64	58	2	0
	Campbell Albatross – Foraging*	60	57	1	0	64	58	2	0
	Common Diving-petrel – Foraging*	60	57	1	0	64	58	2	0
	Indian Yellow-nosed Albatross – Foraging*	60	57	1	0	64	58	2	0
	Pygmy Blue Whale – Distribution*	60	57	1	0	64	58	2	0
	Pygmy Blue Whale – Foraging*	60	57	1	0	64	58	2	0
	Short-tailed Shearwater – Foraging*	60	57	1	0	64	58	2	0
	Shy Albatross – Foraging*	60	57	1	0	64	58	2	0
	Southern Right Whale – Migration*	60	57	1	0	64	58	2	0
	Wandering Albatross – Foraging*	60	57	1	0	64	58	2	0
	Wedge-tailed Shearwater – Foraging*	60	57	1	0	64	58	2	0
	White Shark – Distribution*	60	57	1	0	64	58	2	0
EEZ	Australian Exclusive Economic Zone*	60	57	1	0	64	58	2	0
IMCRA	Otway*	60	57	1	0	64	58	2	0
KEF	West Tasmania Canyons	8	0	0	0	17	1	0	0

*The release location resides within the receptor boundaries.

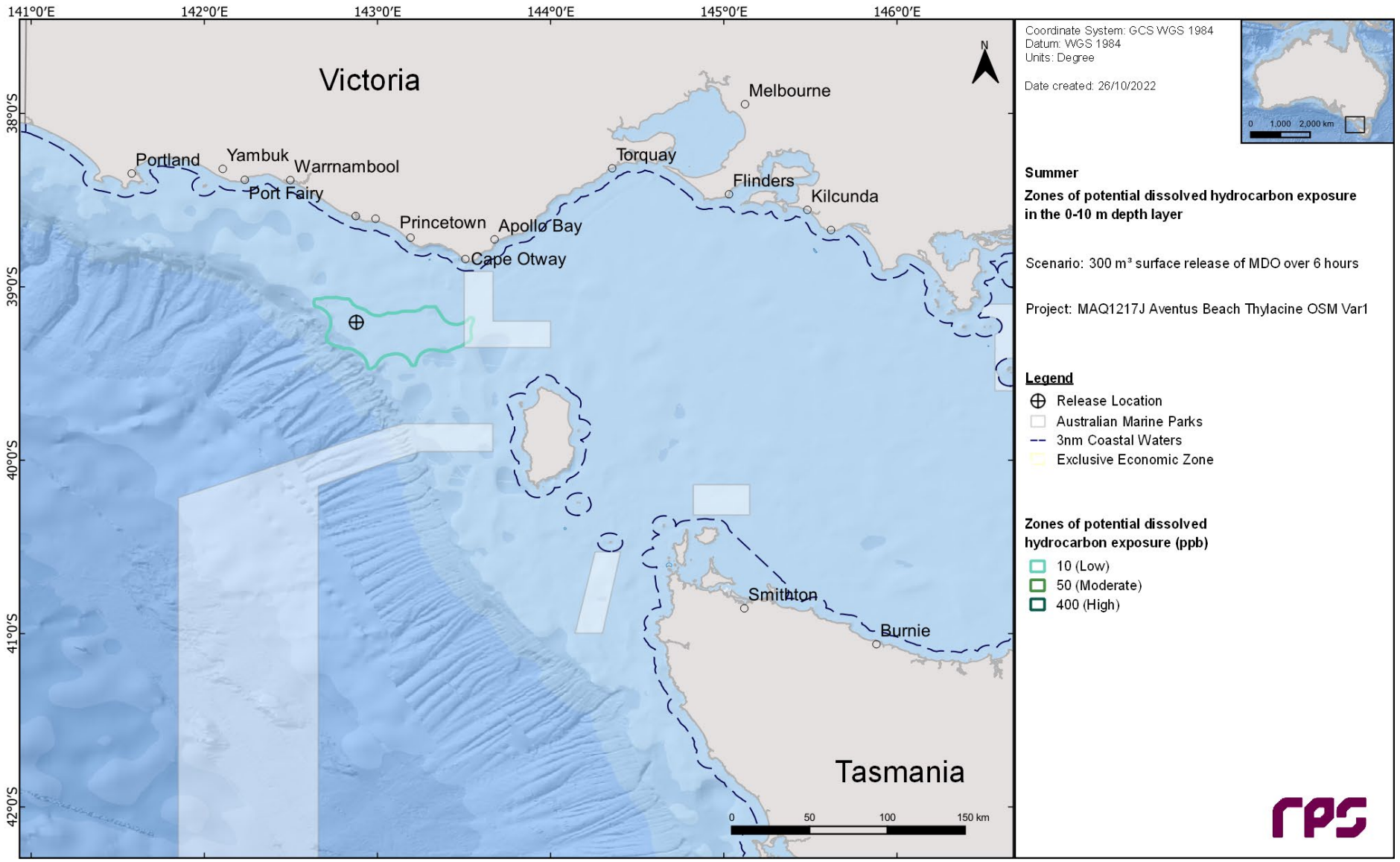

Figure 10-5 Zones of potential dissolved hydrocarbon exposure at 0-10 m below the sea in the event of a 300 m³ of MDO containment loss over 6 hours tracked for 30 days. The results were calculated from 100 spill simulations during summer conditions.

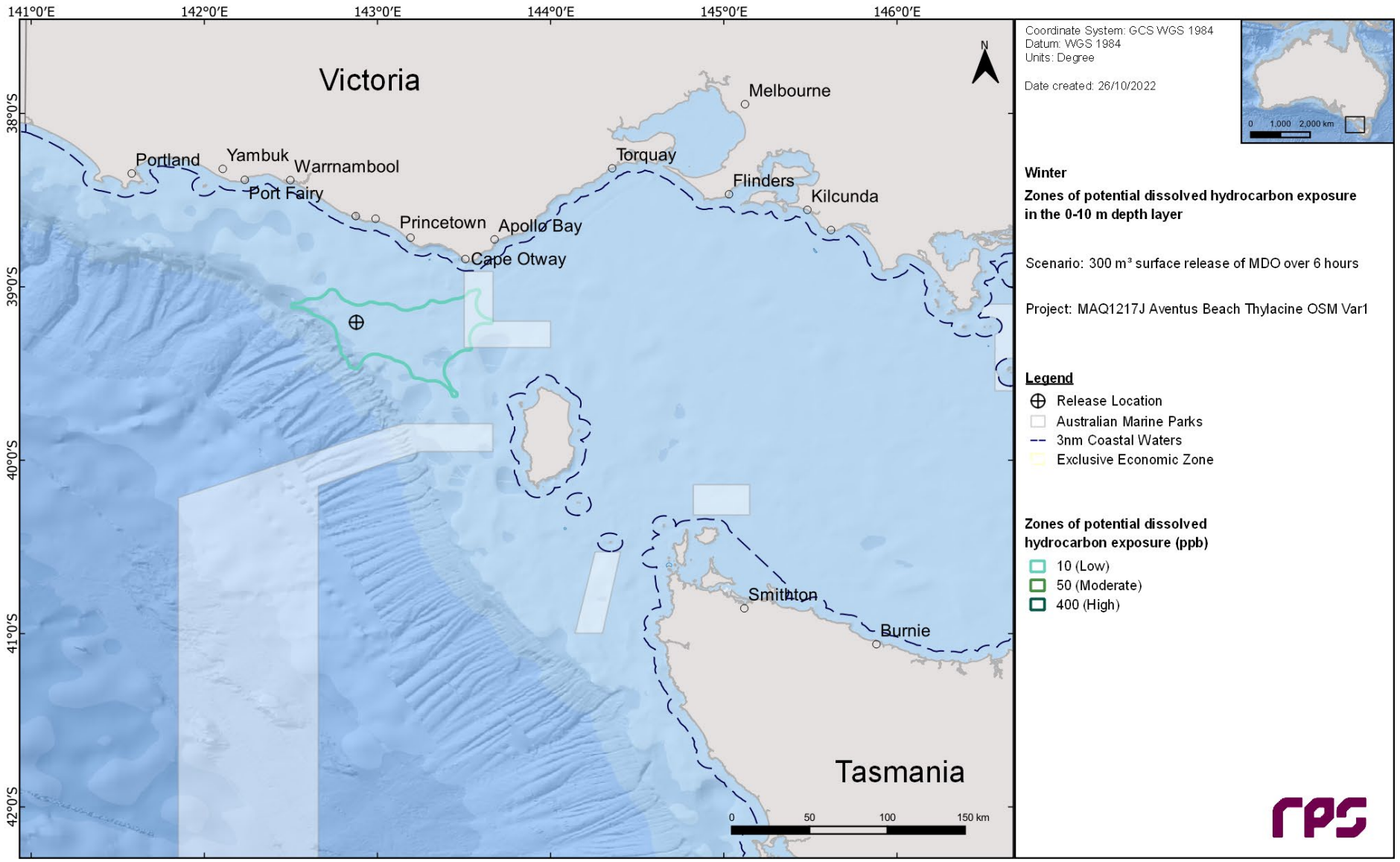

Figure 10-6 Zones of potential dissolved hydrocarbon exposure at 0-10 m below the sea in the event of a 300 m³ of MDO containment loss over 6 hours tracked for 30 days. The results were calculated from 100 spill simulations during winter conditions.

10.1.4.2 Entrained Hydrocarbons

Table 10-6 presents the probability of exposure to individual receptors from entrained hydrocarbons in the 0-10 m depth layer for the summer and winter conditions.

During both summer and winter conditions entrained hydrocarbon exposures at, or above, the low threshold was predicted for AMP, BIA, IBRA, IMCRA, KEF, MNP, RSB, nearshore waters (LGA and sub-LGA) and State Water receptors. The maximum probability of exposure for the low threshold for any receptor during summer and winter was 95% and 98%, respectively and 89% for the high threshold for both seasons. The maximum entrained hydrocarbon concentration predicted during the summer and winter conditions was 6,323 ppb and 7,007 ppb, respectively, which occurred within the receptors containing the release location.

Figure 10-7 and Figure 10-8 presents the zones of potential entrained hydrocarbon exposure for the 0-10 m depth layer, for each threshold assessed under summer and winter conditions, respectively

Table 10-6 Probability of entrained hydrocarbons exposure to marine based receptors in the 0–10 m depth layer. Results are based on a 300 m^3 surface release of MDO over 6 hours, tracked for 30 days. The results were calculated from 100 spill simulations per season.

Receptor		Summer (November through to March)			Winter (April to October)		
		Maximum instantaneous entrained hydrocarbon exposure	Probability of instantaneous entrained hydrocarbon exposure		Maximum instantaneous entrained hydrocarbon exposure	Probability of instantaneous entrained hydrocarbon exposure	
			Low	High		Low	High
AMP	Apollo	238	15	2	230	37	3
	Zeehan	28	9	0	43	8	0
BIA	Antipodean Albatross – Foraging*	6,323	95	89	7,007	98	89
	Black-browed Albatross – Foraging*	6,323	95	89	7,007	98	89
	Black-faced Cormorant – Foraging	16	3	0	35	9	0
	Bullers Albatross – Foraging*	6,323	95	89	7,007	98	89
	Campbell Albatross – Foraging*	6,323	95	89	7,007	98	89
	Common Diving-petrel – Foraging*	6,323	95	89	7,007	98	89
	Indian Yellow-nosed Albatross – Foraging*	6,323	95	89	7,007	98	89
	Little Penguin - Foraging	14	2	0	34	9	0
	Pygmy Blue Whale – Distribution*	6,323	95	89	7,007	98	89
	Pygmy Blue Whale – Foraging*	6,323	95	89	7,007	98	89
	Short-tailed Shearwater – Foraging*	6,323	95	89	7,007	98	89
	Shy Albatross – Foraging*	6,323	95	89	7,007	98	89
	Southern Right Whale - Aggregation	1	0	0	10	1	0
	Southern Right Whale - Connecting Habitat	9	0	0	19	3	0
	Southern Right Whale – Migration*	6,323	95	89	7,007	98	89
	Wandering Albatross – Foraging*	6,323	95	89	7,007	98	89
	Wedge-tailed Shearwater – Foraging*	6,323	95	89	7,007	98	89
	White Shark – Distribution*	6,323	95	89	7,007	98	89
	White Shark - Foraging	6	0	0	12	2	0
	White-faced Storm-petrel - Foraging	108	7	1	110	11	1
EEZ	Australian Exclusive Economic Zone*	6,323	95	89	7,007	98	89
IBRA	King Island	9	0	0	18	3	0
	Otway Plain	2	0	0	12	1	0

Receptor		Summer (November through to March)			Winter (April to October)		
		Maximum instantaneous entrained hydrocarbon exposure	Probability of instantaneous entrained hydrocarbon exposure		Maximum instantaneous entrained hydrocarbon exposure	Probability of instantaneous entrained hydrocarbon exposure	
			Low	High		Low	High
	Warrnambool Plain	1	0	0	10	1	0
IMCRA	Central Bass Strait	196	9	1	165	26	2
	Central Victoria	66	7	0	113	11	1
	Otway*	6,323	95	89	7,007	98	89
KEF	West Tasmania Canyons	275	35	2	267	10	2
MNP	Twelve Apostles	2	0	0	10	1	0
SHORE	Colac Otway	2	0	0	12	1	0
	Corangamite	1	0	0	10	1	0
	King Island	9	0	0	18	3	0
SUB-LGA	Apollo Bay	2	0	0	11	1	0
	Cape Otway West	2	0	0	12	1	0
	Moonlight Head	1	0	0	10	1	0
State Waters	Tasmania State Waters	14	2	0	32	8	0
	Victoria State Waters	5	0	0	22	2	0

*The release location resides within the receptor boundaries.

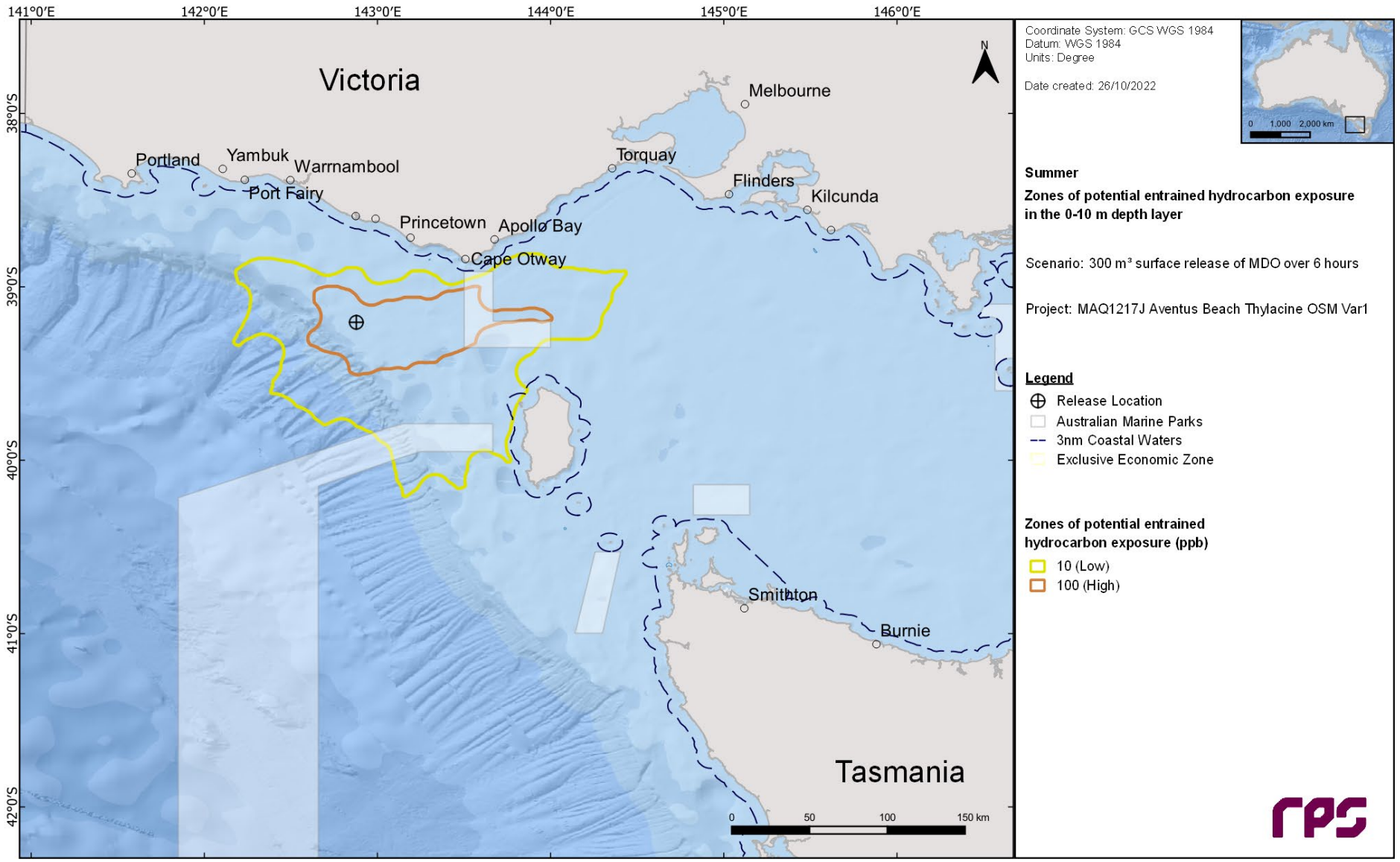

Figure 10-7 Zones of potential entrained hydrocarbon exposure at 0-10 m below the sea surface in the event of a 300 m³ of MDO containment loss over 6 hours tracked for 30 days. The results were calculated from 100 spill simulations during summer conditions.

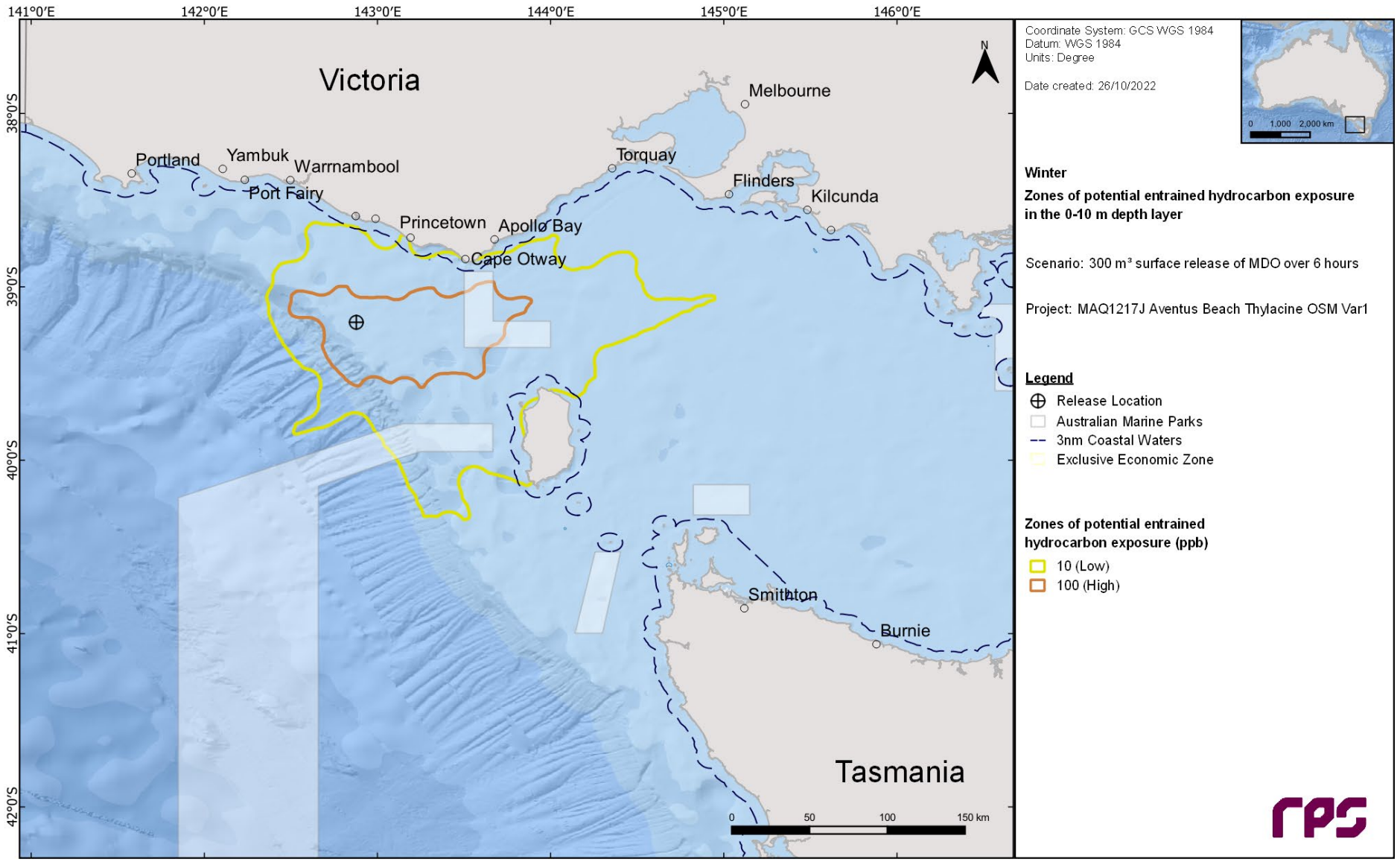

Figure 10-8 Zones of potential entrained hydrocarbon exposure at 0-10 m below the sea surface in the event of a 300 m³ of MDO containment loss over 6 hours tracked for 30 days. The results were calculated from 100 spill simulations during winter conditions.

10.2 Deterministic Analysis

The stochastic modelling results were assessed, and the "worst case" deterministic runs were identified and are presented below. The deterministic analysis assessed the largest volume of oil ashore (Section 10.2.1), the longest length of shoreline accumulation above 100 g/m^2, and the minimum time before shoreline accumulation above 10 g/m^2 (see Section 10.2.2).

Please note there was no shoreline accumulation above the 100 g/m^2 threshold, so this deterministic case is not presented.

Table 10-7 presents a summary of shoreline accumulation at the assessed thresholds for the identified deterministic simulations.

Table 10-7 Summary of the worst-case deterministic analysis based on the scenario presented in the Stochastic Analysis Section.

Variable	Threshold	Deterministic Analysis Criteria	
		Largest volume of oil ashore	Minimum time before shoreline accumulation above 10 g/m^2
Season		Winter	Winter
Run Number		5	66
Total area of floating Oil exposure (km^2)	**1 g/m^2**	6	1.0
	10 g/m^2	2.0	1.0
	50 g/m^2	-	-
Total length of shoreline accumulation (km)	**10 g/m^2**	11	3.0
	100 g/m^2	NC	NC
	1,000 g/m^2	NC	NC
Minimum time before accumulation on any shoreline (days)	**10 g/m^2**	8.67	**7.58**
	100 g/m^2	NC	NC
	1,000 g/m^2	NC	NC
Total volume of oil ashore (m^3)		**4.3**	1.1
Total area of entrained hydrocarbon exposure (km^2)	**10 ppb**	2,238	2,297
	100 ppb	407	503
Total area of dissolved hydrocarbon exposure (km^2)	**10 ppb**	37.7	6.0
	50 ppb	-	-
	400 ppb	-	-
Start Date		6th June 2019	28th July 2013

NC = No contact at, or above the specified shoreline accumulation threshold.

10.2.1 Deterministic Case: Largest volume of oil ashore

The deterministic trajectory that resulted in the largest volume of oil ashore was identified as run number 5 during winter conditions, which started on 6th June 2019.

Figure 10.9 illustrates the floating oil exposure and shoreline accumulation over the 30-day simulation.

Figure 10.10 displays the time series of the volume of oil accumulating on shorelines at the low (10 g/m^2), moderate (100 g/m^2) and high (1,000 g/m^2) thresholds over the 30-day simulation.

Error! Reference source not found. displays the time series of the length of oil accumulation on shorelines at the low (10 g/m^2), moderate (100 g/m^2) and high (1,000 g/m^2) thresholds over the 30-day simulation.

Figure 10.11 presents the fates and weathering graph for the corresponding single spill trajectory and Table 10.8 summarises the mass balance at the end of the simulation.

Table 10.8 Summary of the mass balance for the trajectory that resulted in the largest volume of oil ashore. Results are based on a 300 m^3 surface release of MDO over 6 hours, tracked for 30 days.

Exposure Metrics	Peak Volume	Day of occurrence	Volume at day 30
Surface (m^3)	40.9	0.1	0.0
Entrained (m^3)	224.1	0.4	60.7
Dissolved (m^3)	1.4	0.7	0.1
Evaporation (m^3)	94.0	29.8	94.0
Decay (m^3)	146.6	30.0	146.6
Ashore (m^3)	3.0	10.0	0.7

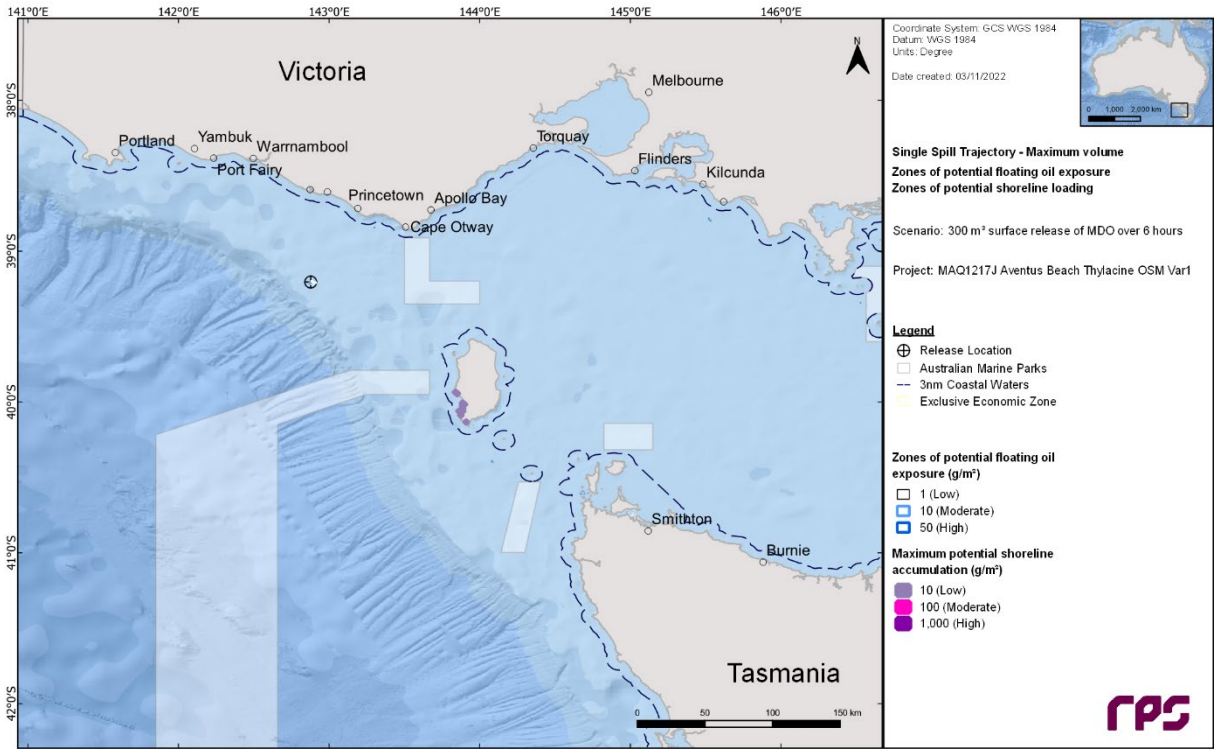

Figure 10.9 Zones of potential floating oil exposure and shoreline accumulation, for the trajectory with the largest volume of oil ashore. Results are based on a 300 m^3 surface release of MDO over 6 hours, tracked for 30 days.

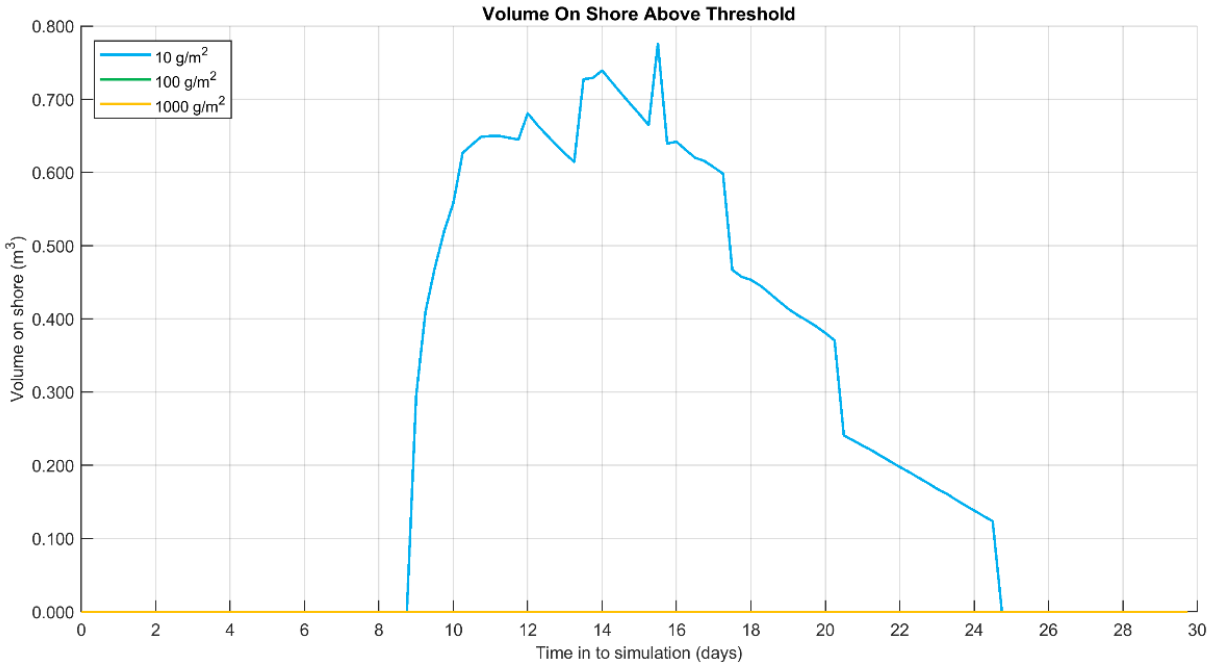

Figure 10.10 Time series of the volume of oil accumulating on shorelines at the low (10 g/m^2), moderate (100 g/m^2) and high (1,000 g/m^2) thresholds for the trajectory with the largest volume of oil ashore. Results are based on a 300 m^3 surface release of MDO over 6 hours, tracked for 30 days.

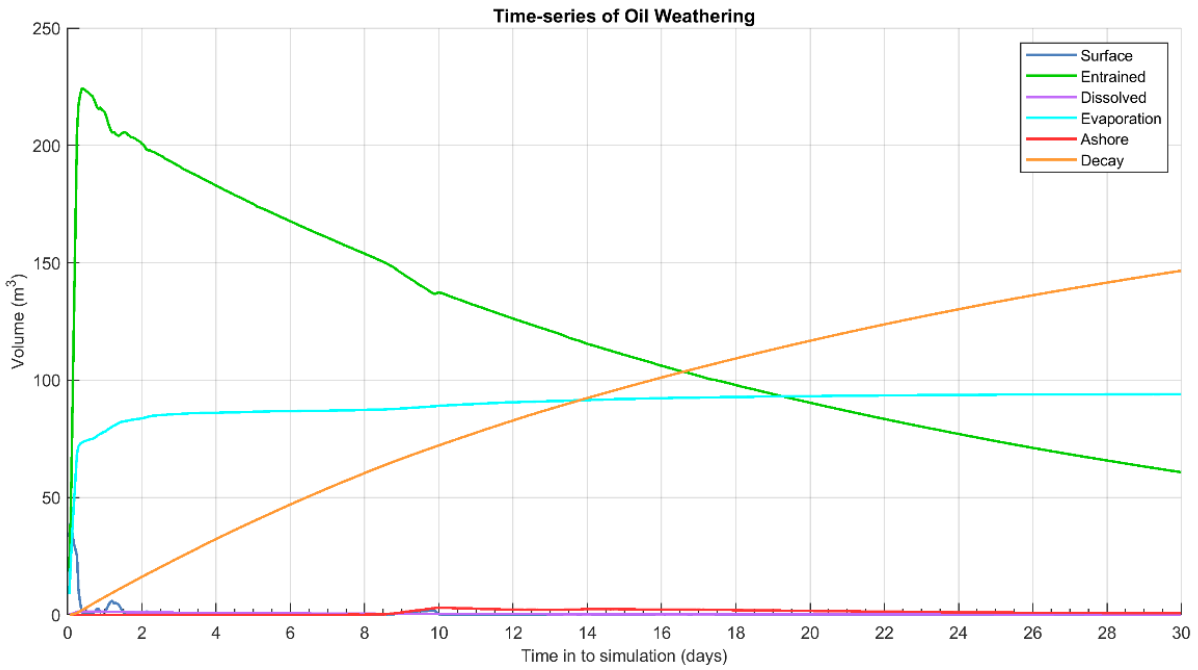

Figure 10.11 Predicted weathering and fates graph for the trajectory with the largest volume of oil ashore. Results are based on a 300 m^3 surface release of MDO over 6 hours, tracked for 30 days.

10.2.2 Deterministic Case: Minimum time before shoreline accumulation above 10 g/m^2

The deterministic trajectory that resulted in the minimum time before shoreline accumulation above the low threshold (10 g/m^2) was identified as run number 66 during winter conditions which started on 28th July 2013.

Figure 10.12 illustrates the floating oil exposure and shoreline accumulation over the 30 days.

Figure 10.13 presents the fates and weathering graph for the corresponding single spill trajectory and Table 10.9 summarises the mass balance at the end of the 30-day simulation.

Table 10.9 Summary of the mass balance for the trajectory that resulted in the minimum time before shoreline accumulation above the low threshold (10 g/m^2). Results are based on a 300 m^3 surface release of MDO over 6 hours, tracked for 30 days.

Exposure Metrics	Peak Volume	Day of occurrence	Volume at day 30
Surface (m^3)	13.4	0.1	0.0
Entrained (m^3)	272.7	0.3	59.1
Dissolved (m^3)	1.0	0.9	0.1
Evaporation (m^3)	83.0	30.0	83.0
Decay (m^3)	159.6	30.0	159.6
Ashore (m^3)	1.0	10.2	0.2

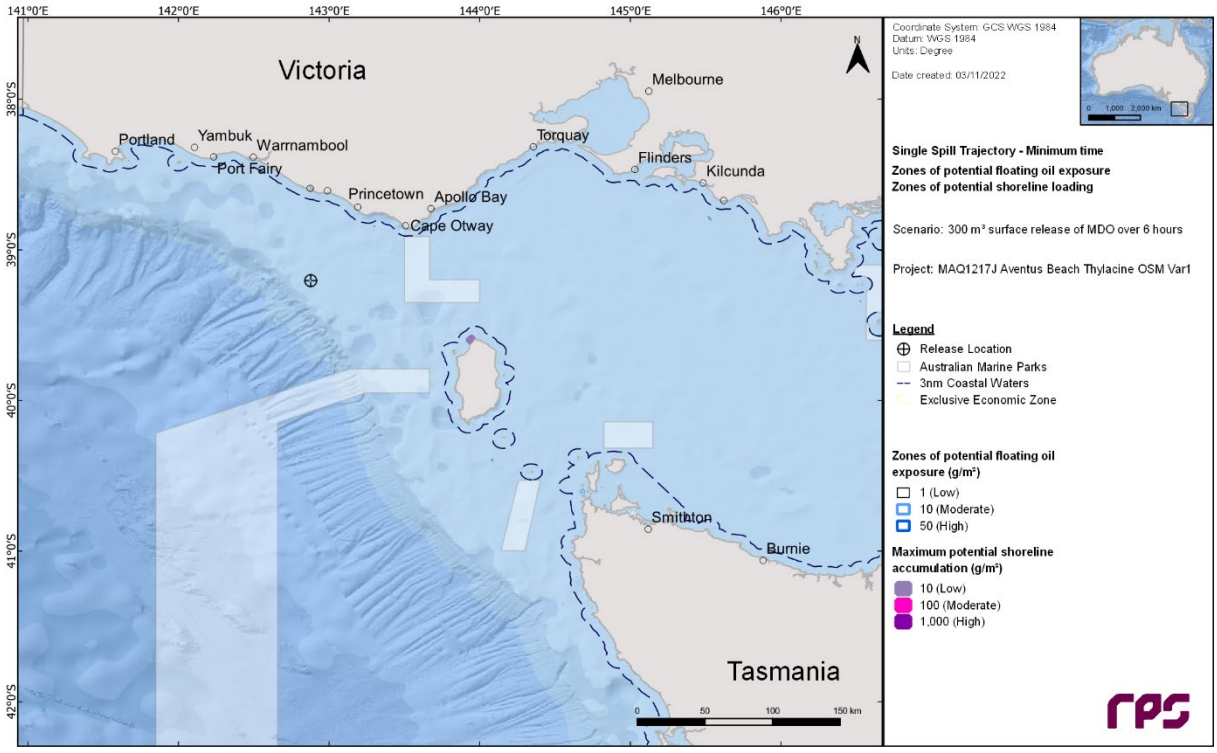

Figure 10.12 Zones of potential floating oil exposure and shoreline accumulation over the 30-day simulation, for the trajectory with the minimum time before shoreline accumulation above 10 g/m^2. Results are based on a 300 m^3 surface release of MDO over 6 hours, tracked for 30 days.

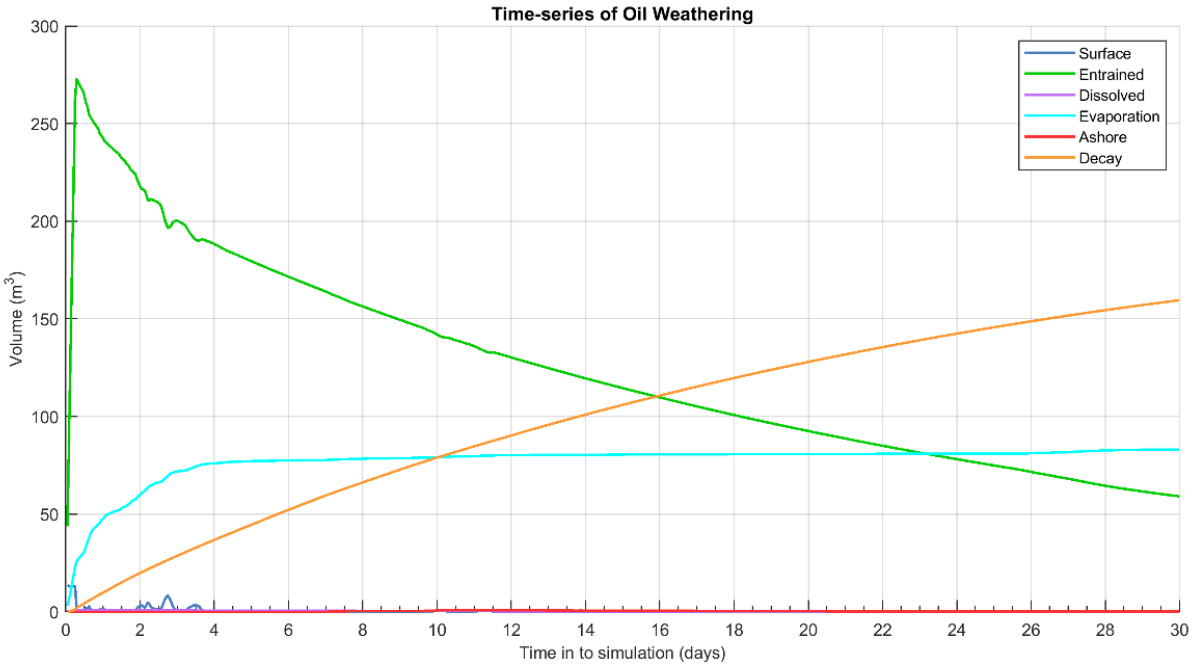

Figure 10.13 Predicted weathering and fates graph for the trajectory with the minimum time before shoreline accumulation above 10 g/m^2. Results are based on a 300 m^3 surface release of MDO over 6 hours, tracked for 30 days.

11 RESULTS – 200 m³ LOSS OF CONTAINMENT CAUSED BY VESSEL COLLISION

This scenario examined a 200 m^3 surface release of MDO over 6 hours to represent a loss of containment caused by vessel collision. A total of 200 spill simulations were run (i.e. 100 spills per season) and tracked for 30 days. The results for all 100 simulations per season were combined and are presented on a seasonal basis (i.e. summer and winter).

Sections 11.1 and 11.2 present the annual stochastic analysis and deterministic analysis results, respectively.

11.1 Stochastic Analysis

11.1.1 Environment that may be affected (EMBA)

Figure 11-1 presents the low threshold environment that maybe affected (EMBA) produced by overlaying the results from all 200 simulations (i.e. 100 per season) during summer and winter conditions.

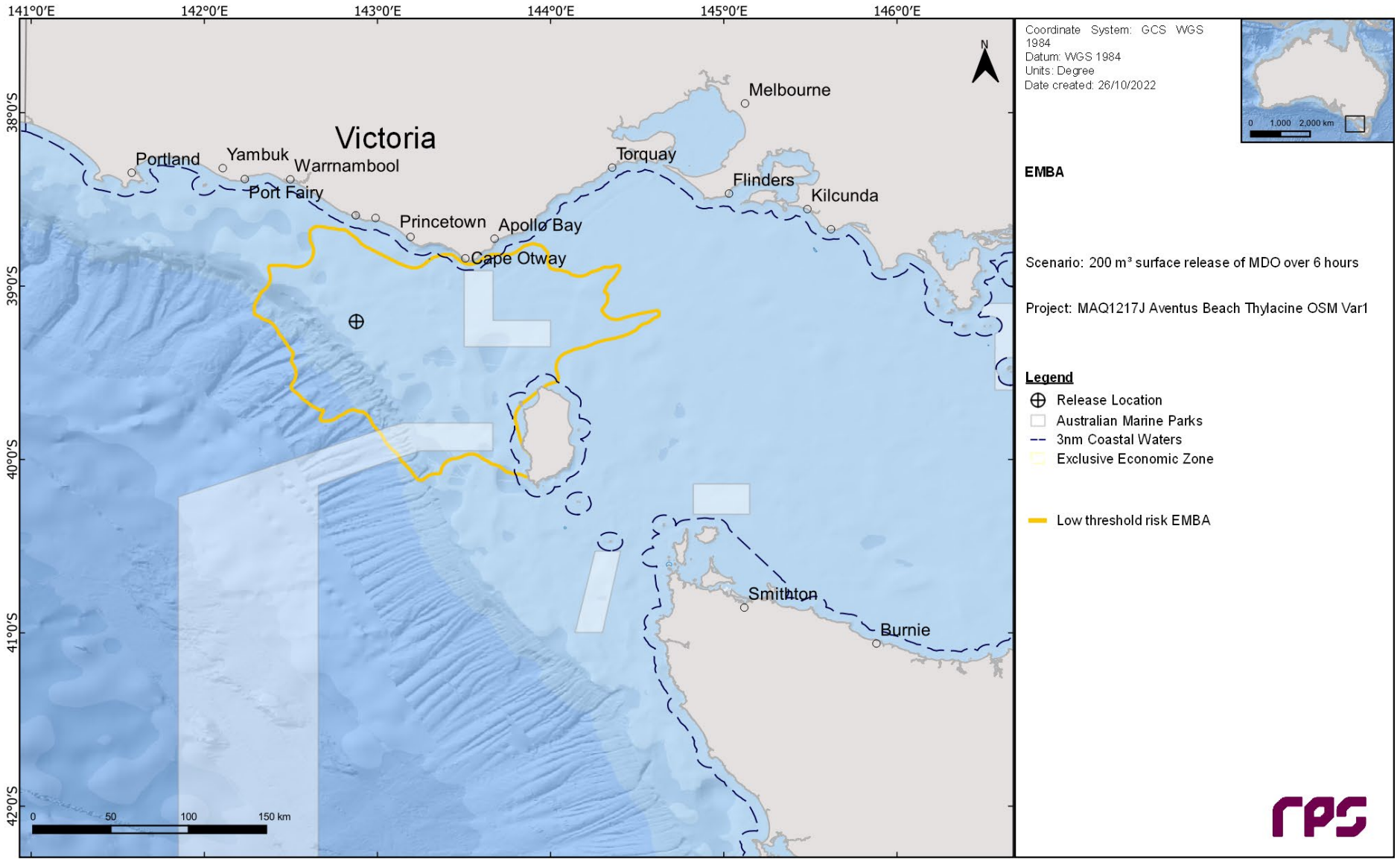

Figure 11-1 Predicted low threshold risk EMBA produced by overlaying the results from all 200 simulations, resulting from a 200 m³ surface release of MDO over 6 hours during summer and winter conditions.

11.1.2 Floating Oil Exposure

Table 11-1 summarises the maximum distance travelled by floating oil on the sea surface at each threshold. The maximum distance from the release location to the low (1–10 g/m^2), moderate (10–50 g/m^2) and high (> 50 g/m^2) exposure zones was 36.5 km (east-southeast) during summer conditions, 9.4 km (southeast) during winter conditions and 0.5 km (southwest) during winter conditions, respectively.

Table 11-2 summarises the potential floating oil exposure to individual receptors during the summer and winter conditions.

A total of 14 BIAs were predicted to be exposed to floating oil at, or above, the low threshold during the summer and winter conditions. Additionally, the Otway IMCRA was shown to be exposed to floating oil at, or above, the low and moderate threshold during both summer and winter conditions (see Table 10-2). The release location resides within all receptors shown to be exposed to floating oil.

Figure 11-2 and Figure 11-3 present the zones of potential floating oil exposure for all thresholds under summer and winter conditions, respectively.

Table 11-1 Maximum distance and direction from the release location to the edge of floating oil exposure. Results are based on a 200 m^3 surface release of MDO over 6 hours, tracked for 30 days. The results were calculated from 100 spill simulations per season.

Season	Distance and direction travelled	Zones of potential floating oil exposure		
		Low	Moderate	High
Summer	Maximum distance (km) from release location	36.5	8.6	-
	Maximum distance (km) from release location (99th percentile)	34.2	8.1	-
	Direction	East-southeast	East-southeast	-
Winter	Maximum distance (km) from release location	31.6	9.4	0.5
	Maximum distance (km) from release location (99th percentile)	30.2	9.3	0.5
	Direction	Southeast	Southeast	Southwest

Table 11-2 Summary of the potential floating oil exposure to individual receptors. Results are based on a 200 m³ surface release of MDO over 6 hours, tracked for 30 days. The results were calculated from 100 spill simulations per season.

Receptor		Summer (November through to March)						Winter (April to October)					
		Probability of floating oil exposure (%)			Minimum time before floating oil exposure (hours)			Probability of floating oil exposure (%)			Minimum time before floating oil exposure (hours)		
		Low	Moderate	High	Low	Moderate	High	Low	Moderate	High	Low	Moderate	High
BIA	Antipodean Albatross – Foraging*	100	75	-	1	1	-	100	50	3	1	1	3
	Black-browed Albatross – Foraging*	100	75	-	1	1	-	100	50	3	1	1	3
	Bullers Albatross – Foraging*	100	75	-	1	1	-	100	50	3	1	1	3
	Campbell Albatross – Foraging*	100	75	-	1	1	-	100	50	3	1	1	3
	Common Diving-petrel – Foraging*	100	75	-	1	1	-	100	50	3	1	1	3
	Indian Yellow-nosed Albatross – Foraging*	100	75	-	1	1	-	100	50	3	1	1	3
	Pygmy Blue Whale – Distribution*	100	75	-	1	1	-	100	50	3	1	1	3
	Pygmy Blue Whale – Foraging*	100	75	-	1	1	-	100	50	3	1	1	3
	Short-tailed Shearwater – Foraging*	100	75	-	1	1	-	100	50	3	1	1	3
	Shy Albatross – Foraging*	100	75	-	1	1	-	100	50	3	1	1	3
	Southern Right Whale – Migration*	100	75	-	1	1	-	100	50	3	1	1	3
	Wandering Albatross – Foraging*	100	75	-	1	1	-	100	50	3	1	1	3
	Wedge-tailed Shearwater – Foraging*	100	75	-	1	1	-	100	50	3	1	1	3
	White Shark – Distribution*	100	75	-	1	1	-	100	50	3	1	1	3
EEZ	Australian Exclusive Economic Zone*	100	75	-	1	1	-	100	50	3	1	1	3
IMCRA	Otway*	100	75	-	1	1	-	100	50	3	1	1	3

*The release location resides within the receptor boundaries.

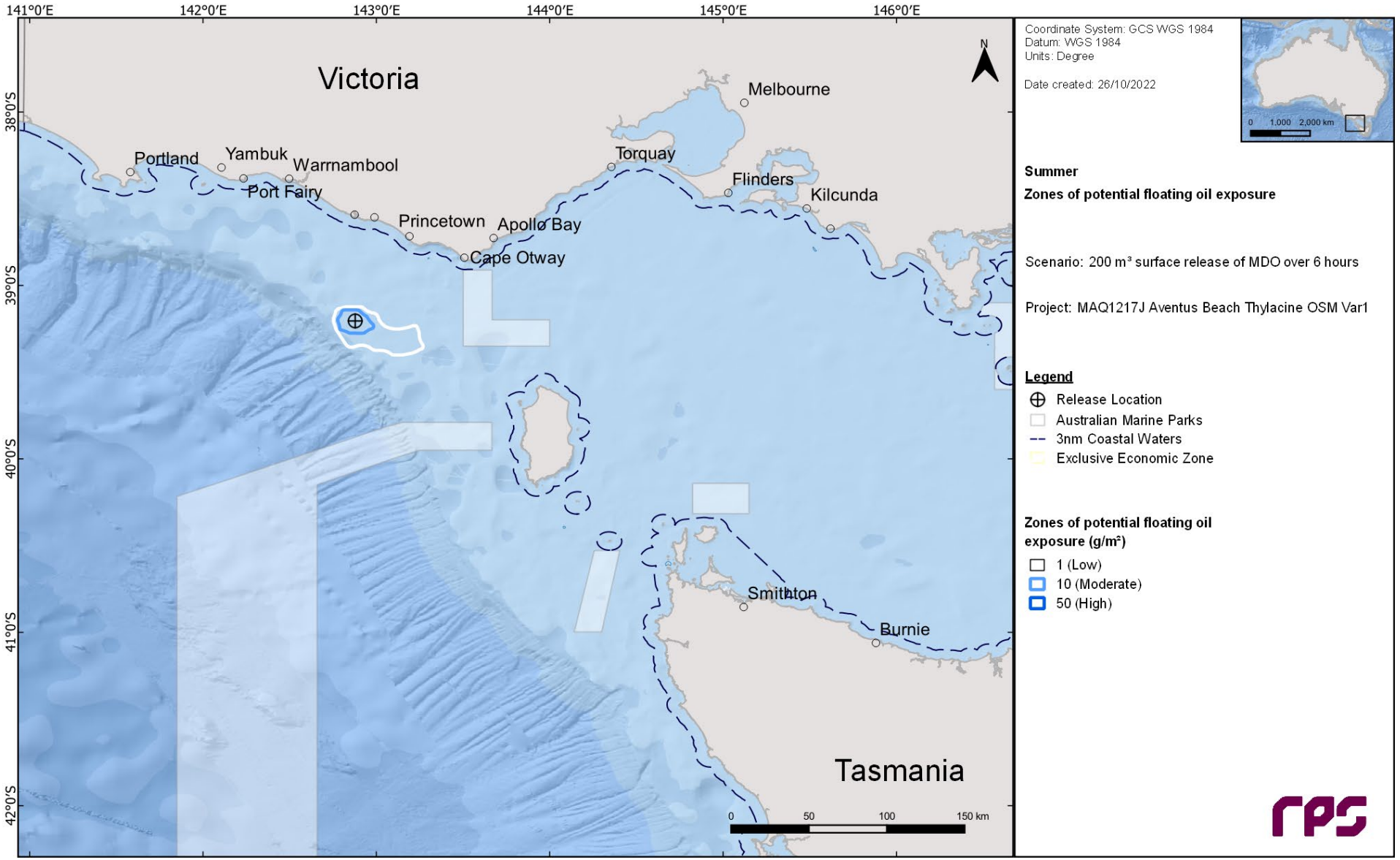

Figure 11-2 Zones of potential floating oil exposure in the event of a 200 m³ of MDO containment loss over 6 hours tracked for 30 days. The results were calculated from 100 spill simulations during summer conditions.

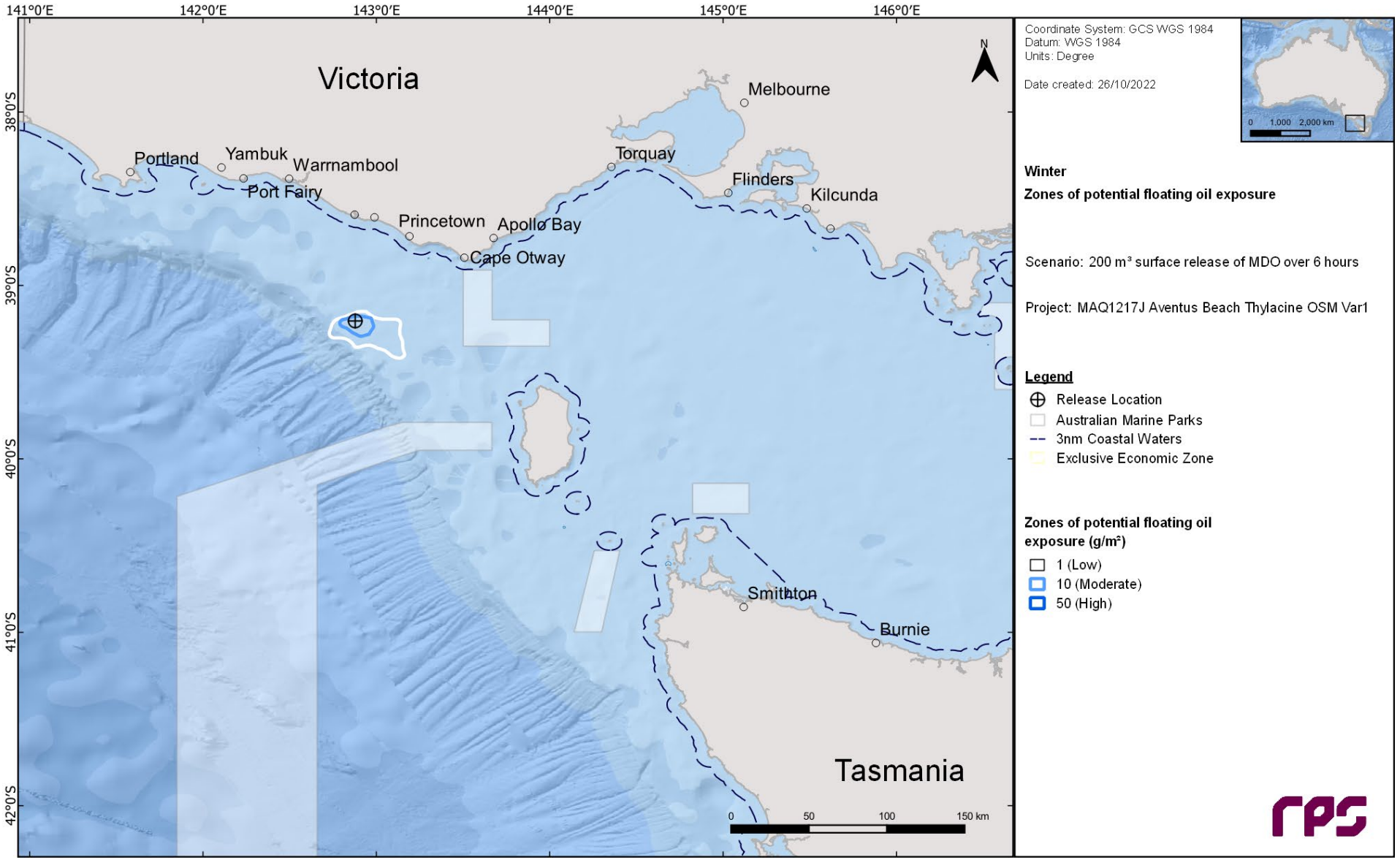

Figure 11-3 Zones of potential floating oil exposure in the event of a 200 m³ of MDO containment loss over 6 hours tracked for 30 days. The results were calculated from 100 spill simulations during winter conditions.

11.1.3 Shoreline Accumulation

Table 11-3 presents a summary of the predicted potential shoreline accumulation during the summer and winter conditions. The probability of accumulation to any shoreline at, or above, the low level (10 g/m^2) threshold was 0% during summer conditions and 2% during winter conditions. The minimum time before oil accumulation at, or above, the low threshold was 8.13 days during the winter conditions. The maximum total volume ashore for a single spill trajectory during the winter conditions was 2.7 m^3, and the maximum length of shoreline accumulation at the low threshold was 5 km. No shoreline accumulation was predicted for the moderate (100 g/m^2) or high (1,000 g/m^2) threshold.

Table 11-4 summarises the shoreline accumulation on individual receptors during the summer and winter conditions. During the winter conditions, King Island was the only shoreline receptor that was predicted to have shoreline accumulation above the low threshold (10 g/m^2) with a probability of low accumulation of 2%. The minimum time before shoreline accumulation at King Island during winter conditions was 8.13 days, whilst the maximum shoreline accumulation volume was 2.7 m^3.

The maximum potential shoreline loading above the low, moderate and high shoreline thresholds for winter conditions are presented in Figure 11-4.

Table 11-3 Summary of oil accumulation across all shorelines. Results are based on a 200 m^3 surface release of MDO over 6 hours, tracked for 30 days. The results were calculated from 100 spill simulations per season.

Shoreline Statistics	Summer	Winter
Probability of accumulation on any shoreline (%)	0	2
Absolute minimum time for visible oil to shore (days)	-	8.13
Maximum total volume of hydrocarbons ashore (m^3)	-	2.7
Average total volume of hydrocarbons ashore (m^3)	-	0.2
Maximum length of the shoreline at **10 g/m^2** (km)	-	5
Average shoreline length (km) at **10 g/m^2** (km)	-	4
Maximum length of the shoreline at **100 g/m^2** (km)	-	-
Average shoreline length (km) at **100 g/m^2** (km)	-	-
Maximum length of the shoreline at **1,000 g/m^2** (km)	-	-
Average shoreline length (km) at **1,000 g/m^2** (km)	-	-

Table 11-4 Summary of oil accumulation on individual shoreline receptors. Results are based on a 200 m^3 surface release of MDO over 6 hours, tracked for 30 days. The results were calculated from 100 spill simulations per season.

Shoreline Receptor		Summer																Winter														
		Maximum probability of shoreline loading (%)			Minimum time before shoreline accumulation (days)			Load on shoreline (g/m^2)		Volume on shoreline (m^3)		Mean length of shoreline accumulation (km)			Maximum length of shoreline accumulation (km)			Maximum probability of shoreline loading (%)			Minimum time before shoreline accumulation (days)			Load on shoreline (g/m^2)		Volume on shoreline (m^3)		Mean length of shoreline accumulation (km)			Maximum length of shoreline accumulation (km)		
		Low	Mod	High	Low	Mod	High	Mean	Peak	Mean	Peak	Low	Mod	High	Low	Mod	High	Low	Mod	High	Low	Mod	High	Mean	Peak	Mean	Peak	Low	Mod	High	Low	Mod	High
Shoreline	King Island	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	8.13	-	-	<1	35	< 0.1	2.7	4	-	-	5	-	-

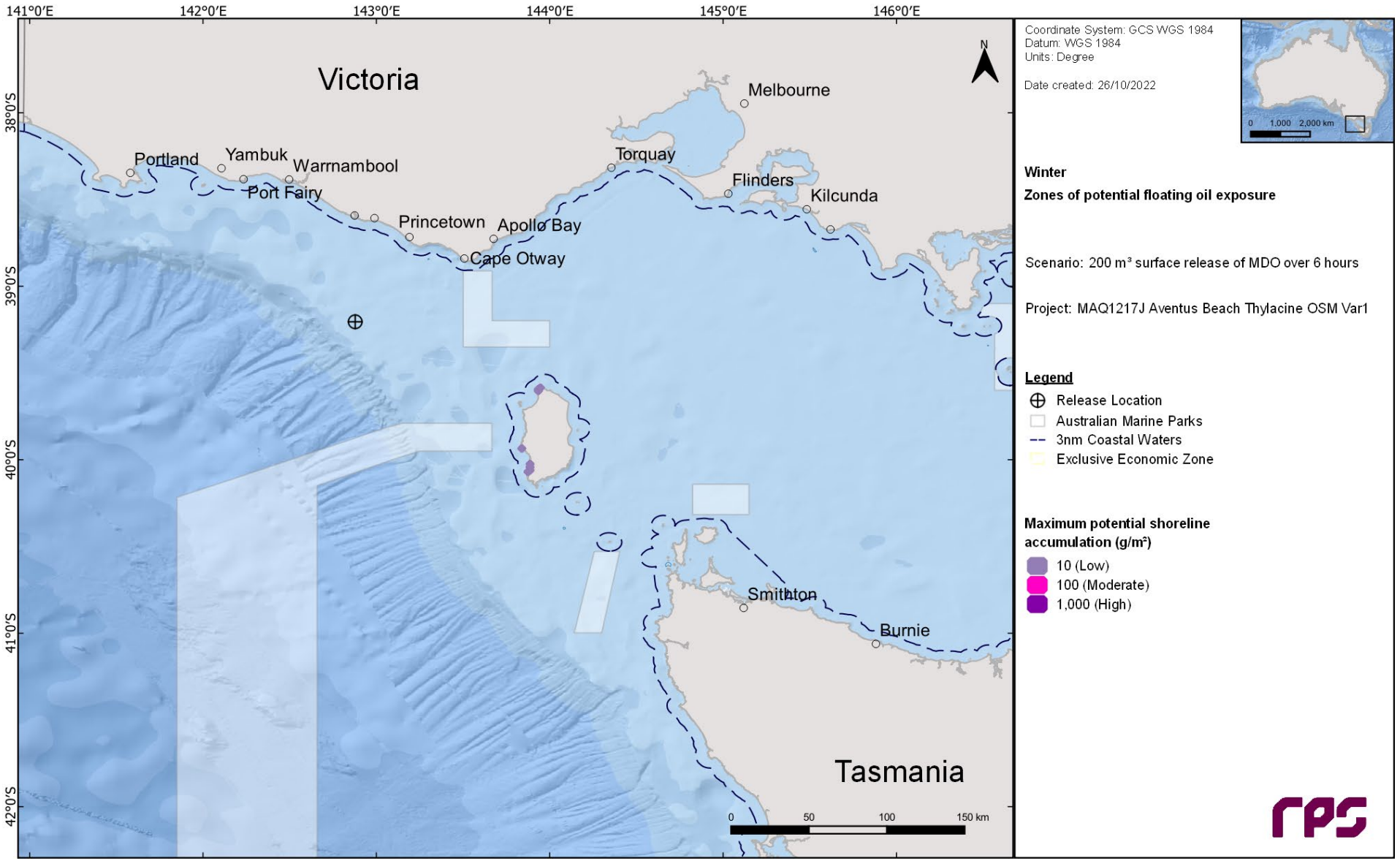

Figure 11-4 Maximum potential shoreline loading in the event of a 200 m³ of MDO containment loss over 6 hours tracked for 30 days. The results were calculated from 100 spill simulations during winter conditions.

11.1.4 In-water exposure

11.1.4.1 Dissolved Hydrocarbons

Table 11-5 summarises the probability of exposure to individual receptors from dissolved hydrocarbons in the 0-10 m layer during the summer and winter conditions.

A total of 14 BIAs were shown to be exposed to dissolved hydrocarbons above the low threshold during both the summer and winter conditions. Furthermore, the Otway IMCRA was also shown to be exposed above the low threshold during both summer and winter conditions. The maximum probability of exposure for the low threshold for any receptor during either summer and winter was 43%. During the summer and winter conditions the maximum dissolved aromatic concentrations at any given receptor(s) was predicted to be 45 ppb and 43 ppb, respectively, which occurred within receptors containing the release location.

Figure 11-5 and Figure 11-6 presents the zones of potential dissolved hydrocarbon exposure for the 0-10 m depth layer, for each threshold assessed under summer and winter conditions, respectively.

Table 11-5 Probability of dissolved hydrocarbons exposure to marine based receptors in the 0–10 m dept. Results are based on a 200 m^3 surface release of MDO over 6 hours, tracked for 30 days. The results were calculated from 100 spill simulations per season.

Receptor		Summer (November through to March)				Winter (April to October)			
		Maximum instantaneous dissolved hydrocarbon exposure	Probability of instantaneous dissolved hydrocarbon exposure			Maximum instantaneous dissolved hydrocarbon exposure	Probability of instantaneous dissolved hydrocarbon exposure		
			Low	Moderate	High		Low	Moderate	High
BIA	Antipodean Albatross – Foraging*	45	43	0	0	38	43	0	0
	Black-browed Albatross – Foraging*	45	43	0	0	38	43	0	0
	Bullers Albatross – Foraging*	45	43	0	0	38	43	0	0
	Campbell Albatross – Foraging*	45	43	0	0	38	43	0	0
	Common Diving-petrel – Foraging*	45	43	0	0	38	43	0	0
	Indian Yellow-nosed Albatross – Foraging*	45	43	0	0	38	43	0	0
	Pygmy Blue Whale – Distribution*	45	43	0	0	38	43	0	0
	Pygmy Blue Whale – Foraging*	45	43	0	0	38	43	0	0
	Short-tailed Shearwater – Foraging*	45	43	0	0	38	43	0	0
	Shy Albatross – Foraging*	45	43	0	0	38	43	0	0
	Southern Right Whale – Migration*	45	43	0	0	38	43	0	0
	Wandering Albatross – Foraging*	45	43	0	0	38	43	0	0
	Wedge-tailed Shearwater – Foraging*	45	43	0	0	38	43	0	0
	White Shark – Distribution*	45	43	0	0	38	43	0	0
EEZ	Australian Exclusive Economic Zone*	45	43	0	0	38	43	0	0
IMCRA	Otway*	45	43	0	0	38	43	0	0

*The release location resides within the receptor boundaries.

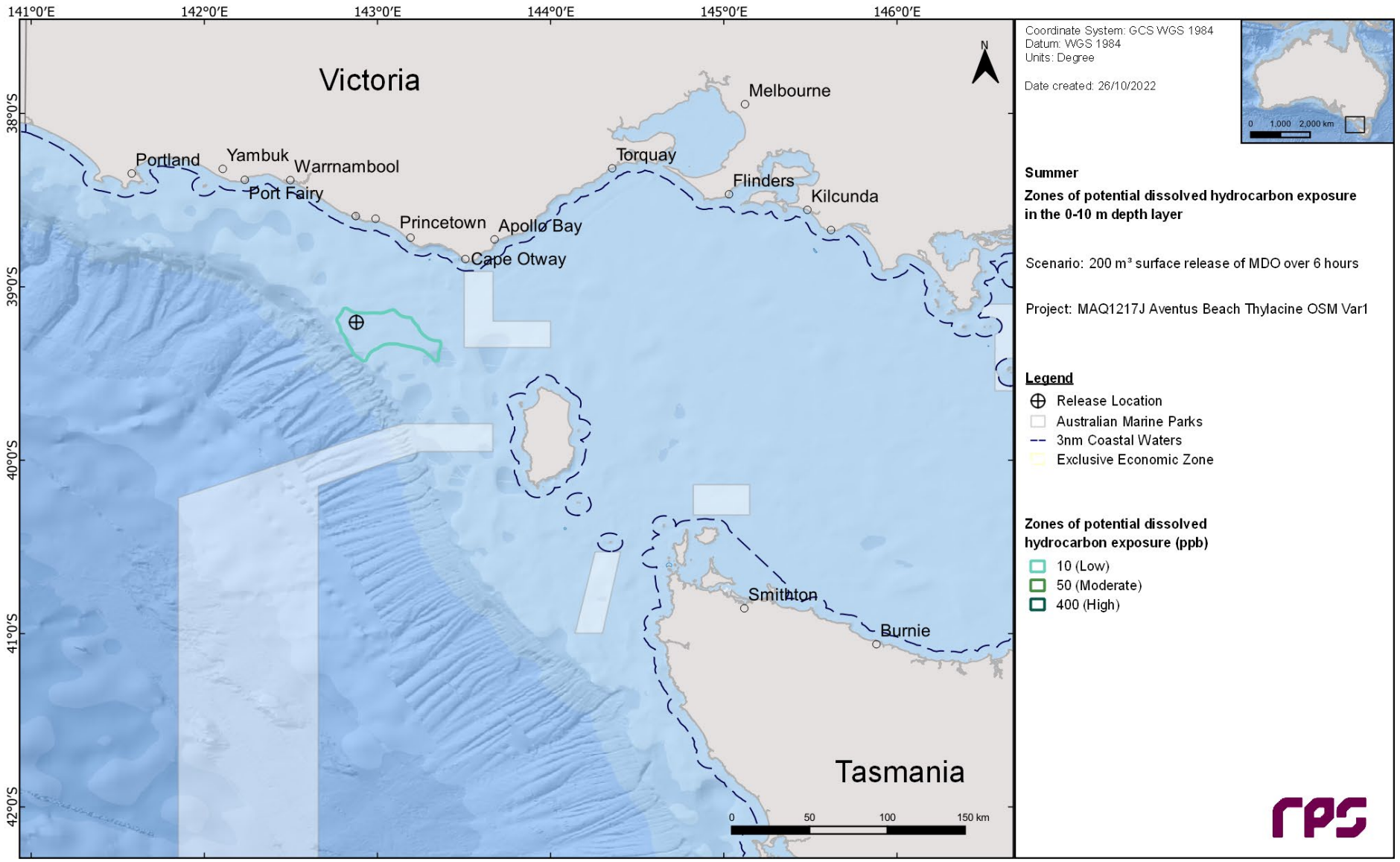

Figure 11-5 Zones of potential dissolved hydrocarbon exposure at 0-10 m below the sea in the event of a 200 m³ of MDO containment loss over 6 hours tracked for 30 days. The results were calculated from 100 spill simulations during summer conditions.

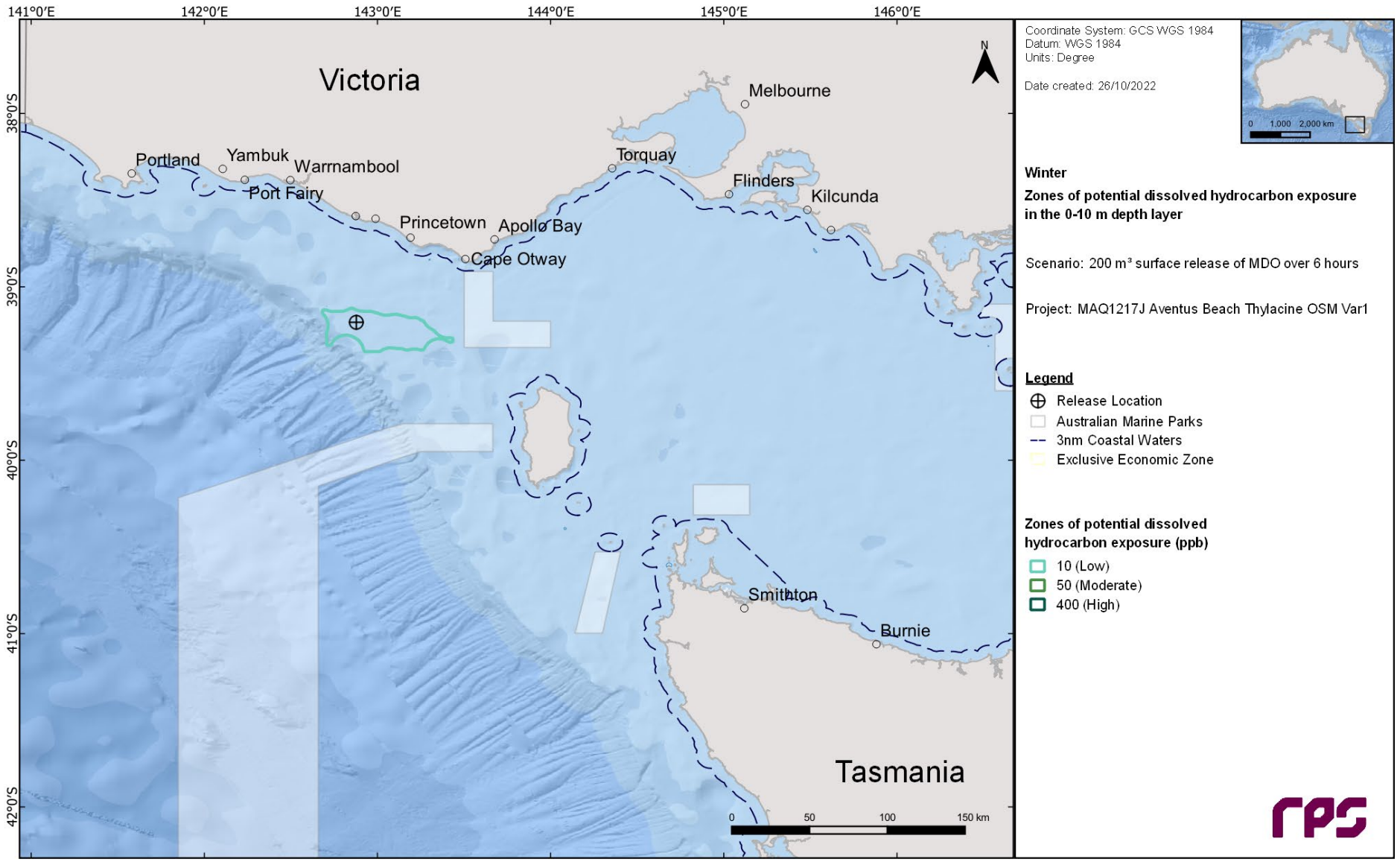

Figure 11-6 Zones of potential dissolved hydrocarbon exposure at 0-10 m below the sea in the event of a 200 m³ of MDO containment loss over 6 hours tracked for 30 days. The results were calculated from 100 spill simulations during winter conditions.

11.1.4.2 Entrained Hydrocarbons

Table 11-6 presents the probability of exposure to individual receptors from entrained hydrocarbons in the 0-10 m depth layer for the summer and winter conditions.

During both summer and winter conditions entrained hydrocarbon exposures at, or above, the low and high threshold was predicted for AMP, BIA, IBRA, IMCRA, KEF, MNP, RSB, nearshore waters (LGA and sub-LGA) and State Water receptors. The maximum probability of exposure for the low threshold for any receptor during summer and winter was 95% during summer and 98% during winter. The maximum entrained hydrocarbon concentration predicted during the summer and winter conditions was 4,243 ppb and 4,604 ppb, respectively, which occurred within receptors containing the release location.

Figure 11-7 and Figure 11-8 presents the zones of potential entrained hydrocarbon exposure for the 0-10 m depth layer, for each threshold assessed under summer and winter conditions, respectively

Table 11-6 Probability of entrained hydrocarbons exposure to marine based receptors in the 0–10 m depth layer. Results are based on a 200 m^3 surface release of MDO over 6 hours, tracked for 30 days. The results were calculated from 100 spill simulations per season.

Receptor		Summer (November through to March)			Winter (April to October)		
		Maximum instantaneous entrained hydrocarbon exposure	Probability of instantaneous entrained hydrocarbon exposure		Maximum instantaneous entrained hydrocarbon exposure	Probability of instantaneous entrained hydrocarbon exposure	
			Low	High		Low	High
AMP	Apollo	162	14	2	155	30	3
	Zeehan	18	5	0	27	6	0
BIA	Antipodean Albatross – Foraging*	4,243	95	86	4,604	98	87
	Black-browed Albatross – Foraging*	4,243	95	86	4,604	98	87
	Black-faced Cormorant - Foraging	11	1	0	24	4	0
	Bullers Albatross – Foraging*	4,243	95	86	4,604	98	87
	Campbell Albatross – Foraging*	4,243	95	86	4,604	98	87
	Common Diving-petrel – Foraging*	4,243	95	86	4,604	98	87
	Indian Yellow-nosed Albatross – Foraging*	4,243	95	86	4,604	98	87
	Little Penguin - Foraging	9	0	0	22	4	0
	Pygmy Blue Whale – Distribution*	4,243	95	86	4,604	98	87
	Pygmy Blue Whale – Foraging*	4,243	95	86	4,604	98	87
	Short-tailed Shearwater – Foraging*	4,243	95	86	4,604	98	87
	Shy Albatross – Foraging*	4,243	95	86	4,604	98	87
	Southern Right Whale - Connecting Habitat	7	0	0	12	2	0
	Southern Right Whale – Migration*	4,243	95	86	4,604	98	87
	Wandering Albatross – Foraging*	4,243	95	86	4,604	98	87
	Wedge-tailed Shearwater – Foraging*	4,243	95	86	4,604	98	87
	White Shark - Distribution	4,243	95	86	4,604	98	87
	White-faced Storm-petrel - Foraging	70	5	0	75	7	0
EEZ	Australian Exclusive Economic Zone*	4,243	95	86	4,604	98	87
IBRA	King Island	7	0	0	12	2	0
IMCRA	Central Bass Strait	133	7	1	110	19	1
	Central Victoria	44	3	0	72	7	0
	Otway*	4,243	95	86	4,604	98	87

Receptor		Summer (November through to March)			Winter (April to October)		
		Maximum instantaneous entrained hydrocarbon exposure	Probability of instantaneous entrained hydrocarbon exposure		Maximum instantaneous entrained hydrocarbon exposure	Probability of instantaneous entrained hydrocarbon exposure	
			Low	High		Low	High
KEF	West Tasmania Canyons	182	31	1	175	9	1
Nearshore Waters	King Island	7	0	0	12	2	0
State Waters	Tasmania State Waters	9	0	0	21	4	0
	Victoria State Waters	3	0	0	16	2	0

*The release location resides within the receptor boundaries.

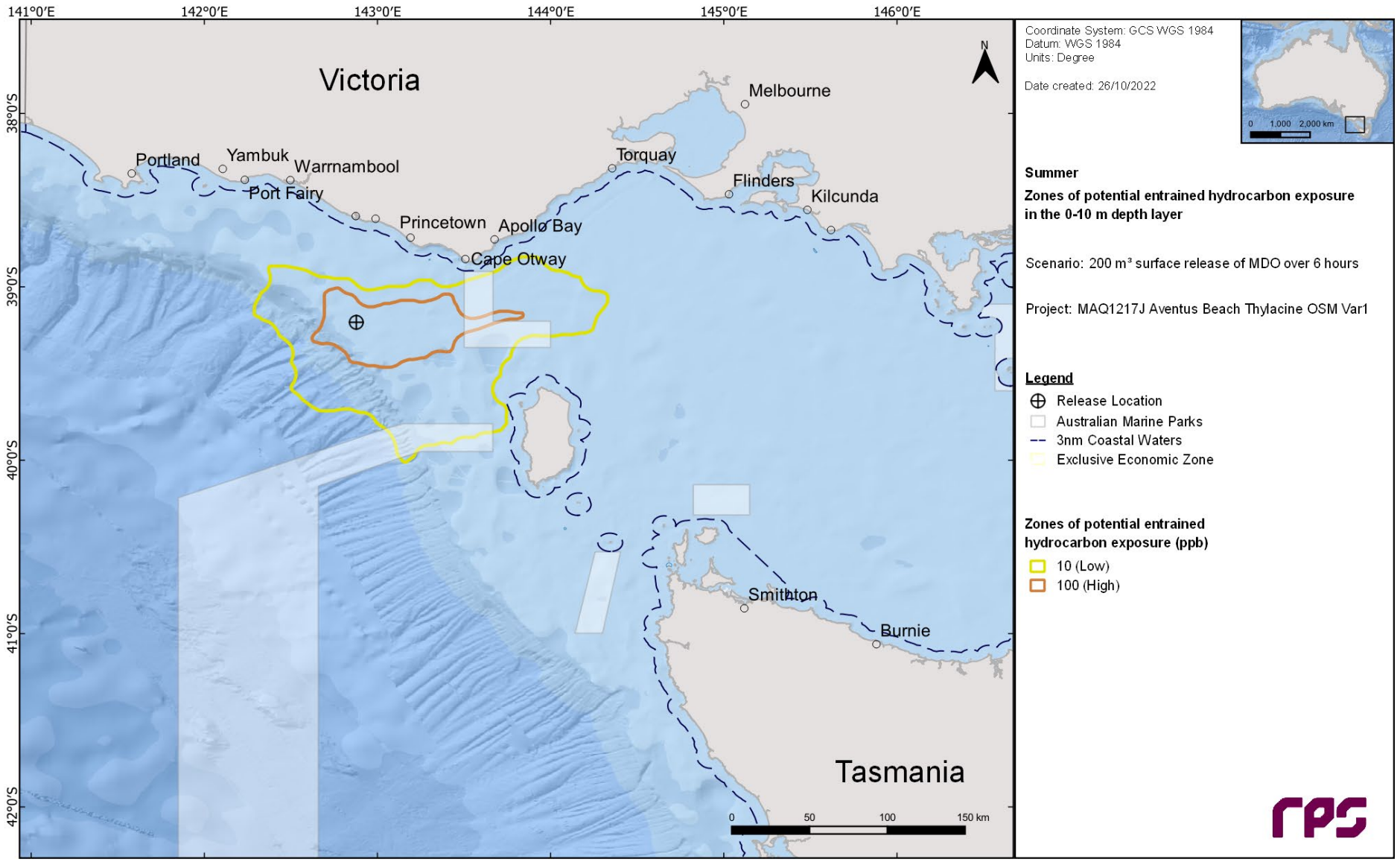

Figure 11-7 Zones of potential entrained hydrocarbon exposure at 0-10 m below the sea surface in the event of a 200 m³ of MDO containment loss over 6 hours tracked for 30 days. The results were calculated from 100 spill simulations during summer conditions.

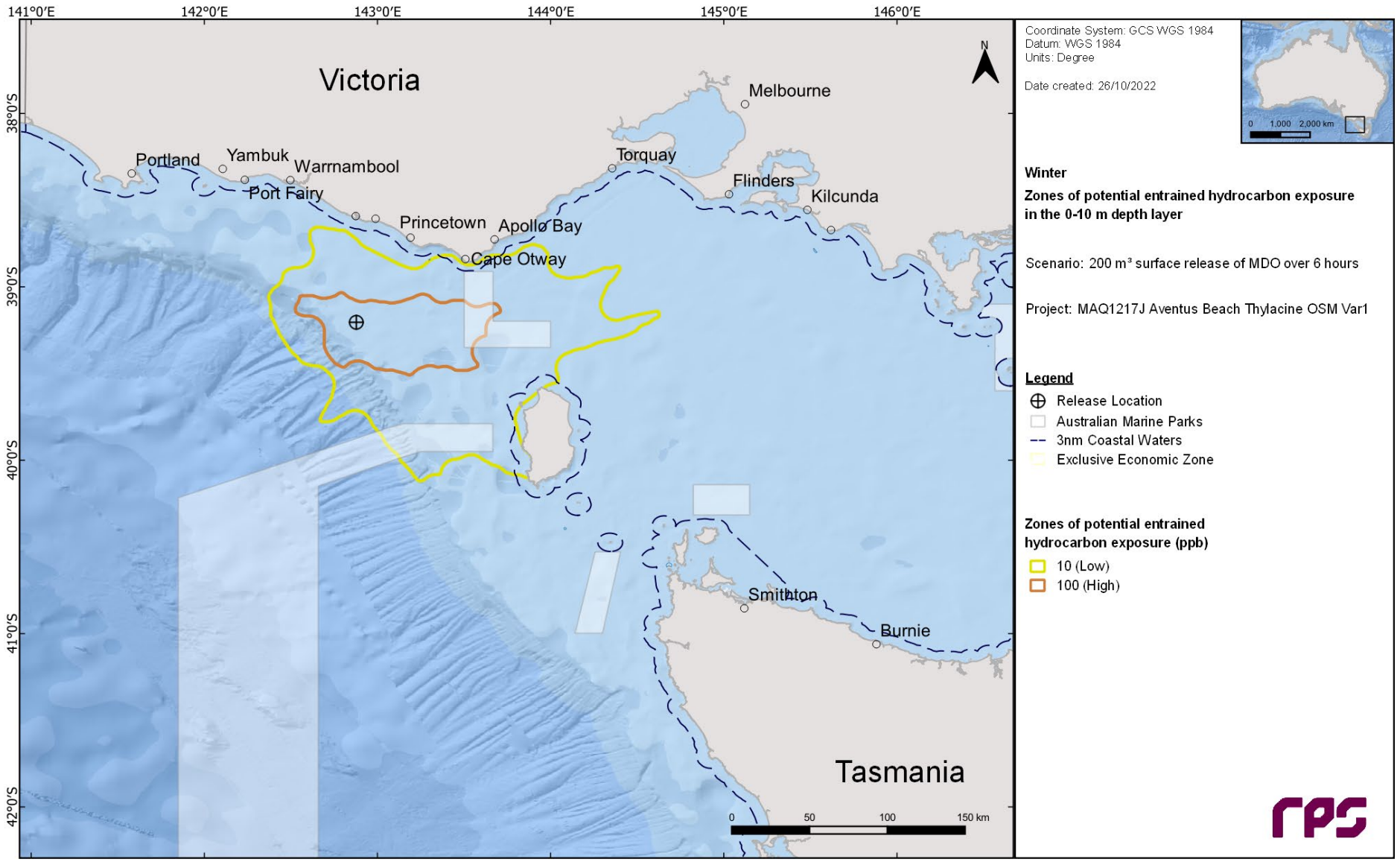

Figure 11-8 Zones of potential entrained hydrocarbon exposure at 0-10 m below the sea surface in the event of a 200 m³ of MDO containment loss over 6 hours tracked for 30 days. The results were calculated from 100 spill simulations during winter conditions.

11.2 Deterministic Analysis

The stochastic modelling results were assessed, and the "worst case" deterministic runs were identified and are presented below. The deterministic analysis assessed the largest volume of oil ashore (Section 11.2.1), the longest length of shoreline accumulation above 100 g/m^2, and the minimum time before shoreline accumulation above 10 g/m^2 (see Section 11.2.2).

Please note there was no shoreline accumulation above the 100 g/m^2 threshold, so this deterministic case is not presented.

Table 11-7 presents a summary of shoreline accumulation at the assessed thresholds for the identified deterministic simulations.

Table 11-7 Summary of the worst-case deterministic analysis based on the scenario presented in the Stochastic Analysis Section.

Variable	Threshold	Deterministic Analysis Criteria	
		Largest volume of oil ashore	Minimum time before shoreline accumulation above 10 g/m^2
Season		Winter	Winter
Run Number		5	66
Total area of floating Oil exposure (km^2)	**1 g/m^2**	5.0	1.0
	10 g/m^2	1.0	-
	50 g/m^2	-	-
Total length of shoreline accumulation (km)	**10 g/m^2**	5.0	3.0
	100 g/m^2	NC	NC
	1,000 g/m^2	NC	NC
Minimum time before accumulation on any shoreline (days)	**10 g/m^2**	8.83	**8.13**
	100 g/m^2	NC	NC
	1,000 g/m^2	NC	NC
Total volume of oil ashore (m^3)		**2.7**	0.8
Total area of entrained hydrocarbon exposure (km^2)	**10 ppb**	1,896	1,886
	100 ppb	268	397
Total area of dissolved hydrocarbon exposure (km^2)	**10 ppb**	12.2	**-**
	50 ppb	-	-
	400 ppb	-	-
Start Date		6th June 2019	28th July 2013

NC = No contact at, or above the specified shoreline accumulation threshold.

11.2.1 Deterministic Case: Largest volume of oil ashore

The deterministic trajectory that resulted in the largest volume of oil ashore was identified as run number 5 during winter conditions, which started on 6th June 2019. Figure 11.9 illustrates the floating oil exposure and shoreline accumulation over the 30-day simulation.

Figure 11.10 displays the time series of the volume of oil accumulating on shorelines at the low (10 g/m^2), moderate (100 g/m^2) and high (1,000 g/m^2) thresholds over the 30-day simulation.

Error! Reference source not found. displays the time series of the length of oil accumulation on shorelines at the low (10 g/m^2), moderate (100 g/m^2) and high (1,000 g/m^2) thresholds over the 30-day simulation.

Figure 11.11 presents the fates and weathering graph for the corresponding single spill trajectory and Table 11.8 summarises the mass balance at the end of the simulation.

Table 11.8 Summary of the mass balance for the trajectory that resulted in the largest volume of oil ashore. Results are based on a 200 m^3 surface release of MDO over 6 hours, tracked for 30 days.

Exposure Metrics	Peak Volume	Day of occurrence	Volume at day 30
Surface (m^3)	27.1	0.1	0.0
Entrained (m^3)	148.1	0.4	40.3
Dissolved (m^3)	0.8	0.6	0.1
Evaporation (m^3)	63.8	29.8	63.8
Decay (m^3)	96.8	30.0	96.8
Ashore (m^3)	1.9	10.0	0.4

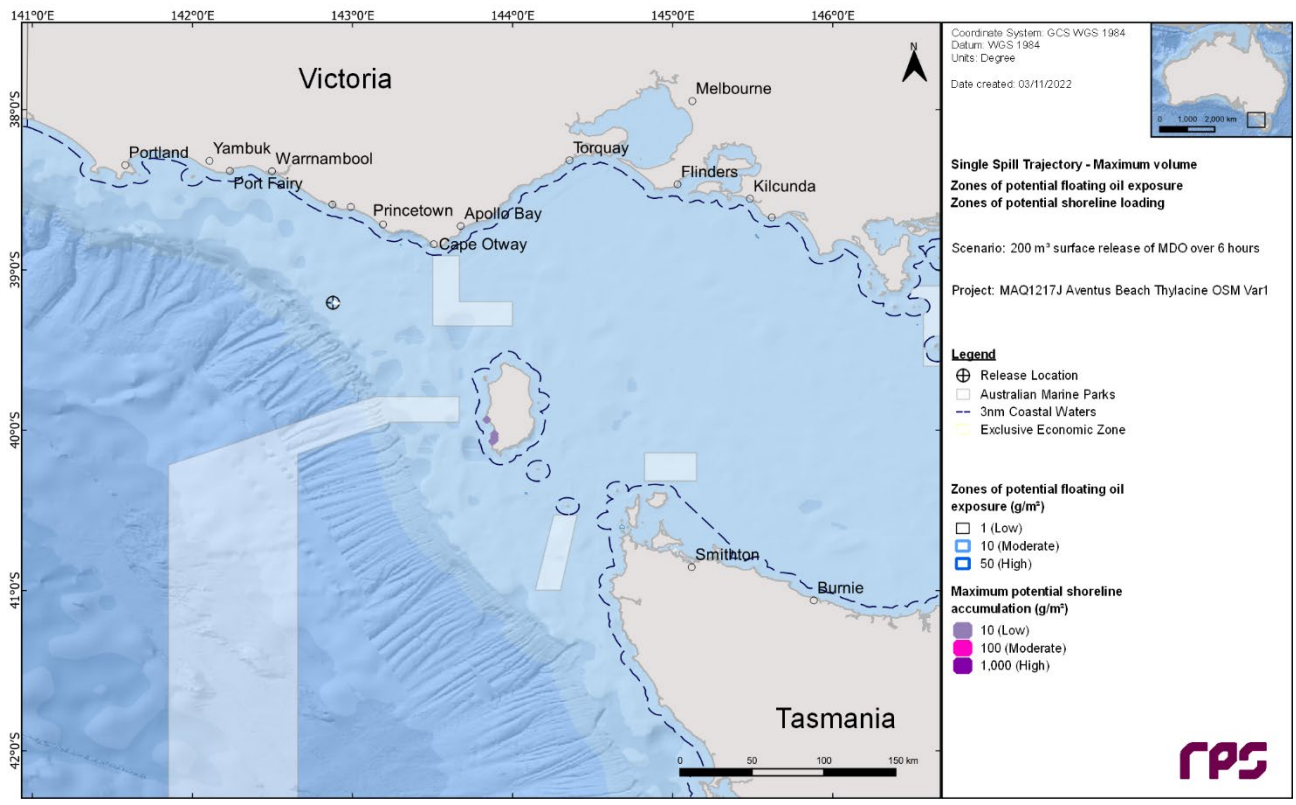

Figure 11.9 Zones of potential floating oil exposure and shoreline accumulation, for the trajectory with the largest volume of oil ashore. Results are based on a 200 m^3 surface release of MDO over 6 hours, tracked for 30 days.

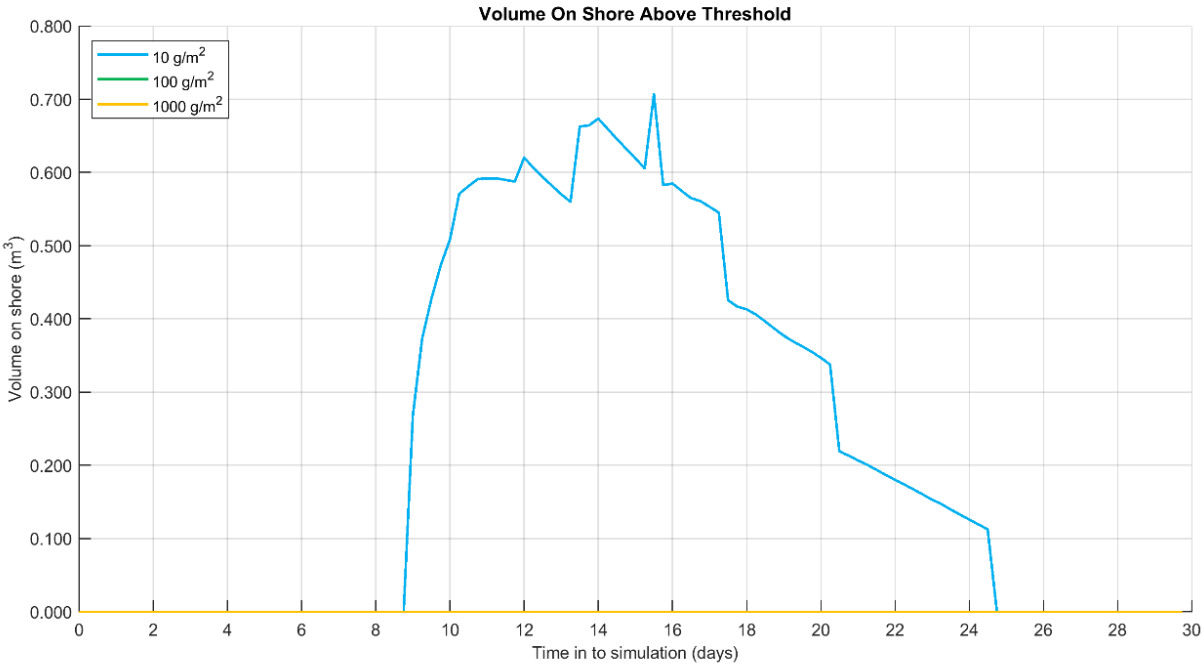

Figure 11.10 Time series of the volume of oil accumulating on shorelines at the low (10 g/m^2), moderate (100 g/m^2) and high (1,000 g/m^2) thresholds for the trajectory with the largest volume of oil ashore. Results are based on a 200 m^3 surface release of MDO over 6 hours, tracked for 30 days.

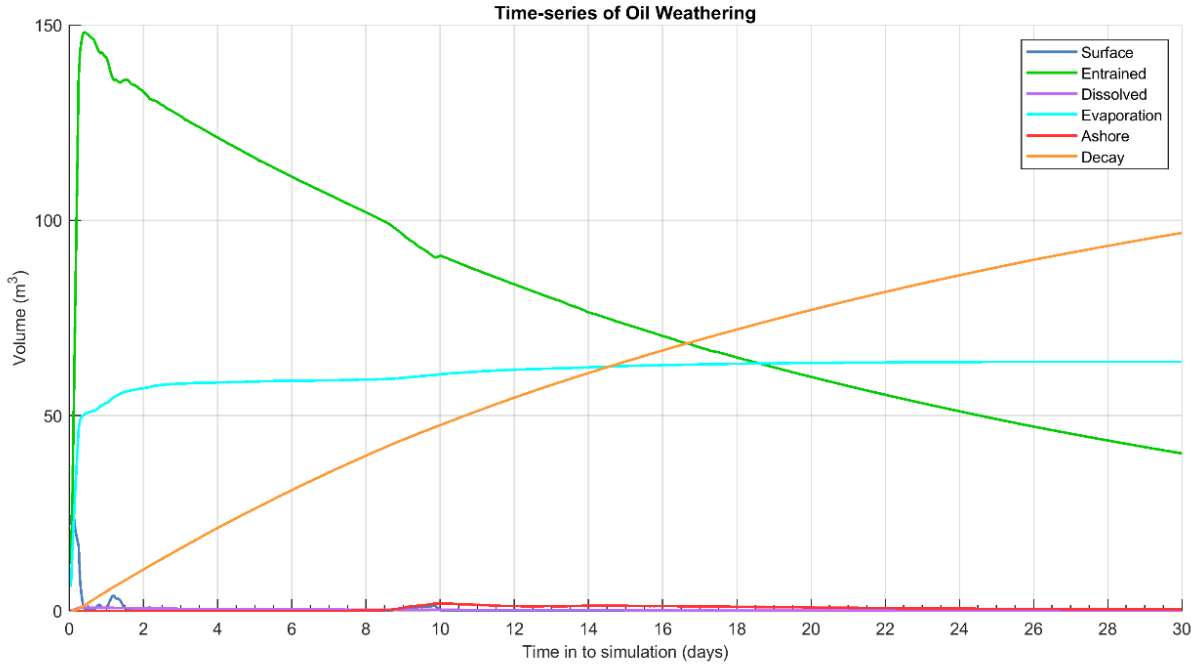

Figure 11.11 Predicted weathering and fates graph for the trajectory with the largest volume of oil ashore. Results are based on a 200 m^3 surface release of MDO over 6 hours, tracked for 30 days.

11.2.2 Deterministic Case: Minimum time before shoreline accumulation above 10 g/m^2

The deterministic trajectory that resulted in the minimum time before shoreline accumulation above the low threshold (10 g/m^2) was identified as run number 66 during winter conditions which started on 28th July 2013. Figure 11.12 illustrates the floating oil exposure and shoreline accumulation over the 30 days.

Figure 11.13 presents the fates and weathering graph for the corresponding single spill trajectory and Table 11.9 summarises the mass balance at the end of the 30-day simulation.

Table 11.9 Summary of the mass balance for the trajectory that resulted in the minimum time before shoreline accumulation above the low threshold (10 g/m^2). Results are based on a 200 m^3 surface release of MDO over 6 hours, tracked for 30 days.

Exposure Metrics	Peak Volume	Day of occurrence	Volume at day 30
Surface (m^3)	8.8	0.1	0.0
Entrained (m^3)	180.8	0.3	39.5
Dissolved (m^3)	0.5	1.5	0.0
Evaporation (m^3)	55.4	30.0	55.4
Decay (m^3)	106.3	30.0	106.3
Ashore (m^3)	0.7	10.3	0.1

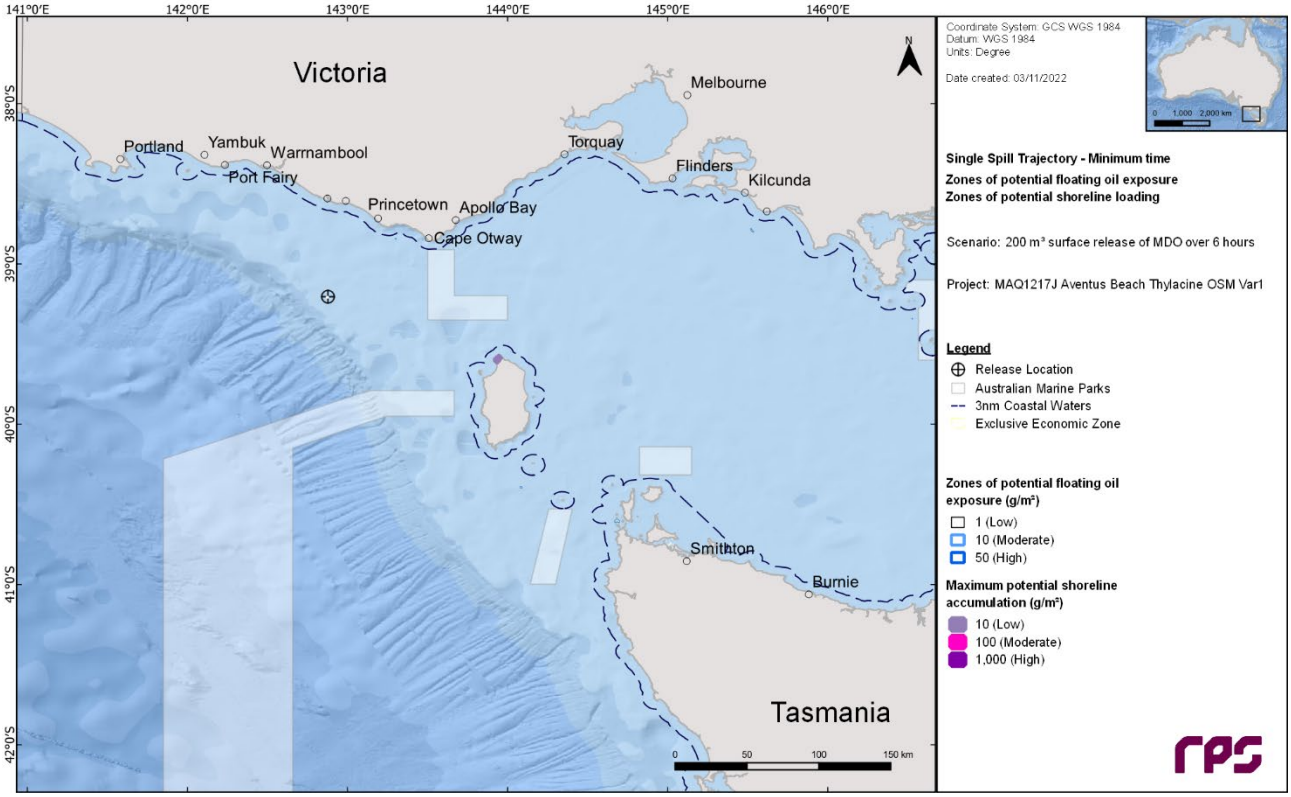

Figure 11.12 Zones of potential floating oil exposure and shoreline accumulation over the 30-day simulation, for the trajectory with the minimum time before shoreline accumulation above 10 g/m^2. Results are based on a 200 m^3 surface release of MDO over 6 hours, tracked for 30 days.

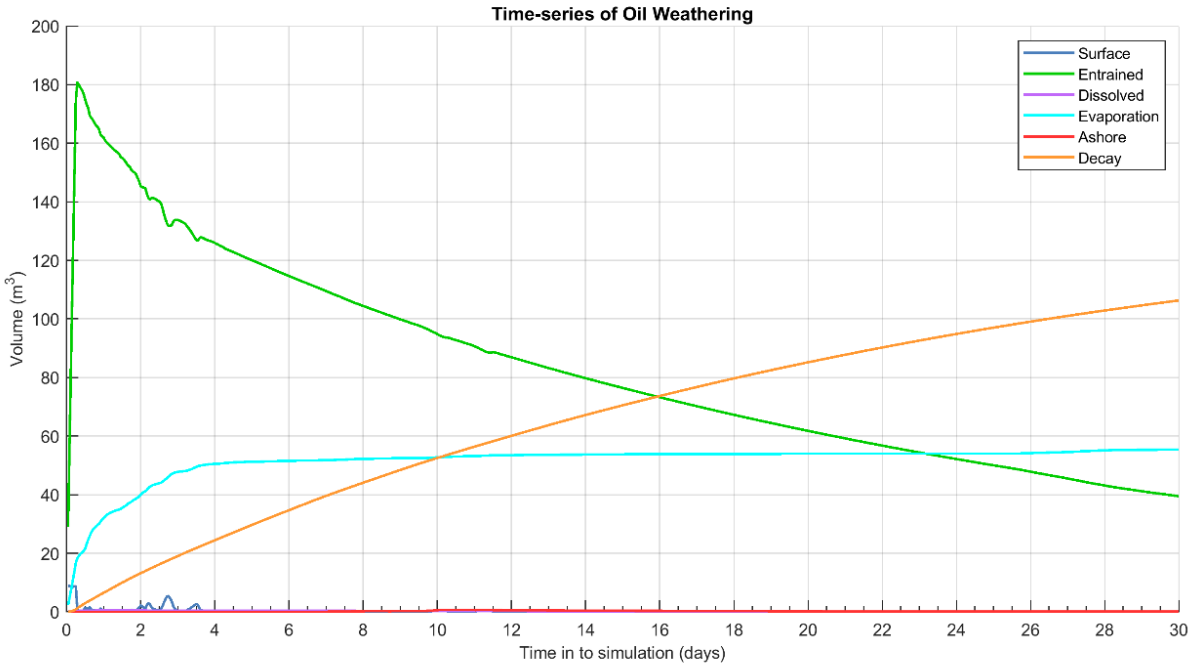

Figure 11.13 Predicted weathering and fates graph for the trajectory with the minimum time before shoreline accumulation above 10 g/m^2. Results are based on a 200 m^3 surface release of MDO over 6 hours, tracked for 30 days.

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Appendix F

Engagement Summary

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Engagement Summary

Otway Offshore Phase 5
Engagement Summary
25/01/2023

Entity ID	Organisation Name	Number of Engagements	Engagement Status	Engagement Summary	Assessment Summary	Assessment Detail	Last Engagement Date
1451	12 Apostles Helicopters & Port Campbell Heliport	2	No response received	Follow up email sent.	No response, continue consultation		1/12/2022
1453	3D Oil Ltd	2	No response received	Follow up email sent.	No response, continue consultation		1/12/2022
4838	Abalone Council Australia Ltd	3	No response received	Engagements via email and phone call made to ensure information was received.	No response, continue consultation		8/12/2022
1456	Abalone Council Victoria	15	No concerns raised	Several engagements undertaken to establish correct contact details for this and the other Abalone associations.	No concerns raised, continue consultation		2/12/2022
1457	Abalone Victoria Central Zone	14	No concerns raised	Several engagements via email and phone were undertaken to establish correct contact details and ensure information was received.	No concerns raised, continue consultation		9/12/2022
155189264	Allfresh Seafood	2	No response received	Follow up email sent.	No response, continue consultation		1/12/2022
987	ANZT Fishing Company	2	No response received	Emailed to verify correct contact details.	No response, continue consultation		6/12/2022
4194721	Apollo Bay Chamber of Commerce	5	Concerns raised	General concerns about potential harms to the ocean that may affect local business. Appreciated Beach reaching out to them.	Concerns remain, maintain consultation	Functions, interests or activities of local tourism and support businesses in Apollo Bay will not be affected by the project activities as they are outside of the EMBA. Functions, interests or activities of commercial fishers based in Apollo Bay will not be affected by activities in the EP as fishing history records show minimal fishing effort in the Activity Area, Beach offshore project activities since 2019 have not caused impacts in the	2/12/2022

Entity ID	Organisation Name	Number of Engagements	Engagement Status	Engagement Summary	Assessment Summary	Assessment Detail	Last Engagement Date
						Activity Area which is now subject to PSZ exclusion. There is a remote likelihood, minor consequence, and low risk to fish from MDO loss of containment, however no concerns have been raised by commercial fishers. Remaining concerns are of a general nature about potential impacts from offshore oil and gas industry, in particular from seismic surveys.	
1469	Apollo Bay Dive Centre and Surf n Fish	2	No response received	Follow up email sent.	No response, continue consultation		1/12/2022
1470	Apollo Bay Fisherman's Cooperative	4	No response received	Follow up email sent.	No response, continue consultation		1/12/2022
239075338	Apollo Bay Fishing Charters	3	No response received	Follow up engagement sent.	No response, continue consultation		25/01/2023
4194724	Apollo Bay Landcare	4	No concerns raised	Phoned to verify correct contact details and interest in Beach projects and consultation.	No concerns raised, continue consultation		23/01/2023
239075339	Apollo Bay Police and Ocean Rescue	3	No concerns raised	Appreciated Beach reaching out to include them in consultations to open lines of communications that would assist should there be an issue.	No concerns raised, continue consultation		1/12/2022
4941	Apollo Bay Sailing Club	3	No response received	Multiple engagements via email and phone were undertaken to establish correct contact details.	No concerns raised, continue updates	Functions, interests or activities not affected by project activities.	10/11/2022
239075341	Apollo Bay Surf & Kayak	2	No concerns raised	Appreciated Beach contacting them and happy to receive updates.	No concerns raised, continue consultation		10/11/2022
239075353	Apollo Bay Surf Life Saving Club	2	No concerns raised	Phoned to verify correct contact details.	No concerns raised, continue consultation		10/11/2022
239075342	Apollo Bay Visitor Information Centre	2	No concerns raised	Phoned to verify correct contact details.	No concerns raised, continue consultation		10/11/2022
4194523	Atlantis Fisheries Consulting Group	6	No concerns raised	Primary engagement is with SETFIA and SSFI both of which are supported by Atlantis Fisheries Consulting Group.	No concerns raised, continue consultation		28/11/2022
8388625	Australian Border Force - Maritime Border	12	No response received	Follow up email sent.	No response, continue consultation		1/12/2022

Entity ID	Organisation Name	Number of Engagements	Engagement Status	Engagement Summary	Assessment Summary	Assessment Detail	Last Engagement Date
	Command						
4949	Australian Coastal Society - Victorian Chapter	8	No concerns raised	Follow up email sent.	No concerns raised, continue consultation		24/01/2023
988	Australian Communications and Media Authority	15	Concerns raised	Advised Indigo Central cable may be in proximity of project area. Beach acknowledged its appreciation of the response and advised it would contact Superloop, the cable owner.	Concerns resolved, continue consultation	Checked Indigo Central cable was located approximately 19 km from the activity area and is not at risk from the project activities. Added to environment maps in EP. Identified cable owner Superloop and commenced consultation.	12/12/2022
989	Australian Fisheries Management Authority	42	No concerns raised	Acknowledged information provided and noted impacts on commercial fishing have been addressed	No concerns raised, continue consultation		9/12/2022
4953	Australian Marine Conservation Society	6	No response received	Phoned and emailed to identify contacts and interest in consulting with Beach.	No response, continue consultation		23/01/2023
1477	Australian Maritime Safety Authority - Joint Rescue Coordination Centre	41	No concerns raised	Acknowledged email received.	No concerns raised, continue consultation		1/12/2022
4194736	Australian Oceanographic Services Pty Ltd	14	No concerns raised	Discussed Beach Projects and services provided by Australian Oceanographic Services.	No concerns raised, continue consultation		19/12/2022
1471	Australian Petroleum Production and Exploration Association	13	No response received	Updates sent as a courtesy and responses are not expected.	No response, continue consultation		18/11/2022
991	Australian Southern Bluefin Tuna Industry Association	4	No response received	Follow up email sent.	No response, continue consultation		1/12/2022
4194356	Australian Wildcatch Fishing (Corporate Alliance Enterprises)	15	No response received	Phoned to verify correct contact details.	No response, continue consultation		1/12/2022
4194546	Aventus Consulting	3	No concerns raised		No concerns raised, continue consultation	Consultant to Beach, included in relevant person updates for reference.	1/12/2022
155189265	Beach Energy	5	No response received		No response, continue consultation	Beach Corporate Affairs Contact included in engagements for reference.	1/12/2022

Entity ID	Organisation Name	Number of Engagements	Engagement Status	Engagement Summary	Assessment Summary	Assessment Detail	Last Engagement Date
239075345	Beach Patrol 3280	3	Concerns raised	Contacted via Social Media to establish contact details, their potential interest in Beach's projects and whether they wanted information and further consultation. They advised their concerns were about marine pollution from ships and confirmed they would like to be added to Beach's contact list for information on Beach's offshore projects and provided their email address.	No response, continue consultation	Functions, interests or activities highly unlikely to be affected, as EMBA does not extend to shoreline at Warrnambool.	24/01/2023
155189260	Bev McArthur MLC, Member for Western Victoria	6	No concerns raised	Information acknowledged.	No concerns raised, continue consultation		2/12/2022
1489	Blue Whale Study Inc	13	No concerns raised	Beach has long standing professional relationship with them, consulting on research and services regarding marine mammal protection.	No concerns raised, continue consultation		1/12/2022
4194731	Boon Wurrung Foundation	5	No response received	Engagements via email and phone to establish correct contacts, their interest in Beach projects and consultation.	No response, continue consultation	Beach will continue to consult to ascertain if they have an interest. However, the Boonwarrung sea country is outside of Planning Area and is highly unlikely to be affected as per assessment of potential impacts, due to nature and scale of activities, mitigations in place.	16/12/2022
1496	Bunurong Land Council Aboriginal Corporation	9	No response received	Engagements via email and phone to establish correct contacts, their interest in Beach projects in south west Victoria. Beach has previously consulted with them regarding Beach operations in Bass Strait and recently regarding the Coastal Restoration project that Beach is supporting at Deakin University Blue Carbon Lab. Held online meeting on 10/1/2023 to answer questions on the project they may have from reviewing information sent by Beach, and ask how they wished to consult with Beach in the future as Beach has further projects planned that will be adjacent their sea country. Explained Beach has	No concerns raised, continue consultation	The Bunurong sea country is outside of Planning Area for the Otway Phase 5 well connection project. Consultation with them established they had no questions and didn't raise any concerns. Beach sought further consultation regarding further projects in Bass Strait and commenced discussions about the approach. Beach will seek face to face meetings in the near future when convenient to them.	25/01/2023

Entity ID	Organisation Name	Number of Engagements	Engagement Status	Engagement Summary	Assessment Summary	Assessment Detail	Last Engagement Date
				consulted other staff at their organisation in the past and we want to ensure the correct contacts for future consultation.They advised they had contacted Eastern Maar Aboriginal Corporation (EMAC) as they understand the Otway Phase 5 Project is near EMAC sea country, and Bunurong have contacts at EMAC. They did not have any questions or concerns regarding the Phase 5 well connection project but are interested in finding a sustainable way to engage with Beach and other energy companies who are seeking meetings with them. They have been restructuring their staff and Beach asked if we could meet in person in the coming weeks at a time more suitable to them. Beach advised it would follow up.			
1497	CO2CRC	6	No response received	Follow up email sent.	No response, continue consultation		1/12/2022
239075429	Coastal Planning	3	No concerns raised	Engagements via email and phone to establish correct contacts, their interest in Beach projects and consultation.	No concerns raised, continue consultation		7/12/2022
239075407	Colac Otway Shire Council	12	Concerns raised	Information provided, meeting held to answer questions and concerns, engagement ongoing for this and all Beach projects given the Council's general interest in Beach activities arising from rate payer concerns about the marine environment and climate change.	Concerns remain, maintain consultation	Functions, interests or activities of the Shire Council not affected by project activities. Concerned about potential impacts to commercial fishers and inquiry about the level of engagement Beach has with them. Advised extensive engagement with Seafood Industry Victoria and Victorian Fisheries Authority. Also with Apollo Bay Fishermans Cooperative and direct local fishers. Explained Beach's sustainability commitments and actions. Appreciated Beach reaching out to them and answering their questions. Beach offered further consultation if they have further questions or concerns. Remaining	12/12/2022

Entity ID	Organisation Name	Number of Engagements	Engagement Status	Engagement Summary	Assessment Summary	Assessment Detail	Last Engagement Date
						concerns are of a general nature about potential impacts from offshore oil and gas industry, in particular from seismic surveys.	
994	Commonwealth Fisheries Association	17	No concerns raised	Phoned to follow up email sent and discussed approach of some fishing associations refusing to consult unless a service agreement is entered into.	No concerns raised, continue consultation	Advised CFA that Beach has and will continue to undertake direct consultation with relevant Commonwealth fishing associations, also directly with fishers. CFA are aware that some associations are intending to charge to consult and there's no over arching direction from CFA. Assessment of all Commonwealth Fisheries that may operate in the Activity and Planning areas show minimal fishing effort. Project activities since 2019 have not caused impacts in the Activity Area, now subject to PSZ exclusion. Remote likelihood, minor consequence, and low risk to fish from MDO loss of containment.	23/11/2022
1508	ConocoPhillips	22	No concerns raised	Follow up email sent.	No concerns raised, continue consultation		1/12/2022
1509	Cooper Energy	33	No concerns raised	Phoned to check their activity status in nearby permits. No activities planned at the time of Beach's project.	No concerns raised, continue consultation		2/12/2022
71303169	Corangamite Catchment Management Authority	11	No concerns raised	Several engagements via email and phone undertaken to verify correct contact details, interest in Beach projects and consultation. Information acknowledged.	No concerns raised, continue consultation		1/12/2022
1038	Corangamite Shire Council	48	No concerns raised	Beach has long history of close engagement with Corangamite Shire Council including their emergency planning personnel. Engagement ongoing through the Otway Gas Plant Community Reference Group (CRG), chaired by Corangamite Shire Councillor and attended by Shire Planning Manager. Information on all	No concerns raised, continue consultation		6/12/2022

Entity ID	Organisation Name	Number of Engagements	Engagement Status	Engagement Summary	Assessment Summary	Assessment Detail	Last Engagement Date
				of Beach's projects is also emailed to several different personnel at the Shire Council. Corangamite Shire Councillors, including Deputy Mayor, attended a tour of the Otway Gas Plan and two onshore to offshore well sites, along with the CRG meeting on 6 December for a detailed briefing on the Thylacine wells connection, other Beach Projects, Beach's social performance and sustainability initiatives and plans.			
41943052	Dan Tehan MP, Federal Member for Wannon	2	No concerns raised	Phoned and emailed to verify correct contact details.	No concerns raised, continue consultation		7/12/2022
239075431	Deakin University - Environment and Society	4	No concerns raised	Phoned and emailed to establish correct contacts details, their interest in Beach projects and consultation. Positive interest in receiving updates.	No concerns raised, continue consultation		7/12/2022
996	Deakin University - School of Life and Environmental Sciences	31	Concerns raised	Advised they would like Beach to sponsor further research into seals and some sea bird species, have asked this previously and believe Beach is not interested.	Concerns remain, maintain consultation	Advised Beach is very supportive of research in support of its impact assessments and the potential to reduce impacts and gave recent examples of major research programs funded by Beach. Advised that Beach has undertaken impact assessments of seals and sea birds, that can be seen in the draft EP on Beach's website, and if he felt there were areas that should be discussed in regard to research, then we are happy to discuss.	9/12/2022
1519	Department of Agriculture, Fisheries and Forestry - Biosecurity and Marine Pests	14	No response received	Follow up email sent.	No response, continue consultation		1/12/2022
239075405	Department of Climate Change, Energy, the Environment and Water - Oceans	3	No concerns raised	Emailed to verify correct contact details. Head of the Oceans team appreciated Beach contacting them.	No concerns raised, continue consultation		1/12/2022
4898	Department of Climate Change, Energy, the	5	No concerns raised	Multiple engagements via email and phone were undertaken to establish	No concerns raised, continue consultation		17/11/2022

Entity ID	Organisation Name	Number of Engagements	Engagement Status	Engagement Summary	Assessment Summary	Assessment Detail	Last Engagement Date
	Environment and Water - Parks Australia (Marine)			correct contact details. Head of Marine and Island Parks Branch appreciated Beach contacting them.			
1520	Department of Defence - Australian Hydrographic Office	42	No concerns raised	Information acknowledged via email and call to Beach's 1800 number for offshore projects to check timings, what notice would be required given the existing PSZs and cautionary zones, and when Beach would request a Notice to Mariners. AHO understood and advised they will issue a NTM after we advise them.	No concerns raised, continue consultation	Advised that 2-4 weeks before the activity commences, Beach will request a Notice to Mariners be issued by AHO. Notwithstanding the existing PSZs, Beach applies this precautionary approach.	22/12/2022
1521	Department of Defence - Infrastructure Division, Defence Support & Reform Group	1	No response received	Engagement via email to ensure information was received.	No response, continue consultation		28/11/2022
1523	Department of Environment, Land, Water and Planning	27	No concerns raised	Information acknowledged.	No concerns raised, continue consultation		25/01/2023
239075362	Department of Environment, Land, Water and Planning - Coastcare Victoria	5	No concerns raised	Phoned to verify correct contact details. Positive discussion with facilitator who offered to share information in community newsletters.	No concerns raised, continue consultation		21/12/2022
4905	Department of Industry, Science and Resources	3	No concerns raised	Phoned to verify correct contact details. Emailed information.	No concerns raised, continue consultation		2/12/2022
1527	Department of Jobs, Precincts and Regions: Earth Resources Regulation	4	No concerns raised	Follow up email sent.	No concerns raised, continue consultation		1/12/2022
239075420	Department of Natural Resources and Environment Tasmania - Biosecurity	2	No concerns raised	Information acknowledged.	No concerns raised, continue consultation		7/12/2022
4194633	Department of Natural Resources and Environment Tasmania - Conservation	3	No concerns raised	Information acknowledged.	No concerns raised, continue consultation		1/12/2022
1529	Department of Natural Resources and Environment Tasmania -	16	No concerns raised	Emailed to verify correct contact details. Assisted with the identification of other departments to contact and	No concerns raised, continue consultation		28/11/2022

Entity ID	Organisation Name	Number of Engagements	Engagement Status	Engagement Summary	Assessment Summary	Assessment Detail	Last Engagement Date
	Marine/Fisheries (Fishing Tasmania)			confirmed Beach's information passed onto correct team members.			
239075432	Department of Natural Resources and Environment Tasmania - Tasmania Parks and Wildlife Services	3	No concerns raised	Newly identified relevant person. Queried why they were receiving our updates. Explained the project location and scope.	No concerns raised, continue consultation		16/12/2022
243269638	Department of Premier and Cabinet - Office of Aboriginal Affairs - (Tasmania)	6	No concerns raised	Phone and emailed to seek assistance with contacts for Tasmanian Aboriginal Centre that Beach has tried to contact. Inquired if they had further insights that may verify (or otherwise) Beach's research that found there were no First Nations Peoples groups in King Island.	No concerns raised, continue consultation	They confirmed there was no official First Nations group on King Island and provided further contact suggestions for other Beach Projects in Bass Strait.	25/01/2023
8388638	Department of State Growth - Mineral Resources Tasmania	6	No concerns raised	Emailed to verify correct contact details.	No concerns raised, continue consultation		1/12/2022
999	Department of Transport and Planning: Marine Pollution	17	No concerns raised	Follow up email sent.	No concerns raised, continue consultation		1/12/2022
1530	Dive Industry Association of Australia	2	No response received	Follow up email sent.	No response, continue consultation		1/12/2022
1533	Eastern Maar Aboriginal Corporation	23	No concerns raised	Beach has an Indigenous Land Use Agreement with Eastern Maar peoples, has been seeking to update it and is also negotiating with the Eastern Maar Aboriginal Corporation (EMAC) on an onshore project that is a Future Act in accordance with Native Title Act 1993. Consultation with EMAC on Beach's offshore and onshore projects has been ongoing for many years, including the Otway Offshore Project for which information has been shared by email, at informal meetings with Eastern Maar Aboriginal Corporation (EMAC) staff, at EMAC Board Meetings. With staff turnover, Beach has actively sought to consult with new staff members. Information has included information	No concerns raised, continue consultation	At the last face-to-face meeting on 8 November on Eastern Maar Country, EMAC's Cultural Heritage Manager explained Eastern Maar peoples spiritual connection to Sea Country which extends to as far as the eye can see, the cultural importance of Deen Maar (Lady Julia Percy Island) and Kooyang (eels), EMACs increasing role in protecting Country, including Sea Country in which EMAC will be formally involved in protecting the 12 Apostles Marine Park. Beach explained the final stages of its drilling campaign that will involve connecting the remaining 4 wells drilled earlier this year and discussed approach to modelling and management of spills that would not	21/12/2022

Entity ID	Organisation Name	Number of Engagements	Engagement Status	Engagement Summary	Assessment Summary	Assessment Detail	Last Engagement Date
				sheets, maps, presentations, question and answer sessions at meetings. 7 October 2022, Beach arranged a phone meeting with EMAC to provide an update on it's Otway Offshore Project and to specifically request a face-to-face meeting to consult with EMAC so that Beach could understand their sea country values and sensitivities and answer any questions and concerns regarding potential impacts from our project activities and a meeting was subsequently arranged for 8 November 2022. Beach attended the face-to-face meetings on Eastern Maar country with EMAC Cultural Heritage Manager and other personnel, with Beach's GM Victoria, Manager First Nations Relations, and Group Manager Social Performance and Community. On 18 November, Beach followed up that meeting with emails to several EMAC staff summarising key points about the project and including a project information sheet, and sent a further email summarising the key discussion points at the meeting on 8 November 2022. Since 18 November 2022, Beach has followed up several times via emails, phone calls and SMS messages to inquire if EMAC have further questions about the project. There have been no replies, however Beach will continue to consult EMAC on this and all of its Otway Basin projects, along with environmental partnership opportunities that are being explored between EMAC and Beach.		impact Deen Maar or the coastline near Hopkins River or Merri River, and use of marine mammal observers on the Construction Support Vessel. They explained their broad interests and concerns for protection of the marine environment but did not raise any concern regarding the project activities. Beach explained its approach to emergency response planning and preparedness and suggested that for EMAC's growing role in protecting sea country that Beach would be pleased to sponsor EMAC people attending training course at Australian Marine Oil Spill Centre (AMOSC) and we would also be able to connect them with companies we use for engaging marine mammal observers on our contracted vessels.	
79691781	[redacted]	12	No response received	Follow up email sent.	No response, continue consultation		1/12/2022
1001	Environment Protection	11	No response	Follow up email sent.	No response, continue		1/12/2022

Entity ID	Organisation Name	Number of Engagements	Engagement Status	Engagement Summary	Assessment Summary	Assessment Detail	Last Engagement Date
	Authority (EPA) Tasmania		received		consultation		
1537	Environment Protection Authority (EPA) Victoria	7	No concerns raised	Information acknowledged.	No concerns raised, continue consultation		3/12/2022
4945	Environment Tasmania	5	No concerns raised	Emailed to verify correct contact details.	No concerns raised, continue consultation		23/01/2023
1536	Environment Victoria	5	No concerns raised	Information acknowledged.	No concerns raised, continue consultation		24/01/2023
4999	Felix Ellis MP, Tasmanian Member for North West, West Coast and King Island	6	No concerns raised	Emailed to verify correct contact details, interest in Beach projects and consultation. Information sent and acknowledged.	No concerns raised, continue consultation		1/12/2022
1542	First Nations Legal & Research Services Ltd	17	No response received	Follow up email sent.	No response, continue consultation		1/12/2022
1458	First Peoples - State Relations (Victoria)	3	No concerns raised	Information acknowledged.	No concerns raised, continue consultation		1/12/2022
4194528	Fisheries Research and Development Corporation	3	No response received	Engagement via email to ensure information was received.	No response, continue consultation		28/11/2022
1002	Fishwell Consulting	23	No concerns raised	Discussed the project location for PSZs with Fishwell consultant who also consults to SETFIA. Agreed on approach to provide data file of PSZ coordinates that could be directly downloaded to fisherman's plotters.	No concerns raised, continue consultation	Beach has provided a data file of the PSZ coordinates.	8/12/2022
4194614	Flinders Island Aboriginal Association Inc	3	No response received	Follow up email sent.	No response, continue consultation	Beach will continue to consult to ascertain if they have an interest. However, Flinders Island sea country is outside of Planning Area and is highly unlikely to be affected as per assessment of potential impacts, due to nature and scale of activities, mitigations in place.	25/01/2023
1544	Friends of Bay of Islands Coastal Park	4	No response received	Follow up email sent.	No response, continue consultation		23/01/2023
1545	Frying Nemo Fish and Chips	2	No response received	Follow up email sent.	No response, continue consultation		1/12/2022
1546	[redacted]	3	No concerns raised	Emailed to verify correct contact	No concerns raised,		4/12/2022

Entity ID	Organisation Name	Number of Engagements	Engagement Status	Engagement Summary	Assessment Summary	Assessment Detail	Last Engagement Date
	[redacted]			details and if they would like to receive updates directly.	continue consultation		
5004	Gavin Pearce MP, Federal Member for Braddon	15	No concerns raised	Engagement to establish project interest, correct contact details, provide information sheet and arrange time for phone meeting. Meeting covered project activity details and location of EMBA, extremely unlikely MDO release risk to King Island, consultation undertaken with different relevant persons on King Island, and Beach's approach to supporting research and minimising impacts on commercial fishers. Mr Pearce acknowledged Beach's comprehensive approach to engagement of King Island relevant persons, past approach to conducting its Prion Seismic Survey and general support for the development of more gas for the east coast Australian Market.	No concerns raised, continue consultation		28/12/2022
155189270	Gayle Tierney MLC, Member for Western Victoria	6	No response received	Follow up email sent.	No response, continue consultation		2/12/2022
4881	Go Surf School	5	Concerns raised	Phoned to discuss concerns raised in email regarding potential impacts to business in the event of an offshore oil and gas industry incident that prevented beach use.	Concerns resolved, continue consultation	Concerns regarding marine diesel spill resolved. Agreed to discuss future opportunities for joint initiatives regarding community oriented environment protection or education initiatives.	22/12/2022
1553	Grassroots Deli Cafe	1	No response received	Engagement via email to ensure information was received.	No response, continue consultation		6/12/2022
1467	Great Ocean Abalone	5	No concerns raised	Follow up email and phone call.	No concerns raised, continue consultation		16/01/2023
184549378	Great Ocean Road Coast and Parks Authority	2	No concerns raised	Follow up email sent.	No concerns raised, continue consultation		1/12/2022
1554	Great Ocean Road Regional Tourism	12	No concerns raised	Met to discuss Beach projects. They assisted in the identification of tourism related stakeholders and	No concerns raised, continue consultation		12/12/2022

Entity ID	Organisation Name	Number of Engagements	Engagement Status	Engagement Summary	Assessment Summary	Assessment Detail	Last Engagement Date
				agreed to provide project updates to the local industry. Beach advised it has directly identified and consulted marine based tourism operators in the coastal towns adjacent the planning area. Beach asked if they could distribute its project information to their members in the future. Beach will provide a project summary for their newsletter to members and link back to the project information sheet, and will consult with any new tourism operators who seek consultation.			
1556	Great Ocean Road Tourist Park	2	No response received	Follow up email sent.	No response, continue consultation		1/12/2022
4194613	Gunaikurnai Land and Waters Aboriginal Corporation	3	No response received	Follow up email sent.	No response, continue consultation	Beach will continue to consult to ascertain if they have an interest. However, the Gunaikurnai sea country is outside of Planning Area and is highly unlikely to be affected as per assessment of potential impacts, due to nature and scale of activities, mitigations in place.	5/01/2023
4194729	Gunditj Mirring Traditional Owners Aboriginal Corporation	11	No concerns raised	Multiple engagements via email and phone were undertaken to engage and direct phone consultation undertaken on 15 December 2022. They advised that based on the project location they do not have any concerns or questions but would like to consult more broadly in the future.	No concerns raised, continue consultation		10/01/2023
239075406	Indigenous Land and Sea Corporation	2	No concerns raised	Phoned to establish contact details. Appreciative of the call.	No concerns raised, continue consultation		11/11/2022
1564	Institute for Marine and Antarctic Studies, University of Tasmania	10	No concerns raised	Information acknowledged.	No concerns raised, continue consultation		1/12/2022
1565	International Fund for Animal Welfare	4	No concerns raised	Information acknowledged.	No concerns raised, continue consultation		24/01/2023
4194371	Jaclyn Symes MLC, Member for Northern Victoria	14	No concerns raised	Information acknowledged.	No concerns raised, continue consultation		1/12/2022

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1580	[redacted]	4	No concerns raised	Emailed to verify correct contacts details and interest in Beach projects and consultation.	No concerns raised, continue consultation		19/12/2022
1585	[redacted]	2	No concerns raised	Phoned to verify correct contact details and interest in Beach projects and consultation.	No concerns raised, continue consultation		6/12/2022
5012	King Island Boat Club	3	No concerns raised	Emailed to establish correct contact details and interest in Beach projects and consultation. Very happy to receive information.	No concerns raised, continue consultation		2/12/2022
4720	King Island Chamber of Commerce	5	No concerns raised	Emailed and phoned to establish correct contact details, their interest in Beach projects and consultation.	No concerns raised, continue consultation		14/11/2022
8388624	King Island Council	17	No concerns raised	Several engagements via email and phone were undertaken to ensure contacts were correct and information was received. Phone meeting with new King Island Mayor on 23 November 2022. Beach explained the project activities and specifically the EMBA that may reach the western shoreline of King Island in the extremely unlikely event of a loss of MDO, Beach's past Prion seismic survey and engagement undertaken at King Island for that project, Beach's approach to research on impacts where applicable and mitigating impacts on fishers. Beach offered to meet with the King Island Mayor and Councillors and any other groups on King Island. The Mayor advised his appreciation for Beach reaching out to him and other King Island groups, his support for the oil and gas industry, he has no concerns about the project, and that he would appreciate a visit in 2023 and would contact us if he had further questions.	No concerns raised, continue consultation		25/01/2023
4725	King Island Regional Development Organisation	2	No concerns raised	Phoned to establish contact details, their interest in Beach projects and consultation. Very pleased to receive	No concerns raised, continue consultation		14/11/2022

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				information and provided us with other local contacts.			
239075423	King Island Shipping Group	1	No concerns raised	Established contact details via KI Regional Development Organisation.	No concerns raised, continue consultation		7/12/2022
4750	King Island Surf Safaris	3	No concerns raised	Phoned to establish contact details, their interest in Beach projects and consultation. Happy to receive information.	No concerns raised, continue consultation		1/12/2022
4737	King Island Tourism/Visitor Information Centre	4	No concerns raised	Phoned to establish contact details, interest in Beach projects and consultation. Gave us contact details for KI Tourism CEO.	No concerns raised, continue consultation		11/11/2022
4743	King Island Tours	3	No concerns raised	Phoned to establish contact details, interest in Beach projects and consultation. Happy to receive information.	No concerns raised, continue consultation		1/12/2022
4920	Life Saving Victoria	2	No concerns raised	Phoned to verify correct contacts and interest in Beach projects.	No concerns raised, continue consultation		11/11/2022
1601	Lochard Energy	35	No response received	Follow up email sent.	No response, continue consultation		1/12/2022
1709	[redacted]	9	No concerns raised	Phoned and emailed to verify current contact details.	No concerns raised, continue consultation		24/01/2023
8388636	Marine and Safety Tasmania	2	No concerns raised	Phoned to verify current contact details.	No concerns raised, continue consultation		1/12/2022
239075427	Marine Mammal Foundation	7	No concerns raised	Phoned to establish contact details, their interest in Beach projects and consultation. Very interested in engaging and sharing information on marine mammals.	No concerns raised, continue consultation		23/01/2023
4194608	[redacted]	7	No response received	Emailed to verify correct contact details, interest in Beach projects and consultation.	No response, continue consultation		4/12/2022
1204	Moyne Shire Council	11	No response received	Follow up engagement sent to ensure information was received. Email acknowledged.	No response, continue consultation		22/11/2022
1003	Muollo Fishing	15	No concerns raised	Multiple engagements via phone and email to verify correct contact details, interest in Beach projects and	No concerns raised, continue consultation		9/12/2022

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				consultation.			
1004	Mures Fishing	5	No concerns raised	Emailed to verify correct contact details, interest in Beach projects and consultation.	No concerns raised, continue consultation		8/12/2022
1619	National Native Title Tribunal	18	No concerns raised	Follow up engagement sent to ensure they received the information.	No concerns raised, continue consultation		1/12/2022
8388630	National Offshore Petroleum Safety Environment Management Authority (NOPSEMA)	12	No response received	Follow up email sent.	No response, continue consultation		1/12/2022
1005	Ocean Racing Club of Victoria	18	No response received	Follow up email sent.	No response, continue consultation		1/12/2022
4852	Ocean Road Abalone (Southern Ocean Mariculture)	1	No concerns raised	Met to discuss Beach offshore and nearshore Projects in south west Victoria. No concerns raised as their operations are outside of current EMBAs. Will continue to consult regarding other EPs and projects.	No concerns raised, continue consultation		16/11/2022
4194372	Office of the Minister Energy and Resources	5	No response received	Follow up email sent.	No response, continue consultation		1/12/2022
155189273	Office of the Minister for Agriculture and Minister for Regional Development	5	No response received	Follow up email sent.	No response, continue consultation		1/12/2022
4194732	Office of the Minister for Environment	2	No concerns raised	Information acknowledged.	No concerns raised, continue consultation		12/12/2022
4194369	Office of the Minister for Resources	6	No response received	Follow up email sent.	No response, continue consultation		1/12/2022
4194370	Office of The Premier	6	No response received	Follow up email sent.	No response, continue consultation		1/12/2022
4194605	[redacted]	28	No response received	Emailed to verify current contact details.	No response, continue consultation		16/12/2022
4755	Otway Climate Emergency Action Network (OCEAN)	11	No concerns raised	Phoned, emailed and SMS message sent to establish correct contact and to and make a meeting time. They appreciated Beach reaching out to them. Discussed the Otway Phase 5	No concerns raised, continue consultation	Specific concerns regarding the Otway Phase 5 wells connection have not been raised to date. Beach is aware of their general opposition to the oil and gas industry, have	25/01/2023

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				wells connection project and no concerns or questions were raised. A meeting time was arranged for 7/2/23 for Beach to meet their members in Apollo Bay. They are interested in all of Beach's projects, in particular a future transition zone seismic survey. Beach advised it will cover all of its projects and sustainability initiatives at the meeting.		arranged a meeting with OCEAN members on 7/2/23 and will continue consultation on its projects.	
1633	Otway Gas Plant Community Reference Group	25	No concerns raised	Discussed Beach Projects at regular meeting.	No concerns raised, continue consultation		6/12/2022
4194548	Otway Water	4	No concerns raised	Contacted Beach via Beach website email address. Requested a copy of the draft Environment Plan (EP). They emailed a response that expressed appreciation of prompt reply and that they look forward to reading the draft.	No response, continue consultation		24/01/2023
4889	Paaratte Eel Company	2	No concerns raised	Phoned to verify correct contact details, interest in Beach projects and consultation. Happy to receive information.	No concerns raised, continue consultation		6/12/2022
1634	Parks Victoria - Marine	14	No concerns raised	Information acknowledged.	No concerns raised, continue consultation		30/11/2022
4194609	[redacted]	7	No response received	Emailed to verify correct contact details, interest in Beach projects and consultation.	No response, continue consultation		4/12/2022
1639	Peterborough General Store and Takeaway Food	1	No response received	Email sent to provide general update on Beach projects, as Beach has done in the past.	No response, continue consultation		28/11/2022
1640	Peterborough Golf Club	1	No response received	Email sent to provide general update on Beach projects, as Beach has done in the past.	No response, continue consultation		28/11/2022
1641	Peterborough House	2	No response received	Email sent to provide general update on Beach projects, as Beach has done in the past.	No response, continue consultation		28/11/2022
1642	Peterborough Licensed grocers	1	No response received	Email sent to provide general update on Beach projects, as Beach has	No response, continue consultation		28/11/2022

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				done in the past.			
1644	Peterborough Residents Association	21	No response received	Follow up email sent.	No response, continue consultation		1/12/2022
239075411	Petuna Sealord Deepwater Fishing Pty Ltd	1	No response received	Engagement via email to ensure the information was received.	No response, continue consultation		28/11/2022
1648	Port Campbell Board Riders Association	12	No response received	Follow up email sent.	No response, continue consultation		1/12/2022
1649	Port Campbell Boat Charters	5	No concerns raised	Phoned to verify correct contact details, interest in Beach projects and consultation. Happy to receive information even though the business is on hold.	No concerns raised, continue consultation		1/12/2022
1650	Port Campbell Community Group	14	No response received	Follow up email sent.	No response, continue consultation		23/01/2023
1652	Port Campbell Hotel	2	No response received	Follow up email sent.	No response, continue consultation		1/12/2022
4768	Port Campbell Lobster	2	No concerns raised	Phoned to verify correct contact details, interest in Beach projects and consultation. Happy to receive information.	No concerns raised, continue consultation		2/12/2022
205520898	Port Campbell Police	3	No response received	Follow up email sent.	No response, continue consultation		1/12/2022
1653	Port Campbell Professional Fishermans Association	4	No response received	Follow up email sent.	No response, continue consultation		1/12/2022
1655	Port Campbell Progress Association	15	No concerns raised	Information acknowledged.	No concerns raised, continue consultation		5/12/2022
1656	Port Campbell Rifle Range	2	No response received	Email sent to provide general update on Beach projects, as Beach has done in the past.	No response, continue consultation		28/11/2022
1657	Port Campbell Surf Life Saving Club	20	No response received	Follow up email sent.	No response, continue consultation		1/12/2022
1658	Port Campbell Take Away	1	No response received	Email sent to provide general update on Beach projects, as Beach has done in the past.	No response, continue consultation		28/11/2022
1659	Port Campbell Trading	1	No response	Email sent to provide general update	No response, continue		28/11/2022

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	Co.		received	on Beach projects, as Beach has done in the past.	consultation		
1660	Port Campbell Visitor Information Centre	3	No response received	Follow up email sent.	No response, continue consultation		1/12/2022
1661	Port Central Apartments	1	No response received	Email sent to provide general update on Beach projects, as Beach has done in the past.	No response, continue consultation		28/11/2022
1662	Port O' Call Motel	1	No response received	Email sent to provide general update on Beach projects, as Beach has done in the past.	No response, continue consultation		28/11/2022
1666	[redacted]	2	No response received	Emailed to verify correct contact details, their interest in Beach projects and consultation.	No response, continue consultation		15/12/2022
4433	REAL Pizza Pasta Salads	1	No response received	Email sent to provide general update on Beach projects, as Beach has done in the past.	No response, continue consultation		28/11/2022
1681	RHG Fisheries	19	No concerns raised	Emailed to verify correct contact details and if they still fish in the area.	No concerns raised, continue consultation		9/12/2022
4194373	Richard Riordan MLA, Victorian Member for Polwarth	6	No response received	Follow up email sent.	No response, continue consultation		1/12/2022
1694	Richey Fishing Company	3	No concerns raised	Emailed to verify correct contact details, interest in Beach projects and consultation. Happy to continue to receive information.	No concerns raised, continue consultation		6/12/2022
4194374	Roma Britnell MLA, Victorian Member for South-West Coast	8	No concerns raised	Information acknowledged.	No concerns raised, continue consultation		2/12/2022
1670	[redacted]	9	No concerns raised	Emailed to verify correct contact details, interest in Beach projects and consultation. Happy to receive information.	No concerns raised, continue consultation		19/12/2022
4194611	[redacted]	7	No response received	Emailed to verify correct contact details, interest in Beach projects and consultation.	No response, continue consultation		6/12/2022
1676	Schlumberger Australia Pty Ltd	12	No response received	Follow up email sent.	No response, continue consultation		1/12/2022

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1007	SCUBA Divers Federation of Victoria	18	No response received	Follow up email sent.	No response, continue consultation		1/12/2022
1679	Sea Foam Villas Port Campbell	3	No concerns raised	Acknowledged information.	No concerns raised, continue consultation		1/12/2022
155189275	Seafood Industry Australia	5	No response received	Follow up email sent.	No response, continue consultation		1/12/2022
1008	Seafood Industry Victoria	30	No concerns raised	Beach has engaged extensively throughout	No concerns raised, continue consultation		25/11/2022
4194593	Sharkmen Charters	13	No response received	Emailed to verify correct contact details, interest in Beach projects and consultation.	No response, continue consultation		24/01/2023
1009	South Australian Rock Lobster Advisory Council and South Eastern Professional Fishermen's Association	1	No response received	Email sent	No response, continue consultation		28/11/2022
1010	South East Trawl Fishing Industry Association	20	No concerns raised	Extensive engagement with SETFIA through whole of Otway Offshore Project. Beach engaged SETFIA for two consulting exercises: assessment of actual fishing in the project area; assessment of trawl fishing equipment and vessels used for Beach to use as input for its sub sea infrastructure engineering design. Beach has also engaged SETFIA to communicate with its members at ever stage of the project from commencement of drilling, to each rig move, and drilling completion. Discussed the project location for PSZs and agreed on approach to provide data file of PSZ coordinates that could be directly downloaded to fisherman's plotters.	No concerns raised, continue consultation	Beach's Otway Offshore Project has operated successfully with no impact to SETFIA members. Beach will continue to use SETFIA services to consult with their members regarding any impacts and updates for Beach projects. Beach has provided a data file of the PSZ coordinates for upload into plotters by their members.	22/12/2022
205520905	South West Regional Executive Forum	9	No response received	Email sent	No response, continue consultation		28/11/2022
1011	Southern Rock Lobster Limited	12	No response received	Follow up engagement sent via email to ensure information was received.	No response, continue consultation		1/12/2022
1689	Southern Shark Industry	14	No concerns raised	Refer to engagements with SETFIA	No concerns raised,		28/11/2022

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	Alliance (SSIA)			as Simon Boag manages SSIA as well.	continue consultation		
239075433	Superloop	2	No response received	Emailed information about the project and the fact that the activity is 19kms from their cable.	No response, continue consultation		13/12/2022
4194587	Surf Coast Shire Council	35	Concerns raised	Emailed project update and requested meeting. Met on 5 December at council offices. Beach thanked them for the opportunity to meet, explain our projects and environment protections in place, and answer their questions. They explained their concerns that an oil spill may impact local tourism and overall concerns about the impact of fossil fuels on climate change and the council's position on that. They also asked about emissions reductions and engagement by Beach with First Nations Peoples. Beach acknowledged their concerns and opposition to fossil fuels, and that our development of natural gas meets a strong local demand. Beach explained project history and next phase of activities, including oil spill modelling and the nature of the hydrocarbons developed in the Otway Basin being primarily methane and condensate, not black crude oil. Beach explained its activities, targets and aspirations regarding sustainability and emissions reductions Beach explained its engagement with Eastern Maar Peoples and other groups. Beach offered further engagement if they want to discuss any further topics or involve other councillors etc. Council advised they would submit a letter stating their concerns. Beach reminded them of the 'sensitive information' option and Council confirmed they would like their	Concerns remain, maintain consultation	Remaining concerns are unlikely to be resolved through further consultation given their strong opposition to the offshore oil and gas industry. However, Beach will continue to consult and endeavour to provide assurances of its environmental protection measures for its projects.	9/01/2023

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				engagement records to be published in the EP.			
4830	Surfers For Climate	10	Concerns raised	Multiple engagements to establish interest, contact details, reference to the draft EP, and a meeting time. Met online to discuss the project and Beach's operations in the Otway basin. Discussion included specific questions about oil spill modelling, marine mammal impacts, engagement with First Nations Peoples, and their opposition to offshore oil and gas development. Beach explained the safe project history, the ongoing demand for the fuels its producing, its sustainability and emissions reduction actions, and engagement with First Nations Peoples.	Concerns remain, maintain consultation	Remaining concerns are unlikely to be resolved through further consultation given their strong opposition to the offshore oil and gas industry. However, Beach will continue to consult and endeavour to provide assurances of its environmental protection measures for its projects.	25/01/2023
79691782	Surfrider Foundation Australia	24	No concerns raised	Information acknowledged.	No concerns raised, continue consultation		2/12/2022
1696	Sustainable Shark Fishing Association	15	No concerns raised	Phoned to verify correct contact details, interest in Beach projects and consultation. Appreciates regular updates.	No concerns raised, continue consultation		22/11/2022
1015	TARFish	4	No response received	Follow up engagement sent via email to ensure information was received.	No response, continue consultation		1/12/2022
4912	Tasmania Salmonid Growers Association	5	No concerns raised	Multiple engagements via email and phone were undertaken to establish correct contact details and areas where members fish.	No concerns raised, continue consultation		14/12/2022
1698	Tasmanian Abalone Council Ltd	13	No response received	Phoned to follow up receipt of project updates.	No response, continue consultation		9/12/2022
20971523	Tasmanian Aboriginal Centre	10	No concerns raised	Multiple emails were undertaken to follow up project information.	No concerns raised, continue consultation	Beach will continue to consult to ascertain if they have an interest in the sea country adjacent King Island, notwithstanding it is highly unlikely to be affected as per assessment of potential impacts, due to nature and scale of activities, mitigations in place.	24/01/2023

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1017	Tasmanian Rock Lobster Fisherman's Association	13	No response received	Emailed to follow up receipt of project updates.	No response, continue consultation		9/12/2022
1018	Tasmanian Seafood Industry Council	15	No response received	Follow up engagement sent via email to ensure information was received.	No response, continue consultation		1/12/2022
155189276	Tasmanian Seafoods	5	No response received	Phoned twice to verify correct contact details and interest in Beach projects and consultation.	No response, continue consultation		9/12/2022
1699	TGS (previously Spectrum Geo)	14	No concerns raised	Emailed to verify correct contact details, interest in Beach projects and consultation. Happy to receive information.	No concerns raised, continue consultation		6/12/2022
239075434	The Dive Dude	1	No response received	Emailed to establish correct contact details, interest in Beach projects and consultation.	No response, continue consultation		16/11/2022
1703	Timboon Action Group	22	No response received	Follow up engagement sent via email to ensure information was received.	No response, continue consultation		1/12/2022
1708	Timboon Recreational Fishing Club	2	No response received	Follow up engagement sent via email to ensure information was received.	No response, continue consultation		1/12/2022
4194360	[redacted]	15	No response received	Phoned to verify correct contact details, interest in Beach projects and consultation.	No response, continue consultation		8/12/2022
1711	Transport Safety Victoria - Maritime Safety Victoria	17	No concerns raised	Follow up email sent.	No concerns raised, continue consultation		1/12/2022
1712	[redacted]	3	No response received	Emailed to verify correct contact details, interest in Beach projects and consultation.	No response, continue consultation		4/12/2022
1023	Trinsand Fisheries	17	No concerns raised	Phoned to verify correct contact details, interest in Beach projects and consultation. Happy to continue to receive updates and said Beach operations are not impacting on him. Positive discussion and appreciated the call.	No concerns raised, continue consultation		8/12/2022
1713	Tuna Australia	19	Concerns raised	Beach has been providing project updates since March 2021 regarding its Otway Offshore drilling campaign	Concerns remain, maintain consultation	Beach has consulted with them in accordance with the regulations and given the nature and scale of the	22/12/2022

Entity ID	Organisation Name	Number of Engagements	Engagement Status	Engagement Summary	Assessment Summary	Assessment Detail	Last Engagement Date
				and they have not raised any concerns. In response to recent communications from Beach regarding Phase 5 of the project to connect existing wells, they raised concerns about the time required to respond to oil and gas and other industries requests to consult with them. They advised they will now only consult if Beach enter into a service agreement with them at $500 per hour. Beach explained that there is no southern bluefin or eastern tuna and bill fish fishing undertaken in the project area as shown by ABAERS records over many years. Also supported by a detailed report that Beach commissioned from the South East Trawl Fishing Industry Association for the drilling campaign. They advised that fishing locations do gradually change over time but did not disagree with Beach's assessment of fishing locations. Beach advised that their consulting rate is not commercially fair but we would have to accept it for future consultations. Beach advised that given the nature and scale of the well connection activity and the absence of fishing history in the area, that a consulting fee to establish that is not warranted. Beach recommended that their services are engaged in early January 2022 to undertake a detailed assessment off their fishery in relation to Beach's proposed Otway and Bass Basin development plans. Agreed to meet in person in January 2023.		activities and the impact assessments undertaken, we believe that further consultation for this project, under their terms of engagement for a paid service, will not contribute any further information that will meet the purpose of consultation to identify concerns and implement mitigations.	
1714	Twelve Apostles Tourism and Business Group	14	No concerns raised	Acknowledged information.	No concerns raised, continue consultation		11/11/2022
1025	Victorian Fisheries Authority	19	No response received	Follow up email sent.	No response, continue consultation	VFA have previously been engaged and provided fishing effort data in	7/12/2022

Entity ID	Organisation Name	Number of Engagements	Engagement Status	Engagement Summary	Assessment Summary	Assessment Detail	Last Engagement Date
						response to Beach's requests, to enable assessment of potential commercial fishing impacts for the Otway Offshore Project. Continue to engage as per Regulation 11(A)(1)(b).	
1721	Victorian Scallop Fishermen's Association	21	No response received	Follow up engagement sent via email to ensure information was received.	No response, continue consultation		1/12/2022
4194361	VR Fish	21	No concerns raised	Information acknowledged.	No concerns raised, continue consultation		1/12/2022
4194727	Wadawurrung Traditional Owners Aboriginal Corporation	7	No concerns raised	Multiple emails were undertaken to follow up project information. Beach was requested to complete a formal consultation request which was done. Arranged meeting 25/1/2023 (at their earliest availability) to consult to understand potential interests and engagement preference. Beach attended meeting and after 15 minutes, phoned to check if the meeting was still proceeding. They advised cancellation, apologised and set a new date for 2/2/23.	No concerns raised, continue consultation	Beach will continue to consult to ascertain if they have an interest in the sea country adjacent Eastern Maar lands, notwithstanding that Wadawarrung sea country is highly unlikely to be affected as per assessment of potential impacts, due to nature and scale of activities, mitigations in place.	25/01/2023
1728	Warrnambool City Council	5	No concerns raised	Met to discuss Beach Projects in south west Victoria. Followed up with specific Phase 5 project information. No questions or concerns raised.	No concerns raised, continue consultation		1/12/2022
4814	Warrnambool Coastcare Landcare Network	5	No concerns raised	Emailed to verify correct contact details, interest in Beach projects and consultation. Requested to receive information.	No concerns raised, continue consultation		23/01/2023
1729	Warrnambool Professional Fishermen's Association	4	No concerns raised	Emailed to verify correct contact details, interest in Beach projects and consultation.	No concerns raised, continue consultation		1/12/2022
4773	Warrnambool Surf Life Saving Club	4	No concerns raised	Information acknowledged and will be discussed at December meeting.	No concerns raised, continue consultation		5/12/2022
239075413	Warrnambool Visitor Information Centre	2	No response received	Emailed to verify correct contact details, interest in Beach projects and consultation.	No response, continue consultation		15/11/2022
1478	Warrnambool Volunteer Coast Guard	5	No concerns raised	Phoned to verify correct contact details, interest in Beach projects and	No concerns raised, continue consultation		1/12/2022

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				consultation. Happy to receive information.			
4782	Warrnambool Yacht Club	3	No concerns raised	Phoned to verify correct contact details, interest in Beach projects and consultation. Happy to receive information.	No concerns raised, continue consultation		14/11/2022
1730	Waves Cafe, Bar and Restaurant	2	No response received	Follow up email sent.	No response, continue consultation		1/12/2022
1733	[redacted]	14	No response received	Emailed to establish if he still wanted to receive updates.	No response, continue consultation		4/12/2022
1734	Western Abalone Divers Association	3	No concerns raised	Met to discuss Beach Projects and followed up to ensure received updates. Will pass them on to the committee.	No concerns raised, continue consultation		16/11/2022
4194726	[redacted]	4	No response received	Multiple emails were undertaken to follow up project information.	No response, continue consultation		6/12/2022
1741	[redacted]	2	No concerns raised	Phoned to verify correct contacts. Requested we continue to send information.	No concerns raised, continue consultation		6/12/2022