

Hector’s and Māui dolphin research strategy

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Purpose

The purpose of the Hector’s and Māui dolphin research strategy is to:

- support the Government’s vision that New Zealand’s Hector’s and Māui dolphin populations are resilient and thriving throughout their natural range¹;
- support the long-term goal of ensuring Hector’s and Māui dolphin subpopulations are thriving or increasing, supported by an enduring, cohesive and effective threat management programme across New Zealand²;

¹ [Hector’s and Māui Dolphin Threat Management Plan](#)

² [Hector’s and Māui Dolphin Threat Management Plan](#)

- improve knowledge of poorly understood threats³, the nature of those threats, and their extent; and
- identify and prioritise resources for new research, monitoring of populations and management measures, and to inform management responses to those threats.
- to support researchers when applying for funding from both DOC, MPI, and other funding bodies to undertake research that is identified in this research strategy.

Context

Hector's and Māui dolphins are small coastal dolphins found only in New Zealand. Hector's dolphins were gazetted in 1999 as a threatened species under the Marine Mammals Protection Act 1978 (MMP Act). Since 2002, Hector's dolphins (*Cephalorhynchus hectori hectori*) and Māui dolphins (*C. h. maui*) have been designated as separate sub-species in recognition of the genetic and morphometric differences between the populations. Hector's dolphins live mainly around the South Island and Māui dolphins are only found on the west coast of the North Island (WCNI).

Status of Hector's and Māui dolphins

Hector's dolphins are ranked as *Nationally Vulnerable* under the New Zealand Threat Classification System (NZTCS, Baker et al. 2019) with an overall population estimated to consist of around 15,700 individual dolphins (MacKenzie & Clement 2014, 2016). Māui dolphin is ranked *Nationally Critical* under the NZTCS (Baker et al. 2019) and has an estimated population of around 63 (95% c.i. 57-75) individuals above 1 year of age (Baker et al. 2016). Population trends are uncertain for populations of both Hector's and Māui dolphins. Due to their very low population size Māui dolphins are particularly vulnerable to any human-induced deaths.

The Threat Management Plan

In response to public and government concern about the effect of human-induced deaths on these dolphins, the Hector's and Māui Dolphin Threat Management Plan (TMP) was developed in 2008. The Māui dolphin component was reviewed in 2012, and a review of the TMP for each subspecies was undertaken collectively in 2019⁴.

The TMP operates on a "subpopulation" scale. This means it differentiates between the two sub-species and recognizes the east (ECSI), west (WCSI), north (NCSI) and south (SCSI) coasts of the South Island as separate Hector's dolphin subpopulations, consistent with genetic evidence. There have been sporadic sightings of animals off the east coast of the North Island (ECNI), but there is not enough information to assign them to a sub-population, and there is not enough evidence to suggest that there is a consistent, self-sustaining population in this region.

For the purpose of this research strategy the west coast North Island (WCNI) is divided into the *northern zone* for the area north of Cape Egmont in Taranaki and *southern zone* for the area south of Cape Egmont to Wellington. The *northern zone* includes the core range of the Māui dolphin population, and the *southern zone* provides for the future recovery of the Māui and/or Hector's dolphins into their historical natural range. The *southern zone* may currently be used by dolphins to move between the South Island and the North Island.

³ [Hector's and Māui Dolphin Threat Management Plan](#)

⁴ [Hector's and Māui dolphin Threat Management Plan](#)

The areas described above are used to help structure this research strategy. Maps showing the along-shore boundaries of these areas can be found in Appendix 4.

There are a number of threats to the dolphins such as:

- Set net and trawl fishing;
- Toxoplasmosis and other diseases;
- Seismic surveying;
- Seabed mining;
- Dolphin watching and vessel traffic;
- Oil spills;
- Other pollution and sediment run-off;
- Coastal development; and
- Climate change.

These threats may affect the dolphins through various overlapping direct and indirect mechanisms including injury, disease, disturbance, noise, habitat modification, impacts on prey distribution and abundance, reduced foraging success, displacement, and habitat fragmentation. The severity of impacts can be context and scale dependent and will vary depending on a range of interrelated factors (for example, location, spatial extent, size of an operation, technology and timing).

Some of these threats are well understood and extensively addressed in the TMP, such as commercial fishing, whereas others are not well understood, nor well addressed e.g. climate change and indirect effects of human-induced changes in their habitat.

Of these threats, commercial and recreational set-netting, trawling, toxoplasmosis, seismic surveying and seabed mining are actively managed under the TMP. The other threats listed above are mostly managed under other existing regulatory regimes that are generally considered appropriate for managing the risks to Hector's and Māui dolphins.

New emerging threats were identified in the 2023 review of this strategy, including potential impacts from the development of offshore renewable energy projects, and the increasing awareness of risks associated with aquaculture, and cruise ship tourism.

Research strategy and objectives

Gathering more information on Hector's and Māui dolphins and the threats impacting them is crucial to ensuring the actions implemented under the TMP are appropriate and lead to subpopulations thriving and recovering.

Under the TMP, this research strategy has been developed to coordinate research activities amongst government agencies and other research providers. This strategy will be reviewed annually.

The research objectives are:

- Improve information on cause of death of beach-cast dolphins;
- Improve understanding of diseases impacting Hector's and Māui dolphins;
- Improve information on dolphin distribution and movements;
- Improve information on the distribution of dolphin prey;
- Continue monitoring population size, trends and factors important to population growth for Māui and Hector's dolphins;

- Characterise reproductive life history parameters and understand factors that might impair calving rate and survival of offspring;
- Improve information on fisheries impacts; and
- Improve estimation of dolphin subpopulation status and trends.

The threat from the disease toxoplasmosis caused by the parasite *Toxoplasma gondii* is being addressed within a separate research plan that reflects the complex nature of the problem and its terrestrial origin in cats.

Guiding policies and legislative framework

This research strategy is guided by the responsibilities and legislative framework of DOC and Fisheries New Zealand. DOC is the leading central government agency responsible for the conservation of New Zealand's natural and historic heritage, which includes Hector's and Māui dolphins. Fisheries New Zealand is responsible for managing fisheries and their effects on protected species. Regional councils provide for the protection of the habitats of indigenous fauna under the Resource Management Act 1991. There are a number of policies and legislation that guide agencies' responsibilities, which are outlined in Appendix 3.

Collaborative research planning

An effective management and monitoring process for Māui and Hector's dolphins must be based on robust information and evidence-based decision-making. To allow input into this process by the science community, two workshops were held with invited participants from New Zealand and overseas to:

- Evaluate relevant knowledge gaps;
- Identify tools and methods to fill these gaps; and
- Prioritise research to best advance our understanding of Hector's and Māui dolphins, with a view to informing appropriate future management options for each sub-species.

DOC and Fisheries New Zealand used the information identified through these workshops to help develop this research strategy.

Information needs and research questions

The priority information gaps identified from the workshops are listed in Appendix 1. These priorities fall under the following themes⁵:

1) Life history and population dynamics

- a. *Understanding populations* (at different scales as appropriate)
 - i. Demographic assessment of sub-populations: annual reproductive rates, reproductive status, age and sex structure, and survival rates – to assess the level of risk each population faces and monitor population trajectory [1]

⁵ Numbers in square brackets [##] reflect the average priority assigned by participants in the workshops to the top 25 high ranking questions identified in the workshop.

- ii. Understanding genetic population structure which may influence the population resilience and therefore population viability, and changes in genetic diversity through time. [14]
 - iii. Understanding genetic relationships and connectivity of adjacent Hector's dolphin populations at different scales. [15]
- b. *Distribution*
- i. Particular focus on smaller sub-populations and areas recognised as high risk, or uncertain from the Spatially Explicit Fisheries Risk Assessment SEFRA⁶. [2]
 - Temporal and spatial variability in distribution of key populations [2]
 - Understanding offshore distribution [5]
 - Understanding diel movements [19]
 - Understanding factors influencing connectivity/dispersal between subpopulations [9]
 - Improve existing distribution modelling from the TMP risk assessment [6]
 - Understanding the distribution and genetics of ephemeral populations e.g. ECNI, WCNI – *southern zone* [20]
 - Do the animals on the ECNI represent a remnant population or new immigrants? [23]
 - ii. Understanding what factors within turbidity are driving distribution [23]
- c. *Abundance and population trajectories*
- i. Estimated total population size and annual rates of population growth or decline for key populations at different scales as appropriate [3]
 - ii. Reconciling population estimates from different methods and techniques, to understand and potentially correct for inherent biases when using each method [11]

2) Habitat use, behaviour, and diet

- a. *Understanding offshore habitat use* [5]
- b. *Understanding dolphin diet and the seasonal/temporal distribution of prey species* [12]
- c. *Understanding how dolphins are using the water column* [17]
- d. *Understanding diel foraging behaviour* [19]

3) Understanding threats

- a. *Fine scale understanding of threats to Hector's dolphins from various fisheries*
 - i. Improving estimates of bycatch rates using data with better spatial and temporal coverage [4]
 - ii. Better understanding of cryptic mortality rates [7]
 - iii. Estimating levels of recreational, cultural, and illegal fisheries bycatch [10]
 - iv. Understanding factors that influence dolphin captures in trawl fisheries [16]

⁶ <https://www.mpi.govt.nz/dmsdocument/35007/direct>

- v. Understanding how the dolphins are interacting with different fisheries. Fine scale behaviour around fishing gear, vessels, and different fisheries types [21]
- b. *Health – other than Toxoplasmosis*
 - i. Understanding transmission pathways and population level risk from brucellosis and tuberculosis [8]
 - ii. Effects of brucellosis on reproductive output, as this appears to affect reproductive females [8]
 - iii. Investigating the potential for full-screen health assessments [8]
 - iv. Addressing the seasonal disparity in carcass collection and assessing for more cryptic causes of death during the winter period [13]
- c. *Pollutants*
 - i. Understanding the sub-lethal effects of noise and the suitability of existing regulations [18]
- d. *Climate change implications*
 - i. Estimating potential climate change effects on each sub-population, with special focus on Māui dolphins [24]
 - ii. Understanding thermal thresholds for calves [25]
 - iii. Understand climate change effects on key prey species [26]

The clear indication from the workshops was the priority need to focus on demographics, distribution, abundance, and connectivity of small sub-populations. As such, research will first focus on the following:

- West coast North Island northern zone: epigenetic aging, distribution monitoring, and refining of habitat preference models (including diet, and prey distributions).
- South coast South Island: abundance, annual breeding rate, and distribution.
- North coast South Island: abundance and distribution.
- Otago: abundance, determining whether this is a closed or open population, and distribution.
- Key demographic data is still required for life history tables, and key amongst these is an understanding of the frequency of pods with calves. This is best addressed by analysing the long-term Banks Peninsula Marine Mammal Sanctuary database.

Appendix 2 lists research priorities for each sub-population as defined under the TMP structure.

Current Research

Current research projects with project descriptions will be updated regularly as they are developed. These projects will align with priorities as listed above and drawn from priorities identified for each sub-population in Appendix 2. These current research projects can be viewed in an active document that will be updated regularly, including links to associated outputs.

Researchers are encouraged to supply pdf copies of their research outputs so that these can be uploaded to the DOC website.

Mechanisms for delivery, funding and review

Research undertaken on Hector's and Māui dolphins can be delivered through several different streams:

- DOC's Conservation Services Programme (CSP) runs an annual planning and procurement process for research that seeks to better understand and/or mitigate against the threat of fishing on protected species. For more information on this programme see the DOC website⁷.

Observer coverage within inshore fisheries aimed at delivering on the relevant Threat Management Plan objectives for Hector's and Māui is also funded through the CSP. Observers working in offshore fisheries generally have multiple priorities alongside monitoring protected species interactions, which include stock assessments and compliance. DOC contributes to a portion of observer time in these offshore fisheries. Observer coverage is determined through an annual seaday planning process between DOC and Fisheries NZ (including observer services, fisheries management, science and fisheries compliance). A similar joint process with Fisheries NZ and DOC is being used, with the roll-out of Electronic Monitoring (EM), which includes such things as the level of review from onboard cameras across different fisheries regions.

With EM there is the requirement for cameras to always be operating. Unlike with observers (who are either on board or not), the cameras are always operating regardless of whether the choice is made to subsequently review or not. This theoretically results in an incentive for fishers to report accurately, and therefore the observer effect is present 100% of the time.

- Research, development and operational work is funded and procured through standard DOC procedures.
- Fisheries New Zealand has an annual fisheries research services planning and procurement process that includes protected species research.

DOC and Fisheries New Zealand have committed funding towards research on the dolphins, however, neither agency is likely to have sufficient funding to meet all the research needs described in this strategy document. This document, therefore, is intended to support researchers when applying for funding from other funding bodies to undertake research that is identified in this research strategy.

- Other funding sources: Other Government funding streams may be able to contribute to research on Hector's and Māui dolphins (e.g. Ministry of Business Innovation and Employment, Crown Research Institutes core funding, National Science Challenges, etc.), subject to demonstrating the relevance between the goals of the TMP and the requirements of these funding streams.
- Private foundations, non-governmental organisations, and industry organisations (e.g. tourism operators, fishing companies) may also wish to fund or co-fund designated projects or undertake programmes that support the research objectives of this strategy.
- Universities may have access to funds (e.g. grants or scholarships) for programmes of research that support the objectives of this strategy, where they may meet all or part of the cost of the research.

All research commissioned through DOC or MPI processes will be comprehensively peer reviewed by DOC's Conservation Services Programme Technical Working Group or MPI's Aquatic Environment and Biodiversity (AEBR) Working Group. The same forums are offered to research commissioned through other funding streams and participation in these groups is encouraged for transparency and rigour.

There will be an annual review of the research undertaken on Hector's and Māui dolphins, as well as a review of this research strategy.

⁷ <https://www.doc.govt.nz/our-work/conservation-services-programme/>

References

Baker, C.S.; Steel, D.; Hamner, R.M.; Hickman, G.; Boren, L.; Arlidge, W.; Constantine, R. (2016). Estimating the abundance and effective population size of Māui dolphins using microsatellite genotypes in 2015–16, with retrospective matching to 2001–16. Department of Conservation, Auckland. 70 p.

Baker CS, Boren L, Childerhouse S, Constantine R, van Helden A, Lundquist D, Rayment W, Rolfe JR 2019. Conservation status of New Zealand marine mammals, 2019. New Zealand Threat Classification Series 29. Department of Conservation, Wellington. 18 p

MacKenzie, D.I.; Clement, D.M. (2014). Abundance and distribution of ECSI Hector's dolphin. New Zealand Aquatic Environment and Biodiversity Report No. 123. 79 p

MacKenzie, D.I.; Clement, D.M. (2016). Abundance and distribution of WCSI Hector's dolphin. New Zealand Aquatic Environment and Biodiversity Report No. 168. 67 p + supplemental material

Appendices

Appendix 1: List of priority research needs

Ranking	Research need	Key Populations
1	Demographic assessment of sub-populations: annual reproductive rates, reproductive status, age and sex structure, and survival rates – to assess the level of risk each population faces and monitor population trajectory	WCNI – <i>northern Zone</i> ECSI – Banks Peninsula
2	Determine distribution with particular focus on smaller sub-populations and areas recognised as high risk or uncertain from the Spatially Explicit Fisheries Risk Assessment SEFRA. Understanding temporal and spatial variability in key populations	WCNI – <i>northern Zone</i> NCSI – Golden & Tasman Bays NCSI – Marlborough Sounds ECSI – Cloudy Bay ECSI – Otago SCSI – Te Waewae Bay
3	Estimated total population size and annual rates of population growth or decline for key populations	WCNI – <i>northern Zone</i> NCSI – Golden & Tasman Bays NCSI - Marlborough Sounds ECSI – Banks Peninsula ECSI - Otago SCSI – Te Waewae Bay
4	Improving estimates of bycatch rates using data with better spatial and temporal coverage	ECSI - Timaru
5	Understanding offshore distribution	WCNI – <i>northern zone</i> NCSI – Golden & Tasman Bays NCSI – Marlborough Sounds ECSI – Cloudy Bay ECSI – Otago SCSI – Te Waewae Bay
6	Improve existing distribution modelling from the TMP risk assessment	WCNI – <i>northern zone</i> SCSI – Porpoise Bay
7	Better understand cryptic mortality rates	ECSI – Kaikoura ECSI – Timaru
8	Understanding transmission pathways and population level risk from Brucella and Tuberculosis. The effects of Brucellosis on reproductive output, as this appears to affect reproductive females. And Investigate the potential for full-screen health assessments	WCNI – <i>northern zone</i> WCNI – <i>southern zone</i> ECNI NCSI – Golden & Tasman Bays NCSI – Marlborough Sounds ECSI – Cloudy Bay ECSI – Kaikoura ECSI – Pegasus Bay and Banks Peninsula

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		ECSI – Timaru ECSI – Otago SCSI – Porpoise Bay SCSI – Te Waewae Bay WCSI - Karamea North WCSI
9	Understanding factors influencing connectivity/dispersal between subpopulations	NCSI – Golden & Tasman Bays NCSI – Marlborough Sounds ECSI – Cloudy Bay ECSI - Otago SCSI – Porpoise Bay
10	Estimating bycatch from recreational, cultural and illegal fishing	WCNI – <i>northern zone</i>
11	Reconciling population estimates from different methods and techniques, to understand and potentially correct for inherent biases when using each method	ECSI – Cloudy Bay ECSI - Kaikoura
12	Understanding dolphin diet and the seasonal/temporal distribution of prey	WCNI – <i>northern zone</i> NCSI – Golden & Tasman Bays SCSI – Porpoise Bay SCSI – Te Waewae Bay WCSI
13	Addressing the seasonal disparity in carcass collection and assessing for more cryptic causes of death during the winter period	WCNI – <i>northern zone</i>
14	Understanding Genetic population structure which may influence the population resilience and therefore population viability, and changes in genetic diversity through time	WCNI – <i>northern zone</i> NCSI – Golden & Tasman Bays NCSI – Marlborough Sounds ECSI – Cloudy Bay ECSI – Timaru ECSI – Otago SCSI – Porpoise Bay WCSI - Karamea North
15	Understanding genetic relationships and connectivity of adjacent Hector's dolphin populations.	WCNI – <i>northern zone</i> NCSI – Golden & Tasman Bays NCSI – Marlborough Sounds ECSI – Cloudy Bay ECSI – Timaru ECSI – Otago SCSI – Porpoise Bay WCSI - Karamea North
16	Understanding factors that influence trawl capture	ECSI – Timaru
17	Understanding how dolphins are using the water column	ECSI – Kaikoura

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18	Understanding the sub-lethal effects of noise and the suitability of existing regulations	Not dependent on sub-population
19	Understanding diel movements and foraging behaviour	WCNI – <i>northern zone</i> NCSI – Marlborough Sounds ECSI – Cloudy Bay
20	Understanding the distribution and genetics of ephemeral populations e.g. ECNI	WCNI – <i>southern zone</i> ECNI
21	Understanding how the dolphins are interacting with different fisheries. Fine scale behaviour around fishing gear, vessels, and different fisheries types.	ECSI – Kaikoura ECSI - Timaru
22	Are ECNI dolphins a remnant population or new immigrants?	ECNI
23	Understanding what factors within turbidity are driving distribution.	
24	Estimating potential climate change effects on each sub-population, with special focus on Māui dolphins and understanding thermal thresholds for calves	ECSI –Banks Peninsula
25	Understand climate change effects on key prey species	ECSI –Banks Peninsula SCSI – Te Waewae Bay

Appendix 2: Research priorities by sub-population

Population	Research need	Potential Approaches	Theme [Priority]
WCNI <i>northern zone</i>	Age structure	Epigenetic aging from biopsy	1.a.i [1]
	Reproduction	Analysis of historical field observation, coupled with epigenetic aging	1.a.i [1]
	Genetic population structure and connectivity	Genetic analysis of existing samples and from biopsy	1.a.ii [14], 1.a.iii [15]
	Distribution	Acoustic monitoring and drone survey. Refine habitat preference models.	1.b.i.1[2], 1.b.i.2 [5], 1.b.i.5 [6]
	Abundance	Genetic capture-recapture, drone survey programme	1.c.i [3]
	Behaviour/movement	Drone	2.a [5], 2.d [19]
	Diet	Isotope analysis from biopsy. DNA analysis of contents of alimentary canal.	2.b [12]
	Prey distribution	Fish trap/ prey surveys/ analysis of fishery and survey data.	1.b.5 [6], 2.b.[12]
	Estimating levels of recreational, cultural, and illegal fisheries by-catch		3.a.iii [10]
	Disease	Necropsy of recovered carcasses. Beach surveys	3.b.i,ii,iii [8], 3.b.iv [13]
WCNI <i>southern zone</i>	Genetics	Opportunistic biopsy	1.b.6 [20]
	Distribution	Citizen science – sightings	1.b.i.6 [20]
	Disease	Necropsy of recovered carcasses	3.b.i,ii,iii [8]
ECNI	Genetics	Opportunistic biopsy	1.b.6 [20]
	Distribution	Citizen science – sightings	1.b.6 [20]
	Disease	Necropsy of recovered carcasses	3.b.i,ii,iii [8]
NCSI Golden and Tasman Bays	Distribution and Genetics	Targeted and opportunistic biopsy programmes	1.a.ii [14], 1.a.iii [15], 1.b.i.1 [2], 1.b.i.2 [5]
	Abundance	Boat-based and drone surveys	1.c.i [3]
	Connectivity	Acoustic monitoring	1.b.4 [9]
	Diet	Isotope analysis from biopsy	2.b [12]
	Disease	Necropsy of recovered carcasses	3.b.i,ii,iii [8]
NCSI Marlborough Sounds	Genetics	Targeted and opportunistic biopsy programmes. Boat-based and drone surveys	1.a.ii [14], 1.a.iii [15], 1.b.i.1 [2], 1.b.i.2 [5]
	Abundance	Targeted and opportunistic biopsy programmes. Boat-based and drone surveys	1.c.i [3]
	Distribution	Boat-based and drone surveys. Citizen science – e.g. from tourism operations.	1.b.i.1 [2], 1.b.i.2 [5], 2.d [19]
	Connectivity	Genetics and Acoustic monitoring	1.a.ii [14], 1.a.iii [15], 1.b.4 [9]
	Diet	Isotope analysis from biopsy	2.b [12]
	Disease	Necropsy of recovered carcasses	3.b.i,ii,iii [8]
	Genetics	Genetic analysis of existing samples	1.a.ii [14], 1.a.iii [15]

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ECSI Cloudy Bay	Connectivity to Marlborough Sounds	Acoustic monitoring	1.b.i.1 [2], 1.b.i.2 [5]
	Distribution	Drone	1.b.i.1 [2], 1.b.i.2 [5], 2.d [19]
	Reconciling population estimate methods	Analysis of data from previous studies.	1.c.ii [11]
	Disease	Necropsy of recovered carcasses	3.b.i,ii,iii [8]
ECSI Kaikoura	Reconciling population estimate methods	Analysis of data from previous studies.	1.c.ii [11]
	Diving behaviour	Acoustic tag?	2.c [17]
	Presence and Behaviour around set nets at depth set, setting and hauling	Acoustic monitoring	3.a.ii [7], 2.c [17], 3.a.v [21]
	Cryptic mortality	Acoustic and visual monitoring	3.a.ii [7]
	Disease	Necropsy of recovered carcasses	3.b.i,ii,iii [8]
ECSI Banks Peninsula	Demographics – frequency of pods with calves	Analysis of long-term BPMMS dataset	1.a.i [1]
	Demographic changes with environmental variables.	Analysis of long-term datasets. Is dependent on data from previous question	1.a.i [1], 3.d.ii [24], 3.d.iii [25]
	Ongoing population monitoring	Visual surveys	1.c.i [3]
	Disease	Necropsy of recovered carcasses	3.b.i,ii,iii [8]
ECSI Timaru	Genetics – how do they relate to other ECSI open or closed population	Biopsy	1.a.ii [14], 1.a.iii [15]
	Interaction with trawl fisheries	Acoustic and visual monitoring	3.a.i [4], 3.a.iv [16], 3.a.v [22]
	Cryptic mortality	Acoustic and visual monitoring	3.a.ii [7]
	Disease	Necropsy of recovered carcasses	3.b.i,ii,iii [8]
ECSI Otago	Abundance	Boat based visual survey	1.c [3]
	Offshore distribution	Acoustic monitoring	1.b.i.1 [2], 1.b.i.2 [5]
	Genetics – how do they relate to other ECSI populations and SCSi, open or closed population	Biopsy	1.a.ii [14], 1.a.iii [15], 1.b.i.4 [9]
	Disease	Necropsy of recovered carcasses	3.b.i,ii,iii [8]
SCSi Porpoise Bay	Genetics	Targeted Biopsy	1.a.ii [14], 1.a.iii [15], 1.b.i.4 [9]
	Dolphin prey modelling	Prey survey, modelling	1.b.i.5 [6], 2.b [12]
	Diet	Isotope analysis of biopsy	2.b [12]
	Disease	Necropsy of recovered carcasses	3.b.i,ii,iii [8]
SCSi to Te Waewae Bay	Winter Distribution	Drone survey, acoustic monitoring	1.b.i.1 [2], 1.b.i.2 [5]
	Abundance	Drone/aerial survey	1.c.i [3]
	Diet	Biopsy/carcass Isotope?	2.b [12]
	Dolphin prey modelling	Prey surveys	2.b [12], 3.d.iii [26]
	Disease	Necropsy of recovered carcasses	3.b.i,ii,iii [8]
WCSI Karamea North	Genetic connectivity to Golden Bay	Boat based biopsy sampling	1.a.ii [14], 1.a.iii [15]
	Disease	Necropsy of recovered carcasses	3.b.i,ii,iii [8]

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WCSI	Diet?	Isotope analysis from existing samples?	2.b [12]
	Disease	Necropsy of recovered carcasses	3.b.i,ii,iii [8]

Appendix 3: The legislative framework

The table below lists legislative and policy frameworks guiding DOC and MPI in the development of the Hector's and Māui dolphin Threat Management Plan 2020.

Legislative/ policy framework	Guiding principle	Relevant agency
The Wildlife Act 1953	Provides for the protection of all absolutely protected wildlife throughout New Zealand and New Zealand Fisheries Waters. This Act lays out wildlife that is whole or partially protected and restricts hunting, killing or possession of wildlife unless under specified conditions. It also gives the Minister of Conservation the ability to designate Wildlife Sanctuaries within which specified activities can be regulated or restricted.	DOC
Marine Mammals Protection Act 1978 (MMPA)	To make provision for the protection, conservation and management of marine mammals within New Zealand fisheries waters (the Territorial Sea and EEZ). Two key tools within the MMPA are: <ul style="list-style-type: none"> • Marine Mammal Sanctuaries – an area designated by the Minister of Conservation within which specified activities can be regulated or restricted. • Population Management Plans – a management plan that sets maximum allowable human-induced mortality, and maximum allowable fishing-related mortality. 	DOC
Convention on International Trade in Endangered Species (CITES) implemented through Trade in Endangered Species Act 1989	The object of this Act is to enable New Zealand to fulfil its obligations under the Convention on International Trade in Endangered Species of Wild Fauna and Flora and to promote the management, conservation, and protection of endangered, threatened, and exploited species to further enhance the survival of those species. Therefore, no person shall trade in any specimen of an endangered, threatened, or exploited species into or from New Zealand, unless under an appropriate permit or certificate. In addition, the Act gives the Minister of Conservation the following powers: <p>(a) to conduct research and investigations into and surveys of species in New Zealand—</p> <p>(i) that are, or are likely to become, threatened with extinction; or</p> <p>(ii) the existence of which is likely to be affected,— by trade in specimens of those species:</p> <p>(b) to disseminate information relating to the import and export of endangered, threatened, and exploited species.</p>	DOC
Conservation Act 1987 (CA)	New Zealand's principle Act concerning the conservation of indigenous biodiversity and promotes the conservation of New Zealand's natural and historic resources. It sets out the functions of DOC and the management of public conservation land in New Zealand.	DOC
Resource Management Act 1991 (RMA)	Part 2, Purpose and principles <ul style="list-style-type: none"> • To promote the sustainable management of natural and physical resources... including safeguarding the life-supporting capacity of air, water, soil, and ecosystems (s 5(b)). • Recognise and provide for...the protection of areas of... significant habitats of indigenous fauna (s 6(c)). • Have particular regard to...intrinsic values of ecosystems (s 7(d)). <p>New Zealand Coastal Policy Statement (NZCPS)</p> <p>It is mandatory to have at least one in place at all times (s 57(1)) – NZCPS 2010 is the current policy statement¹¹.</p> <ul style="list-style-type: none"> • The Minister of Conservation is required to prepare, monitor, and review the NZCPS. • The Minister of Conservation also approves regional coastal plans developed by regional councils and unitary authorities. 	MfE DOC Local authorities

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	<ul style="list-style-type: none"> Local Authorities are required to give effect to the NZCPS in their Regional Policy Statements, Regional Plans and District Plans (sections 62(3), 67(3)(b) and 75(3)(b)). Local authorities must also have regard to the NZCPS when assessing consent applications. (section 104(1)(b)(iv)) A number of policies within the NZCPS are relevant to the protection of Māui dolphins (e.g.); Policy 7 – Strategic planning Policy 11 – Indigenous biological diversity Policy 13 – Preservation of natural character Policy 14 – Restoration of natural character Policy 21 – Enhancement of water quality 	
	<p>Local Authorities (Regional, Unitary, City and District) must give effect to the NZCPS in their regional policy statements and plans.</p> <p>Regional Coastal plans (mandatory in all regions) can:</p> <ul style="list-style-type: none"> Include objectives, policies and rules Can include spatial planning, e.g. zoning 	Local authorities
Marine Mammals Protection Regulations 1992 (MMPR)	Provide a regulatory framework for behaviour around all marine mammals and a permitting regime for commercial tourism.	DOC
The Fisheries Act 1996 (FA)	<ul style="list-style-type: none"> Purpose of the FA Environmental principles (section 9) Information principles (section 10) Sustainability measures (section 11) Avoid, remedy or mitigate the effect of fishing-related mortality on any protected species (section 15(2)) 	MPI
Te Mana o te Taiao – Aotearoa New Zealand Biodiversity Strategy (ANZBS) 2020	<p>provides the overall strategic direction for biodiversity in Aotearoa New Zealand for the next 30 years. It provides overarching direction and guidance to related strategies and work programmes, of which the Hector's and Māui Dolphin TMP is one.</p> <p>Four of the five ANZBS outcomes align directly with the vision, goals and objectives of the TMP:</p> <ul style="list-style-type: none"> Outcome 2: Indigenous species and their habitats across Aotearoa New Zealand and beyond are thriving. Outcome 3: People's lives are enriched through their connection with nature. Outcome 4: Treaty partners, whanau, hapū and iwi are exercising their full role as rangatira and kaitiaki. Outcome 5: Prosperity is intrinsically linked with a thriving biodiversity. 	DOC

Appendix 4: Maps of sub-population and local populations



