



North Western Mussels Limited
Western Waikato Spat/Nursery Farm
Marine Wildlife Management Plan¹ (DRAFT)

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

¹ This wildlife management plan has been prepared using the A+ Sustainable Management Framework wildlife management plan template <https://www.aplusaquaculture.nz/aplus-resource-library#template-library>

1. Background

North Western Mussels Limited (NWML) has made an application for a resource consent (and concurrent plan change) to undertake Greenshell (*Perna canaliculus*) mussel spat catching and nursery activities at four sites at least 3.1 km off the Whāingaroa/Raglan coastline between Papanui Point in the south and Parikotuku Point in the north.

Spat on-growing and nursery activities are a critical element of the mussel farming industry's operational resilience but changing environmental conditions, including sedimentation from land run off and climate change, as well as spat collection policy settings are impacting resilience and accessibility of the existing supply.

Waikato Regional Council (WRC) have assessed the application and requested a Marine Mammal Management Plan and Seabird Management Plan be submitted as part of a s92 further information request.

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

This draft Marine Wildlife Management Plan (MWMP) has been developed using the template from the A+ Sustainable Framework for Greenshell Mussels and incorporates relevant information and recommended mitigation measures from the following:

Author	Reference
Jim Roberts. Anemone Ltd. (2022)	Marine mammal assessment with respect to the potential effects of proposed mussel spat catching and nursery activities off the coast of Raglan.
Helen McConnell. SLR Consulting NZ. (2023).	Peer Review of Marine Mammal Assessment. North Western Mussels Ltd - Resource 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.

This MWMP has been aligned with national guidelines produced by Fisheries New Zealand (FNZ) to minimise and mitigate the interactions between finfish 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.

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.

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

The objective of the MWMP is to:

1. Avoid adverse effects from the construction and operation of the spat/nursery farm on marine mammals, and where it is not practicable to avoid effects, to minimise those effects to the point that they are minor or less; and
2. Minimise the potential for interaction of marine mammals with the marine farm.

This MWMP outlines statutory and best management practices as well as mitigation measures specifically proposed by Anemone, SLR, Wildlands and Pisces Consulting.

It is the policy of NWML that all marine farm staff must comply with this Marine Wildlife Management Plan.

3.0 Roles and Responsibilities

NWML shall work closely with the Department of Conservation (DOC) and Iwi on the finalisation and implementation of the MWMP. 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 WRC, DOC and Iwi 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.
	WRC	Consent regulator
	DOC	DOC Operations Manager
		Iwi representative(s)
		Marine mammal specialist
		Seabird specialist

4.0 Marine Mammals in the Proposed Area

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

	Species	No. of strandings reported	No. of sightings reported
Baleen whales	Blue whale	2	0
	Bryde's whale	0	1
	Southern right whale	0	4
	Humpback whale	1	1
	Minke whale	2	0
	Pygmy right whale	1	0
Odontocetes – toothed whales and dolphins	Hector's and Māui's dolphin	13	414
	Common dolphin	24	80
	Killer whale (orca)	2	6
	False killer whale	1	0
	Pilot whale	4	0
	Striped dolphin	2	0
	Beaked whale - Andrew's	2	0
	Beaked whale - Cuvier's	6	0
	Beaked whale - Gray's	9	0
	Beaked whale - Shepherd's	1	0
	Beaked whale - species unknown	4	0
	Southern bottlenose whale	1	0
	Sperm whale	5	0
	Pygmy sperm whale	13	0

Those that are expected to occur in the vicinity of the proposed marine farm sites are as follows:

Species	New Zealand Threat Status ³	Frequency of Sightings and Habitat Use	
Māui/Hectors 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 this subspecies and validated sightings have been made in the vicinity of all four proposed farm sites. Modelled density data suggests that highest densities in summer occur directly off Raglan Harbour entrance and along the coast to the north of the harbour entrance in water depths of at least 20 m in winter. Further as described by Anemone pages 7 to 10.	

³ <https://www.doc.govt.nz/globalassets/documents/science-and-technical/nztcs29entire.pdf>

Common dolphins (odontocete)	Not threatened	Common dolphins 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 as described by Anemone page 11.	
Killer whales (odontocete)	NZCPS Policy 11(a)(i) species; classified as 'threatened – nationally critical' by the NZTCS;	Orca 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 as described by Anemone page 11.	
Blue whales (baleen whales)	Data deficient.	Two blue whale sub-species are known to occur around New Zealand: Antarctic blue whale (<i>Balaenoptera musculus musculus</i>), and pygmy blue whale (<i>Balaenoptera m. brevicauda</i>). Numerous sightings of blue whales have been reported offshore the West Coast North Island, primarily in the summer period. Further as described by Anemone page 11.	

Southern right whales (baleen whale)	(NZCPS Policy 11(a)(i) species; classified as 'at risk – recovering' by the NZTCS)	Southern right whales 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. 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 Raglan 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 as described by Anemone page 12.	
Humpback whales (baleen whale)	(NZCPS Policy 11(a)(ii) species; classified as 'endangered' by the IUCN).	Humpback whales 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 as described by Anemone page 12.	

New Zealand fur seals (pinniped)	Not threatened	Few 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 as described by Anemone pages 12 to 13.	
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5.0 Seabirds in the Proposed Area

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

Common Name	Sea Zone		Ecological Value
	Total number of Birds	Total number of Reports	
Penguins			
Penguin spp.	6	3	
Albatrosses			
Albatross spp. large	866	96	
Albatross spp. small	799	47	
Antipodean and Gibson's albatross	3	2	Very High
Northern royal albatross	17	10	Very High
Southern royal albatross	21	12	Very High
Wandering albatross	47	11	Moderate
Black-browed mollymawk	667	75	Moderate
Buller's mollymawk	198	25	High
Campbell Island mollymawk	10	1	Moderate
Grey-headed mollymawk	10	1	Very High
Salvin's mollymawk	720	35	Very High
Shy mollymawk	11,499	663	High
Tasmanian mollymawk	390	20	Moderate
Shearwaters, petrels, and prions			
Buller's shearwater	17	16	High
Flesh-footed shearwater	2,143	267	Moderate
Fluttering shearwater	247	11	Moderate
Shearwater spp.	1,528	73	
Shearwater, prions, and petrels	1,916	60	
Sooty shearwater	375	28	High
Black petrel	685	58	Very High
Cape petrel	2,050	93	Moderate
Grey petrel	4	4	Moderate
Grey-faced petrel	1	1	Low
New Zealand fairy prion	1,115	34	Moderate
New Zealand white-faced storm petrel	286	9	Moderate
Northern diving petrel	128	11	Moderate
Petrel spp.	4,131	174	
Southern/northern giant petrel	446	142	Moderate
Storm petrel spp.	3817	70	
Westland petrel	934	64	Moderate
White-chinned petrel	698	31	Low
Prion spp.	4,642	112	
Gannets and shags			
Australasian gannet	972	149	Low
Boobies and gannets	11	2	
Shag spp.	5	1	
Skuas, gulls and terns			
Gull and tern spp.	48	12	
Red-billed gull	9	4	Moderate
Southern black-backed gull	2,311	468	Moderate
White-fronted tern	34	11	High
Unidentified			
Seabirds	193	13	
Total	43,999	2,919	

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 follows:

Seabirds	Species, Status and Presence ⁴	Potential Effects	
Albatrosses and mollymawks	Toroa/black-browed mollymawk Thalassarche melanophris, Non-resident Native-Coloniser; toroa/Salvin's mollymawk, and toroa/shy mollymawk. Overall observations are rare.	They are very unlikely to be significantly affected by the proposed farm, given their preference for deeper, offshore waters.	
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 (<i>Pterodroma macroptera gouldi</i>, 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.	Individual birds may be attracted to boat activity as fish may be brought to the surface through maintenance or spat harvesting activity. However, it is unlikely to have any significant effect on these species.	 

⁴ Wildlands

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 (Waikato Regional Council 2012).	The species regularly attends ‘boil-ups’ of dense fish schools brought to the surface by dolphins and predatory fish. It feeds on a variety of fish and squid, usually diving to less than six metres deep (Machovsky-Capuska et al. 2014). If the spat-catching/nursery farm structures act as a fish aggregating device, dolphins and predatory fish forage within the area could positively affect tākapu/Australasian gannet.	
Shags	Four shag species were present along the study site, and eBird records indicate that the most common is pied shag (Table 2). Population sizes are unknown, although numbers of pied shags in northern New Zealand are estimated to have been increasing (Bell 2013). A small number of māunga/black shag, kawau tūi/little black shag and kawaupaka/little pied shag (<i>Microcarbo melanoleucos melanoleucos</i>, Non-resident Native – Vagrant) were also 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 (Powlesland et al. 2008).	The buoys will provide suitable roosting structures and the potential for aggregating fish; this will positively affect shag species.	

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 (<i>Sternula albifrons sinensis</i>, Non-resident Native-Migrant) and Caspian tern are present in the location of the proposed spat-catching/nursery farm. 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 cosmopolitan in distribution. It nests in small colonies or as single pairs (Bell and Bell 2008). The species mainly forage on fish in estuaries, harbours, and other inshore locations but is not often seen further out to sea.	The buoys may provide suitable roosting structures for white-fronted tern and southern black-backed gull. However, it is unlikely to have any significant affect on any gull or tern species.	
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6.0 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.

Key observations relating to each effect are identified in Anemone and SLR and summarised here:

Entanglement

1. Entanglement risk is greater for thin and/or slack lines.
2. Despite over 40 years of mussel farming history in New Zealand few fatal entanglements have been reported.
3. Of those fatal entanglements none have involved odontocetes (i.e. dolphins and toothed whales) or pinnipeds (seals or sea lions).
4. Despite the significant overlap between mussel farms and Hector's dolphins around Banks Peninsula, no entanglements of this species have been reported. This is also the case for the spat farm which has been operating for more than 30 years in nearby Aotea Harbour which is within Maui dolphin habitat.
5. Spat lines are considered to pose a greater risk of entanglement to medium-large whales than cultivation lines.
6. Internationally most entanglements in spat lines involve baleen whales but while baleen whales don't echolocate evidence suggests they can detect and avoid lines in the water and the Waikato CMA is not known to represent important feeding habitat for baleen whales.
7. Entanglement is one of the few potential effects from marine farms that can have direct population level consequences for marine mammals. In terms of the requirements of policy 11(a) of the NZCPS this has the potential to be significant.
8. For Maui dolphins, the potential effects of entanglement from the proposed farm will be minor as long as weighted spat lines are used (to ensure the spat droppers are negatively buoyant and detectable) and that all farm components are maintained under tension.
9. Entanglement effects on common dolphins and killer whales will be minor so long as dropper lines are weighted and adequately tensioned.
10. Entanglement effects on baleen whales will be minor so long as lines are adequately tensioned, and increased vigilance is afforded during migration period.
11. Entanglement effects on New Zealand fur seals will be negligible so long as lines are adequately tensioned.

Habitat exclusion

1. Specific information on habitat exclusion is relatively scarce for most New Zealand marine mammal species.
2. Some habitat exclusion effects would be expected for Maui dolphin.
3. The potential for habitat exclusion for sites A – C is not an issue of particular concern but potential exclusion of groups containing juvenile Maui dolphins from Site D could be more ecologically meaningful.
4. Habitat exclusion is unlikely to be an issue for baleen whales which have vast distributional ranges

compared to the small area within which the proposed marine farm activities would be restricted.

5. Habitat exclusion effects will be negligible for on all marine mammal species except for Maui dolphins.
6. Habitat exclusion effects from the proposed farm are likely to minor for Māui dolphins.

Trophic effects

1. Data on trophic effects for marine mammals is limited and sometimes conflicting.
2. Some trophic effects for Maui dolphin should be expected and these could be positive (aggregation of prey species in and around the proposed farm structures) or negative (displacement of prey species from within farm structures).
3. Overall trophic effects on Maui dolphins are likely to be minor.
4. Trophic effects on other marine mammal species are likely to be negligible.

Marine debris

1. For all marine mammal species (including Māui dolphins) marine debris effects are considered to be negligible as long as high-quality UV stabilised rope products are used on the farm and that all structures (including ropes) are regularly inspected and maintained or replaced as required.
2. When these management procedures are coupled with effective waste management strategies, the potential for non-biodegradable waste to be lost from marine farms to the surrounding environment is very low.

Vessel strike

1. Vessel strike tends to be particularly problematic when the distribution of large whales overlaps with shipping routes used by large, fast vessels.
2. Even small vessels can cause fatal injury particularly when they are being operated at high speeds. When vessels are travelling fast, the rate of detection of marine mammals decreases, increasing the chance of collision.
3. Reduction in vessel speed is one of the best recognised mitigations to avoid vessel strike.
4. Given the increased probability of juveniles being present to the south of Raglan Harbour, particular care is warranted when vessels are operating at this site and when in transit to and from Raglan.
5. Recommended mitigations are:
 - a. Compliance with the Marine Mammal Protection Regulations 1992 (a legal requirement)
 - b. A ≤ 12 knot speed restriction will be always adopted by all farm vessels.
 - c. Vessel speeds should be further restricted to ≤ 10 knots or the speed of the slowest marine mammal when within 300 metres of Māui dolphins.
 - d. Maintaining extra vigilance during the Māui dolphin breeding period of November to February.
6. If the recommended mitigations are implemented:
 - a. The effect of vessel strike will be minor for Maui dolphin.
 - b. For other marine mammals the effect of vessel strike will be negligible.

Underwater noise

1. Installation of screw anchors will generate the highest noise levels during marine farm construction.
2. While frequent vessel presence at the farm sites, and farm vessel movement between Raglan and the farm sites will introduce underwater noise into the surrounding water column, vessel noise is typically low relative to other industrial underwater noise sources.
3. The effects of underwater noise from the construction and operation of the proposed marine farm

will be (at most) minor for Māui dolphins and negligible for all other marine mammal species.

Cumulative effects

1. Being one of the rarest marine mammals in the world, it is particularly important to consider the potential cumulative effects on Māui dolphins.
2. Cumulative effects are difficult to assess from the available information, but a standard approach is to assume the maximum effect level for any single threat, which for Maui dolphin, would be minor.
3. Cumulative effects for the other marine mammal species are unlikely to be more than minor.

Note that Anemone noted that the main anthropogenic threat to Maui dolphin is toxoplasmosis:

‘The main population threat to Māui and Hector’s dolphins was historically considered to be entanglement mortality in commercial setnets (e.g., Currey et al. 2012; Dawson et al. 2001). However, a more recent spatial multi-threat risk assessment found that the main anthropogenic threat to both sub-species was likely to be toxoplasmosis, a disease caused by infection with Toxoplasma gondii, a parasite that in New Zealand is spread only by the domestic house cat (Felis catus) (Roberts et al. 2019b; Roe et al. 2013). Based on the relatively small sample of beachcast dolphins for which a primary cause of death was determined from formal necropsy, toxoplasmosis may be a particular problem for reproductive females (Roberts et al. 2019b; Roe et al. 2013). Other emergent threats for the species include brucellosis, and oceanic warming affecting the availability of key prey species (Roberts et al. 2019b)’

NWML have given a commitment to positively contribute to the understanding of the toxoplasmosis threat by supporting a toxoplasmosis monitoring programme should that be considered appropriate.

7.0 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;
- Lights causing attraction or disorientation.

Key observations relating to each effect are identified in Wildlands and Pisces Consulting and summarised here:

Entanglement

- The entanglement risk within a mussel farm is very low given the thickness of ropes and provided that structures associated with mussel farming as ropes are held under considerable tension.
- If a bird is entangled, all incidents, regardless of outcome (e.g. injury or mortality), will be reported to the Department of Conservation as outlined in the Waikato Regional Coastal Plan.

Habitat exclusion

- The presence of structures in the marine area may affect seabird species differently. Some species could potentially avoid foraging within or around farm structures (habitat exclusion), others may be unaffected by the presence of structures, and some species may be attracted to those

structures, including using buoys as roosting sites.

- Overall habitat exclusion is considered to be a less than minor effect.

Benthic habitat change

- The limited predicted benthic changes will have a minor effect on the use of the site by seabirds.

Prey abundance changes

- The use of mussel farms as foraging sites is likely to have a positive impact or neutral impact on the above species, and possibly other seabird species, such as Caspian tern, may also utilise the farm. Birds may benefit from enhanced and possibly more predictable food resources and adjacent, secure resting sites. It seems likely that the proposed spat-catching/nursery farm, while further offshore, will also be used by many bird species for feeding and roosting.

Disturbance

- Disturbance of foraging birds already occurs from recreational and commercial boat traffic entering or leaving Raglan Harbour and boating along the coastline. Vessel movements to and from the proposed spat-catching/nursery farm are unlikely to significantly increase the existing levels of boat disturbance of foraging birds in the area.
- Disturbance of breeding birds is of greater concern. Vessels that service the farm should use routes that avoid rock stacks, islets and islands used by shags, terns, and gulls for nesting by at least 100 metres.
- All vessels must maintain speeds of less than five knots within 200 metres of the shore, which is also likely to reduce the risk of disturbance.
- During the spat-catching/nursery farm construction and usual farm operations (maintenance and harvest vessels) boats should remain 100 metres offshore when transiting, and boat speeds will be less than five knots when approaching the shore or the spat-catching/nursery farm.

Noise

- Overall, the occasional presence of noise from vessels will have a less than minor effect on birds. At most, it represents a short-term disturbance. After the boat has gone, birds will eventually resume their activities within and around the farm.

Ingestion of foreign debris

- Marine waste, particularly plastics, can be consumed by seabirds and could cause death by dehydration, blockages, and release of toxins.
- During maintenance and harvesting, all cordage, plastics, and general waste should be collected on-board and disposed of ashore. Any debris that does accidentally fall overboard should be retrieved as soon as possible.
- This will prevent entanglement, ingestion and pollution of the environment. This will have a minor effect on seabirds if well managed.

Lights causing attraction or disorientation

- Some seabird species (e.g. petrels and shearwaters) can become disorientated or be attracted to lights, which can lead to injury or death through collision with structures or the inability to take flight.
- Navigation lighting and marks will be installed in accordance with Maritime New Zealand (2008, 2018) and Maritime Transport Act 1994.
- Where possible, the farm's navigation lights should be flashing or rotating lights rather than

constant lights, as this can reduce the potential for disorientation of seabirds.

- The 'special markers' will be placed on buoys 200 metres outwards of each corner of the spat-catching/nursery operation, situated two metres above the water level and flash five times every 20 seconds. These markers will flash yellow lights and are less attractive to seabirds compared to violet/blue light.
- If seabirds were attracted to navigational lighting, the risk of collision is likely to be low given the small, low structures involved. Because of these reasons, the potential effect of navigational lighting is considered to be less than minor.

8.0 Marine Farm Configuration and Operations

The SLR peer review describes the relevant aspects of the marine farm configuration:

'This application seeks to develop a new 700-hectare marine farm incorporating spat catching and nursery operations over four separate sites in the Tasman Sea off the west coast of the Waikato region (near Raglan). The proposed marine farm structures would be installed at least 3.1 km from the coastline between Papanui Point in the south and Parikotuku Point in the north.'

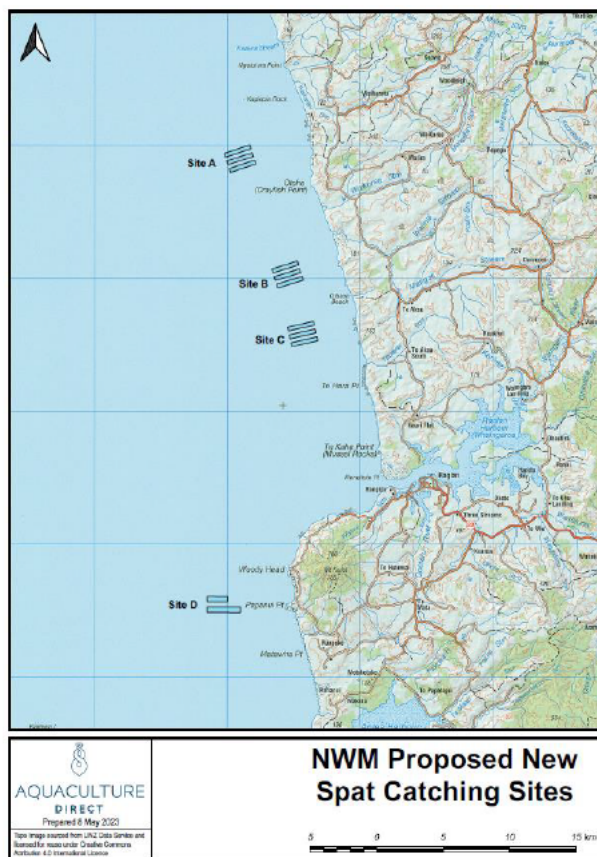


Figure 1 – Location map

'Sites A to C are proposed for locations approximately 20 km north of Raglan Harbour, with Site D approximately 10 km to the south of the harbour entrance. All structures would be deployed in a water depth of 20 - 40 m.'

*The proposal includes both spat catching and spat holding until the optimum conditions have been reached for it to be transferred to the final grow out site. Spat holding (or nursery activities) would involve both spat that is caught onsite and spat that is sourced from a hatchery and then seeded onto lines at the proposed farm sites. Consent is not being sought to grow mussels to harvest size. The purpose of the proposed marine farm is therefore threefold, to 1) Catch green-lipped mussel (*Perna canaliculus*) spat; 2) Seed bio-secure hatchery spat; and 3) Operate a mussel nursery for juvenile mussels of an average size of 70 mm, and up*

to a maximum size of 90 mm.

Spat holding activities aim to increase the survival rate of juvenile mussels once they are relocated to their final cultivation site (most likely at existing mussel cultivation farms in the Hauraki Gulf). Overall, the four proposed farm sites (or blocks) will consist of 11 rows (three rows each for Sites A-C separated by 300 m, and two rows for Site D separated by 400 m) with a total of 451 individual longlines.

The cumulative area of occupation is presented in Table 1 and includes the space between lines in each row. Each row at Sites A, B and C will have 41 lines (e.g. Figure 2). Row 1 of Site D will have 31 lines and Row 2 of Site D will have 51 lines. The lines in each row will run parallel to the coast and be 50 m apart’.

	Site A	Site B	Site C	Site D	Total
Row 1	60 ha	60 ha	60 ha	60 ha	
Row 2	60 ha	60 ha	60 ha	100 ha	
Row 3	60 ha	60 ha	60 ha		
Total consented area	180 ha	180 ha	180 ha	160 ha	700 ha

Table 1 Cumulative area of occupation

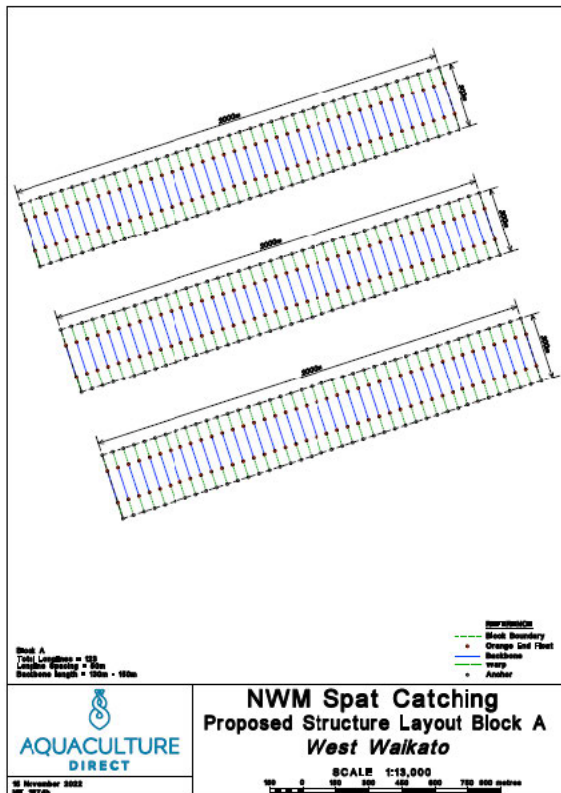


Figure 2 – Line layout for sites A - C

Each line will consist of a 150 m backbone line (40 mm diameter) suspended approximately 3 m below the sea surface by 300 L floats at 2-10 m intervals. The backbone line will be secured to the seafloor by a mooring warp (28-75 m long depending on water depth and 44 mm diameter) attached to a screw anchor at either end. From the backbone line the weighted and filamentous dropper lines will be hung. It is proposed that each dropper line is approximately 8 m in length with 60-80 mm cut pile filaments. Dropper lines will be attached at each end to the backbone line to form a continuous spat catching/holding rope’.

Installation will occur over three stages in accordance with a staging development plan (SDP) which includes a delay in the development of Site D until suitable development and monitoring has been carried out at sites A-C. The stages proposed are as follows:

	Site A	Site B	Site C	Site D	Total
Stage 1	90ha	90ha	90ha	N/A	270ha
Stage 2	180ha	180ha	180ha	60ha	600ha
Stage 3	180ha	180ha	180ha	160ha	700ha

Figure 3 – Staged development plan

9.0 General Protocols

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 the Department of Conservation (DOC).
- Disposing of a dead marine mammal under the direction of DOC.

Compliance with the Marine Mammal Protection Regulations 1992

The Marine Mammal Protection Regulations of 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.

Compliance with the Wildlife Act 1953

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

Compliance with Coastal Permit Conditions

Consent to operate the marine farm will be contingent upon adherence to a set of coastal permit conditions. It is anticipated that compliance with the MWMP will be a condition of consent.

Compliance with the A+ Sustainable Management Framework for Greenshell Mussels

The A+ Sustainable Management Framework (SMF) for Greenshell mussels⁵ details how the A+ programme monitors and guides improvement of farming practices and protocols within the Greenshell mussel industry of Aotearoa.

⁵ <https://www.aplusaquaculture.nz/>

The aim of the SMF 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 pamphlet 'Sharing our Coasts with Marine Mammals'.*
- *Systems for staff awareness and training as well as recording and reporting Marine Mammal and 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 eg 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'.*

NWML will register and comply with all requirements of the A+ SMF.

10.0 Specific Protocols

Specific protocols will be finalised into the MWMP by a suitably qualified experienced marine scientist. An advanced draft of the MWMP will be provided to DOC for comment and then provided to the WRC, along with any DOC comments, to WRC at least 4 months prior to any work being undertaken on the farm.

The following sets out the protocols which have been recommended by Anemone, SLR, Wildlands and Pisces Consulting 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.	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 marine mammal or seabird interactions.
	The farm layout will include sufficient spacing between the lines for dolphins to swim between them.	The line spacing will be at least 50 metres and the dropper spacing will be at least 600 mm apart. This provides sufficient space for dolphins and killer whales to safely swim through the farm.
	The rope specifications shall be sufficient to ensure structural integrity and avoid breakage.	The warps will be 44 mm Durashield 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 diameter of 75/80 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.	Anchors will be installed by an experienced marine engineer with the use of a drill operating from a surface vessel. 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.	The warp layout will not enable cross over by virtue of the proposed layout. The line lengths are 300 metres at sites A – C and 400 metres at site D to account for the deeper water. 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.	Anchor warps will be installed by an experienced marine engineer and hydraulic barge winches will be used at installation and in maintenance activities to ensure adequate tensioning.
	Spat rope will be self-tensioned with added negative buoyancy.	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.	The inspection schedule will be as follows: - Fortnightly surface maintenance inspections to visually identify damage to backbone lines and floats. - At least annual underwater maintenance inspections to visually check anchor warps for chafing and any other damage.

		• Additional visual and underwater maintenance inspections after any significant storm event • Annual visual check for wear on floats 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.	• Any free, loose, or floating ropes will be cleared 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.
	Artificial lighting will be minimised to that necessary for navigational safety.	• The navigational lighting system will be established in accordance with the Maritime New Zealand and/or the Harbour Master and checked by a suitably qualified marine scientist prior to implementation. • Farming and maintenance operations will be restricted to daylight hours unless operational or safety requirements prevail.
	All staff will be aware of, and follow where required, an emergency disentanglement protocol.	• The MWMP will include an emergency disentanglement protocol developed by a suitably qualified marine scientist. 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.	• 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. • 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 no later than one month from the date on which the material was lost.	
Vessel strike	Vessel operators shall maintain vigilance for marine mammals and seabirds during all on-water operations.	The following steps will be taken to ensure that all vessel protocols are followed: • All 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.
	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 Maui 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, 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 during marine farming activities 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 baleen whale or sperm 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'.	• 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. • 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. • Any vessel interactions with marine mammals will be recorded and reported to DOC in accordance with the reporting protocols. • All vessels will display the DOC sticker that sets out vessel rules in relation to approaching marine mammals. • 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'. • DOC staff will be welcome to accompany the marine farm operators on board a vessel to view the implementation of the MWMP protocols.
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. All noise suppression equipment on vessels, including mufflers and ventilation baffles, shall be consistently maintained in optimal working condition.	• Staff shall receive training at induction and every 6 months on all the aspects of this MWMP including the importance of minimising underwater noise. • 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. • A record of vessel inspections will be kept including where any remedial work 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.	• NWML will provide evidence to WRC and DOC that the navigation lights meet this requirement once they have been installed.

11.0 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.

12.0 Marine Mammal Monitoring

A marine mammal monitoring programme will be developed in conjunction with a suitably qualified marine scientist and staff shall regularly monitor for and record the presence (or absence) of marine mammals in accordance with the programme.

At a minimum the monitoring programme will include the following:

- A sightings reporting template will be developed and used on all farm visits to record all marine mammal sightings (or the absence of sightings) including details of species observed, numbers of individuals (including separate counts of juveniles), and other details as indicated.
- Information recorded will include:
 - What species of mammal is sighted?
 - What date and time is the mammal sighted?
 - What farming operations or activities that the vessel is engaged when sighting the marine mammal (e.g. harvesting, checking lines, travel to/from site)?
 - At what approximate distance is the marine mammal visible?
 - Heading and distance from the vessel.
 - Observer name and position.
 - Photographs and video footage if collected.
- All staff will be trained on the importance of and format for reporting sightings.
- Any interactions with marine mammals will be recorded within the sightings template but in a separate section for ease of reference. Note that any interactions will also be reported to DOC as outlined below.

The marine mammal monitoring programme will include any protocols for Passive Acoustic Monitoring established to inform the staged development plan as outlined below.

A marine mammal sighting log is provided in **Appendix Two**.

13.0 Reporting and Response

Any interactions with marine mammals will be reported to DOC in accordance with the Marine Mammal Protection Act 1978.

The following procedure will be followed if a live entangled or injured marine mammal is discovered:

1. Staff or crew shall assess the situation at a safe distance and assess species, what structures are involved, is equipment available to assist, can animal be safely cut free from any entangling lines without retaining cordage/debris.
2. **If staff or crew observe a potential or actual entanglement, or an injured mammal, they shall immediately call the local DOC Te Rapa office (07 850 8373) or 0800 DOC HOT (0800 362 468) to**

make them aware of the situation. 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.

3. At least one photograph will be taken of the affected mammal.
4. The incident shall then be recorded in detail in the DOC marine mammal sighting system <https://www.doc.govt.nz/marine-mammal-sighting-form> within 24 hours.

Collated marine mammal sightings records shall be made available at quarterly intervals to DOC or more frequently if required.

NWML will report any seabird entanglements, regardless of outcome to DOC.

Comprehensive records of regular maintenance and training activities will be kept current and made available for review by WRC or DOC upon request.

Additional reporting will be carried out as recommended by a suitably qualified and experience marine scientist in the finalisation of the MWMP.

14.0 Staged Development Plan

The MWMP will include a staged development plan (SDP) designed by a suitably qualified and experienced marine scientist which includes the following:

- Identification of indicators of concern.
- The design of a Passive Acoustic Monitoring Programme capable of assessing the spatial and seasonal occurrence of Maui dolphin within the site as well as detecting any indicators of concern.
- A requirement that the monitoring programme be implemented by a suitably qualified and experienced marine scientist.
- A requirement about the timing of the monitoring programme and SDP.
- Criteria to be met prior to moving to the next stage.
- Reporting to be provided by the suitably qualified and experienced marine scientist to DOC and WRC to inform a decision by the WRC whether to proceed to the next stage.
- Consultation with DOC on the design of the SDP before it is implemented and before each stage progresses.

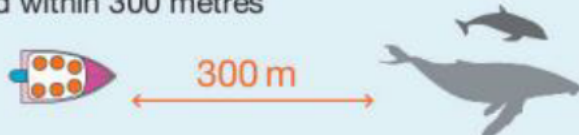
15.0 Review

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 significant marine mammal incident occurs.

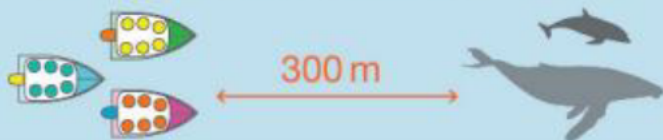
APPENDIX ONE – KEY BEST PRACTICE GUIDELINES

Simple rules for boaties when interacting with whales and dolphins

Don't travel faster than idle or 'no wake'
speed within 300 metres



No more than 3 vessels within 300 metres



Do not obstruct their path.
Approach from a parallel/
slightly rear direction



Do not swim with
dolphin pods
containing juveniles



Stay 50 metres away from any
whale or orca



Stay 200 metres away from any
baleen/sperm whale with a calf



Do not swim with
whales or orca



www.doc.govt.nz

New Zealand Government



Department of
Conservation
Te Papa Atawhai

Source DOC '[Sharing our coast with marine mammals](#)'

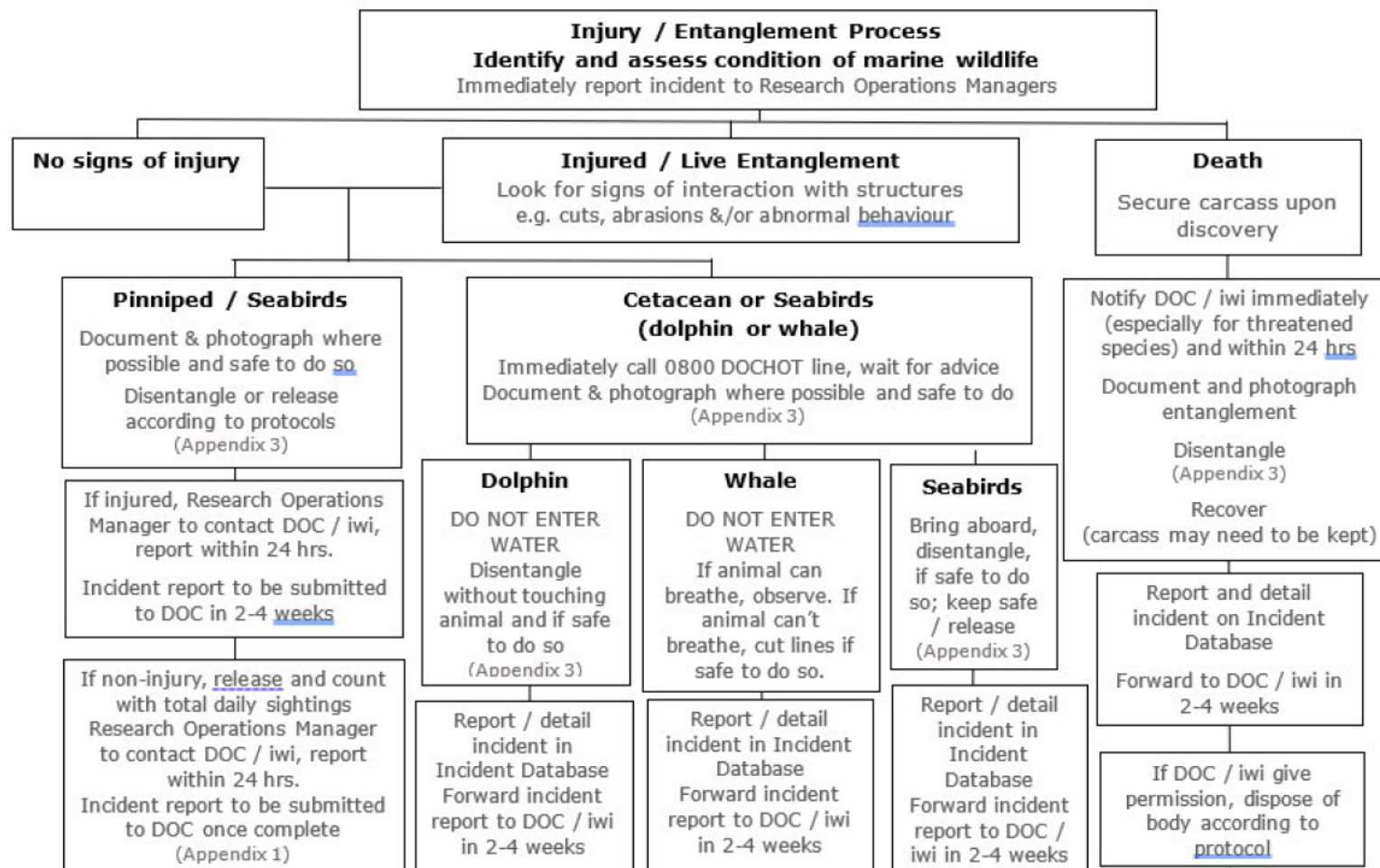


Figure 2. Flow chart outlining the various protocols and procedures for any marine mammal incidents (e.g. entrapment, injury or entanglement) with the farm.

APPENDIX TWO – MARINE MAMMAL SIGHTING LOG

[illegible]

APPENDIX THREE – RESOURCES AND REFERENCES

The below 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/nztcs29entire.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>