

Conservation Services Programme
Marine Mammal Medium-Term Research Plan
DRAFT

November 2024

Conservation Services Programme

Department of Conservation

1. Purpose

The Conservation Services Programme (CSP) undertakes research to understand and address the effects of commercial fishing on protected species in New Zealand fisheries waters (for further details see the [CSP Strategic Statement](#)). All marine mammal species in New Zealand waters are protected under the Marine Mammals Protection Act 1978; those encountered in New Zealand waters and subject to this plan are detailed in Table 1.

This CSP marine mammal medium term research plan (CSP marine mammal plan) will be reviewed annually and used as a tool to develop projects for the CSP Annual Plan over the subsequent five years to deliver on the marine mammal population, mitigation, and interaction research components of CSP. The plan has been developed as part of the work of the CSP Research Advisory Group ([CSP RAG](#)), and will be used in the development of [CSP Annual Plans](#) and any other relevant delivery mechanisms.

Marine mammal research that falls outside the scope and mandate of CSP, such as work prioritised and conducted through existing Threat Management Plans (TMPs) (e.g., the New Zealand sea lion and Hector's and Māui dolphin TMPs), and work that relates to threats other than the direct and indirect effects of commercial fishing, is not included in this plan.

2. Guiding objectives and risk framework

The CSP marine mammal medium term research plan is guided by several key documents and processes, including the CSP Strategic Statement, Te Mana O Te Taiao Aotearoa New Zealand Biodiversity Strategy 2020, relevant action and threat management plans, the New Zealand Threat Classification System (NZTCS), and relevant risk assessments. These are detailed further on in this document.

The relevant CSP objectives that have guided the development of this plan are as follows (for further details see the [CSP Strategic Statement](#)):

- **Objective A:** Proven mitigation strategies are in place to avoid or minimise the adverse effects of commercial fishing on protected species across the range of fisheries with known interactions.
- **Objective B:** The nature of direct adverse effects of commercial fishing on protected species is described.
- **Objective C:** The extent of known direct adverse effects of commercial fishing on protected species is adequately understood.
- **Objective D:** The nature and extent of indirect adverse effects of commercial fishing are identified and described for protected species that are at particular risk to such effects.
- **Objective E:** Adequate information on population level and susceptibility to fisheries effects exists for protected species populations identified as at medium or higher risk from fisheries.

The risk referred to in the guiding objectives is the risk of direct and indirect fisheries-related impacts, both of which could result in population level effects, to the 57 marine mammal taxa found in New Zealand waters (Table 1). A new marine mammal risk assessment was recently published (MacKenzie et al., 2022) using recently developed species distribution layers, and an alternative implementation of a multi-species spatially explicit fisheries risk assessment (SEFRA) to that which was used in previous marine mammal risk assessments. Of the 57 marine mammal taxa found in New Zealand, 54 were used in that assessment and grouped for the multi-species SEFRA model into nine species groups: small pinnipeds, large pinnipeds, Cephalorhynchus, common dolphin, other small dolphins, large dolphins, baleen whales, beaked whales, and other whales. Despite the use of the best available data, there remains considerable uncertainty around the inputs as few species encountered in New Zealand have been studied extensively in the New Zealand EEZ or elsewhere in the world.

Currently, comprehensive Risk Assessments (those that evaluate risk wider than just direct commercial fishing interactions) exist for three marine mammal species; Hector's and Māui dolphins (Roberts et al., 2019), and New Zealand sea lions (Roberts and Doonan, 2016).

Unlike seabirds and protected fish species, marine mammals do not currently have a National Plan of Action to help guide research on these taxa. The last iteration of a Marine Mammal Action Plan by the Department covered the period from 2005 to 2010 ([MMAP](#)). In lieu of an updated plan, the two primary aims of the MMAP, and their related objectives remain relevant:

- **Species protection:** To actively protect marine mammal species and populations, and allow the recovery of those that are threatened with extinction or that have been depleted or otherwise adversely affected by human activities or unusual natural events.
 - To build understanding of the main biological parameters for all marine mammals, and especially species threatened or affected by past or present human activities;
 - To protect key sites in New Zealand waters that are of significance to marine mammals;
 - To maintain and restore the distribution, abundance, and diversity of marine mammals in NZ waters and beyond;
 - To achieve self-sustaining populations of all marine mammals throughout their natural range and avoid extinctions of all marine mammal populations.
- **Management of human interactions and use:** To manage human interactions with marine mammals in order to minimise adverse effects on their survival, welfare and recovery, and to ensure the appropriate management of both living and dead marine mammals.
 - To identify and assess all significant threats to marine mammals (in general and as species, populations and individuals);
 - To address and mitigate human-related threats to the welfare of marine mammals and the viability of their populations and habitats, and to progressively work towards eliminating human-related mortalities of marine mammals;
 - To manage dead and distressed marine mammals, and the holding and taking of marine mammals (including body parts);
 - To address risks and uncertainty when making decisions and to ensure a precautionary approach is taken.

The Department of Conservation reviewed the New Zealand Threat Classification System (NZTCS) for marine mammals in 2019 (Baker et al., 2019). This new listing replaces all previous NZTCS lists for marine mammals and informs prioritisation and changes in threat status which are reflected in this document.

The Department of Conservation updated the New Zealand Biodiversity Strategy 2000-2020 and published **Te Mana O Te Taiao Aotearoa New Zealand Biodiversity Strategy 2020**¹ (TMOTT). The Strategy outlines thirteen objectives to safeguard New Zealand’s biodiversity, each of which has specific goals set to achieve five-, ten- and thirty-year targets. The 5-year/2025 goals in the Strategy that pertain most to CSP and to marine mammals include ambitious fisheries bycatch reduction goals, goals for the sustainable use of marine resources, and goals to protect marine biodiversity and ecosystems:

10.1.1 Prioritised research is improving baseline information and knowledge of species and ecosystems

10.7.1 There have been no known human-driven extinctions of indigenous species

12.2.1 The number of fishing-related deaths of protected marine species is decreasing towards zero for all species

By 2030 and 2050, respectively, TMOTT includes bycatch reduction goals that state that:

12.2.2 The direct effects of fishing do not threaten protected marine species populations or their recovery

12.2.3 The mortality of non-target species from marine fisheries has been reduced to zero

The TMOTT goals serve to provide context for the broader application of CSP research into the Department’s wider research planning and strategic directions for the next five years and onwards.

3. Data Requirements

In general, there is a gross lack of data relating to the population structure of marine mammals in New Zealand. There are 57 taxa (species/sub-species) of marine mammal found in New Zealand waters. Of these, 30 are classified as data deficient (i.e., not enough information exists to properly determine their threat status). Of the remaining 27 taxa, the breakdown is as follows:

Threatened – Nationally Critical	4
Threatened – Nationally Endangered	1
Threatened – Nationally Vulnerable	2
At Risk – Recovering	1
At Risk – Naturally Uncommon	2

¹ <https://www.doc.govt.nz/globalassets/documents/conservation/biodiversity/anzbs-2020.pdf>

Not threatened	5
Migrant	1
Vagrant	11

This plan describes a research approach to fill knowledge gaps to better understand marine mammal species' susceptibility to impacts from commercial fisheries and therefore inform and prioritise management actions to avoid, remedy, or mitigate these impacts:

- **Estimated capture rates:** The estimation of capture rates and numbers in different fisheries is a core prerequisite for setting research priorities for marine mammals as this is of great importance in accurately estimating risk. This information is generally best obtained through vessel observation programmes but may increasingly be supplemented by data collected via cameras on vessels. Preliminary information has been included in this plan that can be used in setting observation and mitigation priorities.
- **Species distributions:** To accurately assess risk of fishing as a function of overlap with and impacts from commercial fisheries, developing accurate species distributions are required. For migratory species these distributions should contain seasonal distributions. For the more commonly caught marine mammals (dolphins and pinnipeds), it is possible that some information can be obtained through incidental capture and fisheries observer data.
- **Population demographics:** Most marine mammals exhibit slow growth rates, late sexual maturation, and low fecundity. These factors place them at increased risk of impacts from commercial fishing mortalities. Having a better understanding of the size and genetic structuring of marine mammal populations would allow better determination of the resilience of these populations to fishing impacts and key areas of susceptibility.
- **Post-release survival:** The degree of post-release survival in commercial fisheries is not well understood for marine mammal species. Some fishery/species interactions may have a higher incidence of live release than others, for example marine mammals bycaught on longline vs caught in trawl and/or setnets. While these bycaught animals are assessed as being alive at time of release, the level of injury or subsequent interaction induced mortality is poorly understood.
- **Mitigation efficacy:** Female New Zealand sea lions have been observed interacting with squid trawl nets around the Auckland Islands. The squid trawl fishery developed SLEDs (sea lion exclusion devices) to reduce the number of sea lions caught and drowned in trawl nets. SLED efficacy has been questioned as animals that exit from a net via a SLED may suffer impacts with the device, potentially leading to mild brain injury (e.g., mild concussion) leading to risk of drowning. Work was undertaken through the Aquatic Environment Working Group to improve our estimation of the number of sea lions likely to escape through the SLED and survive. This pulled together the best available information and expert opinion to estimate and model the likelihood of each

potential outcome for a sea lion interacting with a trawl net. This work allowed for a multiplier to be used in the development of the current SQU 6T Operational Plan that took cryptic mortality into account. There will be uncertainty around the estimations, however, until technology allows for more accurate assessments of the fate of sea lions interacting with trawl nets, the desktop study by Meyer (2019) provides the best available information to guide this work in the meantime.

- **Indirect effects:** The indirect effects of fishing (i.e., the alteration of food sources through habitat modification and/or prey competition, which can cause nutritional stress) has been identified as a potential driver of population decline for New Zealand sea lions and could similarly be so for other marine mammal populations. Further information on the effect of the alteration of food sources and/or nutritional stress on marine mammal populations would be of importance for accurately estimating risk.
- **Animal behaviour and interaction with fishing gear:** Other sources of information, particularly regarding the nature of marine mammal interactions with or behaviour around fishing gear (i.e., trawl gear, longline gear, setnets, and trap and/or pot lines), is also of great importance in accurately estimating risk. Understanding the behaviour of animals including their diving behaviour and foraging strategies, can help to better understand the potential overlap and likelihood of capture in a particular fishery. This understanding can help identify what aspects of the fishery may make them more or less vulnerable to capture, increasing our ability to develop meaningful mitigation strategies and approaches.

4. Current risk and uncertainty

The risk assessments considered in the development of this plan only examine the direct effects of commercial fishing and do not account for the indirect effects of fishing (i.e., habitat removal, prey availability, etc.) or any wider anthropogenic or environmental change effects. The population research component of this plan is focused on obtaining better estimates of those parameters, which contribute most uncertainty in risk estimates.

The latest marine mammal risk assessment has been used in this plan to consider those species with likely high numbers of capture events, and the impacts on those species with high conservation threat status. This risk assessment was developed using data up to the 2019 fishery year, so changes implemented under the TMP for Hector's and Māui dolphins in 2020 and more recently are not reflected in its outputs. As a result, some caution needs to be given to how these outputs are applied, particularly as Hector's and Māui dolphins are amongst those with greatest risk.

The species with the greatest number of interactions with fisheries is the New Zealand fur seal. Despite their conservation status as *Least Concern*, such high rates of bycatch will need to be addressed to reach the target within TMOTT of reducing mortality of non-target species in marine fisheries to zero. The risk assessment did a good job of predicting the number of captures of fur seals; however, the predicted distribution of captures did not fit well with actual data, this was also true for NZ sea lions and common dolphins.

Uncertainties within the risk assessment through modelling inputs (notably distribution for many species), the paucity of information on rare species or those infrequently recorded from New Zealand waters, and where species may be confused within fisheries data, show both the caution with which these outputs should be used, but also the areas that require better data to resolve. Numerous species and whole species groups where there is a scarcity of information on fisheries interactions, basic biological information, population sizes, and distribution should perhaps be omitted from future risk assessments as they have likely been a source for confounding the results in some areas. There were, for example insufficient, observed captures of whales to assess the performance of the model (for the three whale groups).

Previous iterations of this plan have largely focused on the outputs of Abraham et al. (2017) but also included assessments involving more detailed quantitative modelling to assess fisheries risk for some taxa. These assessments are listed in Table 2. This plan does not attempt to summarise the findings and recommendations from these assessments, but the gaps identified in those documents are captured here. The findings should be taken into consideration by the CSP RAG when prioritizing research proposals for these taxa.

Pot fisheries for which a number of interactions have been recorded, have yet to be assessed within these risk assessments. To date the primary species noted to interact with such gear are humpback whales and killer whales. Other species for which there are records of entanglement include southern right whales and some dolphin species, including Hector's dolphin. Populations of humpback whales and southern right whales appear to be undergoing post-whaling recovery in New Zealand waters, with an increasing number of interactions with pot fishing gear. With the occurrences of pot fishing gear among entanglement reports, increasing populations of some whale species, and the likelihood of ongoing spatial and temporal overlap between pot fisheries and species prone to entanglement, suggest that entanglement incidents have the potential to further increase (Pierre *et al.* 2022). It would therefore be sensible to include pot fisheries in future risk assessments, and further explore the nature of these interactions and mitigation approaches for these fisheries.

The assigned conservation status under the NZTCS is consideration for prioritised action and research particularly where there are known interactions with fisheries. Thirty of the 57 species are data deficient and should be assumed threatened, however, for the most part there is no indication of fisheries interactions. The conservation status of some species may, however, be a result of lack of recent detail on populations within New Zealand waters for which historic records have allowed for species to be assigned to a particular threat status (e.g., killer whales: listed as *nationally critical*). Others may be vulnerable to fisheries because of their population size and the likelihood that understanding fisheries risk may be confounded because species are readily misidentified, such as between false killer whales (*at risk- naturally uncommon*) and pilot whales (*least concern*), so the true risk may not be understood. The understanding of the nature of an interaction with a fishery may be important, such as if there is a depredation issue, in some cases the threat status of a species gives a good indication that the fishery risk is not impacting on the population. Long-finned pilot whales for example have few records of fisheries interactions across different fisheries, however they appear able to sustain huge losses to their populations each year as a result of strandings, however, consideration should be given to minimizing risks for animal welfare reasons and overall to meet targets under TMOTT.

5. Research priorities

As there is a relative paucity of data for marine mammals in New Zealand, particularly relating to their distribution, population structure and the nature of their interactions with commercial fishing, this plan is not intended to prescribe a fixed five-year stream of research, but rather provides a list of research priorities that should be undertaken in the next few years to narrow the data gaps and allow for further research. The CSP should be focussed primarily on those species where fisheries overlap and interaction is likely, and to gather better data for those species for which interactions with fisheries are common, or where species are most vulnerable.

The CSP marine mammal research priorities fall roughly into six categories:

- 1) Characterisation of marine mammal bycatch
- 2) Mitigation studies
- 3) Population monitoring
- 4) Population size and structure determination
- 5) Tracking/distribution studies
- 6) Post release survival

These priorities have been developed to meet the following outputs which are specifically related to the risk from fishing:

- Routine population monitoring for marine mammal species at risk from commercial fishing impacts (i.e., aerial monitoring, vessel surveys, pup counts (pinnipeds), drone monitoring, public and tourism sightings and observer/fishermen reports, genetic methods). Methods to integrate different monitoring techniques.
- Tracking and distribution studies of highly mobile marine mammal species to inform estimates of both species' distribution patterns and spatial overlap between commercial fisheries and marine mammal species. These studies should be designed to be informative on seasonal movements, foraging, and diving behaviour. This may also include changes in distribution to either fisheries or species as a result of climate change where this may contribute to shifts in fisheries overlap.
- Population size and structure should be determined (e.g., through genetic analysis) for marine mammal species to identify both structure of populations within the New Zealand Exclusive Economic Zone (NZ EEZ) and differentiation from worldwide populations, to enable adequate population level management.
- Quantification of the nature of migratory species' migration patterns (i.e., identification of migratory routes and scale, seasons, and overlap with commercial fishing activity), and how they might change under future climate change scenarios. Engaging in coordination with international agreements for marine mammals.
- Where marine mammal species are known to be released alive following capture, assess post-release survival to better estimate bycatch mortality.

- Development of further live release methods and protocols to maximise post-release survival probability of marine mammal species for fisheries where live captures are relatively frequent.
- Method and species-specific bycatch mitigation options developed for each protected marine mammal species known to interact with commercial fisheries.
- Quantification of the indirect effects of fishing and whether these effects can act as potential drivers of population decline in marine mammals.
- Description of the diet of marine mammals, and identification of potential interactions with commercial species; examination of the potential overlap between marine mammal feeding areas and commercial fishing species distribution and how this might change under future climate change scenarios.
- Description of potential high-risk areas following fishing effort data, historic bycatch records, fleet characterisation, and marine mammals' known distribution.

Tables 3 & 4 detail the research and development priorities for the 13 marine mammal taxa that have been suggested as priority species. These 10 species have been selected based on their threat status, the incidence of being bycaught in commercial fisheries, or a combination of these two. Whilst other research prioritisation processes are in place for Hector's and Māui dolphins, and sea lions, various fisheries related projects may be suitable for funding through CSP.

Priority level (Low, Medium, and High) has been assigned qualitatively based on the importance of the work (i.e., whether the research addresses significant data gaps), the NZ threat classification of the species, the species' risk of fisheries related mortality, and the species' estimated annual potential fatalities.

To develop research priorities to deliver the CSP research response detailed in Tables 3 and 4, some further operational principles were developed and used as appropriate:

- Studies on highest risk species prioritised for earlier years, as informed by risk assessments;
- Mitigation, live release, and post release survival studies should focus on fisheries with most frequent interactions;
- Annual grouping of CSP projects by location across protected species taxa, to maximise synergies with other research projects, for example vessel-based research in the Auckland Islands squid fishery can assist both basking shark and New Zealand sea lion research;
- Planning live release, survival estimation, and tracking studies in a complementary manner;
- Aim to leverage from existing studies, of both the Department and other government and non-government organisations;

- Prioritise review projects thereby ensuring adequate data collection is advanced in early years, as these projects are relatively low cost and may result in finding current risk estimates are under-estimated, and;
- Prioritise studies which make better use of existing research platforms such as biological sampling by government observers.

6. References

- Abraham, E.R.; Neubauer, P.; Berkenbush, K.; Richard, Y. 2017. Assessment of the risk to New Zealand marine mammals from commercial fisheries. New Zealand Aquatic Environment and Biodiversity Report 189. Prepared for the Ministry of Primary Industries. 127 p.
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- Roberts, J.O.; Doonan, I.J. 2016. Quantitative Risk Assessment of Threats to New Zealand Sea Lions. New Zealand Aquatic Environment and Biodiversity Report No. 166. 111 p.
- Roberts, J.O.; Webber, D.N.; Roe, W.D.; Edwards, C.T.T.; Doonan, I.J. 2019. Spatial risk assessment of threats to Hector's and Māui dolphins (*Cephalorhynchus hectori*). New Zealand Aquatic Environment and Biodiversity Report No. 214. Prepared by Fisheries New Zealand. 174 p

Tables

Table 1. List of 57 taxa and “ecotypes” of marine mammals encountered in New Zealand waters and their conservation status under the NZ Threat Classification System and IUCN red list, adapted from Baker et al., 2019 and following the species groupings in the marine mammal risk assessment of MacKenzie et al. 2022.

Species group	Species common name	Species name	New Zealand threat status	IUCN threat status
Small pinniped	Antarctic fur seal	<i>Arctocephalus gazella</i>	Vagrant	Least concern
	Crabeater seal	<i>Lobodon carcinophaga</i>	Vagrant	Least concern
	New Zealand fur seal	<i>Arctocephalus forsteri</i>	Not threatened	Least concern
	Ross seal	<i>Ommatophoca rossi</i>	Vagrant	Least concern
	Subantarctic fur seal	<i>Arctocephalus tropicalis</i>	Vagrant	Least concern
Large pinniped	Leopard seal	<i>Hydrurga leptonyx</i>	At risk – naturally uncommon	Least concern
	New Zealand sea lion	<i>Phocarctos hookeri</i>	Nationally vulnerable	Endangered
	Southern elephant seal	<i>Mirounga leonina</i>	Nationally critical	Least concern
	Weddell seal	<i>Leptonychotes weddellii</i>	Vagrant	Least concern
Cephalorhynchus	Hector’s dolphin	<i>Cephalorhynchus hectori hectori</i>	Nationally vulnerable	Endangered
	Māui dolphin	<i>Cephalorhynchus hectori maui</i>	Nationally critical	Critically endangered
Common dolphin	Common dolphin	<i>Delphinus delphis</i>	Not threatened	Least concern
Other small dolphin	Bottlenose dolphin	<i>Tursiops truncatus</i>	Nationally endangered	Least concern
	Dusky dolphin	<i>Lagenorhynchus obscurus</i>	Not threatened	Least concern
	Fraser’s dolphin	<i>Lagenodelphis hosei</i>	Data deficient	Least concern
	Hourglass dolphin	<i>Lagenorhynchus cruciger</i>	Data deficient	Least concern
	Melon-headed whale	<i>Peponocephala electra</i>	Vagrant	Least concern
	Pygmy killer whale	<i>Feresa attenuata</i>	Vagrant	Least concern
	Pantropical spotted dolphin	<i>Stenella attenuata</i>	Vagrant	Least concern
	Risso’s dolphin	<i>Grampus griseus</i>	Data deficient	Least concern
	Rough-toothed dolphin	<i>Steno bredanensis</i>	Data deficient	Least concern
	Southern right whale dolphin	<i>Lissodelphis peronii</i>	Data deficient	Least concern
	Striped dolphin	<i>Stenella coeruleoalba</i>	Data deficient	Least concern
	Spectacled porpoise	<i>Phocoena dioptrica</i>	Data deficient	Least concern

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Large dolphin	False killer whale	<i>Pseudorca crassidens</i>	At risk – naturally uncommon	Near threatened
	Long-finned pilot whale	<i>Globicephala melas</i>	Not threatened	Least concern
	Orca	<i>Orcinus orca</i>	Nationally critical	Data deficient
	Orca “Type B”	<i>Orcinus orca</i>	Vagrant	Data deficient
	Orca “Type C”	<i>Orcinus orca</i>	Vagrant	Data deficient
	Orca “Type D”	<i>Orcinus orca</i>	Vagrant	Data deficient
	Short-finned pilot whale	<i>Globicephala macrorhynchus</i>	Data deficient	Least concern
Baleen whale	Antarctic blue whale	<i>Balaenoptera musculus musculus</i>	Data deficient	Critically endangered
	Antarctic minke whale	<i>Balaenoptera bonarensis</i>	Data deficient	Near threatened
	Bryde’s whale	<i>Balaenoptera edeni</i>	Nationally critical	Least concern
	Fin whale	<i>Balaenoptera physalus</i>	Data deficient	Vulnerable
	Humpback whale	<i>Megaptera novaeangliae</i>	Migrant	Endangered (Oceania) Least Concern (Global)
	Minke whale (Dwarf)	<i>Balaenoptera acutorostrata</i>	Data deficient	Least concern
	Pygmy blue whale	<i>Balaenoptera musculus breviceuda</i>	Data deficient	Endangered increasing
	Pygmy right whale	<i>Caperea marginata</i>	Data deficient	Least concern
	Sei whale	<i>Balaenoptera borealis</i>	Data deficient	Endangered
	Southern right whale	<i>Eubalaena australis</i>	At Risk Recovering	Least concern
Beaked whale	Andrew’s beaked whale	<i>Mesoplodon bowdoini</i>	Data deficient	Data deficient
	Arnoux’s beaked whale	<i>Berardius arnuxii</i>	Data deficient	Least concern
	Cuvier’s beaked whale	<i>Ziphius cavirostris</i>	Data deficient	Least concern
	Dense-beaked whale	<i>Mesoplodon densirostris</i>	Data deficient	Least concern
	Ginkgo-toothed beaked whale	<i>Mesoplodon ginkgodens</i>	Data deficient	Data deficient
	Gray’s beaked whale	<i>Mesoplodon grayi</i>	Not threatened	Least concern
	Hector’s beaked whale	<i>Mesoplodon hectori</i>	Data deficient	Data deficient
	Pygmy beaked whale	<i>Mesoplodon peruvianus</i>	Data deficient	Least concern
	Ramari’s beaked whale	<i>Mesoplodon eueu</i>	Data deficient	Not listed

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	Shepherd's beaked whale	<i>Tasmacetus shepherdi</i>	Data deficient	Data deficient
	Southern bottlenose whale	<i>Hyperoodon planifrons</i>	Data deficient	Least concern
	Spade-toothed whale	<i>Mesoplodon traversii</i>	Data deficient	Data deficient
	Strap-toothed whale	<i>Mesoplodon layardii</i>	Data deficient	Least concern
Other whale	Dwarf sperm whale	<i>Kogia sima</i>	Data deficient	Least concern
	Pygmy sperm whale	<i>Kogia breviceps</i>	Data deficient	Least concern
	Sperm whale	<i>Physeter macrocephalus</i>	Data deficient	Vulnerable

Table 2. List of marine mammal risk assessments

Species	Citation and Link
Hector's and Māui dolphin	Roberts, J.O.; Webber, D.N.; Roe, W.D.; Edwards, C.T.T.; Doonan, I.J. 2019. Spatial risk assessment of threats to Hector's and Māui dolphins (<i>Cephalorhynchus hectori</i>). New Zealand Aquatic Environment and Biodiversity Report No. 214. Prepared by Fisheries New Zealand. 174 p
New Zealand sea lions	Roberts, J.; Doonan, I. 2016. Quantitative Risk Assessment of Threats to New Zealand Sea Lions. New Zealand Aquatic Environment and Biodiversity Report No. 166. 111 p.
Level 2 Marine Mammal Risk Assessment	Abraham, E.R.; Neubauer, P.; Berkenbush, K.; Richard, Y. 2017. Assessment of the risk to New Zealand marine mammals from commercial fisheries. New Zealand Aquatic Environment and Biodiversity Report 189. Prepared for the Ministry of Primary Industries. 127 p.
New Zealand marine mammal populations	MacKenzie, D.I.; Fletcher, D.; Dillingham, P.W.; Meyer, S.; Pavanato, H. (2022). Updated spatially explicit fisheries risk assessment for New Zealand marine mammal populations. New Zealand Aquatic Environment and Biodiversity Report No. 290. 218 p. http://www.mpi.govt.nz/news-and-resources/publications http://fs.fish.govt.nz go to Document library/Research reports

Table 3. CSP research and development priorities for select New Zealand marine mammal taxa for 2022-2027 of species groups (following MacKenzie *et al.* 2022): Small pinniped, large pinniped, Cephalorhynchus, Common dolphin, Small dolphin
High and Medium/High priorities have been highlighted

Species group	Small pinniped	Large pinniped		Cephalorhynchus		Common dolphin	Small dolphin	
Species	New Zealand fur seal	New Zealand sea lion	Southern elephant seal	Māui dolphin	Hector's dolphin	Common dolphin	Dusky dolphin	Bottlenose dolphin
Mitigation studies	High (capture mitigation)		Medium (capture mitigation – trawl)		Medium/ High (capture mitigation – setnet & trawl, pot entanglement)	Medium/High (understanding capture mitigation –trawl)	Medium (capture mitigation - setnet)	
Population monitoring	Medium to High	High (annually)	Medium	High	High			Medium/High (different coastal populations)
Population size and structure determination	High	Medium		High	High (Key areas)	Medium	Medium	Medium/High (Marlborough Sounds)
Tracking and distribution studies	Medium/High	High (distribution particularly around mainland)	Low/Medium (quantify fisheries overlap)	High (offshore and harbours)	Medium/ High (species distribution/ habitat use – North coast South Island)			
Indirect effects of fishing	Low/ Medium	Medium	Low/ Medium		Low/ Medium	Low/Medium	Low/ Medium	Low/ Medium
Post release survival	Medium		Low/Medium		Low/ Medium		Low/Medium	Low/ Medium

Table 4. CSP research and development priorities for select New Zealand marine mammal taxa for 2022-2027 of species groups (following MacKenzie *et al.* 2022): large dolphin, Baleen whale. High and Medium/High priorities have been highlighted.

Species group	Large dolphin			Baleen whale	
Species	Pilot whale	False Killer whale	Killer whale	Humpback whale	Southern right whale
Mitigation studies	Medium (capture mitigation - trawl)	Medium (capture mitigation - trawl)	Medium/High (pot/trap lines)	Medium (pot lines)	Medium (pot lines)
Population monitoring	Low/Medium (genetic overview of population)	Medium (genetic overview of population)	Medium to High		
Population size and structure determination	Low/Medium (genetic overview of population)	Medium (genetic overview of population)	High (population size for coastal ecotype)		
Tracking/distribution studies		Low/Medium			
Indirect effects of fishing	Low/ Medium	Low/ Medium	Low/ Medium	Low/ Medium	Low/ Medium
Post release survival	Low/ Medium	Low/ Medium	Low/ Medium	Low/Medium	Low/Medium