



**North Western Mussels Limited
Western Waikato Spat/Nursery Farm
Marine Wildlife Management Plan**

This document will be reviewed annually to ensure it remains up to date against wildlife management legislation and best practice in New Zealand aquaculture.

Review Date	Person(s) Involved	Description of Changes / Review

CONTENTS

	Section	Page
1.0	Background	1
2.0	Purpose	2
3.0	Marine Farm Configuration and Operations	3
4.0	Roles and Responsibilities	4
5.0	Marine Mammals in the Area	5
6.0	Seabirds in the Area	9
7.0	Potential Effects on Marine Mammals	13
8.0	Potential Effects on Seabirds	13
9.0	General Protocols	13
10.0	Specific Protocols	15
11.0	Emergency Disentanglement Protocols	20
12.0	Reporting and Response	22
13.0	Staff Training	24
14.0	Marine Mammal Monitoring	24
15.0	Seabird Monitoring	27
16.0	Review	27
	APPENDIX ONE Sharing Our Coasts with Marine Mammals	
	APPENDIX TWO Handling and Release Guide	
	APPENDIX THREE Marine Mammal Sighting Form	
	APPENDIX FOUR Seabird Sighting Form	
	APPENDIX FIVE Underwater Passive Acoustics Monitoring Programme for Marine Mammals	
	APPENDIX SIX Resources and References	
	APPENDIX SEVEN Consent Conditions	

1.0 Background

This Marine Wildlife Management Plan (MWMP) has been prepared for North Western Mussels Limited (NWML) to adhere to when undertaking Greenshell (*Perna canaliculus*) mussel spat catching and nursery activities at three Whāingaroa/Raglan marine farm sites.

The farm sites are located at least 3.1 km off the coastline between Papanui Point in the south and Parikotuku Point in the north on the west coast of Waikato. They sit within the Central West Coast, IUCN's North Island Important Marine Mammal Area (IMMA), which includes the only currently occupied year-round habitat of critically endangered Māui dolphins.



Figure 1 Location map

Preparation of and operation in accordance with this MWMP is a condition of consent for coastal permit XXX¹.

This MWMP has been prepared by Rebecca Clarkson of Aquaculture Direct Limited, using the A+ Sustainable Management Framework (A+) Marine Wildlife Management Plan template, in alignment with national guidelines produced by Fisheries New Zealand (FNZ) and incorporating all relevant information and recommended mitigation measures from the following:

Author	Reference
Jim Roberts. Anemone Ltd. (2022 and updated 2026)	Marine mammal assessment with respect to the potential effects of proposed mussel spat catching and nursery activities off the coast of Whāingaroa.
Helen McConnell. SLR	Peer Review of Marine Mammal Assessment. North Western Mussels Ltd - Resource

¹ Pending consent

Consulting NZ. (2023).	Consent Application
Della Bennet. Wildlands Consultants Ltd. (2022).	Assessment of effects of a proposed mussel spat-catching/nursery operation along the western Waikato coast on seabirds.
Hilke Giles. Pisces Consulting. (2023).	Technical review of the seabird effects assessment provided with an application by North Western Mussels Limited for a mussel spat/nursery marine farm off the Waikato Region West Coast.
Helen McConnell. SLR Consulting NZ. (2024).	Peer review of the NWML draft Marine Wildlife Management Plan.
Simon Childerhouse. Blue Planet Marine. (2026)	Proposal for baseline acoustic monitoring for marine mammals

Table 1 MWMP references

The FNZ guidelines set out recommended practices to minimise and mitigate the interactions between open ocean aquaculture and marine mammals². The guidelines identify that the main effects that need to be addressed include:

- **Attraction or avoidance**, because marine farm structures represent a new physical, visual, or acoustic obstruction that marine mammals may choose to ignore, investigate, or avoid. Attraction might alter natural foraging and passage patterns, potentially lead to interactions and also to incidents.
- **Interactions** with farm structures, defined as events when a marine mammal makes physical contact with the farm structure, which may lead to:
- **Incidents** that cause injury (e.g., rope cut, abrasion), entrapment, or entanglement (live or fatal) of a marine mammal.

The intent is for NWML to demonstrate how best practice marine mammal and seabird management will be achieved and that proposed management practices are efficacious, practical, and implementable.

The MWMP is a living document and will be reviewed and updated in accordance with consent conditions and any updated scientific information or guidance.

2.0 Purpose

Marine farmers recognise the coastal environment is a shared resource with high biodiversity and social values. When operating a marine farm, farmers strive to do everything possible to not disturb wildlife on and around marine farms, and ensure all steps are taken to minimise the risk of adverse interactions between marine mammals and marine farms.

All New Zealand marine mammals are protected under the Marine Mammals Protection Act 1978 and the Marine Mammals Protection Regulations 1992. Marine mammals and seabirds are protected under the Wildlife Act 1953.

² Clement D, Milardi M, Cumming S. 2021. [Best practices and technologies available to minimize and mitigate the interactions between finfish open ocean aquaculture and marine mammals](#). New Zealand Aquatic Environment and Biodiversity Report No. 273. 20 p.

The objective of the MWMP is to:

1. Avoid adverse effects from the construction and operation of the spat/nursery farm on marine fauna with the primary focus on mammals and seabirds, and where it is not practicable to avoid effects, to minimise those effects to the point that they are minor or less;
2. Avoid adverse effects from the construction and operation of the spat/nursery farm on indigenous taxa listed as 'threatened' or 'at risk' by the New Zealand Threat Classification System or listed as 'threatened' by the International Union for Conservation of Nature and Natural Resources (IUCN).
3. Minimise the potential for interaction of marine mammals and seabirds with the marine farm and minimise the risk of incidents.
4. Describe protocols and procedures for the management of marine mammal and seabird interactions and incidents.

This MWMP outlines statutory and best management practices as well as mitigation measures specifically proposed by specialised marine consultants including Anemone, SLR, Wildlands, Pisces Consulting and Blue Planet Marine. The conclusions in the marine mammal and seabird assessments and peer reviews that all residual effects will be negligible or minor rely on the full and ongoing implementation of the mitigation and management measures described in this MWMP.

The MWMP also includes provision for monitoring marine mammals including one year of baseline acoustic monitoring prior to installing structures at each site, and additional monitoring as appropriate in consultation with a qualified marine expert prior to progression between Stages One, Two and Three. An acoustic monitoring protocol is set out in **Appendix Five**.

3.0 Marine Farm Configuration and Operations

The site is to be used for spat catching and spat nursery activities including:

- Spat catching (green-lipped mussel, *Perna canaliculus*);
- Seeding of hatchery-produced (biosecure) spat; and
- Nursery rearing of juvenile mussels to ~70 mm average size (up to 90 mm maximum)

The spat nursery activity is to be carried out over three separate sites, A to C, covering a total consent area of 540 hectares off the west coast of Waikato. Each site comprises 3 rows spaced 300 metres apart. Each row comprises 41 lines, each line comprises 150 metre backbones spaced 50 metres apart.

Farm infrastructure will include a mix of single and double backbone longline structures, anchored at either end with anchors, 60 to 80 meters of 44 mm Durashield warps with a breaking strain of 31,000 kg, and backbone of 40 mm with a breaking strain of 25,000 kg³. The catching/nursery medium is heavily weighted hairy spat catching rope, with a 25mm core and spat-catch fibrillation increasing the diameter to 75 to 80 mm.

³ Or similar infrastructure with the same or better specifications

The farm will be developed in the following stages in accordance with the conditions of consent.

		Stage One	Stage Two	Stage Three	Total
Site A	Area		90ha	90ha	180ha
	Rows		1.5	1.5	3
	Lines		61	62	123
Site B	Area		90ha	90ha	180ha
	Rows		1.5	1.5	3
	Lines		61	62	123
Site C	Area	120ha		60ha	180ha
	Rows	2		1	3
	Lines	82		41	123
Total	Area	120ha	180ha	240ha	540ha
	Rows	2	3	5	9
	Lines	82	122	165	369

Table 2 Development stages

Development of Stage One can only commence after one year of baseline monitoring for marine mammals as set out in the monitoring plan in section 14.0 and **Appendix Five**. Development of Stages Two and Three can only commence after advice from a suitably qualified marine mammal expert and confirmation in writing from WRC. Conditions of consent are set out in **Appendix Seven**.

NWML have entered into an Oati with Ngaa marae O Tahinga (Ngaati Tahinga) and will liaise with them on all aspects of this MWMP as appropriate.

4.0 Roles and Responsibilities

NWML shall designate a contact person(s) (and their contact details), who is responsible for the monitoring, reporting and implementation of this MWMP. NWML will inform the Waikato Regional Council (WRC) and DOC of any changes in the details of the designated contact person. The following is a summary of the key contacts, roles and responsibilities.

Name	Organisation	Role/Responsibility
Jake Bartrom	NWML	Overall responsibility for MWMP including all aspects of training, monitoring, reporting and implementation.
		Vessel skippers have responsibilities to ensure their operations are in keeping with this MWMP.
		Farm staff have responsibilities to ensure their operations are in keeping with this MWMP.
	WRC	Regulates compliance with the consent and therefore the MWMP.
	DOC	Provides liaison on preparation and implementation of this MWMP including receiving the Stage One Integrated Monitoring Report.
	Marine mammal expert	Undertakes baseline monitoring, prepares the Stage One Integrated Monitoring Report and undertakes future monitoring as required.

Table 3 Roles and responsibilities

5.0 Marine Mammals in the Area

The following species of marine mammal may occur in the Waikato coastal marine area⁴

Baleen whales	Blue whale
	Bryde's whale
	Southern right whale
	Humpback whale
	Minke whale
	Pygmy right whale
Odontocetes – toothed whales and dolphins	Hector's and Māui's dolphin
	Common dolphin
	Killer whale (orca)
	False killer whale
	Pilot whale
	Striped dolphin
	Beaked whale - Andrew's
	Beaked whale - Cuvier's
	Beaked whale - Gray's
	Beaked whale - Shepherd's
	Southern bottlenose whale
	Sperm whale
	Pygmy sperm whale
	Blue whale

Table 4 Marine mammals that may occur in the area

⁴ From Table 2, SLR (2023). This list will be reviewed prior to finalising this MWMP

Marine mammals that are expected to occur in the vicinity of the proposed marine farm sites⁵ include:

Species	New Zealand Threat Status ⁶	Frequency of Sightings and Habitat Use	Image ⁷
Māui/Hector's dolphins (odontocete)	(NZCPS Policy 11(a)(i) species; Māui dolphin classified as 'Threatened - Nationally Critical', and Hector's dolphin classified as 'Threatened – Nationally Vulnerable' by the NZTCS)	The proposed marine farm sites are within the core range for the Māui dolphin subspecies and validated sightings have been made in the vicinity of all three proposed farm sites. Hector's dolphins have also been recorded in the region, also in very small numbers, although it is not considered the core range for Hector's dolphins. Modelled density data suggests that highest densities in summer occur directly off Whāingaroa Harbour entrance and along the coast to the north of the harbour entrance in water depths of at least 20 m in winter. Further details provided on pages 7 to 10 in Anemone (2026).	

⁵ Summarised from Anemone (2022) references available within that report

⁶ <https://www.doc.govt.nz/globalassets/documents/science-and-technical/nztcs29entire.pdf>

⁷ Images sources from DOC <https://www.doc.govt.nz/nature/native-animals/marine-mammals/> and A+ aplusaquaculture.nz

Common dolphins (odontocete)	Not Threatened	Common dolphins (aihe) are abundant around the North Island of New Zealand and are also predicted to be relatively abundant off the West and North Coasts of the South Island. Common dolphins predate on a variety of fish and cephalopod species, with arrow squid, jack mackerel and anchovy identified as the primary prey species. Further details provided on page 11 in Anemone (2022).	
Killer whales (odontocete)	NZCPS Policy 11(a)(i) species; classified as 'Threatened – Nationally Critical' by the NZTCS)	Orca (kākahi) occurring off the West Coast of the North Island are likely to comprise part of a small wider-ranging New Zealand population. The main prey of orca around New Zealand include rays, sharks, finfish, and other cetaceans (Visser 2000). Further details provided on page 11 in Anemone (2022).	
Southern right whales (baleen whale)	(NZCPS Policy 11(a)(i) species; classified as 'Nationally Recovering by the NZTCS)	Southern right whales (tohorā) undertake seasonal migrations from the Antarctic region to the Subantarctic islands of New Zealand and mainland coastal waters, where they occur between July to November. Very rare sightings of southern right whales have been reported within shallow and sheltered areas of the West Coast of the North Island during the winter period, including in the mouth of Whāingaroa Harbour, within 20 km of the proposed mussel spat farm. Southern right whales use shallow	

		coastal waters for winter calving and for nursery grounds. Further details provided on page 12 in Anemone (2022).	
Humpback whales (baleen whale)	(NZCPS Policy 11(a)(ii) species; Oceania sub-population classified as 'Endangered' by the IUCN).	Humpback whales (paieka) are considered a non-resident seasonal migrant visitor to New Zealand, passing around the coast of New Zealand when migrating between summer feeding grounds around Antarctica and winter calving / breeding grounds in tropical or near-tropical waters. Northbound humpbacks predominantly migrate along the East Coast of the South Island, through the Cook Strait then up the West Coast of the North Island in winter months, and southbound humpbacks return along the West Coast in spring. Humpback whale sightings have been reported immediately offshore of the proposed mussel spat farm in winter months. Further details provided on page 12 in Anemone (2022).	
New Zealand fur seals (pinniped)	Not Threatened	Few New Zealand fur seal (kekeno) breeding rookeries exist on North Island offshore islands, with the most northern sites off Waikato, at Gannet Island and off Taranaki at Sugar Loaf Islands representing areas where pup numbers are few (but consistent pupping occurs each year) and expansion is unlikely due to the small area of available habitat. Further details provided on page 12 to 13 in Anemone (2022).	

Table 5 Marine mammals expected in the area

6.0 Seabirds in the Area

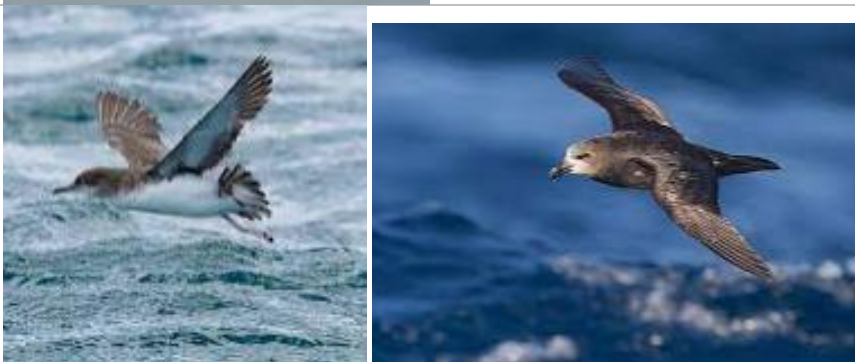
The following species of seabird may occur in the Waikato coastal marine area⁸:

Albatrosses	Northern royal albatross
	Black-browed mollymawk
	Salvin's mollymawk
	Shy mollymawk
Shearwaters, petrels, prions and fulmar	Buller's shearwater
	Flesh-footed shearwater
	Fluttering shearwater
	North Island little shearwater
	Shearwater sp.
	Sooty shearwater
	Black petrel
	Cape petrel
	Grey-faced petrel
	New Zealand white-faced storm petrel
	Northern diving petrel
	Northern giant petrel
	Fairy prion
	Prion sp.
	Northern fulmar
Gannets and shags	Australasian gannet
	Black shag
	Little black shag
	Little pied shag

Table 6 Seabirds that may occur in the area

⁸ From Table 2, Wildlands (2022). This list will be reviewed prior to finalising this MWMP

Those that are Nationally Threatened or At Risk, rare in the region, or have the potential to be affected by the proposed farm are as follows⁹:

Seabirds	Species, Status and Presence	Images ¹⁰
Albatrosses and mollymawks	Toroa/black-browed mollymawk , non-resident native-coloniser; toroa/Salvin's mollymawk, and toroa/shy mollymawk. Overall observations are rare. Further details provided on page 14 in Wildlands (2022).	
Shearwaters, petrels, prions, storm petrels and fulmars	The coastal observations are dominated by pakahā/fluttering shearwaters, followed by 20 unidentified shearwater species, ōi /grey-faced petrel, not threatened) and pāngurunguru/northern giant petrel. The eBird data set indicates that all of these species are present within the coastal zone, four kilometres from shore. Further details provided on page 14 in Wildlands (2022).	

⁹ Summarised from Wildlands 2022 – references available within that report.

¹⁰ Images sourced from DOC <https://www.doc.govt.nz/nature/native-animals/birds/sea-and-shore-birds/> and <https://www.doc.govt.nz/globalassets/documents/conservation/marine-and-coastal/fishing/fishers-guide-to-nz-seabirds/fishers-guide-to-new-zealand-seabirds.pdf>

Gannets	The tākapu/Australasian gannet breed on Karewa Gannet Island. This area has significant conservation values as an island wildlife sanctuary and is a major gannet breeding site. Further details provided on page 16 in Wildlands (2022).		
Shags	Four shag species use the area with the most common being pied shag. Population sizes are unknown, although numbers of pied shags in northern New Zealand are estimated to have been increasing. A small number of māunga/black shag, kawau tūi/little black shag and kawaupaka/little pied shag, Non-resident native – vagrant) have also been observed along the coast. The eBird data suggests the feeding distributions of all four species overlap with the proposed spat-catching/nursery locations and are coastal foraging species. Further details provided on page 16 in Wildlands (2022).		
Gulls and Terns	Red-billed gull, white-fronted tern and southern black-backed gull are common inshore species. The red-billed gull population in the northern North Island has undergone a significant decline over the last decades.		

White-fronted terns roost and nests on beaches, headlands and small offshore islands with gannets, gulls and other terns that over-winter in New Zealand. The species is in decline nationally, with predation by introduced predators thought to be the primary threat. Disturbance of breeding colonies by people may also be an issue. Small numbers of tara teo/eastern little tern Non-resident Native-Migrant) and Caspian tern are present in the area. Eastern little tern may be present from October to March and are mostly in non-breeding plumage. Small flocks or individual birds may be seen around the North Island and are mainly seen at estuaries and coastal lakes. Caspian tern number as low as 1,300-1,400 pairs nationwide, but are cosmopolitan in distribution. It nests in small colonies or as single pairs. The species mainly forage on fish in estuaries, harbours, and other inshore locations but is not often seen further out to sea. Further details provided on page 16 in Wildlands (2022).	 The image block contains three photographs of terns. The top photo shows two White-fronted terns perched on a wooden post; they have white bodies, black caps, and black bills. The middle photo shows a single Eastern little tern on a sandy beach; it has a white body, a black cap, and a long, thin, dark bill. The bottom photo shows a single Caspian tern on a rocky shore; it has a white body, a black cap, and a distinctive bright red bill.
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Table 7 Seabirds expected in the area

7.0 Potential Effects on Marine Mammals

The following potential effects of the proposed activity on marine mammals have been identified:

- Entanglement;
- Habitat exclusion;
- Trophic effects;
- Marine debris;
- Vessel strike;
- Underwater noise; and
- Cumulative effects.

Details relating to each effect are described in detail in Anemone (2022) and SLR (2023).

8.0 Potential Effects on Seabirds

The following potential effects of the proposed activity on seabirds have been identified:

- Entanglement;
- Habitat exclusion;
- Benthic habitat change;
- Prey abundance changes;
- Disturbance;
- Noise;
- Ingestion of foreign debris; and
- Lights causing attraction or disorientation.

Details relating to each effect are described in detail in Wildlands (2022) and Pisces Consulting (2023).

9.0 General Protocols

9.1 Compliance with the Marine Mammal Protection Act 1978

All marine mammals found in New Zealand waters enjoy full protection as mandated by the Marine Mammals Protection Act of 1978. The act strictly prohibits the 'taking' of marine mammals without a permit. The term 'take' encompasses a range of actions, including capturing, killing, injuring, attracting, poisoning, tranquilising, herding, harassing, disturbing, or possessing marine mammals. It also includes activities such as branding, tagging, marking, and any similar actions, as well as processes like flensing, rendering down, or separating any part from a carcass.

NWML will not have a permit to 'take' marine mammals. Any individual engaging in actions related to marine mammals is personally accountable for their conduct within the framework of the Marine Mammals Protection Act of 1978. Non-compliance may lead to the dismissal of staff for serious misconduct, and both the individual and the company could face legal consequences under the Marine Mammals Protection Act of 1978.

Nevertheless, the Marine Mammals Protection Act of 1978 provides certain defences and exemptions in specific circumstances. Some of which may occur as responses under the MWMP. These include:

- Assisting an injured marine mammal.
- Retrieving dead marine mammals under the direction of DOC.
- Disposing of a dead marine mammal under the direction of DOC.

9.2 Compliance with the Marine Mammal Protection Regulations 1992

The Marine Mammal Protection Regulations (1992) specify behaviours that must be followed by all individuals in the vicinity of marine mammals. Adherence to these regulations is a legal obligation and include requirements for safe vessel operation set out in the MWMP.

9.3 Compliance with the Wildlife Act 1953

All seabirds are protected in New Zealand under the Wildlife Act 1953 (except black-backed gulls).

9.4 Compliance with Coastal Permit Conditions

Consent to operate the marine farm is contingent on the compliance with the coastal permit conditions set out in **Appendix Seven**.

9.5 Compliance with the A+ Sustainable Management Framework for Greenshell Mussels

The A+ programme monitors and guides improvement of farming practices and protocols within the Greenshell mussel industry of Aotearoa.

The aim of A+ is to achieve the following:

- Facilitate best environmental practice through research, risk management, ongoing monitoring and reporting, and promotion of continuous improvement.
- Promote a culture of environmental stewardship that supports and enhances clean waters and functioning natural ecosystems.
- Communicate environmental and social performance to inform and allay any community concerns and to increase support for the industry.

The A+ programme requires annual self-reporting and participation in 3 yearly independent verification. A+ includes an objective that *‘marine mammals, seabirds, and other wildlife are not adversely affected by mussel farm operations’* and requires the following management practices and indicators:

- All marine farmers are aware of and comply with the Marine Mammal Regulations 1992 with respect to vessel speeds, approach angles and proximity to marine mammals.
- All vessels servicing marine farms display in a position visible to the skipper, the DOC sticker setting out vessel rules in relation to approaching marine mammals.
- Additionally, all vessels should abide by the rules detailed in the DOC guidance ‘Sharing our Coasts with Marine Mammals’¹¹.
- Systems for staff awareness and training as well as recording and reporting marine wildlife incidents have been implemented.

A+ also includes an objective to *‘minimise marine debris and effects of non-organic waste on the natural environment’* and requires the following management practices and indicators:

- ‘Maintain all structures to ensure that they are restrained, secure and in working order at all possible times so as not to create a navigational hazard.
- Best practice methods to reduce non-organic waste are implemented e.g., means for collection of rope ties during seeding and spat harvest, movement to clamp systems etc.
- Evidence of staff training to reduce waste to the marine environment’.

¹¹ <https://www.doc.govt.nz/sharingcoasts> or equivalent guidance provided by DOC

Participation in A+ is a condition of consent.

10.0 Specific Protocols

The following sets out the protocols which have been recommended by Anemone, SLR, Wildlands, Pisces Consulting and Blue Planet Marine with an indication of how they will be achieved and confirmation that the proposed management practices are efficacious, practical, and implementable.

10.1 Specific Marine Wildlife Management Protocols for NWML Mussel Spat Nursery Operation

Effect	Protocol	Implementation
Entanglement	All staff will be trained in all aspects of the marine farm operation that are required to mitigate the risk of entanglement.	1. Staff shall receive training at induction and every 6 months on all the aspects of this MWMP including how to identify and record marine mammals, to minimise interactions and incidents, and to respond appropriately to any marine mammal or seabird interactions or incidents.
	The farm layout will include sufficient spacing between the lines for dolphins to swim between them.	2. The line spacing will be at least 50 metres and the dropper spacing will be at least 600 mm apart. The 50 metre spacing ' <i>provides sufficient space for dolphins and killer whales to safely swim through the farm</i> '. ¹²
	The rope specifications shall be sufficient to ensure structural integrity and avoid breakage.	3. The warps will be 44 mm Durashield (or equivalent) warps with a breaking strain of 31,000 kg. The backbone will be 40 mm with a breaking strain of 25,000 kg. The catching rope will have a 25 mm core with spat catch fibrillation increasing the diameter to 75 to 80 mm. These specifications are significantly higher than in normal marine farming operations. Where feasible, high-quality UV stabilised rope products will be used on the farm.
	Anchoring will be sufficient to ensure structural integrity.	4. Anchors will be installed by an experienced marine engineer with the use of a drill operating from a surface vessel and with sufficient number of anchors to ensure the farm is permanently fixed in location. The anchors will be drilled to approx. 6-12 metres depth into the substrate (depending on the specifics of the chosen location).
	Anchor warps shall not overlap or cross between blocks.	5. The warp layout will not enable cross over by virtue of the proposed layout. The line lengths are 300 metres. The warp length will be between 60 to 80 metres depending on the water depth. The warp ratio will be in the order of 2.5:1. The spacing between lines will be at least 50 metres.
	Warps and backbones will have adequate tensioning.	6. Anchor warps will be installed by an experienced marine engineer, and hydraulic barge winches will be used at installation and in maintenance

¹² SLR (2023)

		activities to ensure adequate tensioning.
	Spat rope will be self-tensioned with added negative buoyancy.	7. Spat rope will have a lead core, which is self-tensioning with negative buoyancy as well as acting as a sonar deflection mechanism.
	Infrastructure will be regularly inspected and maintained to ensure structural integrity including that ropes and lines remain adequately tensioned and secure.	8. The inspection schedule will be as follows: a) Fortnightly surface maintenance inspections to visually identify damage to backbone lines and floats and any loose or unsecure components. b) At least annual underwater maintenance inspections to visually check anchor warps and other submerged components for chafing and any other damage. c) Additional visual and underwater maintenance inspections after any significant storm event d) Annual visual check for wear on floats 9. A record of infrastructure inspections will be kept including where any remedial work is indicated and when it has been carried out.
	Farm structures and equipment shall be maintained to avoid free, loose, or floating lines or ropes capable of causing entanglement.	10. Any free, loose, or floating ropes will be removed or fixed as soon as they are noticed. Any other maintenance issues identified during routine operations or targeted inspections will be remediated as soon as is practically possible. 11. Staff training will place high importance on immediately attending to any free, loose or floating ropes.
	Artificial lighting will be minimised to that necessary for navigational safety.	12. The navigational lighting system will be established in accordance with the requirements of Maritime New Zealand and/or the Harbour Master and checked by a suitably qualified marine scientist prior to implementation. 13. Farming and maintenance operations will be restricted to daylight hours unless unforeseen operational or safety requirements prevail.
	All staff will be aware of, and follow where required, an emergency disentanglement protocol.	14. The MWMP will include an emergency disentanglement protocol developed by a suitably qualified marine scientist as set out in Section 11.0. 15. All marine mammal or seabird entanglement incidents regardless of outcome will be recorded and reported immediately to DOC.

Marine debris	All farm vessels shall have covered waste bins and debris retrieval nets onboard.	16. Staff shall receive training at induction and every 6 months on all the aspects of this MWMP including the importance of retaining all waste onboard, ensuring infrastructure is secure and maintained and avoiding loss of non-organic material to the marine environment. 17. NWML will operate under an Operational Management Plan (OMP) which replicates the requirements to mitigate and, if necessary, remedy, loss of marine debris. Staff will receive OMP training in conjunction with training on the MWMP.
	All waste shall be collected, retained onboard and disposed of at an appropriate facility onshore.	
	If any loose debris does enter the water around the marine farm, it must be promptly retrieved.	
	All structures will be maintained to ensure that they are restrained, secure and in working order at all possible times so as not to create a navigational hazard or pose a risk to marine mammals or seabirds.	
	Retrieval of any lost farm structures (e.g. anchors, lines, droppers, ties, or floats) from the seabed, water column or foreshore shall occur as soon as practicably possible.	
Vessel strike	Vessel operators shall maintain vigilance for marine mammals and seabirds during all on-water operations.	18. The following steps will be taken to ensure that all vessel protocols are followed: a) All staff shall receive training at induction and every 6 months on all the aspects of this MWMP including how to identify and record marine mammals, to minimise interactions, and to respond appropriately to any interactions. b) A vessel transit map shall be created that identifies any rock stacks, islets or islands used by seabirds which require a 100 m buffer for transiting. c) A copy of the key MWMP vessel protocols, including clear identification of vessel speeds, will be provided in easily accessible format on all marine farm vessels. In particular, the maximum allowable vessel speed of 12 knots for all vessels will be clearly displayed along with speed restrictions that apply within 300 m of marine mammals. d) Any vessel interactions with marine mammals will be recorded and reported to DOC in accordance with the reporting protocols. e) All vessels will display the DOC sticker that sets out vessel rules in relation to approaching marine mammals.
	All staff will be aware of the need for increased vigilance from June to November for southern right whale and humpback whale migrations and from November to February for Māui dolphin breeding season. A dedicated staff member will have the responsibility to provide additional vigilance to support the vessel operator during these times.	
	Vessel operators shall endeavour not to disrupt the normal movement or behaviour of marine mammals.	
	Care shall be taken not to separate any individuals from a group, or scatter any groups of marine mammals and no vessel shall proceed through a pod of dolphins.	
	No sudden or repeated change in the speed or direction of any vessel shall occur in the vicinity of marine mammals (except in emergency circumstances).	
	No vessel shall cut off the path of a marine mammal.	
	Vessels shall not exceed 12 knots at any time including moving	

	between the farm and the shore. Vessels less than 300 m from a marine mammal shall move at a constant slow (no wake) speed. In the case of dolphins, vessels may exceed this speed in order to outdistance the dolphins but must increase speed gradually and shall not exceed 10 knots within 300 metres of any dolphin. No vessel shall approach within 50 m of a whale, and if a whale approaches a vessel, the vessel shall make every attempt to keep out of the path of the whale and to maintain a minimum distance of 50 m. No vessel shall approach within 200 m of a whale with a calf. Vessels shall use routes that avoid rock stacks, islets and islands used by shags, terns and gulls for roosting by at least 100 m. All staff shall be aware of and comply with the Marine Mammal Regulations 1992 with respect to vessel speeds, approach angles and proximity to marine mammals. All vessels shall display in a position visible to the skipper, the DOC sticker setting out vessel rules in relation to approaching marine mammals. All vessel operators shall be aware of, have access to, and abide by the rules detailed in the DOC pamphlet 'Sharing our Coasts with Marine Mammals'.	f) All vessel operators will be aware of, have access to, and abide by the rules detailed in the DOC pamphlet 'Sharing our Coasts with Marine Mammals'¹³ (included in Appendix One). g) DOC staff will be welcome to accompany the marine farm operators on board a vessel to view the implementation of the MWMP protocols. 19. During the period when increased vigilance is required, the Farm Manager will ensure there are sufficient staff on board to appoint one as the dedicated marine mammal watchperson. This staff member will: a) Maintain a log of the days and times that they are undertaking the dedicated marine mammal role. b) Whilst on farm, implement a requirement for hourly scans with naked eye and good quality binoculars during the months of June to February; and c) Whilst in transit, maintain a dedicated watch for marine mammals paying particular attention to the presence of Māui dolphins during the breeding season months (November – February).
Underwater noise	Underwater noise will be minimised during the construction of the farm and during farm operations. To ensure minimal underwater noise levels resulting from farming activities, regular maintenance will be conducted on all farming equipment and vessels. Proper upkeep measures will be implemented to minimise the generation of underwater noise and vibrations.	20. Staff shall receive training at induction and every 6 months on all the aspects of this MWMP including the importance of minimising underwater noise. 21. In addition to the farm infrastructure inspection and maintenance schedule all vessels will be inspected and maintained at least annually and more frequently if unusual noises are detected. 22. A record of vessel inspections will be kept including where any remedial work

¹³ Or any relevant updates

	All noise suppression equipment on vessels, including mufflers and ventilation baffles, shall be consistently maintained in optimal working condition.	is indicated and when it has been carried out.
Lights	Navigation lights will be flashing or rotational lights rather than constant lights to reduce the potential for disorientation of seabirds.	23. NWML will provide evidence to WRC and DOC that the navigation lights meet this requirement once they have been installed.

Table 8 Marine wildlife protocols

11.0 Emergency Disentanglement Protocols

DOC have developed a Handling and Release Guide for protected species interactions within New Zealand fisheries¹⁴. The protocols set out are relevant for the NWML operation and will be followed. Specific protocols for marine mammals are set out below. The guide is included in **Appendix Two** for reference.

11.1 Marine Mammals

Responding to a marine mammal entanglement, particularly of larger animals, holds significant risk and is a potentially dangerous task. Human safety is of the utmost importance and should always be considered first before attempting to implement the following procedures. Persons should never enter the water to free an entangled mammal and never attempt to free a mammal alone. There should always be at least two people present in case help is required.

DOC Te Rapa office (0800 275 362) or 0800 DOC HOT (0800 362 468) should always be called immediately upon sighting any live or dead entangled marine mammal. Staff will need to pass on the location (GPS coordinates), number and species of animals observed and any details of the potential or actual entanglement. Specific advice should be sought from the DOC marine mammal disentanglement team.

NOTE – In the event of observing the entanglement of a live whale or dolphin, immediate action may be required in advance of seeking expert advice from the DOC marine mammal disentanglement team. For example, if an entangled mammal is unable to easily reach the surface to breathe, it may be possible to adjust the farm structure to allow it to reach the surface to breathe. If possible, and without endangering human safety, it may be possible to release the tension in such a manner that the mammal can reach the surface to breathe. This may allow the mammal to survive until a more, complete and planned disentanglement can be undertaken.

11.1.1 Smaller Mammals (e.g. Dolphin, Seal)

Any disentanglement should only be attempted from the farm itself or a vessel (i.e. do not enter the water). If in doubt about how to release the animal, contact DOC on the numbers above in Section 11.

The procedure for smaller mammals is to:

1. Release the animal from a line or other obstruction immediately without entering the water;
2. Ensure that no line or object remains attached to the animal upon release (if line etc. needs to be cut);
3. Ascertain whether any injuries have occurred either to the entangled animal or the releaser; and
4. Collect photos and videos of the entanglement and any injuries prior to release to allow a full understanding of the incident and so that any possible improvements can be identified.

11.1.2 Larger Mammals (e.g. Whales)

The procedure for larger mammals is:

1. Entanglement at the surface (i.e. able to breathe)

In the event that a larger mammal, such as a pilot whale or humpback whale, is entangled at the

¹⁴ <https://www.doc.govt.nz/globalassets/documents/conservation/marine-and-coastal/marine-conservation-services/resources/resources-for-fishers/csp-protected-species-handling-and-release-guide-july-2024.pdf>

surface (hence, is able to breathe), DOC has a trained team that can respond to the entanglement. In this case, it is important that DOC is contacted immediately on the following number (0800 DOC HOT line; 0800 362468). Note that the entanglement response teams are based in Kaikoura and the Bay of Islands, so any response can take several hours. However, this is not normally an issue as it is necessary for a live animal to tire over several hours before you can get close enough to attempt cutting it free.

2. Entanglement at depth (i.e. unable to breathe)

If the animal is at entangled at depth and unable to reach the surface for a breath, there is usually little choice but for the marine farm operator to cut the necessary lines to free the animal. When cutting lines, it is recommended they are cut into small sections (e.g. predator nets is cut into small panels) to increase the chance that the animal can free itself of the cut section(s). If the animal is surfacing to take breaths, no attempt should be made to cut it free due to the danger it poses (i.e. potential to overturn a vessel).

NOTE - It may be necessary to use a vessel with a HIAB (e.g. crane) to assist with a rescue attempt involving a large whale in a farm, however, the DOC team will advise.

11.2 Seabirds

Staff will follow the process set out in the Handling and Release Guide in **Appendix Two**.

11.3 Dead Marine Wildlife Incident Protocols and Procedures

The farm manager will contact DOC as soon as possible and, no later than 24 hours after, any dead marine animal or seabird is discovered on the farm.

As soon as possible and within 24 hours of discovery of a dead marine animal, the farm manager will document the entanglement, including photographs before the carcass is recovered. Specific advice should be sought from the DOC marine mammal disentanglement team. Any entangling materials must be retained for later identification.

Disposal must occur when reporting is complete, and permission has been granted by DOC. In some circumstances DOC may require a necropsy to be conducted. If so, arrangements for transport to an appropriate necropsy facility must be determined in consultation with DOC on a case by case basis. Disposal advice and permission must be sought from DOC.

Notification of relevant iwi is the responsibility of DOC.

12.0 Reporting and Response

12.1 Incident Reporting

Any unusual marine mammal incidents (e.g., injuries, mortalities, entanglements, etc.) will be reported to DOC in accordance with the Marine Mammal Protection Act 1978. Reporting requirements include:

1. At least one photograph and all video will be taken of the affected mammal.
2. The following details should be included in the incident form:
 - a. Date
 - b. Time

- c. Weather conditions (visibility, sea state, etc)
 - d. Farm location (as specific as possible, i.e. coordinates)
 - e. Farm activity (if transiting note speed)
 - f. Species (e.g. dolphin, whale, seal) - common names, and if possible, the species names
 - g. Description of animal (e.g. size) and location and types of any injuries
 - h. Full description of circumstances (including behaviour of the animal before, during and after the incident, reasons for entanglement if relevant, where the injury of entanglement has occurred on the animal, actions taken and the outcome)
 - i. Ensure photos or video are taken as often as possible with each step in the process
 - j. If dead, note the degree of decomposition and follow the protocol.
3. Incidents involving Māui or Hector's dolphins will be reported to DOC immediately.
 4. Other marine mammal incidents will be recorded in detail on the DOC marine mammal sighting system <https://www.doc.govt.nz/marine-mammal-sighting-form>, and/or using the form set out in **Appendix Three** and sent to DOC within 24 hours.
 5. NWML will respond to any unusual marine mammal incidents including any indicators of concern as set out in Section 14.

12.2 Other Reporting

Other record keeping and reporting will be as follows:

1. Collated marine mammal sightings records shall be sent at quarterly intervals to DOC or more frequently if requested.
2. NWML will report any seabird entanglements, regardless of outcome to DOC.
3. Comprehensive records of regular maintenance and training activities will be kept current and made available for review by WRC or DOC upon request.
4. Additional reporting will be carried out as recommended by a suitably qualified and experienced marine scientist during operation of the activity.
5. An Integrated Stage One Marine Mammal Monitoring Report will be prepared in accordance with Section 12.4 before NWML seeks to proceed to Stage Two.

12.3 Response to Indicators of Concern

If an indicator of concern as set out in section 14.1, including an incident, is detected, NWML will:

1. Implement the relevant incident and reporting procedures in this MWMP;
2. Notify DOC and WRC;
3. Obtain advice from a suitably qualified and experienced marine mammal expert; and
4. Implement any additional monitoring, mitigation, operational restriction or review recommended by that expert before the relevant activity continues or the next stage proceeds.

For Māui dolphin, any actual or probable farm related injury, entanglement or mortality will be treated as a serious indicator of concern and NWML will:

1. Cease operations;
2. Immediately notify DOC and follow all instructions;
3. Obtain advice from a suitably qualified and experienced marine mammal expert; and
4. Implement any additional monitoring, mitigation, operational restriction or review recommended by that expert in consultation with DOC.

12.4 Integrated Stage One Monitoring Report

Before Stage Two commences, NWML will prepare an Integrated Stage One Marine Mammal Monitoring Report.

The report will be prepared, or reviewed, by a suitably qualified and experienced marine mammal expert. It will summarise and assess the baseline and Stage One monitoring results, including passive acoustic monitoring, visual observations, sightings, interactions, incidents and any indicators of concern.

The report will include:

- A summary of monitoring undertaken, including monitoring methods, locations, timing, effort and any limitations.
- A summary of marine mammal detections and sightings, including species, timing, location, numbers where observed, behaviour where practicable, and any relevant seasonal or spatial patterns.
- A summary of any observed or suspected interactions with farm structures or vessels, and any observed or suspected entanglement, injury or mortality.
- An assessment of whether marine mammal occurrence, behaviour, interactions and incidents are consistent with the effects anticipated in the marine mammal assessment and peer review.
- An assessment of the effectiveness of the mitigation measures and operational protocols in this MWMP.
- A summary of any indicators of concern and the actions taken in response.
- Recommendations for any changes to monitoring, mitigation measures, operational procedures or reporting for Stage Two and any later stage.
- Advice on whether Stage Two would create any unacceptable risk of adverse effects on marine mammals.

NWML will provide the report and the marine mammal expert's advice to WRC before seeking confirmation to proceed to Stage Two. The report will also be provided to DOC.

13.0 Staff Training

All staff and contractors shall receive training at induction and every 6 months on all the aspects of the MWMP including how to identify and record marine mammals, the range of factors which are important to minimise interactions and the protocols to be followed in response to any interactions.

Staff and contractors will also receive training at induction and every 6 months on all aspects of the Operational Management Plan (OMP) including how certain OMP protocols relating to the integrity and security of structures relate to the requirements of this MWMP.

Protocols of specific importance are as follows:

- Key actions to minimise interactions with marine mammals, including that staff are not permitted to attract wildlife to farm sites (e.g. no fishing or feeding wildlife is permitted);
- Key actions to minimise incidents with marine mammals, including the requirement to immediately attend to any free, loose or floating ropes to reduce the risk of marine mammal entanglement;

- How to respond appropriately to any marine mammal interaction or incident, including awareness of the Emergency Disentanglement Procedures and Health and Safety protocols necessary for dealing with live or dead marine mammals;
- Awareness of and mandatory compliance with the Marine Mammal Regulations 1992 with respect to vessel speeds, approach angles and proximity to marine mammals, and any additional NWML procedures for safe operation of vessels around marine mammals (including maximum 12 knot speed limit for work vessels);
- Awareness of the need for increased vigilance from June to November for migrating southern right whales and humpback whales, and from November to February for Māui dolphins with calves, including the requirement for a dedicated staff member to provide additional vigilance to support the vessel operator during these times;
- How to identify, record and report marine mammal sightings, interactions and incidents, including reporting timeframes;
- Importance of retaining all waste onboard, ensuring infrastructure is secure and maintained, including OMP training; and
- Importance of minimising underwater noise.

Throughout the training material, care will be taken to ensure the correct use of the terms ‘interaction’ and ‘incident’ in keeping with the FNZ (2021) definitions set out in section 1.0 above.

14.0 Marine Mammal Monitoring

14.1 Purpose

Marine mammal monitoring is an important component of this management plan. This section sets out the monitoring NWML will undertake to:

- Establish a baseline of marine mammal occurrence before installation of the first structures at Site C;
- Monitor marine mammals during operation the activity including identification of any indicators of concern.
- Inform, through expert review, whether any change to monitoring or management is required during operation of the activity including before each stage proceeds.

This programme gives particular attention to Māui dolphin, recognising that the proposed sites lie within the subspecies’ core range and that validated sightings have been recorded in the vicinity of all three sites.

14.2 Indicators of Concern

The following are indicators of concern and will require reporting and response as set out in section 12.

- Any injury, entrapment, entanglement or mortality involving a marine mammal;
- Repeated interactions with farm structures that create a credible risk of incident;
- Repeated observations suggesting avoidance, displacement or other behavioural change that a marine mammal expert considers ecologically meaningful; and
- Any monitoring result that, in the opinion of the marine mammal expert, indicates effects may be greater than anticipated, particularly for Māui dolphin.

14.3 Monitoring Framework

The monitoring programme has four components:

Component	Purpose	Details
Baseline monitoring	The purpose of the baseline programme is to establish the seasonal and spatial pattern of cetacean occurrence across the project area, including relative detection rates for Māui dolphin and other vocalising cetaceans.	- Baseline monitoring will be undertaken for 12 months before installation of the first structures at Site C as part of Stage One. - A suitably qualified and experienced marine mammal expert will provide advice regarding the need for baseline monitoring to be undertaken before installation of structures for any further stages. - Baseline monitoring will include passive acoustic monitoring with servicing, download and redeployment at approximately 3-month intervals.
Stage One monitoring	The purpose of Stage One monitoring is to identify whether marine mammal occurrence, behaviour, interactions or incidents remain consistent with the effects anticipated in the marine mammal assessment and peer review.	Passive acoustic monitoring will continue during Stage One at Site C and will be supported by visual observations during vessel transits, installation activities and routine operations, together with recording of all sightings, interactions and incidents.
Stage One review	The purpose of the review is to: Determine whether the monitoring results indicate that any change to monitoring, mitigation or operations is required, and whether it is appropriate to proceed to Stage Two.	- Before Stage Two commences, baseline and Stage One monitoring results will be assessed in an Integrated Stage One Marine Mammal Monitoring Report prepared, or reviewed, by a suitably qualified and experienced marine mammal expert in accordance with Section 12.2A. - The review will advise: - Whether monitoring indicates that adverse effects are being avoided, remedied or mitigated to the extent required by the consent. - Whether occurrence, behaviour, interactions or incidents are consistent with the effects anticipated in the marine mammal assessment and peer review. - Whether any changes to monitoring, mitigation measures or operations are required. - Whether progression to Stage Two would create any unacceptable risk. - What marine mammal monitoring is required for Stage Two and any later stage.
Stage Two and Stage Three monitoring	The purpose of Stage Two and Stage Three monitoring is to identify whether marine mammal occurrence,	The monitoring that is recommended as part of the Stage One review (and any future reviews) will form the monitoring programmes for Stages Two and Three.

	behaviour, interactions or incidents remain consistent with the effects anticipated in the marine mammal assessment and peer review.	
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Table 9 Monitoring framework

14.3 Monitoring Methods

14.3.1 Passive Acoustic Monitoring

Underwater passive acoustic monitoring (PAM) will be the principal baseline monitoring method and will be undertaken prior to and during Stage One.

The PAM methodology, equipment specifications, deployment locations, servicing intervals, analysis methods and reporting requirements will be set out in a project specific acoustic monitoring protocol prepared by suitably qualified experts. An example protocol is provided in **Appendix Seven**.

Acoustic analysis will, at a minimum, report Māui dolphin detections by site and season, detections of other cetaceans where reliably identifiable, and any relevant temporal patterns or changes between baseline and Stage One.

One potential limitation of PAM is that it only detects marine mammals (and other species) that vocalise and so quiet or non-vocalisation fauna will not be detected. However, all available data provides good evidence that most marine mammals vocalise frequently and almost constantly, especially dolphins (including Māui dolphin), which are the main target species for this monitoring. Therefore, this is not considered to be a limitation for the use of this technique.

14.3.2 Visual Observations

Visual observations will supplement PAM during Stage One and will be undertaken during vessel transits; installation works and routine site visits where practicable.

Visual observations will record sightings including details of species observed, numbers of individuals (including separate counts of juveniles), and other details as set out in Section 12 above.

All staff will be trained on the importance of and format for reporting sightings.

A marine mammal sighting form is provided in **Appendix Three**.

14.5 Marine Mammal Monitoring Review

The monitoring components of this MWMP will be reviewed as part of the Stage One review and will then set out monitoring requirements for Stage Two and any later stages. The monitoring review will take into account any reporting and response of any marine mammal incidents or indicators of concern identified during previous monitoring or operations.

15.0 Seabird Monitoring

It is important to understand which bird species may utilise the area of proposed operations. A log of seabird observations and interactions during spat mussel maintenance and harvesting will be maintained.

This will include the following:

- A short survey of birds within the site recorded when a vessel approaches the spat farm during construction, maintenance and spat harvest.
- The survey to include interactions of birds roosting on structures, buoys and markers, or observed in the water within approximately 100 metres of the farm.

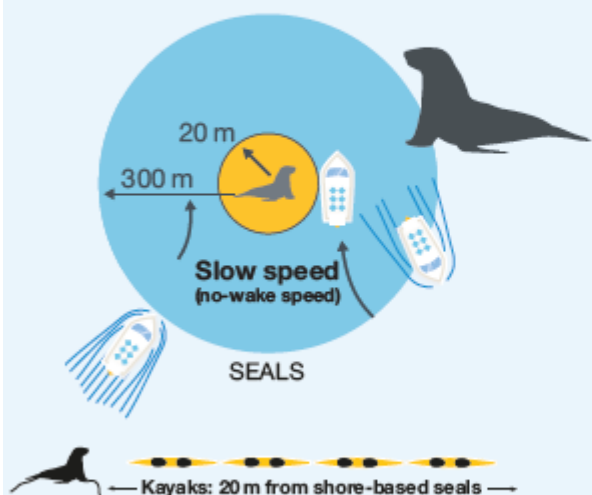
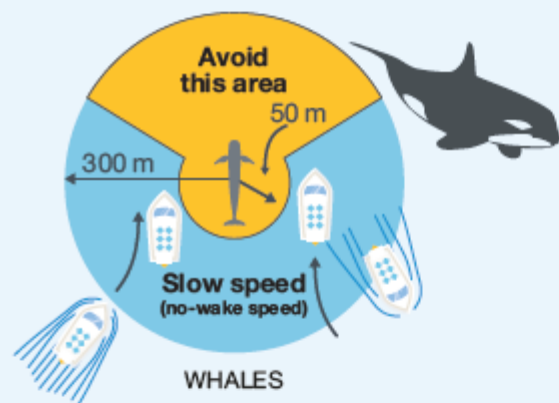
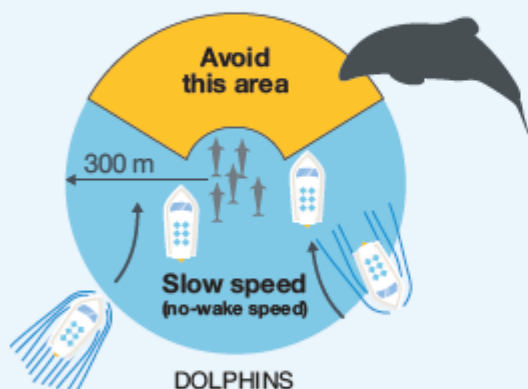
A seabird sighting form is provided in **Appendix Four**.

16.0 Review

The MWMP will be reviewed as recommended by a suitably qualified and experienced marine scientist. For the avoidance of doubt, review will occur no later than five years from the finalisation of the MWMP, prior to any additional stages being developed, and earlier if any material changes are made to the operation, or if any indicators of concern are identified.

Ngā tamariki a Tinirau

Simple rules for interacting with MARINE MAMMALS



Te whānau puha, ngā aihe me ngā kekeno – e mātaki ai i tai

Whales, dolphins and seals – sea-based viewing

- Ensure you travel no faster than idle or 'no wake' speed within 300 m
- Make sure there are no more than three vessels within 300 m
- Approach from a direction that is parallel and slightly to the rear. Do not circle the marine mammals, obstruct their path or cut through any groups
- Idle slowly away

Ngā aihe
Dolphins

- Gradually increase speed to outdistance dolphins; do not exceed 10 kn until more than 300 m away
- Do not swim with dolphin pods containing juveniles

Te whānau puha
Whales (including orca and pilot whales)

- Stay at least 50 m away from any whale
- Stay at least 200 m away from any baleen or sperm whale mother and calf
- Do not swim with whales

Ngā kekeno
Seals

- Vessels – stay at least 20 m away from the water's edge where seals may be present
- Swimmers – stay at least 5 m away from the water's edge

Ngā kekeno – e mātaki ai i uta
Seals – shore-based viewing

- Stay at least 20 m away
- Do not get between a seal and its escape route to the sea
- Do not handle seals
- Keep dogs away



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APPENDIX TWO

Handling and Release Guide

For protected species
interactions within
New Zealand fisheries.



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Purpose of this guide

This guide has been designed for fishers to easily access information on the Conservation Services Programme's best practice methods of protected species bycatch handling and treatment.

Fishers are responsible for handling all protected species appropriately in order to maximise the chance of their survival. Mishandling protected species can significantly reduce their chances of survival and have long term impacts on the sustainability of the species.

Proper handling practices also reduce the risk of injury to crew. This guide provides information on:

- The correct and incorrect handling methods.
- The main protected species groups caught in New Zealand fisheries.
- Measures to increase crew safety.



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Handling principles

Recording all protected species interactions is a legal requirement in New Zealand fisheries, it is not illegal to accidentally capture protected species while commercially fishing, but it is illegal to fail to report a protected species capture.

Principle 1

Safety of the boat and its crew are paramount.

Crew should always put their personal safety first when handling protected species. Ensure appropriate personal protective equipment (PPE) is used to protect against things such as cuts, bites and stings.

Principle 2

All reasonable steps should be taken.

Every care should be taken to release protected species alive. Take steps to reduce stress to the animal and handle with care to minimise further harm or injury.

Principle 3

Return protected species to sea.

Operators are expected to take all reasonable steps to ensure that bycatch is returned to the water as quickly as practicable and in a manner that does not reduce the chance of survival.

Principle 4

Retaining protected species.

With-holding any part of a dead protected species is an offence under the Wildlife Act 1953. Unless a fisheries observer requires it, the entire animal must be returned to sea.

Principle 5

Record all protected species interactions.

Record all protected species interactions including vessel impacts (seabirds that impact upon the vessel and are unable to leave of their own accord). Fisheries observers file their own reports on protected species interactions and this does not revoke the vessels obligation to report captures.

Principle 6

Know your trigger limits.

Notify your liaison officer within 24 hours if a trigger breach occurs.

Best Practice Handling

This section outlines the best practice handling procedures for protected species fishers may encounter.

It is important to handle non-retained species carefully to ensure that they have the best chance of survival post capture. Proper handling practices also reduce the potential risk of injury to crew members.

Contents

Seabirds	1
Seals and Sealions	4
Dolphins and Whales	6
Sharks	8
Rays	10
Turtles	12
Sea Snakes	14



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THINK FIRST: Safety Around Seabirds

Large birds can inflict a serious bite, it is recommended to wear gloves and eye protection if handling seabirds.

Immobilise the beak and feet with a firm hold to avoid bites and cuts.

Hold birds at waist-height, well away from your face.



immobilise the feet and beak

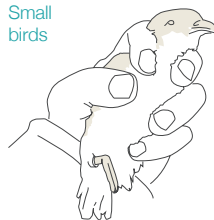
All seabirds in New Zealand are protected except the black backed gull. The risks to seabirds are highest where there is overlap between fishing operations and large numbers of foraging seabirds.

If a seabird is noticed on a line, stop the vessel to reduce drag on the line. When the bird is within reach, gently bring it on board by hand or using a net. Do not pull the bird up on the line as this may cause further injury. Do not handle birds by wingtips as it can break the wing.

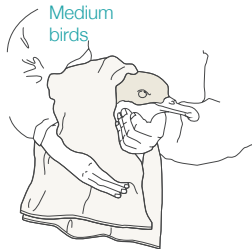
With one crew member holding the bird, another crew member can carefully detach the fishing gear from the animal.

Small birds: e.g. storm petrels, diving petrels. Bird can be held in one hand with its back in the palm of the hand and the neck between index and middle fingers.

Small birds



Medium birds



Medium sized birds: e.g. petrels, shearwaters. Hold the body of the bird with both hands with wings folded. If the head also needs to be restrained hold the bird by the neck or bill without covering nostrils.

Large birds: e.g. albatross. Hold the body and folded wings in your arms or crouch over the bird holding it in place with your legs. Restrain head by holding the neck or bill without covering nostrils.

Penguins: Hold the penguin firmly by the neck. Put the penguin under your arm to hold the flippers in.

Gannets and shags: Hold back of head firmly and maintain grip to avoid bites. Hold the bird, with wings folded, against body. Do not hold the bill shut.

Large birds



Penguins



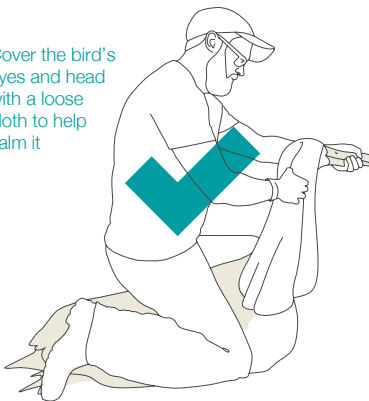
If a live seabird is landed on the vessel

- Once a seabird is on board, move slowly and quietly around it.
- Keep the bird's bill away from your face to avoid injury.
- Cover the bird's eyes and head with a loose cloth to help calm it, making sure to keep nostrils exposed. For gannets, which do not have nostrils, allow the bill to stay slightly open.
- Fold wings into resting position and hold gently but firmly to the bird's body. Avoid applying pressure to the breast as this may cause damage. Never restrict the bill or legs with tape or bands.

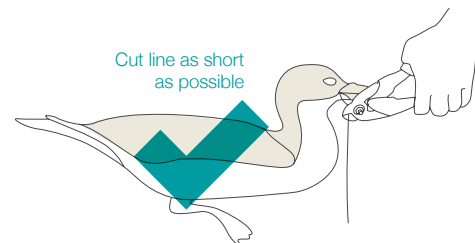
How to remove a hook

- With one crew member holding the bird, another crew member can detach the fishing gear from the animal.

Cover the bird's eyes and head with a loose cloth to help calm it

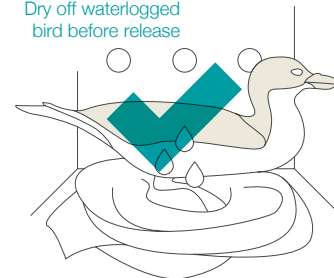


- Exposed hooks in bills or neck can be snipped off. Flatten the barbs with pliers or cut off barbs with snips if pulling hook back through the tissue.
- If the hook is swallowed, cut the line as close to the mouth as possible. Do not try and pull hook out from inside the bird. Untangle and cut away any line caught around the bird's wings, body or legs.



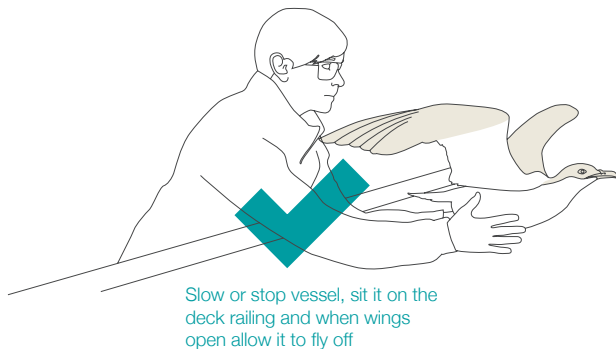
- Waterlogged birds will need to be dried off before release. Dry any excess water off carefully with cloth. Place the bird in a box with air holes in a sheltered area away from sunlight and wind. A towel in the base of the box will aid in absorbing excess water from the bird. Do not place the box in a heated wheelhouse or galley. The animal is safe to release once feathers are dry and it appears alert.

Dry off waterlogged bird before release

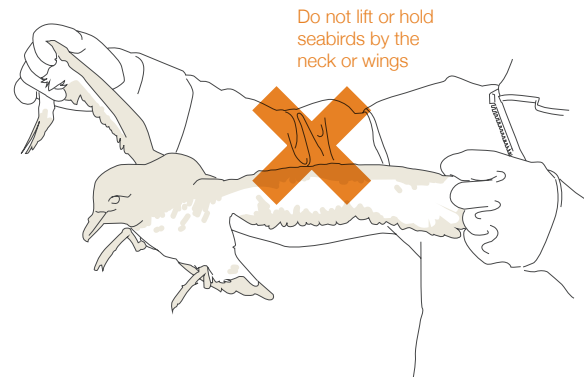


Returning live seabirds to the water

- To **release a bird**, slow or stop vessel, sit it on the deck railing and when wings open allow it to fly off. If it does not fly off on its own, gently lower it over the side of the vessel with a hand net.
- **Record all captures**, noting any leg band numbers present on the animal. If the animal is deceased and is not being returned ashore for necropsy, the leg band should be noted and/or photographed prior to returning the bird to sea.



Incorrect handling



- Do not use gaffs or sharp objects in direct contact with the seabird.
- Do not pull the bird on board by a snood.
- Do not kick, hit, throw or push the seabird harshly, or expose it to other physical trauma.
- Avoid sudden actions and movements that may scare the seabird.
- Do not throw seabirds into the air when releasing.
- Do not lift or hold seabirds by the neck or wings.



THINK FIRST: Safety Around Seals and Sea lions

Seals are fast on slippery surfaces. When cornered they may attack and can bite.

Seal bites can cause severe lacerations and infection. Bites need to be treated thoroughly and medical advice or attention is required.



Seals and sea lions can carry a number of infections diseases which can infect humans. Handling marine mammals should always be kept to a minimum.

Any dead marine mammal returned to the sea must be marked with twine around the upper or lower jaw to avoid double counting if recaptured.

If live animals are landed on deck

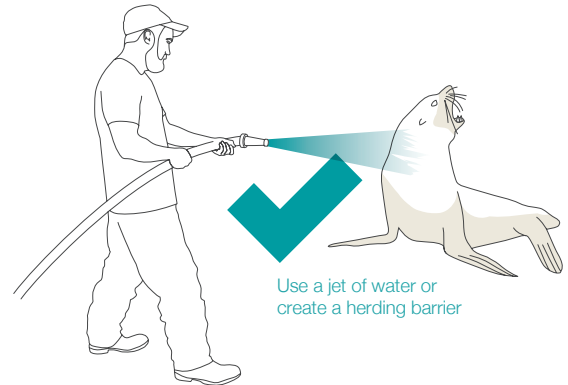
- Seals should be released as soon as they arrive on deck.
- Seals on deck should be restricted to an area close to where they are most likely to escape, and prevented from gaining access to other parts of the vessel.

If live animals are hooked/entangled alongside the vessel

- Seals should be brought as close to the vessel as possible.
- While maintaining a safe distance, if dehooking not possible, cut the line as close to the animal as possible to minimise trailing gear which can be hazardous.

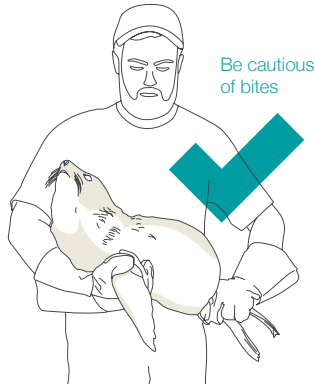
Returning live seals to the water

- A jet from a high pressure hose can force an animal to move. Sheets of timber or pallets can also be used as a moving barrier to herd a seal.
- If the seal is injured it should be returned to the water as caring for injured seals requires specialist skills and keeping it on board may add stress to the animal.



Use a jet of water or
create a herding barrier

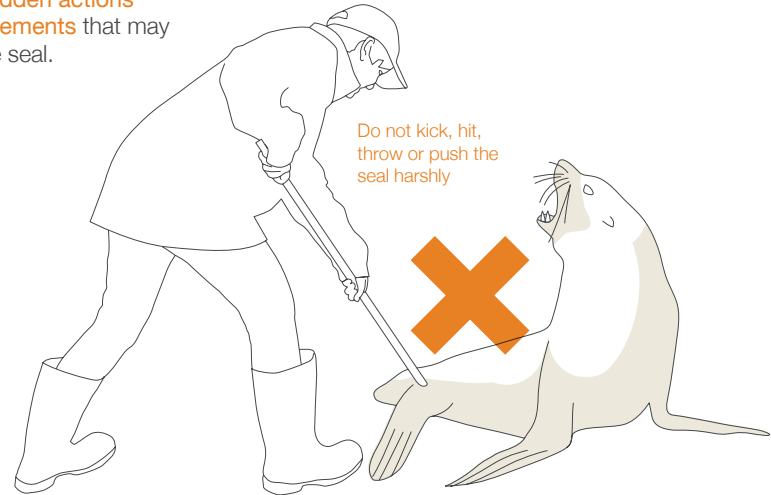
Handling very small animals



- Small seals can be lifted by holding the tail in one hand and a front flipper in the other while supporting the belly of the seal across your arm as depicted in the diagram. If using this method be extremely cautious of bites.

Incorrect handling

- Do not use gaffs or sharp objects in direct contact with the seal.
- Do not kick, hit, throw or push the seal harshly, or expose it to other physical trauma.
- Avoid sudden actions and movements that may scare the seal.



THINK FIRST: Safety Around Dolphins and Whales

Potential injuries include being struck, tripped or bitten by dolphins.

Do not sit on/straddle a dolphin behind the dorsal fin as it has a strong tail and may kick.



There are a range of protected dolphins and whales in New Zealand waters, they can be accidentally captured in a range of fisheries, though predominantly in trawl or set net fisheries.

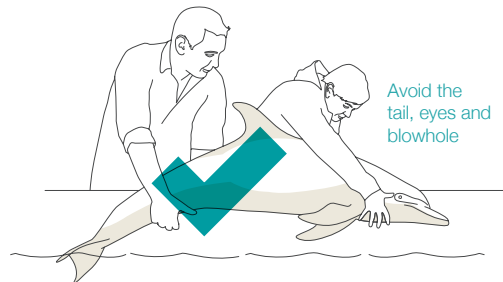
Where possible, release the dolphin or whale from fishing gear without bringing it on deck.

If live animals are landed on deck

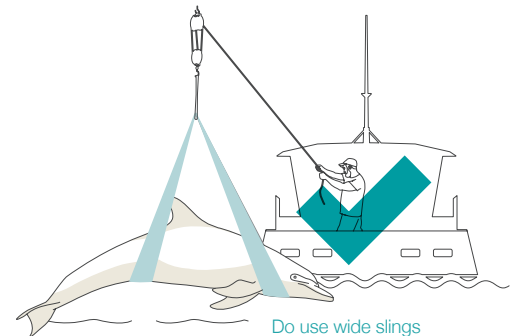
- Dolphins should be released as soon as they arrive on deck.

Returning live dolphins to the water

- Once the animal is untangled from fishing gear, it can be released carefully in to the water.
- Two or more crew members may need to lift the dolphin; hold the dolphin in front of the dorsal fin while pinning the pectoral fins close to your body. Be cautious of the tail, and avoid the eyes and blowhole.



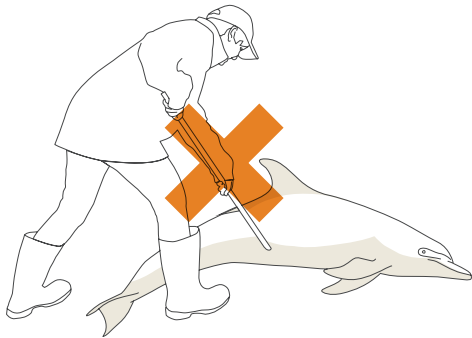
- Alternatively, the animal can be returned to sea using wide slings. Do not use thin cables.
- If the dolphin is injured it should be returned to the water as caring for injured marine mammals requires specialist skills and keeping it on board may add stress to the animal.



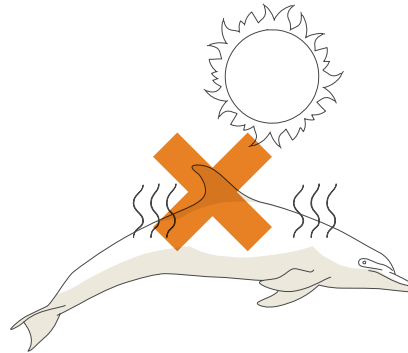
If live animals are hooked/entangled alongside the vessel

- Dolphin or whale should be brought as close to the vessel as possible.
- While maintaining a safe distance, if dehooking is not possible, cut the line as close to the animal as possible to minimise trailing gear which can be hazardous.

Incorrect handling:



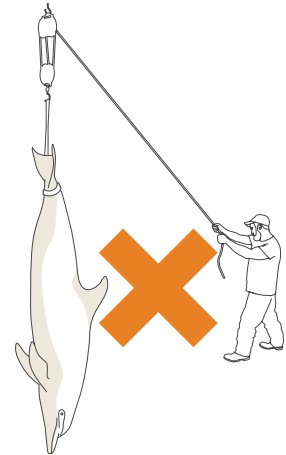
Do not kick, hit, throw, push, use gaffs or other sharp objects to move the dolphin.



Do not cover or pour water in to the blowhole.

Do not leave the dolphin exposed to sunlight for extended periods of time.

Avoid sudden actions and movements that may scare the dolphin.



Do not pick up or drag the dolphin by the tail as this can damage spinal vertebrae.

THINK FIRST: Safety Around Sharks

Treat all sharks as if they are alive, as even sharks which appear to be dead may suddenly lash out and cause injury.

Potential injuries from sharks include being struck, tripped or bitten.



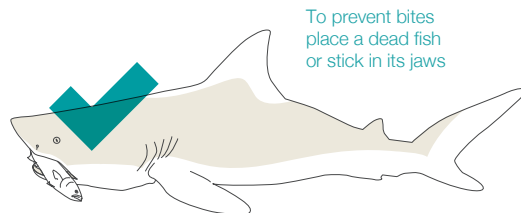
Where possible, avoid working around the jaws of sharks. Put a solid object between a shark's jaws to prevent bites.

There are five protected species of shark in New Zealand waters, they can be accidentally captured in a range of fisheries.

When possible, release the shark from fishing gear without bringing it on deck. This minimises the risk of internal organ damage for the animal.

If sharks are landed on deck

- If it is large and active, let it tire before approaching.
- Treat all sharks as if they are alive.
- Once it is safe to do so, try to return the shark to sea head first and the right way up.
- 1-2 people may be required to handle a shark depending on the size.
- Always attempt to keep the shark in a horizontal position and on their side to reduce the risk of internal damage.



Treating sharks on deck

For line fisheries:

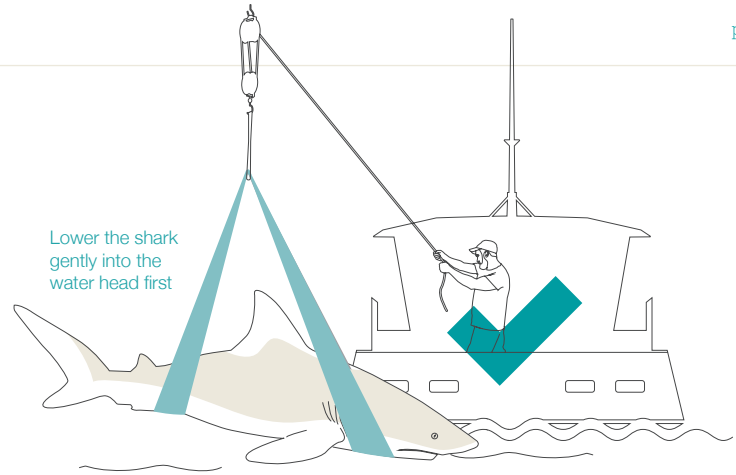
- Hold the shark firmly behind the head and around the tail using gloves and/or a wet towel, and then try to remove the hook.
- If the hook cannot be removed easily the line should be cut as close to the mouth as possible.
- To calm a shark down turn it over onto its back or place a wet towel over its eyes.
- If release needs to be delayed, place a deck hose in the shark's mouth so that water flows through the shark's gills.

If live animals are hooked/entangled alongside the vessel

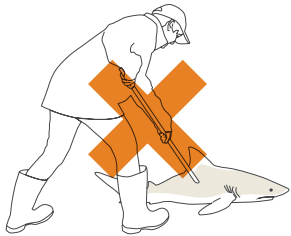
- Leave the shark in the water where possible
- While maintaining a safe distance, if dehooking is not possible, cut the line as close to the hook as possible to minimise trailing gear which can be hazardous.

Returning sharks to the water

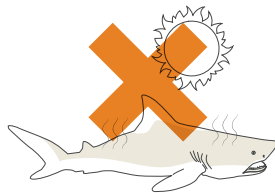
- Lower the shark gently into the water head first and release it.
Do not throw it.
- It may be necessary to face the shark into the current and swim it for a few minutes to aid in recovery before it swims away.
- Small sharks can be released by one person.
- Large sharks may require two people to lift and hold the shark.
- Very large sharks may need to be lifted with the use of wide slings.
- Do not use thin wires or cables.
- Do not release sharks with ropes still attached.



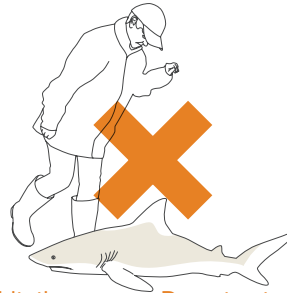
Incorrect handling



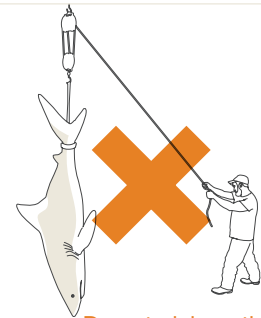
Do not use gaffs or sharp objects in direct contact with the shark. A gaff should be used only to control the line.



Do not leave the shark exposed to sunlight for extended periods of time.



Do not kick, hit, throw or push the shark harshly, or expose it to other physical trauma.



Do not cut off fins or other body parts to remove sharks entangled in gear.

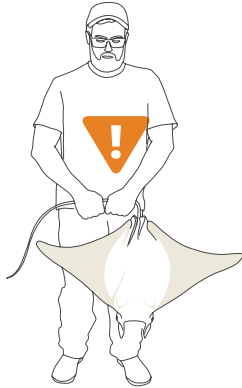
Do not pick up the shark by the tail, head or the gill slits.

THINK FIRST: Safety Around Rays

Potential injuries include being tripped, stings and cuts, and allergic reaction to protective mucous.

Where possible, avoid working around the tail as rays can strike in any direction.

Do not carry rays by the tail.

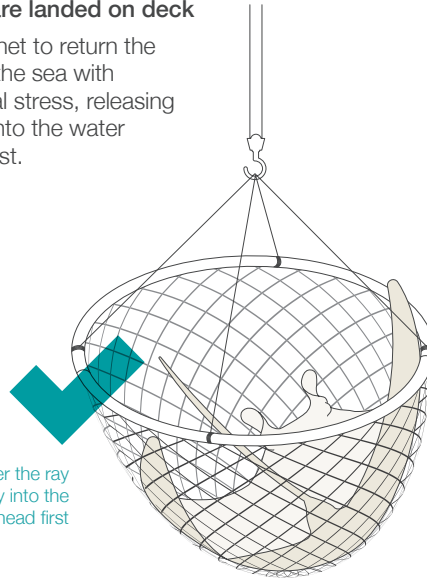


There are two protected ray species in New Zealand waters. Rays are caught in a range of fisheries, though they are most commonly bycaught in purse seine and surface longline fisheries.

Protected rays should if possible be released while the net is still in the water to avoid damage and stress.

If rays are landed on deck

- Use a net to return the ray to the sea with minimal stress, releasing them into the water headfirst.



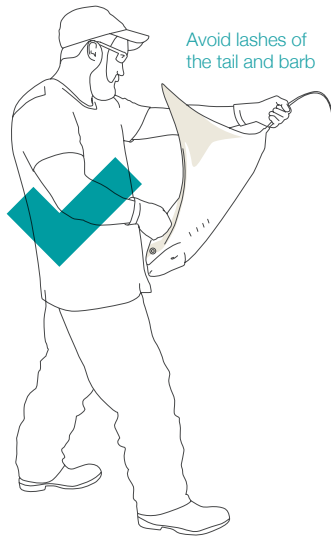
Lower the ray gently into the water head first

Treating live rays on deck

- Keep your fingers away from the mouth and hold the ray away from your body to avoid lashes of the tail and barb.
- For small rays isolate tail and lift by spiracle or snout.
- For medium size rays, isolate the tail and pick up by the snout or the spiracles (the openings behind the eyes).
- For large rays it is best to slide the animal along the deck to a discard chute or scupper. Always watch the tail as rays have the ability to strike in any direction.

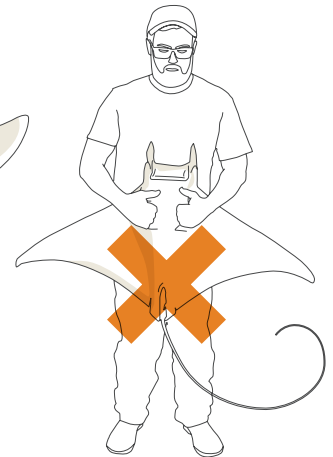
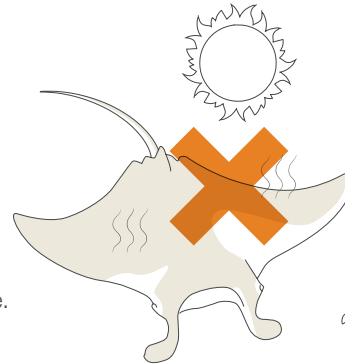
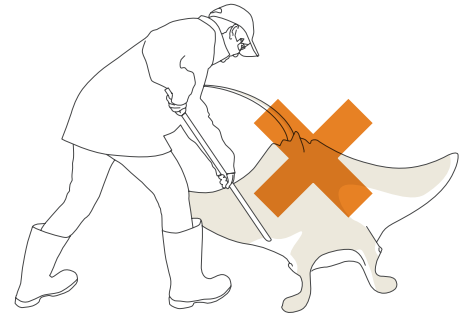
Returning rays to the water

- Lower a small to mid size ray gently into the water head first and release it. **Do not throw it.**
- Large rays can be released by placing them on a piece of net, plastic, or canvas that can be lifted and lowered into the water.



Incorrect handling

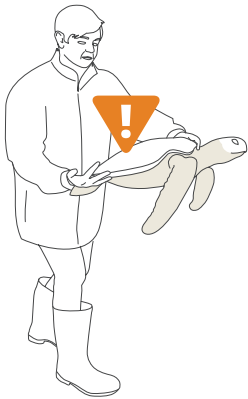
- **Do not use gaffs or sharp objects** in direct contact with the ray.
- **Do not kick, hit, throw or push** the ray harshly, or expose it to other physical trauma.
- **Do not leave the ray exposed to sunlight** for extended periods of time.
- **Do not carry the ray by the tail** to avoid being stung.
- **Do not carry or move the ray by the gill slits.**
- **Do not cut off rays' tail or stings.**
- **Do not cut holes in rays' wings** to put ropes or straps through for release.



THINK FIRST: Safety Around Turtles

Make sure your hands are not where the flippers can crush them against the shell.

Turtles have strong jaws, so keep all fingers, hands and toes away from the turtle's mouth to avoid being bitten.



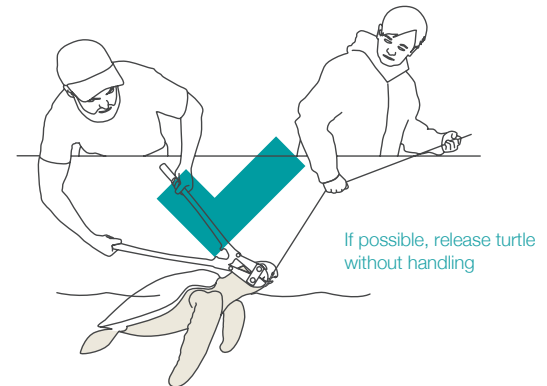
There are five protected species of sea turtles in New Zealand waters, they can be accidentally captured in a range of fisheries, but they are most commonly caught in surface longline fisheries.

If a turtle is too big to be brought on board

- If a turtle is noticed on the line, slow down to reduce trauma to the animal. Carefully bring the animal as close to the vessel as possible without putting strain on the line.
- Use a de-hooker to remove externally embedded hooks. Do not use de-hooker to remove hooks from the mouth, throat or flippers.
- If the hook is visible the shank should be cut with bolt cutters, and if possible the barb should also be cut off.
- If the hook is not visible, cut the line as close as possible to the animal as trailing gear is likely to be fatal.

If a turtle has to be brought onboard

- Use a dip net to bring onboard.
- Take extreme care when handling turtles, they have strong jaws so keep fingers, hands and toes well away from the turtles mouth. Do not position hands where the flippers could crush them against the shell. Lift turtle with one hand at the front of the shell (above head) and the other at the back (near tail). Two crew members may be required to lift large animals.

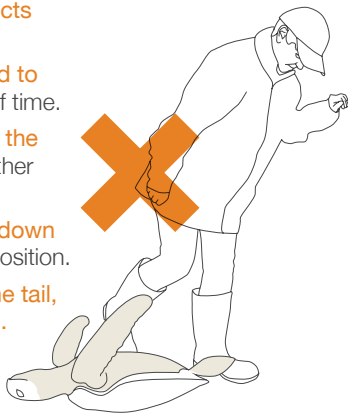


Treating live turtles on deck

- If the turtle appears exhausted or lifeless it will need to be brought on board to be rehabilitated.
- If the animal is inactive it may have water in its lungs. Raise the rear flippers by 20cm for a minimum of 4 hours. A tyre makes a good platform for this.
- Place the turtle in a shaded location and cover in towels wet with saltwater, keeping the nostrils exposed. Keep wet by spraying with saltwater.
- Assess its recovery intermittently using the reflex test: gently pinch the tail of the turtle to gauge reaction.

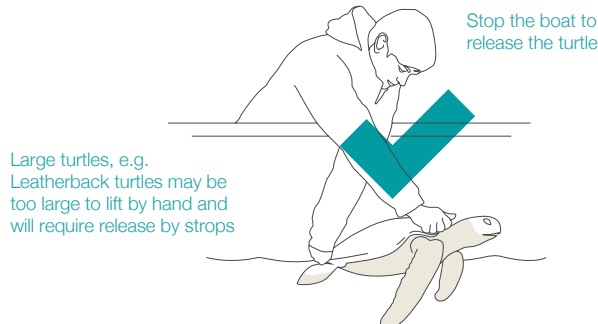
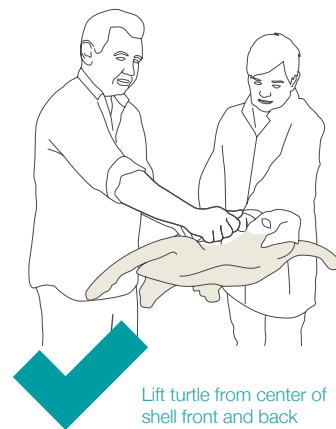
Incorrect handling

- **Do not use gaffs or sharp objects** in direct contact with the turtle.
- **Do not leave the turtle exposed to sunlight** for extended periods of time.
- **Do not kick, hit, throw or push the turtle harshly**, or expose it to other physical trauma.
- **Do not leave the turtle upside down** as they cannot breathe in this position.
- **Do not hold or lift a turtle by the tail, flippers or the sides of its shell.**



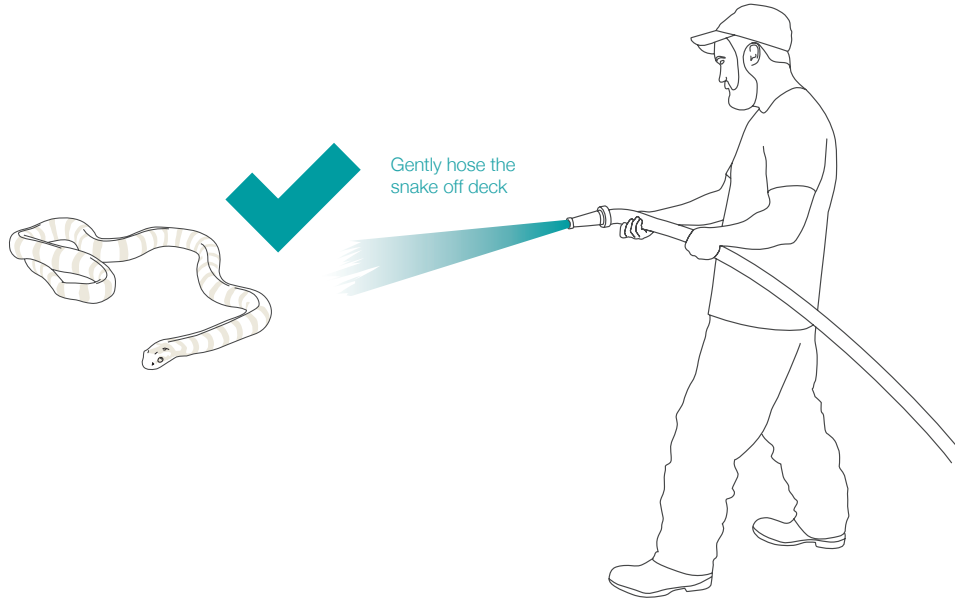
Returning turtles to the water

- Avoid using equipment or carrying them in a way which is likely to inflict cuts, as this can lead to infection and mortality post-release.
- When it has recovered, carefully return the turtle to the water from the lowest point on the vessel releasing the animal head first while the boat is stationary and propeller is not operating. Ensure the turtle is well clear of the vessel before making way again.



THINK FIRST: Safety Around Sea Snakes

Sea snakes are highly venomous and should not be handled, to return a snake to the sea, gently hose it off the deck with water.



APPENDIX THREE

Hector's dolphin <1.6m



Rounded dorsal fin. No beak. Light grey upper. White throat and chest, extending towards tail. Black head and dorsal fin

Dusky dolphin <2m



Short, dark-coloured beak. Dark grey-blue upper. Pale face and belly, light blazes along flank. Two-toned dorsal fin

Common dolphin <2.3m



Sleek body. Prominent beak. Dark upper and dorsal fin. Tan or yellow sides, "hourglass" pattern. Cream or white belly

Bottlenose dolphin <4m



Robust body. Distinctive beak. Rounded forehead. Grey upper body, paler underside

Hourglass dolphin <1.8m



Short beak. Curved dorsal fin. Black upper. White belly and "hourglass" pattern on sides. Rarely seen

Striped dolphin <2.5m



Similar shape to Common. Sleek body. Prominent beak. Dark upper and dorsal fin. Light grey sides. White or pink belly. Thin dark stripes from behind eye

Rough-toothed dolphin <2.8m



Robust body. Cone-shaped head. Large flippers. Dark grey body. Belly, lips and lower jaw white or pink. Rarely seen

Risso's dolphin <4m



Blunt, bulging forehead. No beak. Mouth slopes up. Grey, scarred body, lighter underneath. Long flippers

Southern right whale dolphin <3m



No dorsal fin. Slender body. Black upper. White underside, beak and flipper

Spectacled porpoise <2.2m



Robust body. No beak. Blue-black upper. White lower half and flippers. Black eye patch with white ring. Dorsal rounded (male) or triangular (female). Subantarctic vagrant

Pygmy sperm whale <3.4m



Robust body. Squarish head. Tiny dorsal fin. Tiny, underslung lower jaw. Grey upper, light belly. False gill behind eye

Killer whale <9m



Black upper, white belly and patch around eye. Male dorsal fin very tall and sharp. Flippers rounded

Beaked whale (image sp. Gray's) 3-10m



Multiple spp. Slender body. Prominent beak, often whitish near tip. Small dorsal fin, well back. Some have 2 tusk-like teeth

Pilot whale (image sp. Long-finned) <6.5m



Dark brown/black, white streak behind eye. Long, low dorsal fin. Blunt head, bulging forehead. Often mass strands

False killer whale <6m



Black body. Erect dorsal fin, rounded tip. Rounded head. Often breaches. Can mass strand. Seasonal visitor to NZ

Sperm whale <18m



Large blunt head. Humped ridge along back. Wrinkly skin. Blow angled forward. Shows flukes

Minke whale <9m



Dark blue-grey body, pale scallops on sides. Yellowish baleen. White patch on flipper

Pygmy right whale <6.5m



Dark grey body above, white below. Arched jaw. Has a dorsal fin

Southern right whale <18m



Blackish body, white patches on head & jaws. V-shaped blow. Arched jaw. Callosities on head. No dorsal fin

Bryde's whale <14m



Blue-grey body. Baleen pale at front, black at back. Similar size to Sei but 3 ridges on head

Humpback whale <16m



Blackish body. White underside, esp under tail and flippers. Knobby head. Long flippers. Dorsal fin on hump

Sei whale <18m



Blue-grey body, white under. Black baleen with white fringe. High dorsal fin

Fin whale <24m



Dark grey body, white below. Pale baleen. High dorsal fin. Asymmetrical head colour

Blue whale <30m



Slate blue body. Black baleen. Small dorsal fin, well back. Shows flukes



DEPARTMENT OF CONSERVATION
Te Papa Atawhai
MARINE MAMMAL - LIVE SIGHTING FORM

Sighting ID No. _____
National office database
input only

IMPORTANT: if you see an entangled, stranded or dead marine mammal please call **0800 DOC HOT** (0800 362 468) as soon as possible. Please complete as much of this form as possible and send to: marinemammals@doc.govt.nz or Marine Species & Threats, P0 Box 10420, Wellington 6143

DETAILS

Observer's name: _____ Agency: _____
Vessel details: _____
Address: _____ Ph, email etc: _____
Time of observation: _____ Date of observation: _____

LOCATION

Name/Description/FMA: _____
_____ (with photocopy of map)
Nearest town/area _____ Distance from shore: _____
☐ Map or ☐ GPS reference: _____
What map grid did you use? ☐ NZMS260, ☐ Topo50, ☐ Other: _____
Seen from: ☐ Shore ☐ Boat ☐ Aircraft ☐ Underwater ☐ Other _____

ENVIRONMENT

Depth: _____ Habitat: _____
Sea condition (Beaufort scale): _____ Wind Direction: _____ Strength: _____
Swell (circle): None / Light (0-1m) / Moderate (1-2m) / Heavy (>2m)
Tides (circle): H / M/ L Incoming / Outgoing

ANIMAL PLEASE MAKE TAKING PHOTOS OF THE ANIMAL A **PRIORITY**

Photos/video: ☐ Yes ☐ No
Animal type: ☐ Hector's / Maui's dolphin ☐ Other dolphin ☐ Beaked whale ☐ Toothed whale
☐ Baleen whale ☐ Seal
Number of animals (total): _____ Species: _____
Number of adults: _____ Number of juveniles (if present): _____
ID confidence (definite/probable/unsure): _____ ☐ Used key

ANIMAL DETAILS

Description of animal (colour/shape of body, dorsal fin, tail, any scars present etc): _____

Shape of blow (tall, bushy, v-shaped, angled etc): _____
Total length of animal (please note unit of measurement): ☐ Juvenile _____ ☐ Adult _____
Description of behaviour: _____

_____ Direction animals heading: _____

True seals (Phocids)

Leopard seal (*Hydrurga leptonyx*)



Big, snake-like head. Grey fur, black spots. Sharp, tri-lobed teeth. Males: up to 3m, 270kg. Females: up to 3.5, 300kg. Regular visitor to NZ

Southern elephant seal (*Mirounga leonina*)



Dark grey to brown. Pointed peg-like teeth. Males: up to 5m, 3600kg. Large proboscis. Females: up to 3m, 900kg. Regular visitor to NZ

Weddell seal (*Leptonychotes weddellii*)



Large body, small head. Dark brown, mottled spots. Tri-lobed teeth. Size: up to 3m, 400-600kg. Very rare vagrant to NZ

Crabeater seal (*Lobodon carcinophaga*)



Slender body, long head. Dark brown to blonde fur. Four-five lobes per tooth. Size: up to 2.5m, 200kg. Very rare vagrant to NZ

Ross seal (*Ommatophoca rossii*)



Short head, large eyes. Throat striations. Dark brown, silvery belly. Tri-lobed teeth. Males: up to 2m, 130-215kg. Females: up to 2.5, 130-215kg. Very rare vagrant to NZ

Eared seals (Otariids)

NZ sea lion (*Phocarctos hookeri*)



Blunt nose. Males: up to 3.5m, 250-400kg, dark brown fur. Females: up to 2m, 100-160kg, honey-coloured fur. Southern NZ and Sub-Antarctic

NZ fur seal (*Arctocephalus forsteri*)



Pointed nose. Dark brown fur. Males: up to 2.5m, 150kg. Females: up to 1.5m, 30-60kg. Widely distributed

Sub Antarctic fur seal (*A. tropicalis*)



Pointed nose, short face. "Mohawk" hair, big eyes. Dark brown, cream throat. Males: up to 2m, 160kg. Females: up to 1.5m, 50kg. Rare vagrant to NZ

Antarctic fur seal (*A. gazella*)



Short, wide, pointed nose. Dark brown fur. Males: up to 2m, 90-210kg. Females: up to 1.5m, 30-60kg. Rare vagrant to NZ

Otariids (eared seals) – fur seals and sea lions

☐ External ear ☐ Thick insulating fur
☐ Swim with large front flippers ☐ Flippers bare
☐ "Walk" with belly off ground
☐ Can rotate hind flippers

Phocids (true seals) – Antarctic seals

☐ No external ear ☐ Short fur, blubber insulation
☐ Front flippers short ☐ Swim with hind flippers
☐ "Inch-worm" on land ☐ Hind flippers trail behind
☐ Flippers furry

APPENDIX FOUR – SEABIRD SIGHTING FORM¹⁵

Date	Vessel	Vessel Type and Activity of Vessel	Time of Vessel Approach	Species	Number of Birds Roosting on Structures	Number of Birds in the Water within 100 Metres	Mitigation Action Taken (if any)	Additional Comments (eg Weather and Sea Conditions)	Observer

¹⁵ This form will be updated prior to finalisation

APPENDIX FIVE – UNDERWATER PASSIVE ACOUSTICS MONITORING PROGRAMME FOR MARINE MAMMALS

1.0 Introduction

Blue Planet Marine (BPM) developed an underwater acoustic monitoring plan for Māui dolphins of the West Coast of the North Island near Whāingaroa. This is to assist North West Mussels Limited in their project to undertake mussel spat nursery activities in the area.

This monitoring plan follows on from an expert marine mammal assessment undertaken by Jim Roberts (Anemone Consulting; 2022) which was peer reviewed by Helen McConnell (SLR; 2023) for the Waikato Regional Council.

The project development will be undertaken in stages, supported by a marine mammal monitoring programme, which will be undertaken in consultation with a marine mammal expert. The purpose of this document is to:

1. Propose acoustic monitoring on the three spat farm sites; and
2. Make recommendations for ongoing monitoring.

The acoustic monitoring programme has an overall aim of providing a detailed understanding of the range of cetacean (i.e., whales and dolphins) species potentially using the project area, including their presence, migratory behaviours and relative detection rates with a particular focus on Māui dolphins. The instrumentation and analysis software will provide data on all vocalising cetacean species in the area, as well as provide baseline ambient underwater noise data on natural (geophony), biological (biophony) and anthropogenic (anthrophony) sources.

Specific aims for the passive acoustic monitoring programme are to:

- a) Detect and record the presence of cetaceans, with a specific focus on Māui dolphins, in the project area;
- b) Describe the timing of occurrence of cetacean species in the project area;
- c) Determine the distribution and detection rates of vocalising cetacean species in the project area; and
- d) Provide meaningful data to establish an empirical baseline about ambient background noise levels and marine mammal vocalisations in the project area.

The following provides a description of the underwater acoustic monitoring methods that are being proposed for this project.

2.0 Methodology

2.1 Underwater Acoustic Sensors

We will deploy two acoustic recorders at Farm Site C for a year in advance of construction starting as part of Phase one operations. The recorders will be deployed at the expected northern and southern locations of Farm site C and will be placed on in the closest inshore location and one in furthest offshore location. This should ensure that there is variation in both along- and offshore-distribution of sampling effort.

The effective detection range of Māui dolphins from acoustic monitoring (a dolphin with very high frequency vocalisations) is approximately 300-500 metres. Therefore, it will be necessary to have two recorders at each site to provide local data. This would provide good spatial coverage over the whole area and also good temporal coverage over the full year. It also allows for the continued collection of data in the unlikely event that one of the recorders malfunctions.

While the primary aim of the monitoring is to detect Māui dolphins, it will also be able to detect other vocalising marine mammal species and, specifically, we will analyse the data for detections from baleen whales (e.g., sperm, southern right, humpback and blue) and dolphins (e.g., killer whales, commons).

We know that Māui dolphins have different distributions summer and winter so it is useful to be able to monitor all seasons. This would give you two full years of data at Site C which will provide a high-quality record of dolphin presence in the area.

The underwater recording units used will Ocean Instruments SoundTrap 600HF units which will allow continuous recording at 384 kHz for periods of approximately three months before the units will need to be recovered, the data downloaded and new batteries added. They will then be returned to the same location for further collection. All SoundTraps will be set up with high gain selected and also have the high frequency click detectors enabled. Figure 2 shows the deployment of SoundTraps from a similar project elsewhere.

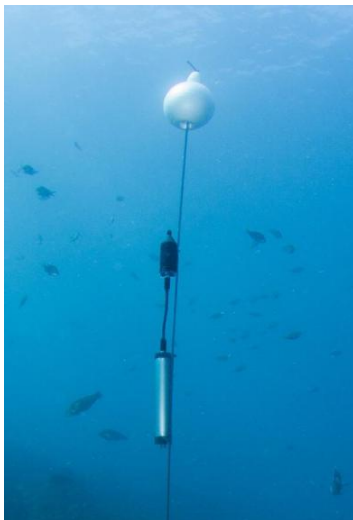


Figure 2: SoundTrap 300STD with external battery pack attached (photo supplied by Ocean Instruments).

Where possible, the acoustic recorders will be deployed on existing spat farm structures and so no additional moorings will be required. If different locations are required, then specific moorings will be required, and these can be easily developed and installed following well developed and tested deployments on acoustic recorders on Golden Bay mussel farms.

2.2 Vessel Operations

It will be necessary to visit each site every three months to deploy, recovery and redeploy the instruments. The deployments and recoveries/re-deployments of both instruments can be undertaken in one day and can be arranged to fit around vessel operations to the sites.

2.3 Acoustic Analysis

Data analyses will be undertaken using Ocean Acoustic Ltd.'s (OAL) proprietary acoustic analysis software, FinFinder (www.oceanacoustics.com). FinFinder is a machine learning detection and classification software that processes raw acoustic files from any autonomous recorder, as well as real-time data acquisition systems and localisation arrays.

FinFinder's detectors and classifiers each contain a specifically trained predictive model that uses an AI engine. The use of deep learning in passive acoustic monitoring is hugely beneficial because the computer learns characteristics of specific environments that it can use to enhance performance. Presently, the detection models are trained on over 1 million hours of PAM data from 55 locations around the world. They can detect vocalisations from a wide range of cetacean species.

Following the initial detection by the AI engine, a range of classification techniques (see further details below) are then used to determine if the trigger signal is, in fact, from a cetacean or not, and identifies species. These processes are accelerated using GPU arrays and parallel computing on our processing servers (1.5TB RAM, 122 CPU workers).

Analysis will include identification and quantification of all Māui dolphin vocalisations detected for the duration of the recordings at each of the sites. Furthermore, we will also analysis for other marine mammal vocalisations using specialised and tested detectors for whales, killer whales and other dolphin species. These combined analyses will provide a valuable insight into how and when marine mammals utilise the project and surrounding area.

Our bioacoustics experts then validate all detections and classifications, including a subsample of negatives, to ensure accuracy in the results. Performance metrics can be calculated and provided. Spectrogram snippets of each detection, as well as the audio of each detection, are also produced and archived for easy recall and playback. These can be provided upon request to see/hear detections themselves and have complete confidence in the results. This is important when incorporating the results in evidence for consent processing.

An example of the outputs from an acoustic recorder from dolphin detections is provided in Figure 3 below.

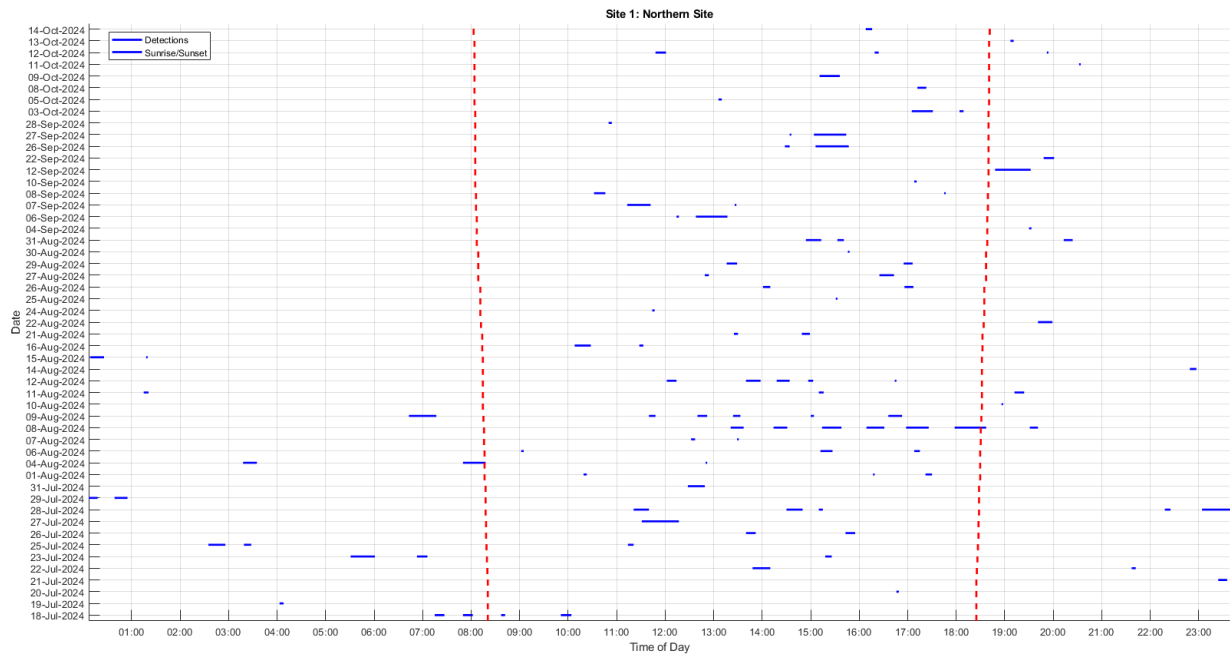


Figure 3: An example of dolphin detections by date and time of day for a previous project.

2.4 Reporting

A trip report will be developed for each deployment and retrieval trip which will summarise the work undertaken and a preliminary assessment of the data collected. A progress report will be provided one month after the 6-month and a final report one month after the 12-month retrieval trip. These reports will summarise all the detections recorded at the sites including details of species detected, times and dates of detections and, where possible, an interpretation of the type of vocalisations detected (e.g., navigating, feeding, communicating, etc.) to provide some potential information about what activities the marine mammals may be undertaking while in the area.

APPENDIX SIX – RESOURCES AND REFERENCES

The following resources have been used to inform the information, guidelines, and protocols outlined in this Marine Wildlife Management Plan.

- **DOC Seabird ID guide -**
<https://www.doc.govt.nz/globalassets/documents/conservation/marine-and-coastal/fishing/fishers-guide-nz-seabirds.pdf>
- **DOC Shorebird Species Guide -**
<https://www.doc.govt.nz/globalassets/documents/conservation/native-animals/birds/sea-and-shore/whats-that-shorebird-brochure.pdf>
- **DOC Whale ID Posters -**
<https://www.doc.govt.nz/globalassets/documents/conservation/native-animals/marine-mammals/whale-id-posters-web.pdf>
- **DOC Marine Mammal ID Flip Cards –**
<https://www.doc.govt.nz/globalassets/documents/conservation/native-animals/marine-mammals/whale-id-flip-cards-web.pdf>
- **DOC Marine Mammal Sighting Reporting Guide -**
<https://www.doc.govt.nz/globalassets/documents/conservation/native-animals/marine-mammals/have-you-seen-marine-mammals.pdf>
- **DOC Behaviour around Marine Mammals Guide -**
<https://www.doc.govt.nz/globalassets/documents/conservation/native-animals/marine-mammals/marine-mammal-regulations-summary.pdf>
- **DOC Marine Mammal Ranges and Breeding Grounds Poster -** <https://www.doc.govt.nz/about-us/science-publications/conservation-publications/native-animals/marine-mammals/marine-mammals-of-nz-poster/>
- **DOC Marine Mammal Conservation Status Guide –**
<https://www.doc.govt.nz/globalassets/documents/science-and-technical/nztcs48.pdf>
- **NZ Birds Online – Bird Encyclopaedia –** <https://nzbirdsonline.org.nz/>
- **MPI (2013). Literature Review of Ecological Effects of Aquaculture. Chapter 4. Effects on Marine Mammals (authored by D. Clement, 2013).**
<https://www.mpi.govt.nz/dmsdocument/3752-Literature-Review-of-Ecological-Effects-of-Aquaculture-Chapter-4-Effects-on-Marine-Mammals>
- **Chapter 6. Seabird interactions (authored by P. Sagar, 2013)**
<https://www.mpi.govt.nz/dmsdocument/3754-Literature-Review-of-Ecological-Effects-of-Aquaculture-Chapter-6-Seabird-Interactions>
- **Best practices and technologies available to minimise and mitigate the interactions between finfish open ocean aquaculture and marine mammals**
<https://www.mpi.govt.nz/dmsdocument/48007-AEBR-273-Best-practices-and-technologies-available-to-minimise-and-mitigate-the-interactions-between-finfish-open-ocean-aquaculture-and-marine-mammals>

APPENDIX SEVEN

RESOURCE CONSENT

Resource Consent: XXXXX

File Number: 61 70 90A

Consent Holder: North Western Mussels Limited

C/- Gulf Mussels Limited

321 Tiki Quarry Road RD 1

Coromandel 3581

Consent Type: Coastal Permit

Consent Subtype: Occupation

Activity Authorised: To undertake mussel spat catching and nursery activities in the Tasman Sea off the coast of Raglan/Whāingaroa including use and maintenance of marine farming structures including navigational safety aids, occupation of the coastal marine area, and associated discharges, disturbances, and deposits.

Location: An area of the Tasman Sea in the west coast of the Waikato region, at least 3.1 km from the coastline, and generally between Te Hara Point in the south and Parikotuku Point in the north.

Map Reference: See Schedule 1 (survey plan and coordinates)

Site	Minimum Distance from Coast	Corner	Northing (NZTM)	Easting (NZTM)
A	4 km	NW	1749789	5839373
		NE	1751690	5839995
		SE	1752156	5838570
		SW	1750255	5837948
B	3.1 km	NW	1753370	5830665
		NE	1755282	5831252
		SE	1755722	5829818
		SW	1753810	5829231
C	3.1 km	NW	1754536	5826283
		NE	1756486	5826724
		SE	1756817	5825260
		SW	1754866	5824820

Consent Duration: This consent will expire 35 years from the date of commencement under s116A RMA.

Subject to the Conditions Overleaf: (To be included once agreed)