FISHERIES INSHORE NEW ZEALAND

RESPONSE TO HECTOR'S AND MĀUI DOLPHIN THREAT MANAGEMENT PLAN

19 August 2019

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PART 1: SUMMARY OF RESPONSE

The draft TMP as a whole

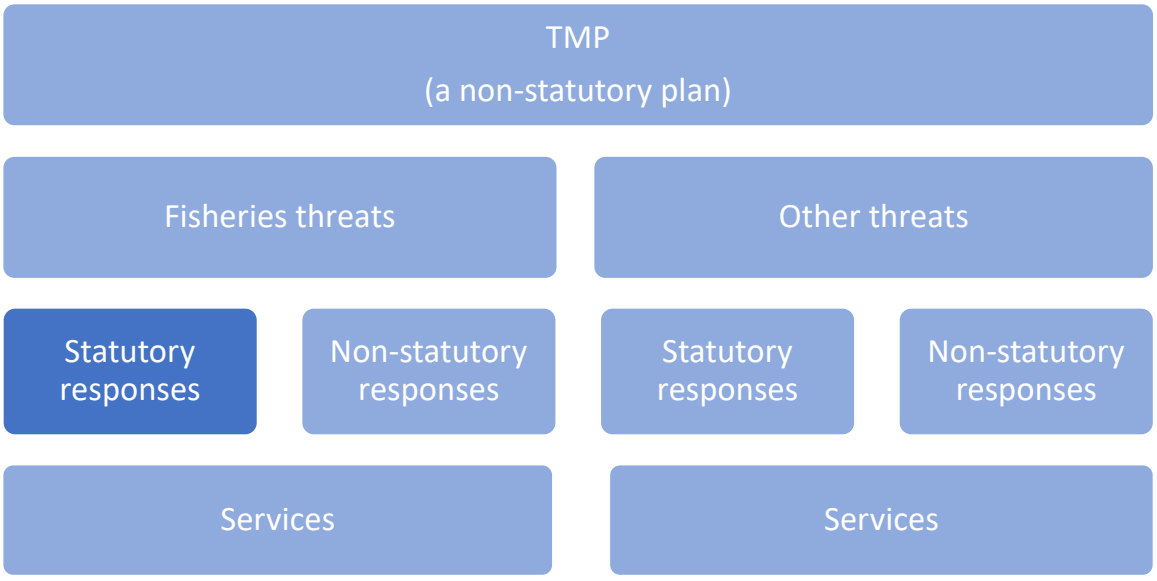
The draft TMP seeks to identify and manage a range of threats to Hector's and Māui dolphins. In doing so, the draft TMP proposes the following vision statement:

> *New Zealand's Hector's and Māui dolphin populations are resilient and thriving throughout their natural range*

It is important to note that the vision statement applies to both Hector's and Māui dolphins, to all threats cumulatively, and is to be given effect through the range of statutory and non-statutory tools available. In addition, various services can be applied to assist in managing and understanding risks.

The broad array of tools shown in the diagram below is necessary to attain this vision because, what is not available to decision makers, is to impose measures through the Fisheries Act 1996 alone to carry the burden of the draft TMP's vision. This is because the draft TMP provides for very limited other management interventions and associated services that would, if employed, contribute significantly to the draft TMP's vision.

The seafood industry is committed to reducing risks to all protected species, not just Hector's and Māui dolphins. To achieve this, innovation, ambition and investment will be required; unfortunately, what's proposed in the draft TMP will not foster those necessary preconditions. Despite this, we remain ready to work toward that end if government is willing to engage with us. Industry is prepared to play its part and collaborate with Government on additional voluntary and assisted measures to contribute to the level of dolphin populations the vision proposes.



The role of the Fisheries Act

Notwithstanding the range of threats identified, the draft TMP disproportionally focuses on statutory restrictions imposed under the authority of the Fisheries Act to meet the vision of the TMP. We consider that is not equitable and effectively ignoring other threats significantly compromises the long-term outlook for these dolphins.

While the proposed management objectives may reflect the government's desired management targets for these dolphins, trying to achieve them only through substantive restrictions on fishers is beyond the reasonable use of the powers available to decision makers under the Fisheries Act.

As set out in the body of this response, the purpose of the Fisheries Act is to provide for the utilisation of fisheries resources while ensuring sustainability. In effect, the Act is to allow resource use, but that is constrained by the requirement to ensure that use is sustainable because the fishery and its supporting environment remain healthy at that level of catch. This is often characterised as a balancing exercise, and as with any balancing exercise, one can only go so far in either direction and still achieve the purpose of the Act.

Therefore, the key question is this: How far can the Minister go in favour of ensuring sustainability without compromising his obligation to also adequately provide for utilisation (so as not to fail to meet the purpose of the Act)?

Our view is that the objectives of 95% of population capacity with 95% certainty for Maui dolphins, and 90% capacity and 95% certainty for Hector's dolphins are well beyond what the disciplines of the Act contemplate, and beyond what can be reasonably imposed as restrictions under the Act.

That said, the inshore finfish industry recognises the need for the Māui dolphin population to rebuild strongly from its current abundance level, and for the Hector's dolphin population to continue to rebuild. The inshore fishing industry is willing to work with the government in a collaborative and constructive manner. That work will need to be developed at a regional level to suit the combination of fishing methods, the population of dolphins, mitigation options and socio-economic impacts—the proposals set out later in this response represent suggested starting points to begin discussing this work, including the use of assisted transitions.

The Fisheries Act only allows the Minister to take such measures as he or she considers are *necessary* to avoid, remedy or mitigate the effects of fishing-related mortality on any protected species. What is necessary is to be interpreted in the context of the Act and with reference to the purpose of the Act, the environmental principles and the information principles. Of particular relevance, the environmental principles require the Minister to maintain associated or dependent species (protected species) above a level that ensures their long-term viability. It follows that the requirement of long-term viability should inform any population objectives in the context of the Minister's consideration of whether measures to avoid, remedy or mitigate the effect of fishing-related mortality are necessary.

Long-term viability is defined in the Act to mean there is a low risk of collapse of the stock or species, and the stock or species has the potential to recover to a higher biomass level. The Minister must ensure protected species are managed *above* long-term viability, but that does not require, or allow, the Minister to manage the abundance of the protected species so far above that threshold that the utilisation objective in the Act is compromised in order to achieve the objectives of the draft TMP.

Population Management Outcomes

Globally, marine mammal populations are impacted by commercial utilisation of fisheries resources. Such externalities are recognised as being inevitable but must be managed to avoid unsustainable impacts on marine mammal populations. Nations and individuals will have differing points of view as to what level of externality is acceptable.

The selection of the management objectives in the draft TMP of 90%:95% for Hector's and 95%:95% for Māui dolphins appear arbitrary. The draft TMP has not even established if the current population of Hector's dolphins are increasing, stable or declining under current management measures. The draft TMP is also silent on where these populations currently sit as a percentage of the maximum number of dolphins the environment can support. There is no model to test the populations' response to various management scenarios; there is nothing upon which to anchor the Minister's decision about what may or may not be necessary in the context of the Act. What we have instead is an assertion that these populations must be restored to close to the maximum number that it is possible for the environment to support with almost maximum certainty that this will occur. Further, it is suggested that a range of management interventions through the Fisheries Act, at high social and economic cost, are required to deliver the desired management outcomes.

Long-term viability

International empirical research has shown that marine mammal populations can recover from low levels of abundance to healthy population levels. However, populations at lower than 30% of capacity can be impacted by Allee effects that can impact the future strength of the population.

Under section 15 of the Fisheries Act, the Minister of Fisheries has the power to determine measures necessary to ensure the long-term viability of protected species populations, but that power is not without limits as have been made explicit in legal proceedings.

New Zealand seeks to adopt a population outcome-based approach to the management of impacted protected species. We welcome that initiative but consider the settings to be unreasonable. We have seen no evidence in this draft TMP of a proper consideration given to the principles and drivers for population outcomes, but we would welcome collaborating with government on how the New Zealand standards should be set.

The NOAA guidelines consider an *optimal sustainable population level* (something considerably higher than long-term viability) for marine mammals is thought to be between 50–85% of capacity, but generally 60% is used. If an optimal management target lies in the 50–85% range, then that would infer that any long-term viability threshold is at a point lower than 50%.

We would contend that marine mammal populations should be managed in New Zealand to target levels consistent with international expectations and management standards. On that basis, and given the particular attributes of Hector's and Maui dolphins, we assert that long-term viability should be considered as 50%.

Above long-term viability

The Fisheries Act specifies that protected species be managed *above* long-term viability. As such, there is some discretion available to the Minister, but that discretion is not unfettered. The Minister must do what is necessary to manage the effects of fishing but, if the long-term viability of a protected species has been sufficiently assured, he or she cannot go beyond that point to the extent that it frustrates the utilisation purpose of the Act.

Factors involved in the setting the bounds of the Minister's discretion (and degree of certainty) may include the existing population size, the current trend, the level of depletion and the associated social and economic costs.

We recognise that Hector's dolphins are a New Zealand endemic dolphin and higher levels of protection than 50% are desirable to protect their uniqueness. We could support an outcome of up to 80% of capacity as the management target to reflect their value to New Zealand but reflecting the current high population that only needs to have an 80% certainty.

We consider Māui dolphins are in a different position. With only 63 adult dolphins at the last review, and only a low rate of population growth possible, the subspecies is effectively in a rebuild position where animals should be valued more highly for their reproductive capacity. We would support the adoption of an outcome of up to 80% of capacity as the management target but with a 95% certainty target for the population while it is rebuilding.

Beyond sustainability

MPI has accepted that managing human-induced mortality to ensure that the dolphin population is maintained at 50% of carrying capacity would ensure the population remains above a viable level; i.e. above that point ensures long-term viability. Managing above that point is available to the Minister, but that discretion must be balanced against his requirement to provide for utilisation. Managing beyond sustainability is best done through agreement with resource users.

Assessing risk

As will be clear from the balance of this response, we have some very serious concerns about the manner in which the risk posed by fishing was calculated, and hence the proposed management justified. In short, much relevant science on dolphin distribution was ignored in favour of a modelling approach, and the outputs and interpretation of the modelling were not peer reviewed by any MPI Working Group.

That model was rejected by MPI for small South Island populations because it was unreliable, yet it was applied to even smaller North Island populations. Gross inconsistencies with aerial surveys, public sightings and MPI Observer data were ignored. We consider most of MPI's assumed risk for Māui dolphins is an artefact of the spatial modelling and hence the decision to apply that modelling to the WCNI was an error given a more reasoned assessment was available. For larger South Island populations, inconsistencies with the scientific surveys of dolphin distribution were also dismissed.

While we have been able to assess the impact on estimated mortalities of the inappropriate spatial risk model for Māui dolphins, we have not been able to estimate the impact of the model for Hector's dolphins with the information provided.

Proposed Management Measures under the Fisheries Act

The fisheries measures proposed in the draft TMP cannot be supported. Both dolphin populations are increasing since management measures imposed under the Fisheries Act were introduced in 2008. Those measures appear to have been effective in arresting any decline in population and in mitigating the impact of commercial fishing on the sustainability of the dolphins.

The measures proposed in respect of Māui dolphins are based on an unacceptable spatial model of Māui dolphin distribution. Removing this phantom risk indicates that fishing mortalities are already below the level required to achieve a proposed 95%:95% population objective. As set out in the table below, no additional coercive measures are required.

ESTIMATED MORTALITIES				
Māui dolphin	**Management objectives allowable maximums**		**Estimated actual mortalities**	
	95%:50%	95%:95%	MPI's modelled risk	Our assessment
Estimated mortalities	0.14	0.055	0.11	0.03

For Hector's dolphins, we consider the 90%:95% population management settings to be unreasonable and inappropriate and suggest those in the following table.

ESTIMATED MORTALITIES				
Hector's dolphin	**Management objectives allowable maximums**		**MPI's assumed risk**	**Our revised risk**
	80%:80%	90%:95%		
Estimated mortality	71.55	24.88	59.15	Unable to calculate

The measures proposed in respect of Hector's dolphins are premised on population objectives we consider are unreasonable and inappropriate for the reasons given earlier. The spatial model will also have contributed to an over-estimate of mortalities.

The measures proposed to achieve those objectives have impacts that go far beyond the levels considered necessary. The draft TMP measures would result in a large number of fishers being forced from their livelihoods with no prospect of compensation or assistance. Over a third of New Zealand's inshore fishing fleet would be forced from the industry, coastal fishing activities in the Kaipara, Manukau, Raglan and Kawhia Harbours, Raglan, New Plymouth, Kaikoura and Timaru closed down and the wellbeing of over 500 families put at risk for little reduction of risk to Hector's and Māui dolphins. The consultation paper provides an inadequate economic analysis of these impacts. We understand that during the consultation phase, MPI has commissioned further work to assess social and economic costs that has not been made available.

Other Threats

The draft TMP has indicated that there are a range of other threats that might be impacting the sustainability of the dolphin populations. Those threats are generally managed under a range of existing regulatory frameworks which appear to be effective and appropriate. We see no reason to unduly strengthen those provisions, although we would support greater compliance activity to enforce them. We are however disappointed with the progress achieved to date in addressing toxoplasmosis that has been acknowledged as a major threat to the dolphins for nearly a decade.

A collaborative approach

Fisheries Inshore shares government's desires to see healthy Hector's and Māui dolphin populations, and we would welcome the opportunity to work with government to further reduce the residual risks that fishing may pose to these animals. However, we consider that the measures contemplated in the draft TMP constitute a simplistic and sub-optimal approach to marine management. Further, we consider the coercive actions proposed to be beyond those that can be justified under the Fisheries Act.

We also have concerns about how the distribution of dolphins, and the risks they are exposed to, have been estimated and the selective use, and paucity, of associated information. We seek to work with government and other interested parties to review the risks to dolphins to provide greater certainty that future management will be effective. In particular, we seek collaborative and urgent action on the most pressing threat, toxoplasmosis.

Adopting a collaborative approach will not only reduce risks to dolphins but will preserve regional fishing communities that are important employers in many coastal towns. The wellbeing of those directly affected, and their families, should not be an afterthought.

Our Commitment

The industry is committed to ensuring the sustainability of the Hector's and Māui dolphins and all other aquatic life with which it shares the waters of New Zealand. The TMP has provided a timely spur to remind industry of the need to seek continual improvements to reduce its impact on the aquatic environment. We have initiated programmes to research newer mitigation and implement additional management measures and are willing to work closely with the government and other organisations to achieve improvements, including through assisted transition; we set these out in Part 10 of this response.

PART 2: WHO WE ARE

1. These comments are provided by Fisheries Inshore NZ Ltd (Fisheries Inshore) in respect of the draft Hector's and Māui Dolphin Threat Management Plan released for consultation on 17 June 2019.

2. Fisheries Inshore represents 80% by value and volume of the inshore finfish, pelagic and tuna fisheries of New Zealand. It was formed in November 2012 as part of the restructuring of industry organisations. Its role is to deal with national issues on behalf of the sector and to work directly with and behalf of its quota owners, fishers and affiliated Commercial Stakeholder Organisations (CSOs). As part of that work it will also work collaboratively with other industry organisations and Sector Representative Entities (SREs), Seafood New Zealand, Fisheries New Zealand (FNZ) and Department of Conservation (DOC).

3. Fisheries Inshore's key outputs are:

    - developing appropriate policy frameworks, processes and tools to assist the sector to manage inshore, pelagic and tuna fish stocks more effectively
    - minimising fishing interactions with protected species and the associated ecosystems
    - working positively with other fishers and users of marine space where we carry out our harvesting activities

4. Fisheries Inshore works closely with its regional committees and other commercial stakeholder organisations that focus on regional and operational issues, (including the Southern Inshore Fisheries Management Company), which are the mandated organisations for the management of the regional fish stocks as well as Deepwater Group Ltd where there is overlap in issues.

5. We recognise that a number of parties who are members of or are affiliated to Fisheries Inshore may provide their own submissions, consistent with this submission or providing their own personal or company views.

PART 3: THE CONTEXT

6. The draft TMP is prepared under the joint sponsorship of the Department of Conservation and the Ministry for Primary Industries. Notwithstanding the draft plan addressing all threats, it is fisheries-centric. Our response is equally fisheries-centric.

7. Reductions in the abundance of a population may occur intentionally as the resource is harvested or unintentionally as the population is affected by the utilisation of other resources. There is always a trade-off between the utilisation of resources and the externalities that result. There will always be differences of opinion as to where that trade-off or point of balance should be positioned. Those who use the underlying resources may advocate for a higher level of externality cost, those who value the subject of the externality may advocate for a lower externality cost.

8. The management of New Zealand resources recognises those differing objectives and the need for a decision-maker to determine where that trade-off or point of balance should be. The point is never fixed per se and may vary to reflect changing societal desires. Fundamentally, the decisionmaker must protect both the sustainability of the resources used and the sustainability of the other resources impacted. That structure underlies the governance framework for New Zealand's utilisation and protection of its resources and vests in the Government the power to set that balance point.

9. The Department of Conservation operates under a number of statutes that are focused on the protection, conservation and management of New Zealand's natural resources, including aquatic protected species such as Hector's and Māui dolphins. The Acts they administer provide for the incidental mortality of protected species as part of lawful activity such as fishing but do not contain provisions to directly manage that activity.

10. The Ministry for Primary Industries operates under a range of statutes that are focused on enabling the utilisation of resources. Unlike other primary production sectors, in respect of New Zealand fisheries, MPI manages the utilisation of the fisheries resources and the protection of other resources impacted by the utilisation of the fisheries resources. That power is vested in the Minister through the provisions of the Fisheries Act 1996. Like all regulated powers, the powers are not unlimited and the Minister must act in accordance with the provisions of the Act.

11. Fisheries measures, such as gear type restrictions, are more commonly made under the provisions of the Fisheries Act 1996 which has the purpose:

> *to provide for the utilisation of fisheries resources while ensuring sustainability*

12. Ensuring sustainability is defined to be:

    (a) maintaining the potential of fisheries resources to meet the reasonably foreseeable needs of future generations; and

    (b) avoiding, remedying, or mitigating any adverse effects of fishing on the aquatic environment

13. The Act contains environmental principles which require all persons exercising or performing functions, duties, or powers under this Act to take into account the following environmental principles:

    (a) associated or dependent species should be maintained above a level that ensures their long-term viability:

    (b) biological diversity of the aquatic environment should be maintained:

    (c) habitat of particular significance for fisheries management should be protected.

14. Long-term viability is defined in the Act to be:

> *in relation to a biomass level of a stock or species, means there is a low risk of collapse of the stock or species, and the stock or species has the potential to recover to a higher biomass level.*

15. Section 15(2) provides that (emphasis added):

> *In the* absence *of a population management plan, the Minister may, after consultation with the Minister of Conservation, take such measures as he or she considers are <u>necessary</u> to avoid, remedy, or mitigate the effect of fishing-related mortality on any protected species, and such measures may include setting a limit on fishing-related mortality.*

16. That provision was the focus of Court proceedings in 2004 *Squid Fishery Management Company Limited v Minister of Fisheries* (See France J CIV-2003-485-2706 and McGrath J CA39/04). In summary, while a Minister has discretion to exercise in respect of what is an appropriate measure, the measure cannot take into account the impact of other threats and is limited to only those measures that are <u>necessary</u> to mitigate the adverse effects of fishing on the protected species. The decision-making power is not unlimited, and the Minister's role is to assess the extent to which, or point at which, fishing-related mortality threatens the sustainability (i.e. long-term viability) of the protected species.

17. Many commentators on protected species matters advocate that because fishing is a relatively simple threat to address through, for example, closures and prohibitions compared to other threats, e.g. disease, predation or oceanic conditions, fishing should be restricted beyond its impacts to take into account the inability to address those other threats. However, using the provisions of the Fisheries Act to offset the impacts of other threats is not lawful. Nor can fisheries management measures be legitimately applied through the Fisheries Act that seek to achieve societal purposes that are beyond than what can be justified under the Fisheries Act.

18. While adverse effect is not defined in the Fisheries Act, long term viability is and adverse in the context of a protected species is to compromise the long-term viability of that species.

19. The concept of "zero bycatch" appears to be on the brink of being imported into an objective in Government decision-making. We note, for example, its inclusion in the draft Biodiversity Strategy which seeks that the bycatch of seabirds, corals and marine mammals is reduced to zero by 2050.[1] Similarly, the Minister of Conservation Eugenie Sage's supported a zero bycatch policy for sea lions at the NZ Marine Sciences 2019 conference.[2]

20. While we note that incidental bycatch of protected species is provided for in a range of legislation such as the Conservation Act, the Wildlife Act, the Marine Mammals Protection Act and the Fisheries Act, this legislation does not support a zero bycatch approach. The Fisheries Act provides protection to the aquatic environment but does not permit a zero bycatch policy. In *Squid Fishery Management Company Limited v Minister of Fisheries* (CA39/04) the Court of Appeal made it clear that such a policy would not be relevant to the Minister's decision-making power under section 15.

21. Despite that, we understand that a zero bycatch goal as a strategic statement, an aspirational goal. We would welcome the opportunity to work with government to invest in moving toward that objective. This will require some ambition, innovation and resources. For such a goal to be worked towards, we must adopt a collaborative and not a coercive approach.

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1 Department of Conservation, 2019, Te Koiroa o te Koiora, August 2019 https://www.doc.govt.nz/globalassets/documents/conservation/protecting-and-restoring/biodiversity-discussion-document.pdf

2 https://www.odt.co.nz/news/dunedin/sage-backs-zero-bycatch-policy-sea-lions

PART 4: THE TMP DEVELOPMENT PROCESS

23. The process to develop the draft TMP has been protracted. Recognising the inherent unreliability of the previous subjective risk assessment, MPI and DOC commissioned the development of a spatially explicit risk assessment for the draft TMP. Wherever possible, this would draw on quantitative information and sought to assess the risk of threats on a spatially differentiated basis. The project was commissioned in 2017. The project re-visited all the demographic and threat information available and updated information previously understood relevant to the management of Hector's and Māui dolphins.

24. Aspects of the research were scrutinised by the Ministry's Aquatic Environment Working Group and by international panels. However, this review did not extend to vital components of the risk assessment in particular which has undermined the quality of the work used as the basis for the draft TMP.

25. While the process was protracted, it was not without its shortcomings. In particular,

    (a) it failed to provide any future population trajectories for Hector's dolphins which are critical to assessing the impact of existing measures and the need for any additional measures. While the impact of identified threats was measured, it was not possible during the process to put those impacts in the context of the population trajectory for the Hector's dolphin population or sub-populations.

    (b) The findings of the spatial habitat modelling were not presented to the AEWG in a form that would allow them to analyse the results of the process in any meaningful manner. Outputs were presented in map form with AEWG participants not having access to the output in detailed quantitative terms. The AEWG scrutiny was largely confined to the methodology and the data inputs but not the outputs.

26. Two stakeholder meetings were convened to provide input into management objectives that might be considered appropriate for the management of the dolphin populations. No background information as to the intent, the impact, international comparisons, relevant factors, or the basis of such measures was provided. The matter was rushed and crammed into the tail of the stakeholder meetings. Consequently, no significance should be attached to the stakeholder considerations of the objectives.

27. While interested parties participated in the research process, there was no such participation in the interpretation of the research findings and the need for or nature of further management interventions. Notwithstanding earlier Ministerial directives that a new paradigm of collaborative approach should be taken by all, MPI and DOC alone interpreted the research, evaluated the risk, determined population objectives and developed options for further management measures. The draft TMP, when released, came as a significant shock to many interested parties including the fishing industry and has resulted in significant stress and concern among potentially affected parties.

28. The draft TMP provides only a series of blunt options for closures in respect of addressing fisheries risks and fisheries representatives were not provided the opportunity to work with officials to develop more pragmatic but equally effective measures. Industry now finds it having to challenge management approaches and options through a written submission process rather than a discussion-based process where better understanding and options could have been mutually explored. We consider the draft TMP was developed without the knowledge and experience required to fully appreciate the range of options, and the nature of the fishing activities to seek a more pragmatic approach that would protect the long term viability of the dolphin populations but in a manner that would result in less harm to the fishing industry.

29. While the draft TMP process initiated meetings with North and South Island stakeholder groups, these resulted in little constructive dialogue or progress. We believe the process would have been better served by establishing a small reference group of the various sectors interested in the management of the dolphins where the results could be interpreted and the need for and nature of additional conservation measures discussed. That process would not have been without tension and conflict but would have provided the sponsors with a wider understanding of the threats and management strategies than is shown in the current TMP. It would have allowed for other options and approaches to be brought into consideration.

The Consultation Process

30. The consultation has been inadequate and inappropriate for what are potentially significant management measures. The fishing industry considers the consultation process does not accord with the best principles and has compromised the ability of the industry to respond in a comprehensive and informed manner.

31. We note the following issues with the process.

FINZ Information Requests

32. On 17 June 2019, the day the draft TMP was released for consultation, we sought a list of the fishers affected, an indication of their catch profile and the level of impact on those fishers. We did not receive a list of affected fishers until 18 July 2019, a month into the submission and with only 17 days of the initial consultation period remaining. The list we received consisted of the fishing operators only and there are problems with the list provided:

    (a) In comparison to the consultation document which indicated there are 160 North Island setnet operators with 10% or more of their landings affected by the proposals and 29 in the South Island, the information sent provided a list of only 120 setnet operators in total. We have received no additional information to explain this variation.

    (b) In comparison to the consultation document which indicated there are 18 North Island trawl operators with 10% or more of their landings affected by the proposals and 77 in the South Island, the information sent provided a list of 95 trawl operators in total. Furthermore, when the trawl files provided are analysed on a finer basis, the number of affected trawl operators in the South Island increases to 143 trawl operators.

33. We received no information on the degree of impact on individual fishers and were informed that the information was being withheld under section 9(2)(a)—to protect the privacy of natural persons, and section 9(2)(b)(ii)—to protect information where the making available of the information would be likely unreasonably to prejudice the commercial position of the person who is the subject of the information. This important information was withheld notwithstanding that Fisheries Inshore has a confidentiality agreement with MPI which provides for access to such information for the purpose of fisheries management and our members have requested that Fisheries Inshore be provided that analysis to better quantify the impacts on them.

34. We also received information on the levels of catch impacted but that information cannot be used to assess the impact on individual fishers or quota holders.

Request for Extension

35. On 25 June 2019, Fisheries Inshore requested an extension of four weeks to the submission period in order to discuss the draft TMP with affected parties, consider our response, alternative management measures and prepare submissions. No response was received from the draft TMP sponsors until 25 July when advice of a two-week extension to 19 August was received. While we appreciate the additional time provided, we still regard the time available as being inadequate given the significance of the matters at hand and the reluctance of MPI to be forthcoming with information as to the impact on the fishing industry.

Request for advice on population management objectives

36. On 5 July 2019, Fisheries Inshore requested any reports and advice relating to the setting of population management objectives. We received a response on 2 August which included one advice paper to the Ministers and one update on the stakeholder forums. The advice paper contained only one recommendation for the settings and no advice on the options, international practices or the implications of setting such objectives.

Request to see additional work commissioned by FNZ

37. On 18 July 2019, Fisheries Inshore requested the terms of reference for the new work being undertaken by NZIER on socio-economic impacts and a copy of the report when available. Fisheries Inshore has yet to receive a substantive response to the request.

Detailed Dolphin Distribution

38. On 17 July 2019, we requested information on the distribution of the Hector's and Māui dolphins that matched the areas where additional measures were proposed. We received the information on 4 August. This was the first time we were able to view the fine scale spatial distribution of the dolphins and the estimated mortalities to enable some scrutiny and understanding of the risk assessment.

Engagement and Communications with Fishers

39. A series of meetings with fishers affected by the draft TMP was only announced on 3 July 2019, 16 days into the process. Industry had to request additional meetings be held in Timaru and Nelson as a significant number of fishers in those localities were potentially affected and MPI had made no provision for meetings. The last meeting in that series was held on 24 July 2019. Most fishers were given short notice of the meetings and many were unable to attend because of other commitments.

40. Individual fishers and quota owners have received no information from MPI as to the detail of the draft TMP or the likely impacts on their businesses. No offers were made to provide them with appropriate information and, without detailed spatial co-ordinates being provided in the information, fishers were unable to determine, other than at an intuitive level, the impact on their own activity. Equally, without impacts on the stocks affected, quota holders were unable to evaluate the impact on their investments and activity.

Summary

41. Despite the short time available for the consultation, MPI adopted the practice that all information requests relating to the consultation would be handled under Official Information Act protocols. With information being effectively withheld from Fisheries Inshore and affected parties, Fisheries Inshore has been unable to:

    (a) Analyse the details of the draft TMP.

    (b) Contact affected fishers with any certainty of knowing who is affected and to what degree.

    (c) Communicate the potential impact of the draft TMP to those affected.

    (d) Assess the impact on individual fishers with any degree of certainty.

    (e) Assess the impact on quota-holders.

    (f) Assess the impact on wider communities.

42. We consider the practices adopted by MPI and their refusal to provide necessary information has compromised our ability to respond to the draft TMP, and thereby provide the Government with the information it requires to properly assess the draft TMP and the measures proposed.

43. We note that MPI has commissioned additional socio-economic research to validate the economic estimates of impact in the draft TMP and provide new information on the local impacts. We have requested that information but have received nothing to date. We request the opportunity to review that important information and submit our views when it is received.

44. We are also concerned that other interested parties will be unaware that additional research has been commissioned that may be relied upon in the formation of the final advice to the Ministers. It is unclear why an economic assessment would be done by MPI during the consultation process rather than being conducted beforehand and providing that to the public as part of the process.

PART 5: VISION AND GOALS

46. The draft TMP contains the following vision statement which may be appropriate for the draft TMP as a whole but should not be applied to measures being advanced under the Fisheries Act.

> *New Zealand's Hector's and Māui dolphin populations are resilient and thriving throughout their natural range*

47. The draft TMP contains a long-term goal and four medium-term goals. The long-term goal being:

> *Hector's and Māui subpopulations are thriving or increasing, supported by an enduring, cohesive and effective threat management programme across New Zealand*

48. For reasons that follow, we consider the long-term goal to be inappropriate in its reference to subpopulations. We would have no problem if the goal referred to Hector's and Māui "*subspecies*" or "*populations*" but reference to subpopulations is inappropriate.

49. Section 15(2) of the Fisheries Act permits management of a "protected species" in the absence of a "*population* management plan". A "protected species" is defined as "any marine wildlife as defined in s2 Wildlife Act 1953 that is absolutely protected" or "any marine mammal as defined in s2(1) of the Marine Mammals Protection Act 1978". Marine mammal is defined as including "all species of […] dolphin". It only refers to "a species", not a subpopulation.

50. Similarly, the original 1999 publication in the NZ Gazette which declared the Hector's dolphin to be a threatened species for the purpose of the Marine Mammals Protection Act referred only to a "species" defined as *Cephalorhynchus hectori*. When the relevant Minister declared marine species 'threatened' under s19 of the Exclusive Economic Zone and Continental Shelf (Environmental Effects) Act 2012 in 2013, the list of marine species included *Cephalorhynchus hectori Maui* but no "subpopulations".

51. Managing a species at a "subpopulation" level is inconsistent not only with relevant legislation and NZ Gazette notices but also the scheme of the Fisheries Act.

52. Hector's dolphins have been managed to date as three geographic units:

    (a) East Coast South Island ("ECSI");

    (b) West Coast South Island ("WCSI"); and

    (c) South Coast South Island ("SCSI").

53. The geographic ranges of those dolphins are defined more by the fisheries restrictions applied and the aerial research surveys than any genetic analysis.

54. The draft TMP comments that the subpopulations are biologically distinct. Alluding to them being biologically distinct is misleading and inconsistent with existing science. There is no need to make that assertion—it would have been enough to say they are managed as separate geographic units.

55. The draft TMP seeks to manage the North Coast South Island ("NCSI") population as a separate management unit. Information on the NCSI population is very limited, but that information indicates the dolphins sampled in Golden Bay have haplotypes characteristic of the WCSI population. Migration between the West Coast and Golden/Tasman Bay may be a natural occurrence, and to that extent, the NCSI area may only be an extension of the WCSI population. However, the NCSI population has been incorporated in aerial surveys as part of the ECSI population.

56. While we may agree that the NCSI area may be considered a management unit for this TMP, more research is needed to confirm the genetic structure of the dolphins in that area and their linkages to other management areas. Under any circumstances it does not appear to be genetically distinct.

57. Given that the populations are management units only and are not biological units, reference to them in the long-term goal is inappropriate. The dolphins are currently considered to consist of two subspecies and that should be reflected in the long-term goal. The populations are merely arbitrary management units and have no recognition as being any more than that—they are not separate genetic units that require separate management. The continued reference to subpopulations is effectively seeking to manage genetic diversity explicitly rather than implicitly. We agree with the need to protect genetic diversity but not through the artificial means being proposed in the goals.

58. The draft TMP contains four new medium-term goals. Similarly, we cannot support the continued reference scale being subpopulations. We consider the scale should be either at the species or subspecies level, not the subpopulation.

59. We consider the term recover to be pejorative in that it depicts a depleted population that is still declining in abundance. We are comfortable with terms such as thrive, resilient and increase which are non-judgemental as to extent of depletion. We would however note that these should be considered as societal goals. These are not outcomes that should be sought to be delivered with reference to the Fisheries Act, the Act contains its own statutory requirements that cannot be substituted with other terminology, no matter how laudable that may be.

PART 6: STRATEGIC APPROACH

61. The draft TMP has two strategic differences to previous TMPs:

    (a) The setting of population management outcomes.

    (b) The use of a spatially explicit risk assessment.

Population Management Outcomes and Fisheries Management Objectives

62. The new approach to set desired population management outcomes in respect of a percentage of the unimpacted levels / current capacity is relatively new internationally in the management of protected species. While it is inherent in some jurisdictions that rely on say Potential Biological Removals, maximum exploitation rates, Fisheries Related Incidental Mortality Limits or Maximum Net-Productivity Level, rarely are the population management outcomes made explicit for species that are not utilised.

63. We welcome this development in that it signals the need to provide more disciplined and forward-looking management of our protected species that will be more enduring and offer management certainty. We can also see risks in such management if the outcomes are used unwisely as "political footballs" or for agendas other than the sustainable management of our protected species. We have long advocated for some greater stability and certainty in the management of our protected species and will work assiduously with the government to attain that end.

64. As noted earlier, there is always a trade-off between the utilisation of resources and the externalities that result on other resources and parts of the ecosystem. Reductions in the abundance of the population may occur intentionally as the resource is harvested or unintentionally as the population is affected by the utilisation of other resources. There will always be differences of opinion as to where that trade-off or point of balance should be positioned. Those who use the underlying resources may advocate for a higher level of externality cost, those who may value the affected resources may advocate for a lower externality cost. While the government is accountable to New Zealand as to where that trade-off or balance point should sit, there is guidance in the Fisheries Act and the Courts as to where that point might sit. In the management of New Zealand fisheries, the Fisheries Act protects both the sustainability of the resources used and the sustainability of the other resources impacted.

65. The population management outcomes in the draft TMP have two explicit components:

    (a) The percentage of the unimpacted levels / current capacity; and

    (b) The level of certainty of achieving that outcome.

66. In essence, the population percentage setting determines the desired abundance of a species relative to its capacity. It can be reflected explicitly where robust information exists to quantify the impacts allowable, as in the fisheries context, or implicitly in the nature and form of the governance framework for areas where information is less robust.

67. The draft TMP proposes that the population management outcome for the Maui dolphin subspecies should be 95% of the capacity and 90% for Hector's dolphins. However, the draft TMP gives very little background as to why these outcomes are appropriate or the reasoning behind the selected outcomes. The outcomes were never discussed in an informed manner in any management meetings with stakeholders. The draft TMP provides little guidance on considerations to be taken into account and the options that might be appropriate. To that extent, the draft TMP is deficient and fails to properly inform stakeholders as to the proposals.

68. The level of certainty in attaining the outcomes is only applied in the draft TMP in the context of fisheries impacts. They should apply equally to the management of other threats and not be limited exclusively to the fisheries threats. The degree of certainty that can be given to fishing may be more explicit but should not be ignored for other threats.

Setting population outcomes and objectives

69. We consider there are some existing practices and uses of population outcomes that can guide settings for Hector's and Maui dolphins and more generally for New Zealand's marine mammals.

70. In contrast to managing protected species populations, New Zealand fisheries have had a long history of operating under such structures. The Fisheries Act necessitated undertaking stock assessments and defining sustainability thresholds and management targets. These were formally recognised in the Harvest Strategy Standard (HSS) released in 2008. These guidelines require:

(a) a “Hard Limit” below which stocks are assessed to be below their sustainable limit and a rebuild strategy must be implemented;

(b) a “Soft Limit” at which measures should be taken on a precautionary basis to prevent further risk of sustainability issues; and

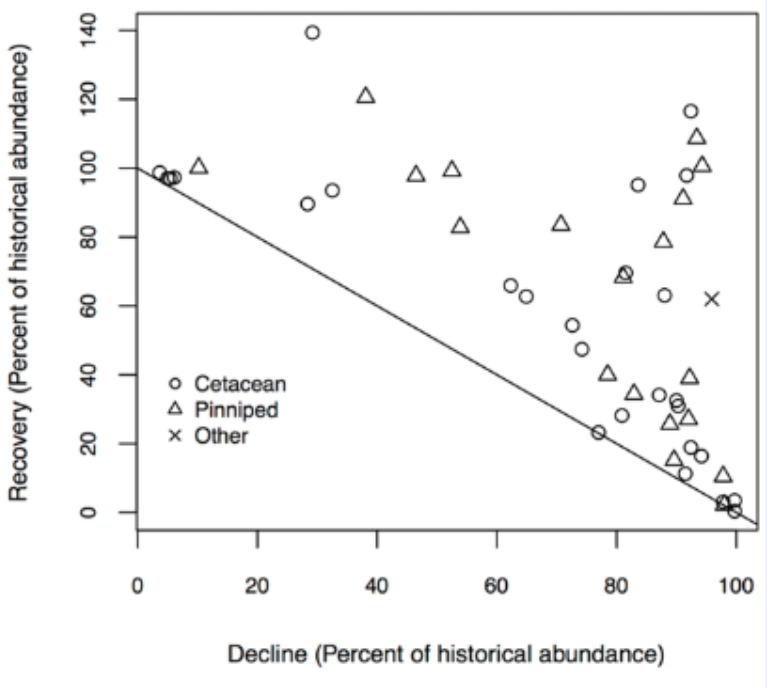
(c) a “Management target” about which the stock abundance should normally fluctuate.

71. In the HSS, fisheries are managed to fluctuate around the target, the soft limit is managed with more precaution and certainty, and a hard limit with near absolute certainty. The structure was established in conformance with the Fisheries Act obligations as guidance for setting catch limits.

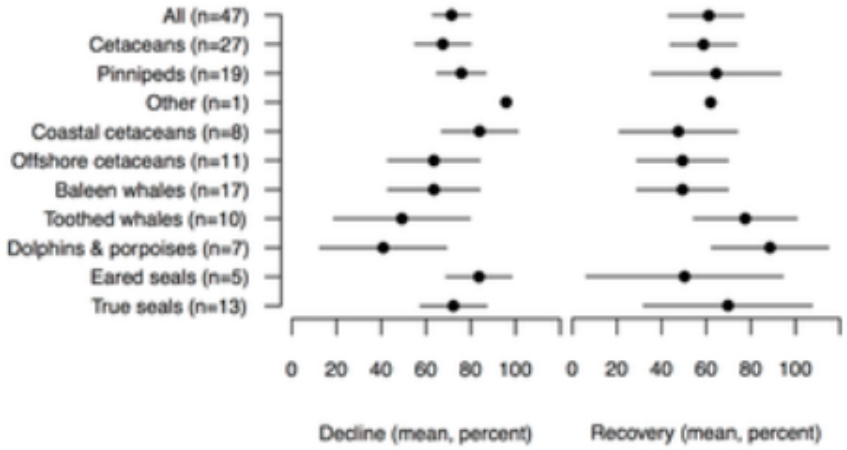
72. In setting population management outcomes and objectives for protected species, New Zealand is adopting that same conceptual structure as has applied in fisheries since the introduction of the Quota Management System and formally operationalised in 2008. Naturally the settings for sustainability thresholds for marine mammals will differ to those of fish, which are more resilient with higher breeding capability, but the considerations are analogous.

73. The draft TMP itself indicates that managing human-induced mortality with a high degree of certainty at or below a level sufficient to ensure the population is maintained at 50% of capacity would ensure the population remains above a viable level (that is, avoids extinction).

74. From a biological perspective, the question of whether a species has a sustainability threshold below which it may not be able to recover is problematic. Islands may be colonised by a species as the result of the immigration of a small number of founding individuals. Some, but not all, depleted marine mammal species have recovered following historical exploitation (Magera et al 2013)[3] – see the figures below from their paper. Magera *et al* indicate that on average, the 47 marine mammal species for which they could obtain reliable data had declined by 71% from, but have recovered so far to 61% of, their historical abundance. That would indicate that the viable level from which a species can recover with managed human-induced mortalities is less than 50% of capacity and can be as low as 20%.



[3] Magera, AM, Mills Flemming, JE, Kaschner, K, Christensen, LB, & Lotze, HK. (2013). Recovery trends in marine mammal populations. PloS one, 8(10). e77908. doi:10.1371/journal.pone.0077908.



75. Peter Best categorised baleen whale stocks depleted to 10% of their original abundance as "severely depleted" and noted that most of those monitored demonstrated significant rates of increase.[4] For fish stocks, the Harvest Strategy Standard for New Zealand Fisheries sets a default hard limit of 10% of B_0 (the average biomass of the stock in the absence of fishing) noting that "there is widespread concern, and some evidence, that when stocks are reduced to low levels they may remain in a depressed state for many years due to depensation". Wade (1998) discussed Allee effects, "where at some point the net production rate declines as population size gets lower" noting that these effects were thought to be a common phenomenon in populations smaller that 10% of capacity, but were not thought to be of significance in the context of the simulations carried out for populations starting at 30% of capacity.

76. There is greater consensus around target population sizes for marine mammals. Magera et al (2013) note "Management bodies often judge recovery with respect to a proportion of K or pre-exploitation size". K is used to denote the current carrying capacity of the environment. The U.S. Marine Mammal Protection Act specifies management for an "optimal sustainable population" level, which is defined by the US National Marine Fisheries Services (NMFS) as "a population level between carrying capacity and the population size at maximum net productivity". An optimal sustainable population level for marine mammals is thought to be between 50–85% of capacity, but generally 60% is used, and the International Whaling Commission assumes 60% is the level at which whale populations are most productive.

77. The NOAA guidelines are structured around the use of the Potential Biological Removals (PBR) which was developed to assess the maximum level of human-induced mortality that a population can incur, while being able to stay above half its carrying capacity in the long term.

78. The NOAA guidelines for recovery of depleted marine mammal populations provides an indication of how population outcomes and in particular the PBR might be determined in different circumstances. It highlights for example, the need for a severely depleted small population to have a very high population outcome to effectively retain more of the productivity of the species to rebuild the population in a more certain and more rapid manner than might otherwise apply. Equally, it indicates that a species with a large population and low risk of extinction could be managed to a lower population outcome to ensure the protection of the marine mammals did not impose unduly restrictive limits on resource utilisation.

79. The Department of Conservation uses a Threat Status classification to assess the relative risk of extinction of its protected species and the performance of its conservation measures. The threat levels for each species are established by a panel of experts. Those assessments are informative to the setting of management outcomes and emphasise the need for a disciplined and rational basis to the settings that would be relevant, and relative, to other species. For example, a species assessed to be "Nationally Critical", the most at risk category, would have a population outcome relative to the assessment which necessitates strong management intervention to reduce the risk to the species. In contrast, a species assessed to be "At Risk" would have outcomes set that reflect the inherent resilience and strength of the species.

80. The Agreement on the Conservation of Small Cetaceans of the Baltic and North Seas (ASCOBANS) has adopted a population objective for small cetaceans to restore and/or maintain stocks/populations to 80% or more of the carrying capacity.[5]

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4 Best PB (1993). Increase rates in severely depleted stocks of baleen whales, ICES Journal of Marine Science, Volume 50, Issue 2, pages 169–186, https://doi.org/10.1006/jmsc.1993.1018.

5 MOP 2: Resolution on Incidental Take of Small Cetaceans (Bonn 1997).

Application to Management of New Zealand Marine Mammals

81. The issue for the draft TMP is how to interpret what is emerging as international practice to the management of New Zealand's protected species is a manner that is compatible with the provisions of the Fisheries Act and the other statutes relating to the conservation of New Zealand's protected species. It would be appropriate to define what is in effect a long-term viability benchmark and a management target. That management target might be varied in the short term to allow for species-specific measures such as rebuilds. Such a structure would provide some certainty for stakeholders and some consistency and guidance for the exercise of powers in the Fisheries Act.

Long-term viability

82. The draft TMP indicates that managing human-induced mortality with a high degree of certainty at or below a level sufficient to ensure the population is maintained at 50% of capacity would ensure the population remains above a viable level (that is, avoids extinction).

83. The NOAA guidelines consider an optimal sustainable population level for marine mammals is thought to be between 50–85% of capacity, but generally 60% is used. If an optimal management target lies in the 50–85% range, then that would infer that any long-term viability threshold is at a point lower than 50%. While it provides some information as to the ability of species to recover from significant reductions in abundance, the work of Magera et al does not consider the risks of small populations. The Wade paper provides a view that Allee effects of small populations are not considered pertinent for an abundance above a level of 30% of capacity.

84. On the basis of those papers, we consider that long-term viability for a marine mammal population such as Hector's and Maui dolphins should be a maximum of 50% of capacity. Given that that outcome provides a floor below which the species should be not be permitted to reach, it would be appropriate that the outcome should be managed with high certainty. A 98% objective would be appropriate.

85. We would see the long-term viability as being akin to the soft limit in the HSS Guideline—the point at which steps should be taken to ensure the risk to the species is mitigated to prevent any further decline in abundance or increased risk of extinction.

Management Targets

86. The Fisheries Act specifies that protected species be managed *above* long-term viability. As such, there is some discretion available to the Minister, but that discretion is not unfettered. The Minister must do what is necessary to manage the effect of fishing, but he or she cannot go beyond that point to the extent that it frustrates the utilisation purpose of the Act (if the long-term viability of a protected species has been sufficiently assured).

87. Factors involved in the setting the bounds of the Minister's discretion (and degree of certainty) may include the existing population size, the current trend, the level of depletion and the impacts on utilisation, including the revenue foregone, the employment opportunities foregone and the impact on the well-being of the current and future generations.

88. The NOAA guidelines consider the optimal sustainable population for marine mammals as being between 50 and 85% of capacity with a tendency to use 60% as the accepted benchmark. Such a position would apply to a species not at a significant risk of extinction. We consider the 80% outcome would satisfy the need to manage *above* the long-term viability of a protected species and provide an appropriate limit to that discretion. Management outcomes could still be set beyond that level, but it would need to involve consultation with and agreement from other stakeholders if utilisation levels are being unduly impacted.

89. Again, it would be desirable to have a reasonable degree of certainty associated with meeting this management objective. The draft TMP proposes an upper 95% percentile should be used as a fisheries objective to ensure the population outcome is achieved. We do not accept that such a high level of certainty needs to be applicable to all management targets. Fisheries performance in the HSS Guidelines is permitted to fluctuate about the target, since the species long-term viability is not an issue. The levels of certainty for management targets for marine mammals should equally be lower, reflecting the lower risks to the species and that the species is more resilient and able to cope with larger shocks should they arise. There are however circumstances where the Minister might set a higher degree of certainty to reflect the circumstances of a particular species.

90. MPI has accepted that managing human-induced mortality to ensure that the dolphin population is maintained at 50% of carrying capacity would ensure the population remains above a viable level; i.e. above that point ensures long-term viability. Managing above that point is available to the Minister, but that discretion must be balanced against his requirement to provide for utilisation. Managing beyond sustainability is best done through agreement with resource users.

91. In terms of the Fisheries Act, we consider the long-term viability obligation could be satisfied by population management outcomes of 50% of capacity and 98% certainty. Managing above long-term viability would enable the Minister to generally manage to 80% of capacity with 50% certainty.

92. However, we recognise that Hector's dolphins are a New Zealand endemic dolphin and higher levels of protection than 50% are desirable to protect their uniqueness. We could support an outcome of up to 80% of capacity as the management target to reflect their value to New Zealand but reflecting the current high population that only needs to have an 80% certainty.

93. We consider Māui dolphins are in a different position. With only 63 adult dolphins at the last review and only a low rate of population growth possible, the subspecies is effectively in a rebuild position where animals should be valued more highly for their reproductive value. We would support the adoption of an outcome of up to 80% of capacity as the management target but with a 95% certainty target for the population while it is rebuilding.

The spatial modelling of dolphin distribution

94. Unlike previous risk assessments, this draft TMP relies, where feasible, on a spatially explicit model of risks. In essence, a spatial distribution of the dolphins is overlain with a spatial distribution of different human activities that cause a threat to dolphins and thereby creates an overlap, to which is applied an estimate of the risk to an individual dolphin from the threat. The determination of risk is highly dependent on the spatial distributions of the dolphins, the activity that threatens dolphins, along with the level of risk that activity causes.

95. While aerial surveys provide estimates of the absolute abundance of dolphins, the estimates are based on survey strata and do not provide a continuous plane of density. While distribution models based on the outputs could have been used to spread the dolphins to achieve that continuous plane, the aerial survey results represented only two points in time, and it was not certain how that distribution might vary in time throughout a year. The preference was to use a model that reflected the habitat suitability, but not actual distribution, for the dolphins.

96. The modelling was based on an analysis of seven habitat components (sea surface temperature, chlorophyll, turbidity, light attenuation, slope, distance to shore and bathymetric depth) and six components of dolphin prey. The final model used as a surrogate distribution for dolphin distribution was a simple model with only turbidity and ahuru factors (ahuru is a species of cod that has been found in the Kaharoa and Tangaroa surveys off the east and west coast of New Zealand and to the south and in Cook Strait).

97. The model was derived from the East Coast and West Coast South Island survey outputs, there being too little ahuru information to allow use of the South Coast South Island aerial survey results. No attempt was made to include the West Coast North Island aerial survey data as it was considered the sightings for such a small population were unreliable and could be unrepresentative of the Māui dolphin population. We disagree with the view that scientific sightings were the only sightings available that surveyed the wider area with the intent of observing the dolphins. Public sightings are more opportunistic, normally clustered on the coastline in known fishing spots with less qualified observers. The unrepresentative level of coverage of the water space does not necessarily reflect the habitat used by the dolphins.

98. While the scientific research was presented to the FNZ Aquatic Environment Working Group for its scrutiny, that scrutiny focused on the approach and methodology but at no time was the detailed distribution of the dolphins provided to the AEWG in a way that would allow them to fully comprehend and consider the reasonableness of the projected distribution and densities. The distribution of the dolphins and risks was provided only in a map or diagrammatic form which did not allow the AEWG to interpret or scrutinise the outputs for reasonableness. As such, the modelling should not be construed as having been fully peer reviewed and accepted by the working group.

99. Being based on the ECSI and WCSI distributions, the model effectively estimates distributions on a residential basis, that is, the number of dolphins that would normally be found living in the region on a permanent basis. It is not an estimate of possible occasional incursions by dolphins resident elsewhere or an estimate of the number of dolphins transiting through an area. No attempts were made to adjust the distributions or provide an alternative methodology to assess how those non-residential presences might be estimated.

100. The level of fit of the model to the aerial survey distribution was poor, achieving only a 24.6% explanation of deviance. To put that level of explanation in context, the model is three times as likely to provide an incorrect prediction as it is to provide a correct prediction. We compare that model performance with work undertaken by T Brough where models with a greater number of habitat variables achieved fits of over 50%.[6]

101. Notwithstanding the poor level of fit, based on analyses and visual inspections of the predicted densities and the aerial survey outputs for the South Island, the model was considered to be acceptable to model the ECSI dolphin distribution. The model appeared to identify areas of high and low densities of dolphins at high levels of spatial aggregation, but its reliability was not examined in the science assessment process at fine levels of spatial aggregation. That is, while it appeared to provide a reasonable fit at a national or South Island-based scale, its level of prediction at the small local scale was not available for scrutiny during the AEWG process. However, when compared to dolphin distributions derived from other sources such as aerial surveys, tourism reporting or anecdotal reporting, the modelling was found to have produced inconsistent outcomes. These became more noticeable and more inconsistent as scrutiny became more fine scale. We discuss the issues below in the sections on distributions of the dolphins and more detail is contained in Appendix 1.

102. The poor level of fit is further demonstrated by the anomalous results for SCSI and NCSI. Due to a lack of available data, the SCSI aerial survey was effectively excluded from the model development phase. Applied retrospectively to the SCSI aerial survey results, the model provided abundance estimates over twice the aerial survey abundance estimates and provided such a poor fit by predicting that only 20% of the dolphins would be located in Te WaeWae Bay, whereas the aerial surveys in 2016 and 2018 placed the percentage at 74% and 99% respectively. The model performed so poorly that alternative scenarios needed to be offered.

103. Similar problems were experienced in fitting the model to the NCSI where the decision was made to use reported sightings as the basis for the dolphin distribution rather than the habitat modelled distribution. The draft TMP states the distributions arising from the model for these two regions was not plausible. The poor performance of the model in those regions was ascribed to the level of model uncertainty at very low population densities.

104. For WCNI, notwithstanding the caveats on the model's applicability to low density populations, the habitat model derived from the WCSI and ECSI analyses was applied to the North Island to obtain a Māui dolphin density distribution. It is simply not rational to reject the model for NCSI and SCSI then apply the same model to the WCNI where similar circumstances prevail.

105. There was no calibration of the model to North Island aerial surveys or distributions. The WCNI only has a small population of Māui dolphins known to be spatially concentrated in areas of high suitability but with a very low overall density of dolphins, far lower than the densities in the NCSI and SCSI coasts where the model was deemed to have provided implausible results. Notwithstanding that, the habitat-based modelling was used as the basis for the offshore Māui dolphin distribution from Cape Reinga to Cape Egmont. Cape Reinga and Cape Egmont were assumed to be the northern and southern extents of Maui distribution without evidence of presence or rationale to support those choices.

106. The modelling had not been developed from a basis that included harbours and the high levels of turbidity in harbours provided implausible results particularly when there was an almost total absence of sightings in harbours. It was decided the turbidity modelling would not be the basis for determining abundance in WCNI harbours. Public sightings were used to inform the distribution of dolphin in the Harbours with a distance decay function used to estimate dolphin densities where no sightings were present. In contrast to that modelling, T Brough found that Hector's dolphin presence was strongly negatively correlated with the presence of mud.[7] Had his research been considered, any presence of dolphins in Harbours would have been confined to the harbour mouths and not spread further into the harbour where narrow channels and mudflats are the typical bathymetry.

107. The dolphin distributions were generated as follows:

    (a) Māui dolphins—the spatial habitat modelling was applied from Cape Reinga to Cape Egmont and the 63 dolphins distributed on the basis of the relative habitat values. The abundance and distribution in Harbours were based on public sightings (none of the various research surveys were used).

    (b) Transitional Zone—the habitat model was applied from Cape Egmont to Pencarrow Head and is also used to estimate the abundance.

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6 Brough TE. (2019). The ecology and conservation of hotspots for Hector's dolphin (Thesis, Doctor of Philosophy). University of Otago. Retrieved from http://hdl.handle.net/10523/9156.

7 Ibid.

(c) NCSI—22 public sightings were used to determine the underlying relative density plane which is then multiplied by the abundance estimate of 214.

(d) ECSI—the spatial habitat model is used to predict the abundance and distribution of dolphins.

(e) SCSI—there are three scenarios offered:

i. the spatial modelling outcome in which 10% of the dolphins are located in Te Waewae Bay;

ii. the 2016 aerial survey outcome in which variously 70%, 72%, 74%% of the dolphins are located in Te Waewae Bay;

iii. the 2018 aerial survey outcome in which 99% of the dolphins are located in Te Waewae Bay.

108. For the reasons discussed later in this submission, we have no confidence in the ability of the habitat modelling to provide accurate fine-scale distributions of Hector's or Māui dolphins. Even at a coarse scale, the ability of the modelling to correctly identify areas of high and low density is poor. The quality and accuracy of the modelling deteriorates markedly with its application at fine scales. The model will project the presence of dolphins where there is no, and has been no, physical presence reported (even with high levels of search effort).

109. While the model may identify areas suitable for the presence of dolphins and thus constitute an area of potential risk should the dolphins enter that space before it can be construed to be a risk that requires management intervention, the plausibility of the modelled risk needs to be analysed and found to be of sufficient probability to warrant intervention. It is not sufficient to say that a poorly performing habitat model identified an area of potential risk and, on the basis of fishing activity in that area, to impose management interventions on a precautionary basis. Yet that is what has happened in this TMP. The risk assessment outputs need to be analysed, filtered and compared to reported presence, previous surveys, and other research and then the need for management interventions be assessed. We see no evidence of that process being undertaken and management interventions have been based on the unfiltered results of a coarse habitat modelling model that has provided implausible and unrepresentative outcomes.

110. The consequence of an incorrect distribution for risk estimation are noted in the draft TMP in the discussions of the NCSI and SCSI conservation measures (see page 49 of the Supporting Document for discussion). Attributing dolphins to areas where there are actually no dolphins but there is fishing will over-estimate the risk of fishing and generate phantom mortalities and phantom risks. Hypothetical outcomes are not acceptable when they lead to in unnecessary management measures that cause the loss of livelihoods and significant damage to regional communities.

111. The implausible or unlikely outcomes of the risk assessment should more appropriately be targeted for further research to verify whether the risk is sufficiently material to be addressed. While there may be risks to the dolphins should the unlikely risks in fact be true, alternatively if the unlikely risks are incorrectly assumed to be true and further closures implemented, fishers' livelihoods are unduly and unfairly impacted. The appropriate cause of action is to verify the risks and then take action as appropriate.

PART 7: THE HECTOR'S AND MĀUI DOLPHIN POPULATIONS

112. *Cephalorhynchus hectori* dolphins are a species of the genus *Cephalorhynchus* that are found only in the Southern Hemisphere. Four species make up the genus:

    (a) Comerson's dolphin found in southern Argentina;

    (b) Chilean dolphin found particularly in southern Chile;

    (c) Heaviside's dolphin found in Namibia and South Africa; and

    (d) Hector's dolphin with a subspecies, Māui dolphins, found in New Zealand.

113. All are small blunt-nosed dolphins with relatively short life spans (20-25 years), a slow reproduction rate (calving every second year), living in shallow coastal waters and having a high metabolic rate.

114. The Māui dolphin was formally recognised in 2002 as a subspecies of the Hector's dolphin based on morphological differences in respect of two aspects of its rostrum. It was also found to be differentiated by having a unique G haplotype, although the wider Hector's dolphin is known to have some 26 haplotypes. Whereas Hector's dolphins have a current range that includes most of the South Island, migrants have been found in more recent years on the lower North Island east and west coasts and in the WCNI area previously considered exclusively Māui territory. Māui dolphins are found exclusively on the west coast of the North Island. There is as yet no evidence of inbreeding between the two subspecies which might lead to the re-absorption of the Māui subspecies into the Hector's subspecies.

The Māui dolphin population

115. In the draft TMP, *Cephalorhynchus* dolphins on the west coast North Island is considered to have:

    (a) A core Māui dolphin distribution area from Maunganui Bluff to New Plymouth;

    (b) A southern tail from New Plymouth to Cape Egmont probably with Māui dolphins;

    (c) Three ***potential habitat*** areas:

        i. Cape Reinga to Maunganui Bluff;
        ii. the WCNI harbours; and
        iii. Cape Egmont to Pencarrow Head, which is considered to be a transition zone, or better described, a transit zone.

Abundance

116. The West Coast North Island zone (Cape Reinga to Cape Egmont) is estimated to have a 2015/16 population of 63 Māui dolphins over the age of one year and in the transition zone, 16 Māui or Hector's dolphins.

117. The 2015/16 abundance of 63 was based on a DNA capture-recapture approach and is considered to be a reliable estimate of the population size with a 95% confidence limits of 57–75 dolphins. No estimate is made of the number of calves although a number were seen. The Māui dolphin estimate of 63 was an increase on the 2011/12 estimate of 55 (95% confidence limits 48–69).

118. Previous to 2011/12, the abundance had been estimated on the basis of aerial surveys, but the estimates contained high levels of uncertainty. While aerial surveys may provide reliable indications of distribution and abundance where the dolphins are numerous, they become less reliable with low densities of dolphins.

119. In addition to the Māui dolphins, two Hector's dolphins were genetically sampled in 2015/16, one being a female previously sampled in 2010 and 2011 and one a male not previously sampled.

120. We agree the estimate of 63 should be used for the abundance of Māui dolphins.

Trend

121. There is some dispute as to the historic trend of the Māui dolphin abundance. There is no dispute that the population has declined. The dispute over the level of historic decline is somewhat distracting in that what is more material is the recent trend and the projected trend of the population under *existing conservation measures*, for that will determine the need for additional measures.

122. Two analyses of the future trajectory for Māui dolphins were undertaken for the draft TMP.

123. Justin Cooke fitted an individual-based population model to genetically-based identification data collected between 2001 and 2016.[8] The modelling indicated a likely decline in the Māui dolphin since 2000 and, in the absence of any mitigation of the toxoplasmosis risk, an expected continuation of that decline. Fishing risk was indicated to be insignificant and its removal will only marginally improve the prospects for Māui dolphins to recover.

124. Jim Roberts used a Bayesian population model fitted to the same mark-recapture data as the Cooke model but fitted to the population size estimates from Baker 2013, Hamner 2013 and Baker 2016.[9] Analysis of the fit indicated the probability of a shift in the population demographics, viz, non-calf survival, in 2008. If that shift in survival rate is not accepted, then the model had a poorer fit and indicated a declining future population in the absence of any mitigation of the toxoplasmosis impact, and furthermore, indicated commercial fishing had only a marginal impact on the prospects of the Māui dolphin to recover. However, if the survival rate shift is accepted, the model had a better fit to the recent estimates and indicated a likely increase in the future population, but again indicated commercial fishing had only a marginal impact on the outcome.

125. The Roberts assumption of a shift in the demographics is further supported by the analyses of population trends from Baker et al 2016 which showed the population decline rate from 2001 reduced over the 2001-2016 from 13% for 2001-07 to 1.5-1.9% for 2001-16.[10] While the change may reflect improved data availability and collection, fundamentally that stabilisation can only have occurred in the presence of population growth in later years.

126. We note that the DOC expert panel that recently reviewed the Threat Status of New Zealand's marine mammals[11] appeared to rely on the Baker 2016 findings for the more recent trend. Their consensus was that the Māui dolphin population had declined by between 1.5% and 3.0% since 2001 and, while the rate may have declined since 2008, the power to detect that change was limited and further significant declines might still be expected.

127. We are more inclined to accept the Roberts assumption of a shift in the demographics since 2008 and consider population increases of Māui dolphins are more probable in the future than declines. Dr Robert's analysis is more clearly focused on the effects and performance of the existing conservation measures and indicates a turning point in the key demographic survival factor, a point supported by the genetic survey analyses. The Cooke modelling takes a longer time perspective and as such loses the impact of the 2008 measures and any turning points in the longer-term trend.

128. The draft TMP adopts that same longer-term perspective of decline and future projection of decline. We contend that the draft TMP should have focused on the efficacy of the current measures and premised its review on that perspective rather than taking the longer historical perspective.

129. Notwithstanding the above, we consider that information on the population trend since the last substantive management intervention to be so vital that it should have been investigated and a robust estimation provided. This would have been a relatively simple and cost-effective exercise.

130. We understand the various views being provided and note it would have been informative if the DNA genetic survey could have been brought forward to provide an additional data point. The need for further fisheries measures would then have been be better informed and the direction of the future for Māui dolphins more clearly defined. The addition of the next genetic-based abundance estimate would be critical to decisions as to the need for additional conservation measures. We recommend the survey be undertaken more frequently in the future to monitor the abundance of Māui dolphins.

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8 Cooke JG, Constantine R, Hamner RM, Steel D, Baker CS. Population Dynamic modelling of the Maui dolphin based on genotype capture-recapture with projections involving bycatch and disease risk. New Zealand Aquatic Environment and Biodiversity report No 216, June 2019.

9 Roberts J, Constantine R, Baker CS (2019). Population Effects of Commercial Fishery and Non-Fishery Threats on Māui Dolphins (*Cephalorhynchus hectori maui*). New Zealand Aquatic Environment and Biodiversity Report No. 215.

10 Baker CS, Steel D, Hamner RM, 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. 2016.

11 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.

Population Management Outcomes

131. The draft TMP proposes management settings of 95% of capacity with 95% certainty.

132. We note that such a setting is not synonymous with "zero bycatch" or "as close to zero as possible" as discussed in the draft TMP document and the National Oceanic and Atmospheric Administration's review and rejection of Sea Shepherd's petition.[12] As noted earlier, while we consider a "zero by-catch" objective to be inconsistent with the provisions of the Fisheries Act, we are willing to work collaboratively with government to move toward that long-term goal.

133. The population of Māui dolphins is small and was always historically small. The subspecies is currently assessed to be "Nationally Critical" and at high risk of progressing to extinction. With existing conservation measures in place and the subspecies appearing to be growing, albeit slowly, the population appears to be recovering from its previous decline. It is uncertain where the existing Māui population is in respect of a percentage of capacity. It is effectively being appropriately managed as if in a rebuild.

134. Given the historic decline levels projected, it could reasonably be assessed that the existing population is more likely to be nearer the minimum sustainable level rather than nearer the desired 95% level. That assessment is consistent with the NOAA's findings in respect of Māui dolphins.

135. However, the population is small and is not resilient to risks such as Allee effects, inbreeding depression and the risk of some unforeseen impact. For that reason, a management target of an outcome that achieves a high proportion of capacity that limits incidental mortalities and ensures the reproductive performance is retained to build the population is desirable. We would consider 95% of capacity is appropriate.

136. The proposed population setting of 95% of capacity still provides for incidental mortality of up to 0.14 Māui dolphins per year from commercial fishing activity.

137. We recognise the need to rebuild the population with greater certainty than for a larger, more robust marine mammal population. For those reasons, we would support a fisheries management objective of 95% certainty. We recognise that, in supporting those settings, the population will grow albeit at a slow rate but will still support a limited utilisation of the fish stocks which gives rise to the risk for the Māui dolphins.

138. We also note that the target of 95% of capacity exceeds the Fisheries Act obligation to ensure the long-term viability of the Māui dolphins, yet we remain committed to work with government to achieve these outcomes.

Distribution

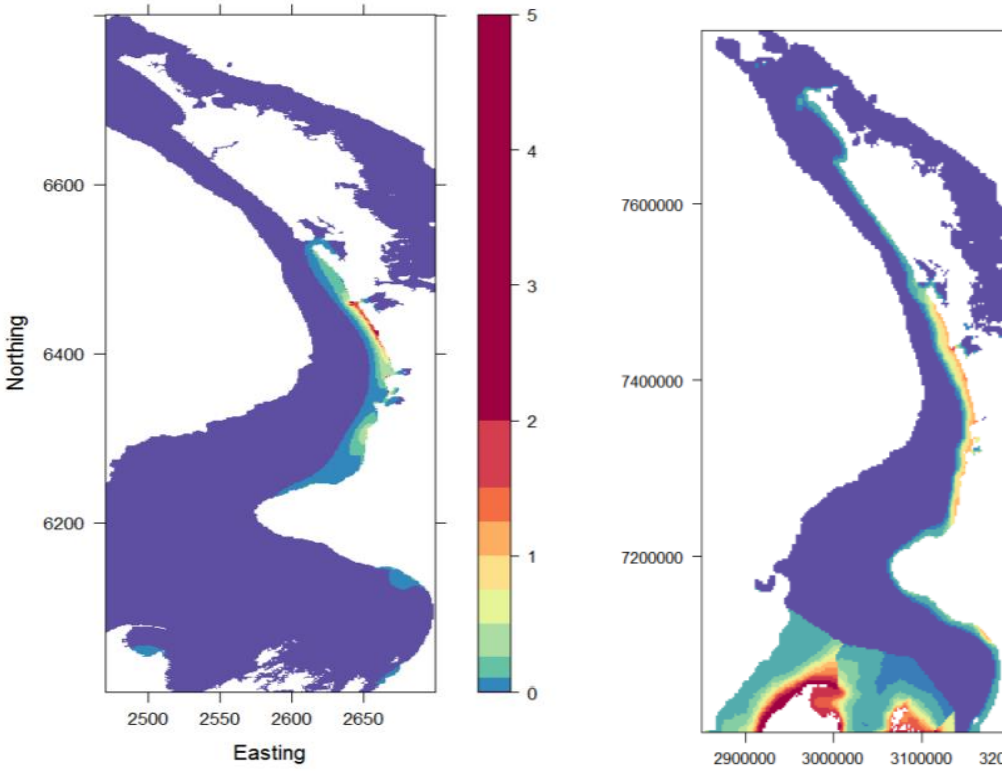
139. As noted earlier, the distribution of Māui dolphins was based on the application of the habitat model to the area from Cape Reinga to Cape Egmont to a seaward distance of the 250m bathymetric contour and within harbours. Public sightings were visually compared to the model outputs as a test of goodness of fit.

140. The habitat model estimated a current abundance of approximately 4,000 Māui dolphins, compared to an actual abundance of just 63 dolphins. To overcome the implausible abundance prediction, the actual abundance of 63 was applied to the predicted relative densities derived by modelling of potential (not actual) habitat. This resulted in small numbers of dolphins (but not zero) being distributed throughout the whole WCNI.

141. The modelled distribution was compared to the public sightings of Māui dolphins and deemed to be an acceptable comparison. Public sightings are not necessarily a reliable indicator of dolphin presence. In addition to the risks of misidentified dolphins and false reporting, small pleasure boats are heavily skewed to a close inshore location close to urban areas and harbours where safe launching and retrieval is possible.

[12] https://www.govinfo.gov/content/pkg/FR-2019-07-10/pdf/2019-14720.pdf

142. The following maps provide on the left the public sightings and on the right the habitat modelled distribution.



143. Whereas the public sightings on the left indicated a distribution concentrated between the Manukau and Port Waikato, stretching north to the Kaipara and south to New Plymouth, the habitat model distribution on the right stretched out the concentrated distribution to between the Kaipara and the Pariokariwa Point and generated dolphin densities as far north as Cape Reinga and as far south as Pencarrow Head.

144. Informative to the distribution of dolphins, Hector's and Māui dolphins are known to have high site fidelity and small home ranges. In the genetic mark-recapture work of undertaken in 2010, 2011, 2015 and 2016, the maximum range of an individual dolphin recorded was 54 km and the average distance between where dolphins were sampled in 2015 and where those same dolphins were re-sampled in 2016 was 7.8 km. These findings were consistent with the findings of Rayment *et al* in respect of Hector dolphins.[13]

145. The following table summarises the distribution of Māui dolphins that arises from the habitat modelling and was used in the risk assessment as the distribution for Māui dolphins. We comment on the distribution below.

DISTRIBUTION OF MĀUI DOLPHINS (as per Habitat Model)							
Area	0-4nm	4-7nm	7-10nm	10-12nm	12nm-100m deep	Over 100m deep	Total
Cape Reinga to Maunganui Bluff	2.7	0.7	0.5	0.2	0.1	1.5	5.7
Maunganui Bluff to Pariokariwa	30.3	13.2	5.4	1.8	2.2	1.4	54.3
Pariokariwa to Cape Egmont	1.7	0.6	0.3	0.1	0.2	2.4	5.3
Harbours							0.9
Total	34.7	14.5	6.2	2.1	2.5	5.3	66.2

[13] Rayment W, Dawson S, Slooten E, Bräger S, Du Fresne S, Webster T. (2009) Kernel density estimates of alongshore home range of Hector's dolphins at Banks Peninsula, New Zealand. Marine Mammal Science, 25: 537−556.

Cape Reinga to Maunganui Bluff

146. It is not clear from the draft TMP or the risk assessment why the range was extended as far as Cape Reinga, given the absence of sightings or any prior acknowledgement that Māui dolphins ever ranged that far north. However, the habitat modelling places 5.7 dolphins on a full-time equivalent basis in that zone.

147. The draft TMP provides a rationale that Māui dolphins may rarely frequent an area and not be observed. For the area from Cape Reinga to Maunganui Bluff, if a dolphin is assumed to have a temporary presence of say 10 days a year in that zone, to achieve a 5.7 full-time equivalent presence would require 219 dolphin visits to the zone. Given a total abundance of 63 Māui dolphins, each dolphin would need to visit the zone three and a half times per year. Given that Māui dolphins have high site fidelity, small home ranges and the most northerly observed point being Bayly's Beach, any assertion that there are 5.7 full-time equivalent dolphins from transitory presence in the Cape Reinga to Maunganui Bluff zone is totally inconsistent with dolphin behaviour and dolphin sightings and appears to be scientifically irrational.

West coast harbours

148. Acoustic surveying of the harbours, and the absence of research and public sightings, do not support the modelling expectation of full-time occupation by Māui dolphins of the WCNI harbours. That avoidance of tidal harbours with mudflats is further confirmed by the research of T Brough in his 2018 thesis where he found Hector dolphin presence was strongly negatively correlated to the presence of mud.[14] There is simply no evidence to support the modelled outcome.

Deepwater locations

149. Nor is it clear why the modelling projected dolphins to be so far seaward. The estimate of 7.8 dolphins being found on average in waters outside 12nm or over 100m deep is not credible for a dolphin that is known to avoid deep water, and in the WCNI, has never been scientifically observed at that distance in aerial or boat-based surveys, nor observed by MPI observers operating in the jack mackerel fleet. There is simply no evidence to support the modelled outcome.

Pariokariwa to Cape Egmont

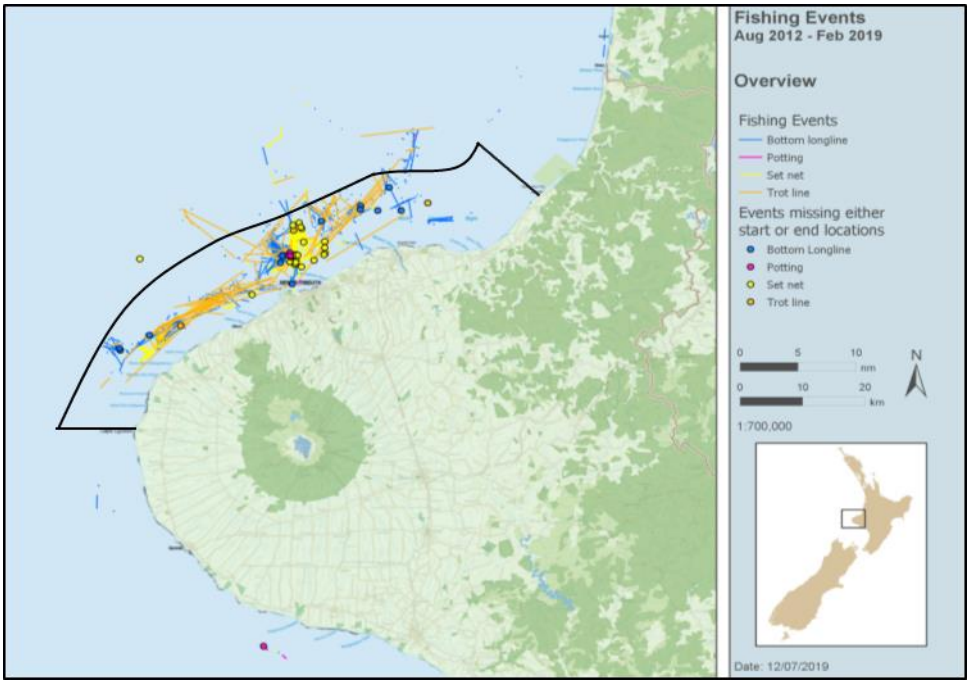
150. The projection of 5.3 Māui dolphins being located in the Pariokariwa to Cape Egmont zone is highly speculative given the last known Māui presence was a beachcast specimen in 1989 and the efforts of DOC and other parties to locate Hector species dolphins in the area.

151. DOC undertook aerial and boat surveys of the area between 2006 and 2013 to detect dolphins in the zone and, after over 40 days of searching and failing to detect any Maui dolphins in the area south of Kawhia, the surveys were ceased.

152. Of particular note is more than 1,100 days of Ministry Observer coverage in the last seven years that was specifically deployed between Pariokariwa and Cape Egmont to observe Maui dolphins. That effort is shown in the figure below and we note that the total number of Hector's or Maui dolphin observations in this area is zero. This is in stark contrast to the model that predicts *c*. 3-4 dolphins to inhabit the same area on a permanent basis. It is simply not reasonable to assume these dolphins would not have been seen in seven years.

153. Validated public reports of Hector species dolphins in the zone are few and far between, some are repeated reports of the same dolphin and a number have proved of doubtful provenance when examined more closely. Interestingly none have been reported in the last five years despite increased recreational boating activity in the area. The assertion that any of them are Maui dolphins is without foundation and merely reflects DOC's arbitrary decision to classify any reporting of a Hector dolphin to the north of Cape Egmont as a Maui and anything to the south a Hector's dolphin. Administrative convenience is not a replacement for proper science.

[14] Above at note 9.



Transition zone

154. For the transitional zone, it is generally understood that there may be occasional Hector's dolphins transiting through the area. The small number of Hector's dolphins detected in the WCNI genetic biopsy programmes indicates the number of transiting dolphins is very small, much lower than the habitat model estimate of 16 dolphins. The general absence of any dolphins is reflected in the paucity of public sightings and the lack of any sightings in surveys undertaken by DOC, MPI or in the MPI Observer programme that has operated since 2012. There is no sensible case for suggesting a residential or full-time equivalent population of 16 dolphins in this zone.

Summary

155. We do not consider the outcomes produced by the habitat modelling are reliable or appropriate to be used to assess fisheries risk. In particular:

(a) Cape Reinga to Maunganui Bluff: we do not accept that Māui dolphins frequent this area on a permanent or occasional basis. The projection of 5.7 dolphins on a full-time basis in the area is unreasonable and contrary to all available evidence.

(b) The Harbours: we do not accept that Māui dolphins frequent the harbours beyond the closed areas on a permanent or occasional basis. Despite the huge volume of vessel traffic, and hence the near certainty of sightings, dolphins have never been reported in Harbours beyond the areas already closed.

(c) Beyond 12 nm: we do not accept that Māui dolphins frequent the area more than 12 nm from the coast on a permanent or occasional basis and the estimate of 7.8 dolphins in that zone is unreasonable and is without foundation.

(d) Pariokariwa to Cape Egmont: we do not accept that Māui dolphins frequent this area on a permanent or occasional basis. The projection of 5.3 dolphins in the area is unreasonable and contrary to MPI's own Observer and DOC's survey data that has been specifically deployed in that area over the past seven years.

(e) The transitional zone: we do not accept that Māui dolphins frequent this area on a permanent or occasional basis but there may be occasional Hector's dolphins transiting the area. However, we do not accept that 16 full-time equivalent dolphins in that area is a reasonable or realistic proposition.

(f) The core area from Maunganui Bluff to Pariokariwa: only 75% of the dolphins being in the core zone is not credible, given the research sightings and the low numbers of dolphins.

156. As noted earlier, the habitat model derived from the South Island east coast and south coast analyses was applied to the North Island to obtain a Māui dolphin distribution model. For the South Island East and

West Coast regions where both dolphin abundances and densities are low, the habitat model was deemed to have provided implausible results. The same habitat model was nevertheless used to predict Māui dolphin distribution. That was a significant error and unreasonable.

157. The distribution of Māui dolphins projected in:

(a) Cape Reinga to Maunganui Bluff;

(b) Inside Harbours;

(c) Outside 12 nm; and

(d) South of Pariokariwa Point,

should be removed entirely for the purposes of the risk assessment. They are hypothetical phantom distributions, not supported by any evidence of current presence and not supported by any scientific studies of movements. They unnecessarily and excessively inflate the risk to Māui dolphins from fishing and provide the basis for inappropriate and irrational additional management measures.

158. The risk assessment identifies potential risks to the dolphins. The identification of such risks needs to be analysed against other information to provide a considered opinion as to the extent of the risk identified. While there is a need for a precautionary approach to the distribution of the Māui population, that level of precaution need be reasonable. In this instance, the distribution of the dolphins that arises from the habitat modelling provides a distribution that is not supported by other evidence available; and in some cases, the modelled distribution is refuted by available science. The limitations of the modelling should be recognised and phantom presences should be removed from the risk assessment. They are not precautionary; they are unreasonable and inappropriate.

159. We have provided more detailed comments on the WCNI distribution in Appendix 1. That appendix reviews the distribution, supporting material (or lack of) and other discussion on a regional basis.

The Hector's dolphin population

Abundance

160. Historically, Hector's dolphins have been managed as three population units, those being the:

(a) East Coast South Island ("ECSI");

(b) West Coast South Island; ("WCSI"), and;

(c) South Coast South Island "SCSI").

161. The draft TMP seeks to manage the North Coast South Island ("NCSI") population as a separate management unit. Information on the NCSI population is very limited but that information indicates the dolphins sampled in Golden Bay have haplotypes characteristic of the West Coast South Island population.

162. For the purposes of setting population management objectives, the draft TMP comments that the four sub-populations are biologically distinct. There is no need to make that assertion—it would have been enough to say they are managed as four separate geographic units. Alluding to them being biologically distinct is misleading and inconsistent with existing science.

163. The risk assessment and the draft TMP use the population estimates in the table below. We agree with the population estimates but note the uncertainty of the NCSI estimate.

	Population size	Rationale
East Coast South Island (ECSI)	9,728	Aerial survey abundance estimates for survey strata within respective rescaling stratum boundaries (MacKenzie & Clement 2014; MacKenzie & Clement 2016). Note that the NCSI estimate was based on a single observation from the winter survey, and so will be highly uncertain.
North Coast South Island (NCSI)	214	
West Coast South Island (WCSI)	5,482	
South Coast South Island (SCSI)	332	Summer aerial survey summer abundance estimate for the south coast of the South Island (MacKenzie & Clement unpublished data).

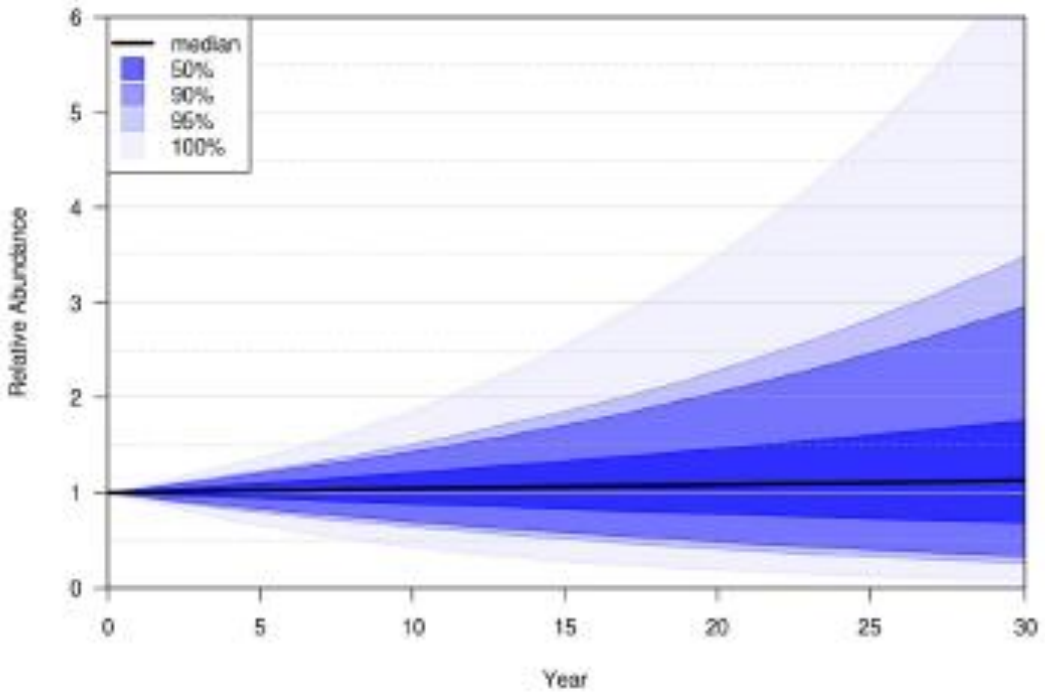
Trend

164. Advice to the Ministers, Cabinet and within the draft TMP states in respect of Hector's dolphins that the population trends are uncertain but may be declining and that there is no evidence on population increases. That is not correct. The reports of the WCSI and ECSI clearly indicated that the populations in those areas are stable or increasing, not declining.

165. The draft TMP fails to include a trajectory for Hector's dolphins, at either the sub-species or the population level. We believe that information is critical to forming an assessment of the effectiveness of existing management measures and the need for additional measures. We consider the omission of the information compromises the ability of submitters and decision-makers to make informed comment on the status of the dolphins. Not obtaining such vital information does not constitute the use of best available information.

166. To overcome the deficiency, Fisheries Inshore commissioned Proteus New Zealand to produce trajectories at the sub-species and population level and identify within them the impact of commercial fisheries activity.[15] The age-structured population model used the demographic variables: adult and calf survival, reproduction probability, female-male sex ratio, and maximum age, as used in the Roberts 2019 risk assessment. Two scenarios were run, the first without fishing deaths identified and second with. For each scenario, 1,000 trajectories were simulated for a 30-year period. The period was truncated to 30 years to allow for a discrete outcome and to restrict the impact of greater uncertainty with time.

167. The modelling indicates that the sub-species can be expected to grow by 13% within the next 30 years using the median with a probability of growth after 30 years of 57%. Removing fishing impacts would see the growth rate increase to 29% and the probability of growth after 30 years increase to 64%. The following diagram illustrates the projected outcomes with the median shown as the black line and the range at differing confidence limits.



[15] McKenzie D. I Population Trajectory Assessment for Hector's Dolphin, Client Report for Fisheries Inshore New Zealand Proteus Report 2019-04 July 21, 2019.

168. The model was run for each sub-population, again using the risk assessments outputs on a regional basis. The outputs of those runs are set out in the table below.

RELATIVE ABUNDANCE TRAJECTORIES (After 30 years)				
Population	**Average**	**Lower 95% percentile**	**Upper 95% percentile**	**Probability of Growth**
NCSI	2.19	0.48	4.50	0.83
ECSI	1.80	0.44	3.85	0.78
WCSI	0.60	0.08	1.86	0.29
SCSI	1.28	0.24	3.01	0.63
ALL	1.13	0.34	2.53	0.57

169. The predicted trajectories indicate that the Hector's dolphin population is increasing at approximately 0.5% per annum. That rate will increase over time as the level of fishing activity remains flat. We are concerned with the WCSI and NCSI estimates which might indicate a movement of dolphins from the WCSI to the NCSI population. That would be consistent with the Golden Bay dolphins sampled by Ogle in 2014 and 2015. We would also suspect that the dolphins might be the source of Hector's dolphins being sighted on the coasts of the North Island.

170. We consider the draft TMP statement that the population may be declining to be misleading. Had a population trajectory been included, this would have been influential in understanding the efficacy current measures and need for future management.

171. Furthermore, population trajectories should have been used by DOC to inform its review of the threat status of marine mammals. In that review,[16] Hector's dolphins were given a new ranking of "Nationally Vulnerable" to reflect the increased abundance estimate of 14,849. In the absence of new published information, the expert panel chose to retain a population trend of a decline of 70% since 1975, noting that the 2008 conservation measures would have reduced the decline rate.

172. Had the panel been provided with an updated trajectory model, the threat status of Hector's dolphins would have improved by a further step to be "At Risk" rather than in the "Threatened" class. The panel could have assessed the dolphins to be either population stable or population declining, depending on their confidence in the analyses.

Population Management Outcomes

173. The draft TMP proposes a population management outcome of 90% for Hector's dolphins compared to a 95% outcome for Māui dolphins, and an 80% outcome for local populations at Kaikoura, Banks Peninsula and Timaru.

174. The selection of the management objectives in the TMP of 90%:95% for Hector's dolphins is arbitrary and not supported by a consistent rationale. MPI accepts that managing human-induced mortality with a high degree of certainty to ensure that the dolphin population is maintained at 50% of carrying capacity would ensure the population remains above a viable level. MPI also acknowledges that its proposed management objectives are "much higher" than above long-term viability—close to the maximum number of dolphins the environment can sustain. The use of such objectives in an attempt to justify further measures to limit fishing is not consistent with the Minister's role under s15(2) to only impose measures necessary to avoid, remedy or mitigate the effects of fishing related mortality on the protected species population.

175. MPI has not even established if the current population of Hector's dolphins are increasing, stable or declining under current management measures. MPI is also silent on where these populations currently sit as a percentage of the maximum number of dolphins the environment can support. There is no model to test the populations' response to various management scenarios; there is nothing upon which to anchor the Minister's decision about what may or may not be necessary in the context of the Act. What we have instead is an assertion that these populations must be restored to close to the maximum number that it is possible for the environment to support with almost maximum certainty that this will occur. Further, it is

[16] 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.

suggested that a range of management interventions, at high social and economic cost, are required to deliver the desired management outcomes.

176. Given the time and resource government has expended in recent years on this matter, this is vital information that is available with very modest cost, time or effort.

177. In the absence of that information, we are left to infer, or have ourselves commissioned as part of providing this response, the following:

(a) The Hector's dolphin populations is increasing. In the absence of any analysis to indicate the current trend in the Hector's dolphin population, Fisheries Inshore commissioned work that indicates the sub-species is expected to grow by 13% within the next 30 years. An increasing population trajectory under current management is an important consideration.

(b) Populations are currently well above long-term viability at or about 90% of capacity. In the report to the expert panel undertaking the risk assessment as part of the DOC Threat Classification Review, Fisheries New Zealand asserted that the ECSI and WCSI populations of Hector's dolphins are close to equilibrium at the current level of mortality, and with lower fisheries mortality in recent years, the populations would be expected to be recovering slightly from a low of 90% of capacity to around 93% of capacity.[17] No comments are available as to the status of NCSI and SCSI dolphins relative to their respective capacity levels but given the low level of fishing activity, it should be accepted that the populations are not heavily depleted. All Hector's dolphin populations are closer to their capacity levels rather than their sustainability minimums and should be managed according to that status.

178. Given that Hector's dolphins have a greater abundance, are projected to continue to increase in number, and are perhaps already close to their capacity, there is no need to impose unnecessary limits on the utilisation of the fisheries resources under the Fisheries Act. The management outcomes for the Hector's dolphins should reflect the management of a dolphin that is not faced with, and is not heading toward, extinction. It is far from those circumstances and differs significantly from the position of the Maui dolphin.

179. We note that the draft TMP advocates assessing local populations at Kaikoura, Banks Peninsula and Timaru at 80% of the carrying capacity. Given that these populations make up 82% of the ECSI population and 51% of the total Hector's dolphin population, we consider there are reasonable grounds to use the 80% for the Hector's dolphin population.

180. All Hector's dolphin populations are closer to their capacity levels rather than their sustainability minimums and should be managed accordingly.

181. We are mindful of the NOAA guidelines that would consider a 50%-85% range as being appropriate for optimal sustainability performance with a setting of 60% being the management norm and the other international practices. A setting of 90% for Hector's dolphins appears inappropriate when compared to those yardsticks.

182. We acknowledge that Hector's dolphins are an iconic species and have in the past declined significantly in number, noting that fishing played a disputed minor role in that decline. The population appears only recently to have stabilised and shown signs of growth and future growth is not assured.

183. We consider a lower percentage of 80% of capacity would be more appropriate for the population management outcome for Hector's dolphins. Such a level would result in an abundant population with the resilience and capacity to ensure sustainability at all times whilst not imposing unnecessary constraints on utilisation of fish stocks. Such as setting would also be consistent with the NOAA guidelines as set out in the Taylor 1996 paper earlier referred to in this response. As we have stated, we are willing to work with government to move beyond that target as part of an agreed and cooperative management approach.

184. With a large population that is deemed close to capacity, the degree of certainty needed in the management of Hector's dolphins can also be decreased. The choice of a high degree of certainty is associated with a desire to increase the rate of increase of what is considered to be a depleted population. Hector's dolphins are not a population that is depleted by incidental by-catch in fisheries. If anything, it is a population that has been recently depleted by the identified onset of a disease to which it has low naturally acquired immunity and a low natural rate of population increase due to its time to maturity, its biennial breeding and its short life span. That does not require other threats such as fishing to be unlawfully removed disproportionately to their impact.

185. We consider that an appropriate longer-term target for Hector's dolphins might be 80%:50%. Acknowledging that Hector's dolphins have only recently exhibited growth and that growth is at low annual

[17] Fisheries New Zealand submission regarding Threat Classification Scheme update for Hector's dolphins, and implications for update process for marine wildlife. Official Information Act response, MPI OIA19-290, dated 25th July 2019, at page 23.

rates, we consider that 80%:80% is the appropriate management setting for the current period. If the population grows at higher rates, the degree of certainty required in future years should be lowered to the more appropriate long-term position of 50%. We will work with government to move the abundance of the dolphins to higher levels as part of an agreed and cooperative management approach. However, that cannot be driven by constraining fishing alone as a substitute for addressing other risks.

Distribution

186. The Hector's dolphin distribution on the South Island's East and West coasts was estimated using the spatial habitat model. Due to the modelling producing implausible results for the North and South coasts, the distribution in those areas reverted to the aerial survey for SCSI and public sightings for the NCSI.

187. The habitat modelling produces the outcomes for the distribution of Hector dolphins in the following table.

DISTRIBUTION OF HECTOR DOLPHINS (as per Habitat Model)*							
Area	**0-4nm**	**4-7nm**	**7-10nm**	**10-12nm**	**12nm-100m deep**	**Over 100m deep**	**Total**
NCSI	110	34	18	8	28	12	210
ECSI Pegasus Bay	3,457	2,383	1,440	601	427	330	8,641 682
WCSI	n/a	n/a	n/a	n/a	n/a	n/a	5,482
SCSI	193	29	23	13	19	29	329
Total	3,755	2,446	1,481	622	474	371	15,344

* The numbers are as per supplied by FNZ on 4 August 2019 and differ from the draft TMP abundance and do not include WCSI

188. As with WCNI, the model appears to have a propensity to allocate higher abundance in the more distant and deeper areas than other research evidence would support.

189. While the modelling appears to have an acceptable goodness of fit when compared at a coarse scale to sightings, the projected distributions appear inconsistent at fine scale with other sources of information. Each of the regional populations appears to have problems with the modelled distributions. These are discussed in greater detail in Appendix 1. Issues we highlight include:

(a) The modelled Kaikoura distribution places the dolphins further from the coast in the south and places them more in the narrow neck of space between the coast and the canyon than other surveys indicate.

(b) In Banks Peninsula the model provides a concentration of dolphins in south Pegasus Bay and lower densities elsewhere about the Peninsula, contrasting with the surveyed population being more widespread about the Peninsula.

(c) The SCSI modelled population places most of the dolphins outside Te Waewae Bay, contrasting with other surveys which concentrate the dolphins in the Bay. The modelling is so unreliable the draft TMP offers alternative distributions to those modelled.

(d) The NCSI modelled population contrasts so unfavourably with other information that it is replaced by public sightings and subjective judgement.

190. With a low overall goodness of fit at the fine scale, we have no confidence that the habitat modelling can accurately predict the location and distribution of dolphins, especially at a scale of 1 km^2. While fishing activity can be accurately mapped, the level of precision assumed by the dolphin habitat model is far less precise and resulting estimates of mortality and risk scores are far less certain than the draft TMP depicts.

191. Consequently, we cannot accept the modelling provides an accurate distribution suited for the production of fine scale estimates of fisheries mortalities and risk to the dolphins. Until the distribution from the modelling is verified, it should not be used to justify additional fisheries closures.

PART 8: THE FISHING MEASURES PROPOSED

192. The draft TMP indicates that commercial fishing has not been the primary factor in the reduction of Hector's and Māui populations and the impacts were insufficient to have caused the historical population declines. The draft TMP also indicates that the removal of all fishing risk will have little impact on the future trajectories of the dolphin populations or would depress the capacity of the populations to achieve population management outcomes of 90% of carrying capacity. To that extent, there is no need for additional management measures under the Fisheries Act to ensure the sustainability of the dolphin populations. There is no need for further measures that would restrict the utilisation of the fisheries.

193. In terms of the Fisheries Act, the obligation to ensure the long-term viability of Māui and Hector's dolphin is being met through the current measures. Estimated mortalities are below the maximum mortalities permitted to achieve the 60%:98% sustainability objective. On that basis, there is no legislative requirement to impose additional restrictions on fishing.

194. We note that there have been references to the draft TMP in respect of seeking to maintain the credibility of New Zealand's profile as a conservation minded nation, to the consideration of a zero-bycatch target, and to reduce the use of set netting in New Zealand.[18] Those are not permitted considerations in the exercise of the powers by the Minister of Fisheries contained in section 15(2) of the Fisheries Act.

195. The spatial risk assessment identified the following areas with high overlap of set net fisheries and dolphins and a high risk score:

Māui

(a) The Kaipara harbour;

(b) The coast to the north of New Plymouth;

Hector's

(a) Along the Kaikoura coast; and

(b) In Pegasus Bay to the north of Banks Peninsula;

(c) in the south Canterbury Bight.

196. For trawling, the spatial risk assessment identified the following areas with high overlap of set net fisheries and dolphins and a high risk score:

Māui

(a) Between Port Waikato and to the south of Kawhia; and

(b) Just outside the existing trawl boundary; and

Hector's

(a) In Pegasus Bay to the north of Banks Peninsula;

(b) In the south Canterbury Bight and Timaru

197. The draft TMP contains a number of discrete fisheries measures to address those and other residual risks. In this section we discuss the need for additional measures as a management issue and have placed detailed discussion of the separate measures in Appendix 1.

Māui Dolphin Territory

198. The population management objective in the draft TMP of 95%:95% provides for a maximum mortality of 0.14 Māui dolphins per annum.

199. The risk assessment currently estimates that deaths from set-netting in the Māui dolphin territory total 0.095 deaths per annum (1 death per 10 years) and 0.018 (1 death per 50 years) from trawling, giving a mean impact of 0.11 deaths per annum (i.e. below that required to meet the management objective). The upper 95th percentile of estimated current fisheries mortalities is 0.30 deaths per annum. To achieve a 95% certainty of achieving the population objective, the draft TMP estimates the average number of estimated mortalities needs to be halved, that is reduced to 0.055 mortalities per annum.

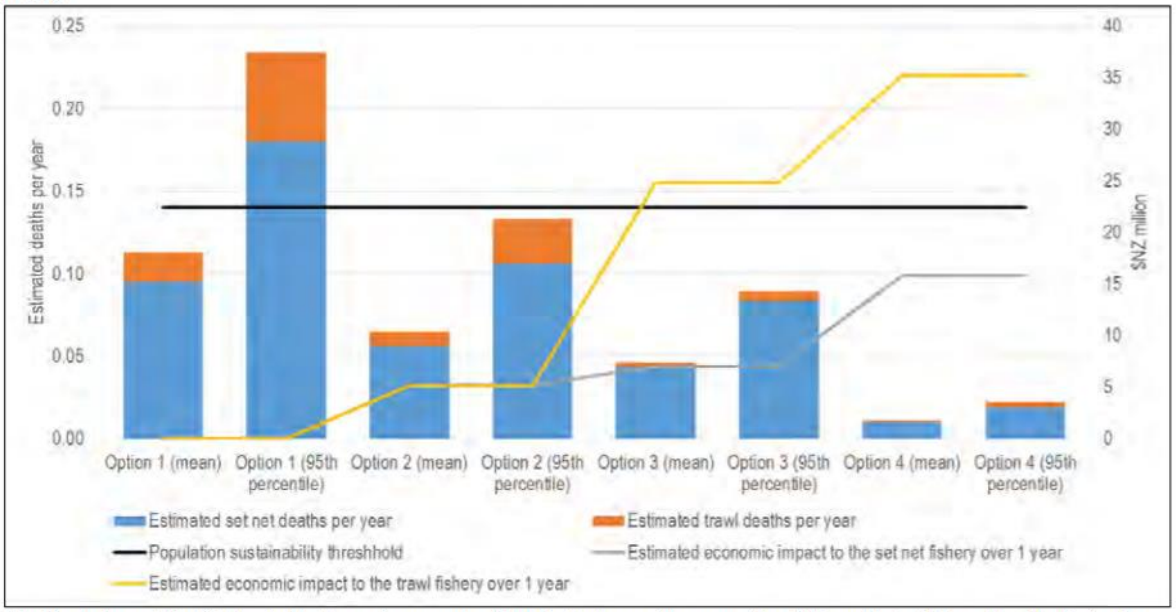
[18] https://www.beehive.govt.nz/release/more-measures-protect-hector%E2%80%99s-dolphins.

200. The draft TMP proposes four options to reduce the risk of commercial set netting and trawling to Māui dolphins. The set net and trawl proposals may be considered separately. These are set out in the following table, we do not support those measures highlighted in red.

PROPOSED MEASURES AND IMPACTS WITHIN ASSUMED MĀUI HABITAT (The figure in brackets is the reduction in annual mortalities)				
Area	**Status Quo**	**Option 2**	**Option 3**	**Option4**
SETNET				
Cape Reinga to Maunganui Bluff	No closures	0-4 nm closure (-0.015)	0-4 nm closure (-0.015)	0-4 nm closure (-0.015)
Maunganui Bluff to New Plymouth	0-7 nm closure	0-10nm closure (-0.012)	0-12nm closure (-0.014)	0-12nm or 100m closure (-0.017)
Harbours	Kaipara and Manukau mouths	Kaipara and Manukau mouths	Extension of Kaipara and Manukau and Closure of Kawhia (-0.011)	All harbours totally closed (-0.041)
New Plymouth to Cape Egmont	0-2nm closure; 2-7 nm observer	0-7 nm closure (-0.012)	0-7 nm closure (-0.012)	0-7 nm closure (-0.012)
WCNI Estimated annual mortalities remaining	**0.095**	**0.056**	**0.043**	**0.01**
TRAWL (Māui Territory)				
Cape Reinga to Maunganui Bluff		0-2 nm closure (-0.0004)	0-2 nm closure (-0.0004)	0-2 nm closure (-0.0004)
Maunganui Bluff to New Plymouth	0-2 or 0-4nm closure	0-4 nm closure (-0.009)	0-10 nm closure (-0.0157)	0-12nm or 100m closure (-0.016)
Harbours	No trawling permitted			
New Plymouth to Cape Egmont			0-4nm closure (-0.00127)	0-4nm closure (-0.00127)
WCNI Estimated annual mortalities	**0.018**	**0.0086**	**0.0019**	**0.00033**

201. The draft TMP depicts the effects in Figure 8. It should be noted that Options 2, 3 and 4 all provide outcomes that are in excess of those required to meet a fisheries-related mortalities objective of 0.055 dolphins per year. Furthermore, these outcomes are far above those required under the Fisheries Act 1996.

Figure 8: Estimated dolphin deaths by year and economic impact under each proposed option for west coast North Island



Note: Population sustainability threshold = the maximum number of dolphin deaths possible per year from fishing-related activities while still achieving the desired population objective.

Figure 8 shows the outcome of each option at the mean level of estimated set-net deaths (blue) and trawl deaths (orange) and at the upper 95th percentile. Making a decision based on the 95th percentile is the most precautionary approach.

202. Our opposition to the measures stems essentially from the unreliability of the spatial distribution of Māui dolphins which underlies the risk assessment. Earlier in this submission, we noted our concerns with the spatial habitat suitability modelling that had the outcome of creating Māui dolphin presence, albeit low, in areas where presence has not been previously reported or recorded. The risk assessment then compares the phantom distribution of Māui dolphins with the distribution of fishing effort and, where an overlap exists, calculates the level of estimated incidental mortalities. In order to remove the phantom risk that has been created by the habitat model, fishing activity must be removed.

203. All this is based on a hypothetical presence of dolphins generated by habitat preference modelling based on South Island conditions but applied without calibration to Māui territory, not supported by any sightings processes and which was deemed unreliable and inappropriate when applied to small populations with low densities in NCSI and SCSI. The draft TMP cautions the use of, and the uncertainty of, the spatial habitat modelling in such circumstances. Before fisheries measures are introduced, the risks need to be properly assessed. Accepting the modelling outcomes at face value as an a priori justification for management measures makes a mockery of any stated objective to manage risks on an informed and scientific basis.

204. The argument has been advanced that the incursion of dolphins into areas outside the existing prohibitions may be so rare that the prospects of being observed are extremely low, but they may occur at some time. If the prospect of dolphins entering such areas is extremely low, then the prospects of them being captured in fishing activity is infinitesimally low. The model is not based on occasional incursions—it is based on placing a resident population of a number of dolphins in the area on a full-time equivalent basis which are then exposed to fishing risk.

205. The draft TMP notes the need for a precautionary approach to protecting dolphins. However, exercising caution still requires reasonableness. Any decision to adopt a more cautious approach needs to be justified in terms of the recent performance of the existing management measures and evidence to support the contention of actual risk.

206. For the reasons provided earlier, we consider estimated Māui dolphin presence and mortalities for the areas from:

(a) Cape Reinga to Maunganui Bluff,

(b) the Harbours,

(c) the areas beyond 12 nm and

(d) Pariokariwa to Cape Egmont

should be zero. This on the basis that the risks in those areas are created by unreliable and implausible modelling rather than being a reflection of actual risk from presence of the dolphins. In making that recommendation, we would seek the removal of the closures imposed in 2012 between Pariokariwa and Hawera. The new information on the absence of dolphins in that area does not warrant any closures.

207. Removing those risks provides the profile of mortalities set out in the following table.

WCNI ESTIMATED RESIDUAL RISK (MORTALITIES)				
	As Per TMP		With Phantom Risks Removed	
	Set netting	Trawling	Set netting	Trawling
Cape Reinga to Maunganui Bluff	0.015	0.0004	0	0
Maunganui Bluff to New Plymouth	0.027	0.0163	0.017	0.013
Harbours	0.041	0	0	0
New Plymouth to Cape Egmont	0.012	0.0013	0	0
Total	**0.095**	**0.018**	**0.017**	**0.013**
Residual Risk from Existing Measures				
As per TMP	**0. 11**			
Without Phantom Risks	**0.030**			
Maximum Allowable Mortalities at 95%:95%	**0.055**			

208. On the above basis, no additional conservation measures are required to achieve the population outcome for Māui dolphins; even at the 95% population outcome with 95% certainty. Fishing related mortalities would be estimated to be one dolphin every 33 years.

209. Notwithstanding there being no need to implement additional measures, the draft TMP provides options that could see over 140 fishers forced from the industry, a total of over 240 families facing economic hardship and losses in revenue to New Zealand of over $95m per year in order to reduce the mortality of Māui dolphins to 1 in every 33 years.

210. Current conservation measures close 6,200 km^2 of the WCNI water space to set netting. The proposed closures will see an additional 14,600 km^2 closed, an increase of 235% in area to allow each dolphin to have access to over 330 km^2 of protected water space. There is however no evidence to support that Maui dolphins ever access that additional space.

211. Notwithstanding the above outcome, Fisheries Inshore accepts that it has an implicit obligation to reduce the level of captures to the least possible and would seek to reduce it further than the current level. We comment on measures the industry proposes to implement in Section 9 of this response.

Ring-netting option

212. The draft TMP proposes to allow ring netting in those areas where set netting is not permitted. Ring netting is the use of a small net that is targeted to catch an identified school of fish. The soak time for the net is short and the fisher is in attendance at all times, actively seeking to drive the fish to the net. The method is only appropriate to catch schooling fish such as kahawai, trevally and mullet. It is not an appropriate method to target flatfish or species such as rig and school shark.

213. We agree that it should be permitted in any harbour areas closed to set netting, including those areas already closed in harbours in the Kaipara, Manukau and Port Waikato.

214. This would recover some revenue lost since the imposition of the ban in 2008.

The Trigger

215. The draft TMP seeks comments on the possibility of a trigger being established that would close fishing in the event a Maui dolphin was captured. Industry would not be averse to the concept of a trigger for Maui dolphins but its support for such a mechanism would be dependent on no new closures being implemented in the WCNI and the delivery of additional monitoring.

216. We are concerned that industry has been portrayed as being adamantly opposed to any camera monitoring on vessels under any situation. That is not the case. Industry is opposed to cameras being imposed before a number of issues are addressed. They include strategic, policy matters and operational settings.

Strategic Matters

217. Electronic monitoring can have many applications for fisheries management. It can be used for verification of catch of both fish and protected species, fisheries science, offence detection and risk assessments. FNZ need to define the purposes for which the monitoring will be used and set out a strategic direction to ensure all the benefits of electronic monitoring are captured.

Policy Matters

218. The policy matters to be addressed include:

    (a) Privacy of the individual

    (b) Access to the imagery by:

        i. Interested public

        ii. MPI officers

    (c) Landings policy

    (d) Catch balancing policy

    (e) Offences, penalties and infringements

Operational Matters

219. The operational matters that need to be addressed include:

    (a) TAC/TACC settings for a large number of stocks

    (b) Catch management and review methodologies and processes, including low information stocks

    (c) Protocols for internal MPI access

    (d) The transition from the current state to a monitored state

    (e) Funding of the capital and operating costs of the equipment

    (f) Business operating protocols

220. These are not trivial matters and a failure to address any part of them will ultimately impact on the costs and benefits of electronic monitoring. Industry is keen to see the technology introduced in a cost-effective and strategic manner with all fisheries management policies settings addressed to provide for an integrated future rather than having cameras tacked onto a fisheries management framework that is not suited to such technology.

The transitional zone

221. Although the spatial assessment estimates 16 Hector dolphins may be present in the zone at all times, the maximum mortality of Hector dolphins or PST is not calculated for the transitional zone.

222. The risk assessment currently estimates that deaths from set-netting in the zone total 0.063 deaths per annum (1 death per 16 years) and an unknown amount from trawling. Notwithstanding neither the level of maximum mortality possible or the current level of mortality being estimated, the draft TMP provides an option to close set netting out to 7 nm from Cape Egmont to Hawera and out to 4nm for Hawera to Pencarrow Head and to close trawling out to 4nm from Cape Egmont to Hawera and out to 2 nm from Hawera to Pencarrow Head.

223. The draft TMP only indicates that the set net measures may reduce dolphin mortalities from set netting by one dolphin every 21 years and from trawling by one dolphin every 680 years.

224. We cannot support the assertion of there being an average of 16 dolphins in the transition zone whether on a permanent or transitory basis. As discussed previously, it is simply not rational or reasonable.

225. There are 10 fishers who set net in the transitional zone who will be significantly affected by the proposed closures. Those fishers primarily target butterfish, hard up against the rocks and seaweed beds, areas avoided by Hector's dolphins. The draft TMP proposes to force those fishers from their livelihoods on the theoretical assumption that dolphins transit the area and may provide genetic diversity to the Māui dolphin population. We note that such breeding may also introduce a genetic threat to the Māui dolphin population.

226. The proposed measures are neither appropriate nor reasonable.

Hector's Dolphins

227. For the reasons provided earlier, we disagree that the appropriate population management setting for Hector dolphins should be 90%:95% and we are mindful that the legislated provision is to ensure a sustainable population and that outcome can be achieved with a 60%:98% population objective. However, it may be more appropriate to agree to a population target of 80%:80%.

228. We estimate that sustainability threshold of 60%:95% could be achieved if mortalities do not exceed 200 deaths per annum. The measures being proposed in the draft TMP are therefore discretionary and are not required to ensure the sustainability of the Hector's dolphin population.

229. The risk assessment currently estimates that deaths from set-netting in the South Island total 44.1 deaths per annum and 15.05 from trawling, giving a mean impact of 59.15 deaths per annum. The upper 95th percentile of estimated current fisheries mortalities is 121 deaths per annum. To achieve a 95% certainty of achieving the draft TMP 90% population outcome, the draft TMP estimates the average number of estimated mortalities needs to be reduced to the levels in the table below. The alternative 80%:80% target mortalities are also presented.

SOUTH ISLAND HECTOR DOLPHIN FISHERIES MEASURES					
	Estimated Current Annual Mortalities			Maximum Mortalities per year to achieve	
Area	**Set Netting**	**Trawling**	**Total**	**90%:95%**	**80%:80%***
NCSI	0.7	0.3	1.0	0.48	1.6
ECSI	42.4	8.6	51.0	23.6	68.0
WCSI	0.3	5.2	5.5	n/a	n/a
SCSI	0.7	0.95	1.65	0.80	1.95
TOTAL	**44.1**	**15.05**	**59.15**	**24.88**	**71.55**

WCSI targets are not estimated as the level of estimated mortalities is below the PST.

* estimated by FINZ

230. The draft TMP proposes three options in the following table to reduce the risk of commercial set netting and trawling to Hector's dolphins. We do not support the options proposed and our opposition stems essentially from:

(a) there being no need to reduce the level of mortalities to achieve an inappropriate population target and

(b) those that are proposed will have effects far in excess of the mortality limit needed to achieve the draft TMP recommended objectives.

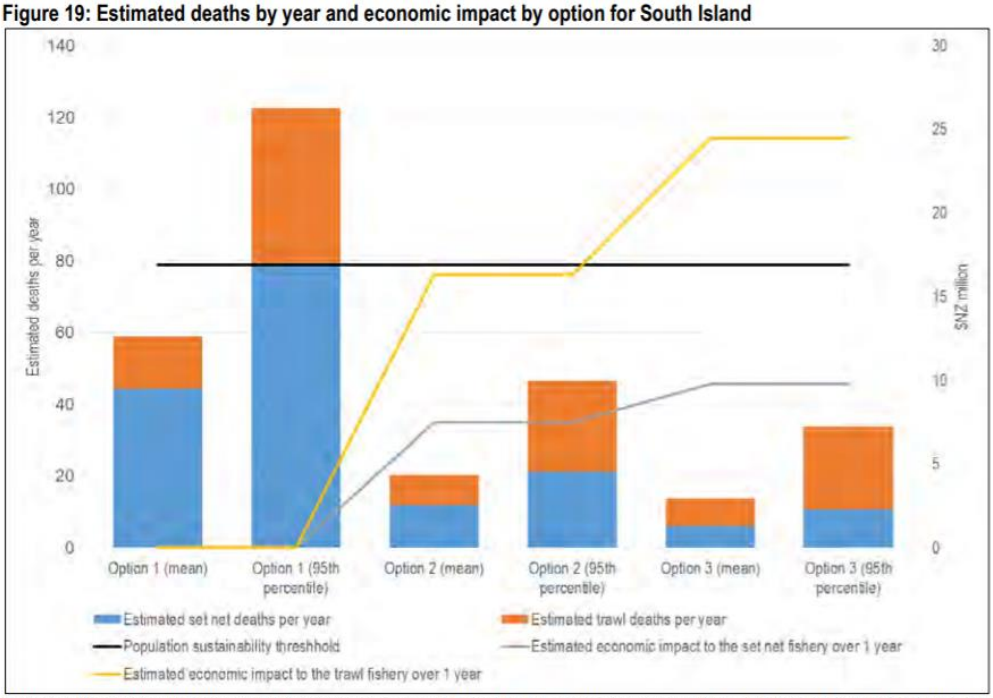
231. As discussed previously, we consider the choice of 90%:95% to be inappropriate for the Hector dolphin population. Under a more appropriate 80%:80% setting, there would be no requirement to reduce the level of mortalities of Hector's dolphins. We would be willing to work with government on mitigations to achieve a higher population objective of 90%:50%.

PROPOSED MEASURES AND IMPACTS FOR SOUTH ISLAND (The figure in brackets is the assumed reduction in annual mortalities)			
Area	**Status Quo**	**Option 2**	**Option 3**
SETNET			
NCSI	No closures	0-4 nm closure (-0.04)	
ECSI	0-4 nm closure	Closures Kaikoura, Pegasus Bay and South Canterbury (-32.3)	More extensive closures Kaikoura, Pegasus Bay to South Canterbury (-38.1)
WCSI	Seasonal closure to 2 nm	No change	No change
SCSI	0-4nm closure	0.7 nm (-0.1)	0-10nm (-0.1)
Estimated annual mortalities remaining	**44.1**	**11.66**	**5.86**
TRAWL			
NCSI	No Closures	0-2 nm closure (-0.12)	
ECSI	0-2nm low headline net	Closures Pegasus Bay and South Canterbury (-5.9)	More extensive closures, Pegasus Bay to South Canterbury (-6.7)
WCSI		No change	No change
SCSI	Closures Te Waewae Bay 0-4 nm	Closures Te Waewae Bay 0-7 nm (-0.85)	Closures Te Waewae Bay 0-10 nm (-0.89)
Estimated annual mortalities remaining	**15.05**	**8.18**	**7.34**
Total Remaining Mortalities	**59.15**	**19.18**	**13.2**

232. The excessive impact of the measures is reflected in the draft TMP in Figure 19 below. We note it includes figures for the WCSI for which no options are proposed.

233. Notwithstanding there being no need to implement additional conservation measures, the proposed measures would have significant impacts on the coastal fishing fleets in the South Island. The set net options would see the closure of setnet activity in Kaikoura, Banks Peninsula and Timaru, forcing 15 vessels and their crews from their livelihoods. In total, some 25 families would be affected. The trawl options would see 25 vessels and their crews forced from the industry, a total of some 92 families forced into hardship. The combined proposals would see Kaikoura, Timaru and Riverton cease to have a coastal fishing sector. The combined proposals would see a loss of economic activity totalling over $35 million per annum with no benefit to the sustainability of the Hector dolphin population.

Figure 19: Estimated deaths by year and economic impact by option for South Island



Note: Population sustainability threshold = the maximum number of dolphin deaths possible per year from fishing-related activities while still achieving the desired population objective.

Figure 19 shows the outcome of each option at the mean level of estimated set-net deaths (blue) and trawl deaths (orange) and at the upper 95th percentile for South Island. Making a decision at the 95th percentile is the most precautionary approach.

PART 9: INCENTIVISING ADDITIONAL ACTIONS / ABSENCE OF ASSISTANCE

234. We are disappointed that the draft TMP contains no information as to what assistance might be available to fishers who wish to transition to alternative fishing methods or who might wish to exit fishing. The draft TMP indicates that some 250 fishers will lose their livelihoods—approximately a quarter of New Zealand inshore coastal fleet, with millions of dollars of assets and future revenue taken away from those fishers and their families. The draft TMP is silent on how those fishers will be treated.

235. We raised this matter in discussion with FNZ officials who proffered the response that since the fisheries measures would be implemented under section 15(2) of the Fisheries Act, no compensation would be payable by dint of section 308 of the Act. We disagree strongly with that proposition. Section 15(2) and section 308 only apply insofar as the measures are necessary to ensure the sustainability of protected species. As noted earlier, sustainability of the dolphin populations can be achieved at a level of 60% of capacity. The population settings and the management measures proposed in the draft TMP are desired targets and far exceed the sustainability thresholds in the Act.

236. If the Minister wishes to progress with proposals that have wider impacts than measures necessary to maintain under the Act, the Minister will need to proceed with a negotiated settlement with the fishing industry and the affected parties.

237. Maintaining dolphin populations at higher than necessary levels of capacity is a public or societal good which, in this case, will have significant externalities. Where public goods and outcomes are sought, private individuals affected have a right to be compensated by society for that good.

238. The draft TMP makes it quite clear that fishing was not responsible for a substantive decline in population numbers—fishing mortalities never compromised the capacity of the populations to grow to 90% of their capacity. If there is no fault or harm imposed by fishers, why should they not be entitled to be compensated to their previous standard of well-being for measures to achieve societal wants.

239. The principle of restorative justice for injurious harm is enshrined in section 5 of the Public Works Act 1981. Where any property is taken for a public good, compensation is paid to the owner on the basis of a willing purchaser and willing seller operating in an open market transaction at a time when the forced acquisition was not known. Claims for other damages, such as foregone revenue and incidental cost and business loss, are an integral component of any compensation agreement. Natural justice demands fishers and other affected parties such as fish processors be compensated for their losses.

240. The desire of the Government to reduce the risk to the dolphins where no such reductions are required to ensure sustainability could be effected by the Government seeking to assist fishers to transition to a gear type which has less risk to dolphins, for example a set netter might transition to trawling or to longlining, or to exit the fishery altogether. Such outcomes could only be achieved by a willing buyer willing seller agreement.

241. It is beyond our comprehension that the draft TMP is silent on the issue of transitional assistance and compensation when the harm to be done to the livelihood and wellbeing of over 250 affected parties will be in the millions of dollars for some parties and will drive them into bankruptcy. This surely is not the actions of a government seeking a fairer and more just society.

PART 10: FISHING INDUSTRY PROPOSALS

242. The fishing industry is mindful of its responsibility to mitigate its impacts on protected species and take all reasonable steps to minimise that impact. However, it cannot support the fisheries measures proposed in the draft TMP. They are poorly informed, excessive, bluntly targeted and will have disproportionate results for the fishers that will be affected by them.

243. The industry proposes an alternative approach to protect Hector's and Māui dolphins. The present conservation measures go beyond what is legally required but reflect the level of protection that some New Zealanders may wish to achieve. We understand those desires and would support measures to reduce fishing impacts that are balanced and will not do any unnecessary, excessive and irreparable harm to the fishers.

244. Rather than embark on a new series of protection measures based on unreliable modelling, the industry favours an approach to:

    (a) Verify the impact of risk to the dolphins;

    (b) Mitigate the risks to the dolphins by implementing a range of appropriate options.

Verification of Risk

245. The current risk assessment is based on:

    (a) an unreliable habitat model that fails to distribute dolphins consistent with other available information on presence. It results in estimates of mortalities that are inconsistent with observed mortalities;

    (b) Estimates of trawl risk that may have a high degree of uncertainty;

    (c) Estimates of set net risk that do not differentiate between variations of target species or fishing activity.

246. We propose that the Government re-consider the utility of the spatial habitat modelling approach and, if they determine that it should form the basis for protected species management, commission additional research to improve the quality of the habitat modelling and to verify the outputs of the modelling. That would involve additional research on the distribution of the dolphins and their use of the marine space.

247. To date, we have no reasonable research or estimates of the dive capability or capacity of dolphins, of their foraging patterns and of their use of the water column or their interactions with fishing gear. Improved knowledge of those factors will assist to understand and mitigate the risk of fishing to the dolphins. The absence of such information places either the dolphins at an unnecessary risk of inappropriately mitigated fishing processes or the fishers for being forced to unnecessarily leave the industry. Either outcome results in a loss of value to New Zealand.

248. Additional monitoring of the trawl sector is required to derive more robust catchability rates. That research needs to examine further whether there is any differentiation in risk between vessel size and power, the hypothesis being that larger vessels with higher tow speeds, wider nets and faster retrieval speeds constitute more risk than small, lesser powered vessels.

249. Additionally, industry is willing to place cameras on vessels to verify the level of catch of protected species through either of the following two options:

    (a) Third Party Provision

        i. The industry is willing to have cameras placed on vessels to observe the retrieval of nets, be they set nets or trawl nets, under a third party arrangement. The cameras would be placed under a voluntary agreement between the vessel owners and a third party who would scan the images for any interactions with protected species.

        ii. The results of the review would be made available to FNZ for their management of fisheries risks to protected species.

        iii. FNZ would be able to view the imagery to verify protected species captures, returning it to the third party on completion of the verification task.

(b) FNZ provision

i. The industry is willing to have cameras placed on the vessels by FNZ and have the imagery available to FNZ for the sole purpose of verifying protected species captures. FNZ would need to ensure the privacy and confidentiality of fishers is fully protected

ii. The industry is willing to have cameras placed on vessels for wider monitoring purposes if the following matters are addressed to the satisfaction of the industry:

- Protection of privacy and confidentiality.
- Access to the imagery.
- Pragmatic and realistic landings and catch balancing policies are implemented and TACC settings are reviewed to be consistent with those policies and the catch history of fishers.
- The offences and penalties regime is reviewed to be consistent with a framework that is based on a greater prospect of detection.
- The operational processes of the fisheries management system are reviewed and amended to result in the timely, responsive active management of New Zealand's fisheries.
- Internal FNZ protocols are established and implemented for use of the imagery.

Additional Mitigation

250. Industry is commencing field trials to test the efficacy of Dolphin Dissuasive Devices to deter dolphin presence from fishing gear and will provide results to MPI within this calendar year.

251. Should those trials prove the efficacy of the devices, industry will initiate a process with quota-holders, Licenced Fish Receivers and operators that will bind vessel operators to the following conditions when fishing within 12 nm of the coast in the following areas:

(a) from Maunganui Bluff to New Plymouth

(b) within Golden and Tasman Bay

(c) from the Waiau River to the Waitaki River

(d) within Te Waewae Bay

Trawlers

252. All trawlers will have an operational Dolphin Dissuasive Device or similar placed either at the centre of the headline or wings of the net.

253. All trawlers will place operational Dolphin Dissuasive Devices on either side of their vessel towards the stern when setting or hauling their net.

Set Net

254. All set netters operating outside a harbour will use a Dolphin Dissuasive Device when setting or hauling their net.

255. All set netters operating outside a harbour will use a Dolphin Dissuasive Device or similar suspended 20 metres above the setnet at intervals of not more than 400 metres apart.

Other options

256. Should those trials prove the devices are ineffective or additionally, industry will engage with FNZ to discuss alternative mitigation options, these might include,

(a) all set netters operating outside a harbour will use nets with the minimum number of meshes high appropriate to their target.

(b) All trawlers when operating within 4 nm of the coast without a PSH net with an approved mammal release device, will use a low headline net that is restricted to a 1 metre height.

(c) No trawlers over 20 metres operating without a PSH net with an approved mammal release device will fish with 4nm of the coast

(d) No vessel operating without a PSH net with an approved mammal release device will trawl at a speed of more than 3 knots within 4nm of the coast

257. Any trawler operating with a PSH net with an approved marine mammal release device will be able to fish in compliance with the approvals provided through the assessment of those devices. We call for urgent attention to address the restrictions in the regulatory process to provide for this and other gear innovation. We are aware there is a process underway to effect this, but this needs to be given a degree of urgency.

Dolphin capture

258. In the event that a Hector-type dolphin is caught on the WCNI, and cannot be released alive, the fisher involved will immediately inform both MPI and Fisheries Inshore. It is critical to identify whether the dolphin is a Hector's or Maui dolphin, and therefore the fisher will retain the animal onboard the vessel and immediately return to port. We note it remains unlawful to retain a protected species, and again request that DOC explicitly allow for this to occur.

259. Industry will call a meeting of fishers and MPI to discuss and implement immediate measures to eliminate fishing risk in the immediate area.

260. Should the captured dolphin be determined to be a transiting Hector's dolphin, the temporary closure will be lifted. In the event the dolphin is a Maui, we will work with MPI to determine what additional measures should be implemented.

PART 11: NON-FISHING RELATED THREATS

261. The Threat Management Plan identifies a number of non-fishing threats and proposes a number of responses to address the risks, viz:

(a) Toxoplasmosis

(b) Marine Mammal Sanctuary extensions;

(c) Seismic surveying;

(d) Seabed mining;

(e) Dolphin watching and vessel traffic;

(f) Oil spills;

(g) Coastal development, other pollution, and sediment run-off;

(h) Infectious diseases (other than toxoplasmosis);

(i) Climate change.

Toxoplasmosis

262. Toxoplasmosis is a parasitic disease caused by infection with *Toxoplasmosis gondii* oocysts. Cats are the only known animal in which the disease can reproduce. The oocysts are waterborne and through either infecting dolphin prey or dolphin water space are ingested by Hector's and Māui dolphins. The disease is possibly widespread through the dolphins. While it can be the cause of death, toxoplasmosis appears to rely on a compromised level of immunity before it becomes fatal.

263. There has been debate in some fora as to the impact of toxoplasmosis and the associated level of fatalities. That debate is only distracting. The degree of impact or attribution of deaths to toxoplasmosis is of no great import in itself. What matters is that the impact is recognised as posing a threat to the dolphins that needs to be addressed.

264. Toxoplasmosis is a cause of death and likely a contributor to the survival rate of Hector's and Māui dolphins being lower than might otherwise be expected for a marine mammal. Of greater concern is that toxoplasmosis may be gender selective and be more likely to become an active source of death in pregnant female dolphins. Necropsies have revealed a number of pregnant but otherwise healthy females which have died as a consequence of toxoplasmosis.

265. Of equal concern to the potential impact of toxoplasmosis is the lack of urgency displayed by government in addressing the issue. Toxoplasmosis was first identified as a cause of death, and possibly a major threat, by Dr Wendi Roe in her papers in 2013. DOC has had six years to begin addressing the matter but has failed to demonstrate any progress in that objective.

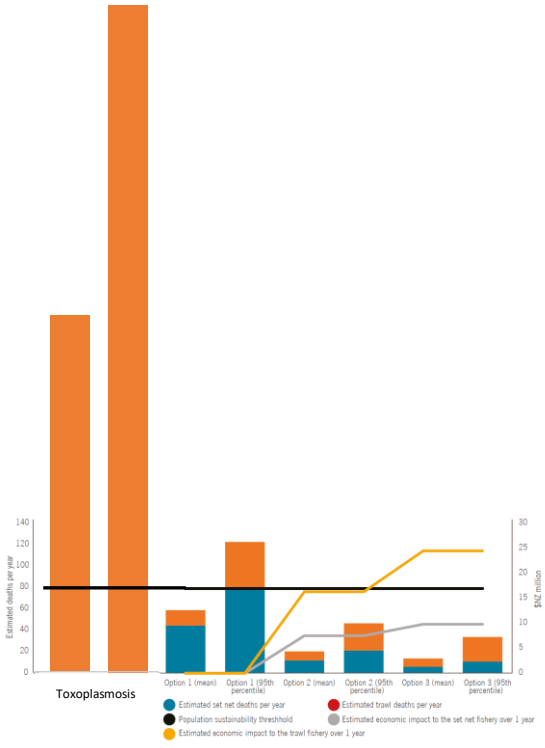
266. DOC proposes to undertake the development of an Action Plan to address toxoplasmosis. It is concerning that DOC is even asking the public whether they should be developing an Action Plan, the answer is of course "Yes". DOC has had six years to progress work on this matter with no progress having been made to date. We are concerned at that failure.

267. We recognise that other nations are addressing the same toxoplasmosis threat to their marine mammal populations and that they are better resourced to undertake scientific research into inoculations, vaccines and vector identification. New Zealand needs to position itself to be able to take advantage of that research when it becomes available rather than divert resources to compete in that same task.

268. We agree with the general workstreams proposed by DOC but find strategic statements such as "reduce the number of dolphin deaths attributable to toxoplasmosis to near zero" as platitudes that fail to signify any commitment to a practical plan to address the issue. This is particularly so given the draft TMP estimates the risk from toxoplasmosis to Hector's and Māui dolphins is 336 per year, some 5.8 higher than government's own estimates from fishing.

269. These estimates are provided in graphical form on the following page. The data used have been taken from page 6 of the draft TMP consultation document and superimposed on to MPI's own Figures 4 and 8 for Māui and Hector's dolphin respectively.


Toxoplasmosis
Estimated deaths per year
$NZ million
Option 1 (mean)
Option 1 (95th percentile)
Option 2 (mean)
Option 2 (95th percentile)
Option 3 (mean)
Option 3 (95th percentile)
Option 4 (mean)
Option 4 (95th percentile)
Estimated set net deaths per year
Estimated trawl deaths per year
Population sustainability threshold
Estimated economic impact to the set net fishery over 1 year
Estimated economic impact to the trawl fishery over 1 year


Toxoplasmosis
Estimated deaths per year
$NZ million
Option 1 (mean)
Option 1 (95th percentile)
Option 2 (mean)
Option 2 (95th percentile)
Option 3 (mean)
Option 3 (95th percentile)
Estimated set net deaths per year
Estimated trawl deaths per year
Population sustainability threshold
Estimated economic impact to the set net fishery over 1 year
Estimated economic impact to the trawl fishery over 1 year

Marine Mammal Sanctuaries

270. We find it surprising that the draft TMP deals with Marine Mammal Sanctuary Extensions as a threat. We would have though DOC would have proposed them as an option to enable protection for the dolphins from other threats such as seismic surveying and mining.

271. We do not agree with the extension of the West Coast North Island Marine Mammal Sanctuary to address the known possible threat from seabed mining. We do not see the sanctuary as a means to provide further protection for Māui dolphins as they are not present in the extension area proposed. We agree that seabed mining proposals and activities need to be subject to greater scrutiny and monitoring of the performance but do not agree that the power should reside with the Minister of Conservation.

272. Equally, we do not agree with the extension of the Banks Peninsula Marine Mammal Sanctuary. The existing sanctuary provides protection for the hotspot of dolphins and a sanctuary should not be implemented to provide the Minister of Conservation with discretionary powers to control activities that are already subject to wider regulatory provisions.

Seismic surveying

273. We are not convinced that seismic surveying provides a level of risk to dolphins of sufficient magnitude or duration to be compromise their survival and future prospects. We recognise that no studies exist as to either the impact or lack of impact, but we are not convinced to take a precautionary approach without there being a well-reasoned rationale for adverse effects. We do not see that case in the draft TMP.

274. We cannot support the Minister of Conservation having the power to permit seismic surveying in sanctuaries. The Minister has a conservation focus rather than a utilisation or balanced focus and while conservation principles are important, so too is the need to consider utilisation opportunities and make a balanced decision in the overall favour of New Zealand.

275. Equally, we cannot support the prohibition of seismic surveying in marine mammal sanctuaries. We favour a balanced assessment and permitting process under existing regulatory provisions.

276. We do support Option 1 to enforce compliance within sanctuaries with the existing code. We are surprised that DOC has not already implemented processes to resolve these issues.

Seabed mining

277. We accept that seabed mining can have lasting and more detrimental effect on dolphins than seismic surveying. However, again we note that there are existing permitting and regulatory provisions in place to manage such activities. We cannot accept therefore the need for additional prohibitions to be implemented which would deny utilisation opportunities.

278. Having said that, we do recognise that Māui dolphins need greater protection and that an extension of the existing prohibitions within the West Coast North Island Marine Mammal Sanctuary to 12 nm is not unreasonable.

Dolphin watching and vessel traffic

279. We are concerned that dolphin watching and vessel traffic results in stress and direct fatalities of Māui and Hector dolphins, not only in terms of vessel strikes but also separation of calves and cows.

280. We do not agree that the current rules applying to dolphin watching and diving tourism are either adequate or are being adequately enforced.

281. We consider that no dolphin watching or diving permits should be issued in Māui dolphin territory between Maunganui Bluff and Pariokariwa Point. The threat of interrupting breeding or calf rearing in such a small population requires that level of protection.

282. We consider that tourism activities in respect of Hector's dolphin watching and diving should be restricted with all such vessels prohibited from operating within Akaroa Harbour and within 2nm of the coast inside the Banks Peninsula Marine Mammal Sanctuary during the November to February period when the dolphins calve and nurse their young. We would accept that such activities are reasonable for the rest of the year when the risks to the dolphin population are lower.

283. We are concerned with the level of enforcement of the rules for viewing dolphins or operating a fast vessels in dolphin waters. Given the number of vessel strikes, fatal and injurious, we believe DOC needs to strengthen its enforcement activities, particularly in Māui territory.

284. We consider the following changes would be appropriate to manage dolphin watching and diving, and vessel traffic to afford greater protection for dolphins:

(a) Māui dolphin territory (Maunganui Bluff to Pariokariwa Point)

i. No dolphin watching or diving permits to be issued;

ii. Vessel speeds within the West Coast North Island Marine Mammal Sanctuary be limited to no more than 10 knots;

iii. No following of dolphins by recreational boats.

(b) Hector's dolphin territory

i. No dolphin watching or diving activity – commercial or recreational – in Akaroa Harbour and within 2nm of the coast within the Banks Peninsula Marine Mammal sanctuary between November and February inclusive;

ii. All commercial dolphin watching or diving vessels to provide positional reporting to DOC (equivalent to the standards on fishing vessels);

iii. All commercial dolphin watching or diving vessels to provide camera footage of all dolphin watching or diving activities to DOC;

iv. No commercial dolphin watching or diving vessels shall follow within 500 m of a commercial vessel engaged actively in fishing.

Coastal Development, Other pollution and sediment runoff

285. Coastal development, sedimentation and other pollution have adversely affected the habitat for Hector's and Māui dolphins and their prey. While the dolphins may prefer turbid waters, that preference does not include a mud substrate. The work of T Brough found a strong negative correlation to the presence of Hector dolphins to mud in the habitat.[19] The dolphins displayed a strong preference for a sandy habitat. Coastal developments and the influx of terrestrial sedimentation constitutes a major threat to the dolphins. Control and management of those activities lies with regional and district councils and they will need to take a stronger role in that field if ongoing degradation of the dolphin environment is to be curtailed. We note that while suspended sediments are rated high as an adverse quality of freshwater, the proposed National Environmental Standard for freshwater fails to include standards for such sediments. We see this as a major oversight as it leaves councils in a weak position to set and enforce appropriate standards.

286. In the past, management of suspended sediments has been weakly incorporated into council standards and plans. As bodies with an interest in the outcomes, DOC, MPI and Ministry for the Environment should take a more active role in planning processes to prevent the degradation of the coastal environment.

Other Infectious diseases

287. Known infectious diseases that can compromise the health of dolphins other than toxoplasmosis include brucellosis, pneumonia and tuberculosis. Klebsiella may need to be added to that list as it is likely that the impact of klebsiella on other delphinids will apply to Māui and Hector dolphins.

288. We recognise that DOC is not able to manage the impacts of such diseases but it is important that the incidence of the diseases in necropsied specimens is recorded.

Climate Change

289. Climate change will impact the Hector and Māui dolphin abundance and distribution. At this point, we can only speculate as to its likely impact but impacts through prey availability, water turbidity and water quality can be expected. How dolphins will respond to wider impacts such as warmer waters or changing currents is only speculative.

290. However, we would recommend that DOC stay abreast of developments and research in that field to assess the likely impacts on the dolphins.

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[19] Tom E. Brough (2019). *The ecology and conservation of hotspots for Hector's dolphin*. A thesis submitted for the degree of Doctor of Philosophy. University of Otago.

PART 12: RESEARCH

291. The draft TMP seeks views on the principal directions for ongoing research into dolphins. The research priorities will be reviewed at a later date by a research advisory group set up to assist DOC with the research.

292. We are concerned at the level of research resources allocated to Hector's and Māui dolphins by DOC and the Government in general. The bulk of the funding appears to be sourced from DOC's Conservation Services Programme and outside sources such as universities and interested parties. It appears little funding is allocated to research from DOC's mainstream funding appropriations. The lack of resourcing for dolphin research and protection by DOC has to be addressed.

293. Without a commitment to provide greater resourcing, providing comment on priority areas for research is somewhat futile. For example, we have been advocating DOC trial satellite tagging and it is only this year, more than a decade later than the last successful tagging trial, that DOC is undertaking research into the ***options***. However, the lack of funding has restricted the scope of the research to a literature review.

294. In a similar vein, we requested DOC test the efficacy of new Dolphin Dissuasive Devices for reducing the risk of fishing to Hector's dolphin (these have been used in the jack mackerel fleet to mitigate the catch of common dolphins). DOC's response was that ***the industry caught too few Hector's dolphins to warrant the research*** and when pressured by Fisheries Inshore to reconsider, DOC agreed to research options ***but not to proceed with field testing*** of available devices.

295. We note that DOC is seeking to employ additional resources to reduce the levels of fishing by-catch rather than investing that funding in valued research. Without a more tangible commitment to providing additional resources and funding, no progress will be achieved in obtaining new information to improve our understanding and management of these dolphins.

296. We agree that DOC need to:

    (a) Continue to necropsy any specimen available, including any by-caught dolphin (please note that fishers are legally required to return any bycatch to the sea and we have been endeavouring unsuccessfully for over a decade to get authority to retain any by-caught dolphin);

    (b) Research toxoplasmosis to identify the source, the vector and prepare for the uptake of any international scientific developments;

    (c) Understand better the distribution and movement of dolphins preferably by satellite-based tagging rather than habitat modelling and more aerial surveys;

    (d) Monitor population trends using genetic based mark-recapture surveys but undertaken on a more frequent basis for Māui dolphins;

    and

    (e) Establish more robust estimates of adult dolphin survival rates; and

    (f) Research dolphin foraging and diving behaviour to better understand and manage the threat of fishing activity.

297. We note that none of the above can be achieved unless DOC increases its commitment to and resources for undertaking that research.

APPENDIX 1 Comments on the Dolphin Distribution

1. This appendix discusses in more detail the distribution of the dolphins. The methods to obtain the distributions used in the risk assessment are as follows:

   (a) Māui dolphins – the spatial habitat modelling is applied from Cape Reinga to Cape Egmont and the 63 dolphins distributed on the basis of the relative habitat values

   (b) Transitional Zone – the spatial habitat modelling is used to estimate both the abundance and distribution

   (c) NCSI – the public sightings are used to determine the underlying relative density plane which is then multiplied by the abundance estimate of 214

   (d) ECSI – the spatial habitat model is used to predict the abundance and distribution of the dolphins

   (e) SCSI – there are three scenarios offered –

      i. the spatial modelling outcome in which 10% of the dolphins are located in Te Waewae Bay

      ii. the 2016 aerial survey outcome in which 70-74% of the dolphins are located in Te Waewae Bay; and

      iii. the 2018 aerial survey outcome in which 99% of the dolphins are located in Te Waewae Bay

2. The spatial habitat model produces the following distributions:

DISTRIBUTION OF HECTOR'S AND MĀUI DOLPHINS (as per Habitat Model*)							
Area	**0-4nm**	**4-7nm**	**7-10nm**	**10-12nm**	**12nm-100m deep**	**Over 100m deep**	**Total**
Cape Reinga to Maunganui Bluff	2.7	0.7	0.5	0.2	0.1	1.5	5.7
Maunganui Bluff to Pariokariwa	30.3	13.2	5.4	1.8	2.2	1.4	54.3
Pariokariwa to Cape Egmont	1.7	0.6	0.3	0.1	0.2	2.4	5.3
Harbours							0.9
Total WCNI	**34.7**	**14.5**	**6.2**	**2.1**	**2.5**	**5.3**	**66.2**
Transitional Zone	5.4	2.1	0.9	0.4	1.7	2.7	13.3
NCSI	110	34	18	8	28	12	210
ECSI **Pegasus Bay**	3,457	2,383	1,440	601	427	330	8,641 682
WCSI	n/a	n/a	n/a	n/a	n/a	n/a	5,482
SCSI	193	29	23	13	19	29	329
Total	**3,755**	**2,446**	**1,481**	**622**	**474**	**371**	**15,344**

* as provided by FNZ 4 August 2019

3. The model estimates dolphin density on a full-time equivalent or permanent occupation basis relative to the assessed habitat suitability of the location, the model has no filter or adjustment for occasional or transitory presence. For that reason, it significantly over-estimates the presence in any region where only a transitory presence is promoted.

4. The draft TMP highlights that the model is unreliable where the dolphin population is of low density and widely distributed. In the three regions which would fit that description, two – NCSI and SCSI – have an alternative distribution proposed while the third – WCNI – continues to use the modelled distribution.

5. The model appears to have a propensity to project more dolphins in more seaward and deeper locations than the existing research would support. When used without additional filters such as presence, the model will project dolphin density, albeit low, on the basis of the habitat factors in that locality. To that extent, the model will project an inappropriate phantom dolphin presence and a phantom fishing risk. Those phantoms need to be removed from any analysis of residual risk.

6. We discuss the regional distributions and the inconsistencies in this appendix.

WCNI

Cape Reinga to Maunganui Bluff

7. The spatial habitat modelling estimates there are 5.7 Māui dolphins on either a residential or transitory basis in the Cape Reinga to Maunganui Bluff region. We cannot agree with that prediction.

8. The only indication of Māui dolphin presence is one dead *Cephalorhynchus* dolphin, presumed to be a Māui dolphin, found beachcast on Ninety Mile Beach in 1981. There are no public or research sightings of Māui dolphins in this area. There is no historic evidence that Māui dolphins ever frequented this region. The only aerial survey of this area in 2001 failed to observe Māui dolphins in the area. Subsequent aerial surveys did not survey this area due to the absence of dolphins. Other aerial or boat research surveys extended only as far as Maunganui Bluffs. There is no evidence to support there being resident Māui dolphins in the region.

9. There have been seven public sightings of Māui dolphins at Bayly's beach some 30 kms south of Maunganui Bluffs which is the northern point of the current closure. That point was set having regard to the known site fidelity and small range of Hector's and Māui dolphins and sightings at Bayly's Beach. The probability of any Māui dolphin entering the Cape Reinga region is extremely low.

10. The draft TMP contemplates the dolphins may have only a transitory presence which generates the risk. Looking at the zone, a full-time equivalent presence of six dolphins would require a 2,190 dolphin day presence in the zone. Given a total abundance of 63 Māui dolphins, and say a 10-day visit, each dolphin would need to visit the zone three and a half times per year. Given that Māui dolphins have high site fidelity and small home ranges, that is a highly unlikely prospect. Given that the habitat model only projects a full-time equivalent presence of seven dolphins north of Manukau, to achieve a six full time equivalent presence in the Cape Reinga zone would mean those dolphins would spend most of their time in the zone and not in the more favoured Kaipara region. Any assertion that there are six full-time equivalent dolphins from transitory presence is significantly outside the expectations of the dolphins and appears to be scientifically irrational.

11. We cannot accept the estimate of 5.7 Māui dolphins being present in the area based on the habitat modelling. The lack of other sightings or presence confirms a nil presence. The estimated number of mortalities and risk should be nil.

The Harbours

12. Habitat modelling places Māui dolphins inside the harbours.

13. The only sightings that support a dolphin presence in harbours have been in some harbour mouths where there is deeper standing water as against the tidal channels and mudflats which exist within the majority of harbour space. T Brough's research noted earlier found a strong negative correlation between Hector's dolphin presence and mud. The same finding would apply equally to Māui dolphins.

14. T-POD click detectors were deployed in harbours of the west coast North Island (a total of 3,211 days of acoustic monitoring) and obtained a small number of positive detections in the mouth of Manukau Harbour (38 click trains) and inside Kaipara Harbour (a single click train) (Rayment *et al*. 2011). Those detections were in the area already closed to set netting. There were no positive detections from six other T-POD detectors around Manukau Harbour, or from six other T-PODs deployed in Kaipara, Raglan and Kawhia Harbours (Rayment *et al*. 2011). By way of contrast, the 38 clicks within the Manukau collected over 1,883 days compared with the coastal reading of over 10,000 clicks for a T-pod located 8 kms from the Manukau shore in 193 days.[20] The absence of visual or acoustic sightings in the harbours from the public and research reflects the avoidance of the muddy harbour habitat by Māui dolphins.

15. Based on the Brough research, and the absence of physical or acoustic sightings other than at the harbour mouth, there is evidence that Māui dolphins will not be found in harbours.

16. The estimated number of dolphins in harbours should be assumed to be nil and the risk nil.

Dolphins beyond 12nm

17. The spatial modelling has a propensity to put dolphins beyond the 12 nm mark at which Māui dolphins have been sighted in scientific aerial surveys. Māui and Hector dolphins have a marked preference for a near coast location and a general avoidance of deep water, as shown in the following analysis of research sightings from the DOC website. The table includes the sightings from all offshore aerial and boat surveys from 1999 to 2009.

MĀUI'S DOLPHINS RESEARCH SIGHTINGS(1) Distance from Shore				
	Summer(2)		**Winter(3)**	
Nautical miles	**Total**	**Percentage**	**Total**	**Percentage**
0-0.3	122	20.33	7	9.59
0.3-1	420	70.00	39	53.42
1-4	52	8.67	20	27.40
4-7	4	0.67	7	9.59
>7	2	0.33	0	0.00
Total	600	100	73	100

1. As provided by DOC in OIA response dated 20 Sept 2009
2. Summer is defined from 1 October to 1 March
3. Winter is defined as being from 1 April to 1 September

18. Any projected abundance beyond 12 nm is inconsistent with any analyses or surveys undertaken on the distribution of Māui's dolphins. There is no evidence to support the projected results and they should be regarded as highly speculative and assumed to be zero.

Pariokariwa to Cape Egmont

19. The habitat model projects a resident population of 5.3 Māui dolphins in the area from Pariokariwa to New Plymouth. We cannot agree with that figure.

20. Genetic biopsy surveys from 2001 to 2016 were undertaken by Auckland University for their tag-recapture research surveyed the areas from Bayly's Beach in the north to Mokau in the south. Hector species dolphins were only observed in the core area from South Kaipara to Raglan. No dolphins were sighted outside those areas. However, the frequent sightings of Hector species dolphins in the Kawhia region indicates that some dolphins are resident in that area. We consider they are more likely to be Māui rather than Hector's dolphins.

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20 Nelson W, Radford C (2019) Occurrence of *Cephalorhynchus hectori* in the coastal areas of Hamilton's Gap, Manukau Harbour,Taranaki and Wanganui River, 2019. https://www.doc.govt.nz/globalassets/documents/conservation/native-animals/marine-mammals/copd-report-whole-deployment-one.pdf

21. A number of beachcast Māui dolphins were found in the New Plymouth area before 1990 but none subsequently. The only recent beachcast specimen near to the locality was a Hector's dolphin in 2012 at Opunake. We consider there may have been a pod of Māui dolphins in that area but they were extirpated in the period before 1990.

22. Since then, sightings of Hector species dolphins between Pariokariwa and Cape Egmont have been infrequent and effectively only commence from 2004. Many of the sightings have not been verified and there are indications, e.g. pod size, that indicate some of the dolphins are not likely to be Hector species dolphins. The sightings are often grouped in time and in location and may represent sightings of the same animal over a short period of time. We do not accept that the DOC verification process can identify any dolphin the area as a Māui or a Hector's dolphin. At best, they can verify a Hector species dolphin but not the subspecies of the dolphin.

23. The acoustic detection programme of W Nelson in 2016 detected no Hector dolphin presence in 123 days of recording in Taranaki. MPI Observer data from over 1,100 days in the area has not sighted a single Hector dolphin.

24. We do not doubt that Hector species dolphins have been infrequently sighted south of Pariokariwa in recent years, but we contend they are Hector's dolphins transiting northwards and not Māui's transiting southwards.

25. The beachcast Hector's dolphin at Opunake confirms the presence of Hector's dolphins in that region. There is no evidence since 1990 that Māui's dolphins frequent the area.

26. With high site fidelity and a small home range, a Māui dolphin resident in the Kawhia region would need to make a 120 km voyage to New Plymouth along a coastline that would offer no suitable habitat. That distance is outside the known range of Māui dolphins but is well within the range of a migrating Hector's dolphin.

27. If there is a transitional zone, we believe it to be between Kawhia and Pariokariwa. It may contain some Māui dolphins but will increasingly contain Hector's dolphins. The dolphins to the south of Pariokariwa are more certain to be Hector's dolphins, not one of 63 Māui dolphins.

28. The estimate of 5.3 Māui dolphins in the area from New Plymouth to Cape Egmont is not accepted. There is absolutely no evidence that supports the contention first made in 2010. It should be assumed to be nil. Those dolphins in the area are more realistically Hector's dolphins transiting to the north.

The Transitional Zone

29. The draft TMP is uncertain as to the subspecies of dolphins in this area. The only evidence that Māui dolphins ever frequented the region is a beachcast specimen found in 1921. All other dolphins where the subspecies has been verified have been Hector's dolphins. It is extremely unlikely that Māui dolphins would be found in a permanent residential or transitory basis in this region.

30. There have been 25 public and research sightings of dolphins between Cape Egmont and Pencarrow Head, but they are infrequent. Most have been reported since 2000 but it is uncertain whether that is because Hector's dolphins have only been moving since that period or that users of the space are more aware of Hector's dolphins.

31. Hector's dolphins are known to infrequently transit through the region as Hector's dolphins have been recorded north of Cape Egmont in what was otherwise regarded as Māui dolphin habitat.

32. The risk assessment assumes there is a population of 16 dolphins in this area. That is based on the average density of dolphins in similar habitat in Māui territory. The draft TMP states there is no evidence of a resident population. The claim is made that the dolphins were more abundant in the past but there is no evidence to support such a claim.

33. However, the assumption of a resident population of 16 dolphins in the transition zone is unreasonable under any rationale. The draft TMP states there is no resident population but then proceeds to accept a population estimate of 16 dolphins which arises from a resident-based model. If there were 16 Hector dolphins moving through the region at any one time but not remaining resident, there would be significant numbers of Hector dolphins recorded in the biopsy sampling to the north of Cape Egmont—in fact, they would exceed the number of Māui dolphins to the north of Cape Egmont. We cannot agree with the estimate of 16 dolphins of any subspecies in the transition zone on a full-time basis.

South Island

34. We do not discuss the distribution for the west coast South Island population since there are no additional management measures proposed.

North Coast South Island

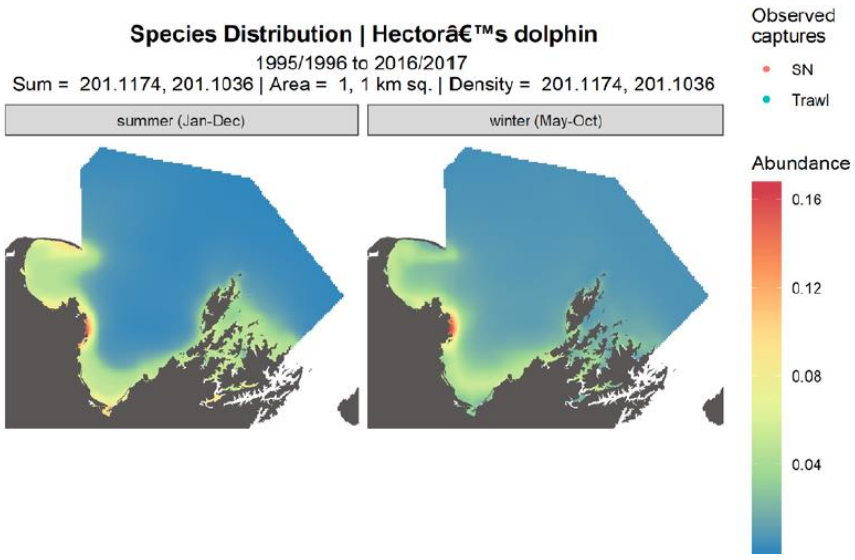
35. The following excerpt accepts the fact that the spatial habitat model for NCSI did not provide plausible results. As an alternative the NCSI population was distributed based on public sightings.

> *In the north and south coasts of the South Island, the habitat model appears to spread the dolphins more widely in space than is plausible (that is, the habitat model predicts that the dolphins occur evenly "everywhere", but this is not supported by actual observations)*[21]

The habitat modelling produced a distribution between the areas as follows:

PROJECTED NCSI DOLPHIN DISTRIBUTION	
Area	**Projected Abundance of Dolphins**
Golden Bay	49
North Marlborough Sounds	73
Tasman	89

36. We contrast that with the distributions used based on public sightings (see maps below) which highlight the area to the east of Abel Tasman National Park. We are concerned that the public sightings reflect the area where charter tourists and kayakers are concentrated, as such the projected distribution might not reflect the actual distribution of the dolphins. There is an absence of turbid water in that locality and the likelihood of dolphins being situated there as compared to the outflow of the Motueka, Takaka or Aorere Rivers should be low.



37. The number of dolphins was determined from a single sighting in the aerial survey and therefore remains uncertain.

38. With only public sightings available, and there being no other studies of NCSI dolphin distribution, the projected distributions, the estimated mortalities and risk estimates are highly uncertain. The data are not of a quality that would justify conservation measures being based on them.

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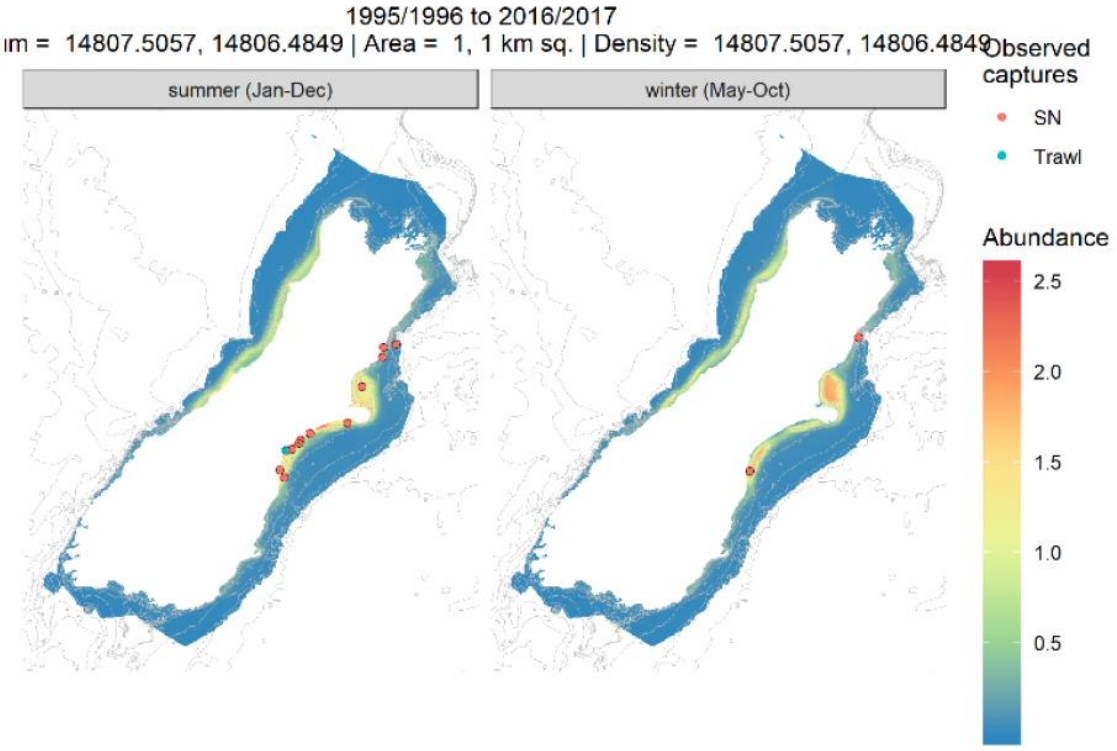
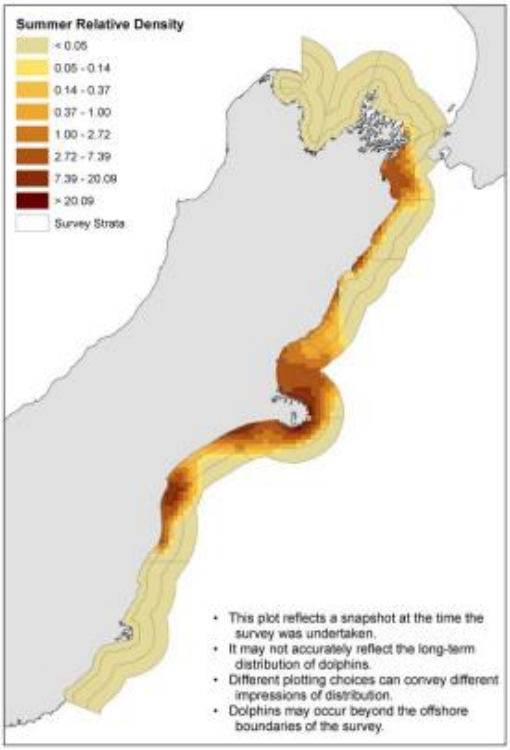
21 Protecting Hector's and Māui Dolphins Supporting Information and Rationale, Department of Conservation 2019, at page 64.

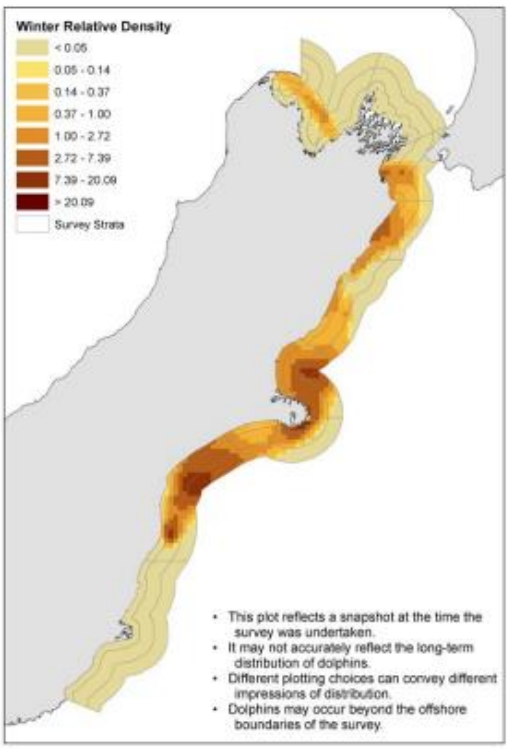
East Coast South Island

39. The distribution of the model is derived from the spatial habitat modelling. We are concerned that the modelling does not result in a close fit to the aerial survey outputs despite the ECSI being the primary input into the model development. We compare below the modelled distribution and the aerial survey results to demonstrate the inconsistencies between the two surveys.

40. As can be seen, there is a marked difference between the density maps from the modelling (above) and the aerial survey (below). We discuss the major discrepancies in the following sections.

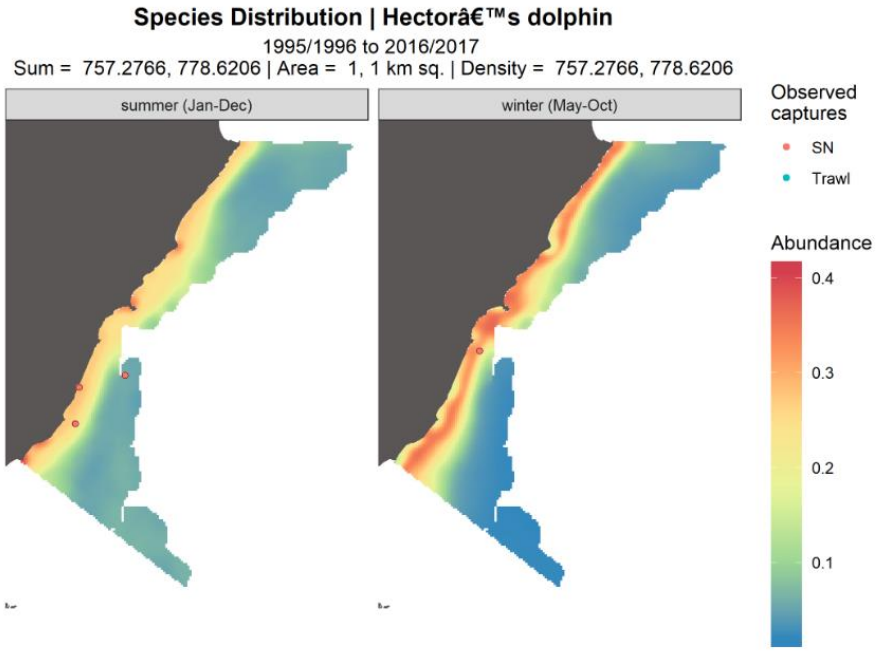






Kaikoura

41. The draft TMP adopts an abundance estimate of 757 dolphins in the Kaikoura area, being the area from Cape Campbell to northern Gore Bay. The spatial distribution used is that derived from the habitat model.



42. The spatial modelling places a higher number of dolphins in the areas about the Kaikoura Peninsula and further out to sea than is demonstrated by other recent surveys. Approximately half of the dolphins are located outside the existing closures. The following table from page 61 of the east coast aerial survey report clarifies the aerial survey only observed dolphins in the 0-4nm stratum and predicted dolphins in the Kaikoura area would only be found in that 0-4 nm stratum.

	Summer		Winter		Summer		Winter	
	Distance offshore (km)		Distance offshore (km)		Depth (m)		Depth (m)	
Stratum	Mean	Max	Mean	Max	Mean	Max	Mean	Max
ECSI	7.0	31.6	14.8	37.1	26.2	150.0	37.8	100.0
Golden Bay			8.9	8.9			30.0	30.0
Cloudy/Clifford Bay	7.7	22.1	12.5	23.2	42.0	150.0	51.6	100.0
Clarence	1.5	2.9	2.7	6.1	13.3	20.0	38.6	100.0
Kaikoura	1.8	6.0	4.7	6.7	16.3	20.0	32.9	50.0
Pegasus Bay	6.6	28.9	6.7	37.1	15.5	50.0	32.1	100.0
Banks Pen. North	9.7	31.6	15.9	35.2	22.3	50.0	39.0	100.0
Banks Pen. South	5.1	12.9	8.3	33.1	28.5	50.0	43.3	50.0
Timaru	6.9	20.3	17.3	33.7	20.6	30.0	33.8	50.0

43. Those findings were consistent with the map below (Weir and Sagnol) of Hector dolphin group sightings from 48 boat surveys undertaken in early 2013 and sightings logged by an ecotourism operator between 2005 and 2013.[22]

[22] JS Weir & O Sagnol (2015) Distribution and abundance of Hector's dolphins (*Cephalorhynchus hectori*) off Kaikoura, New Zealand, New Zealand Journal of Marine and Freshwater Research, 49:3, 376-389. DOI: 10.1080/00288330.2015.1020502.

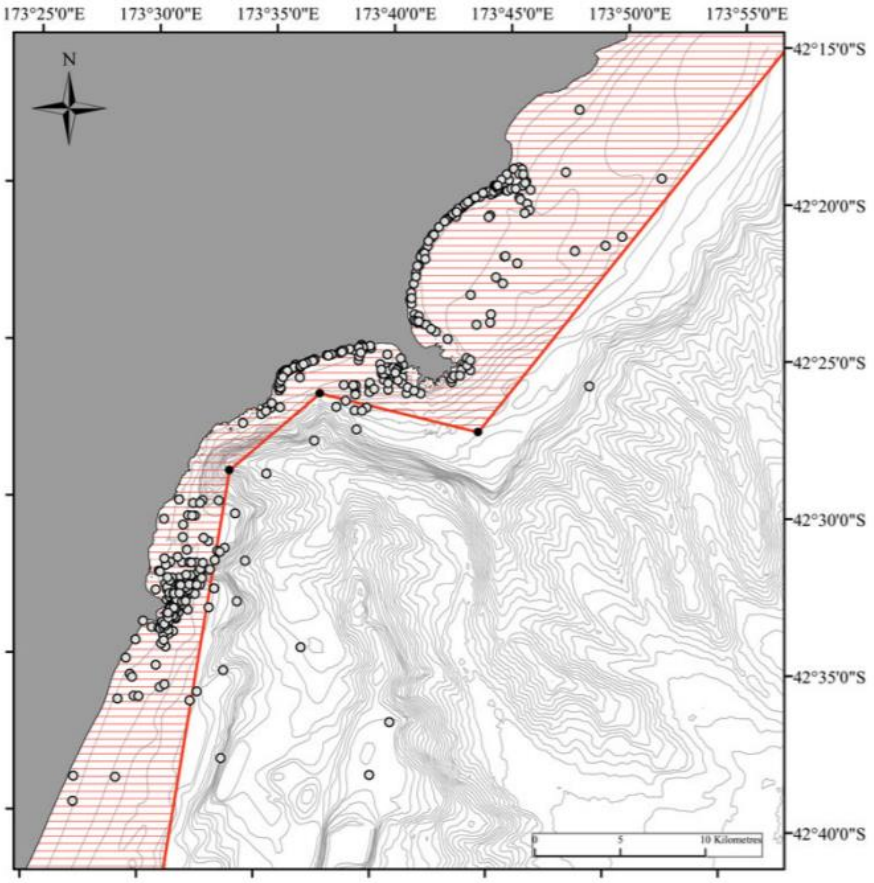


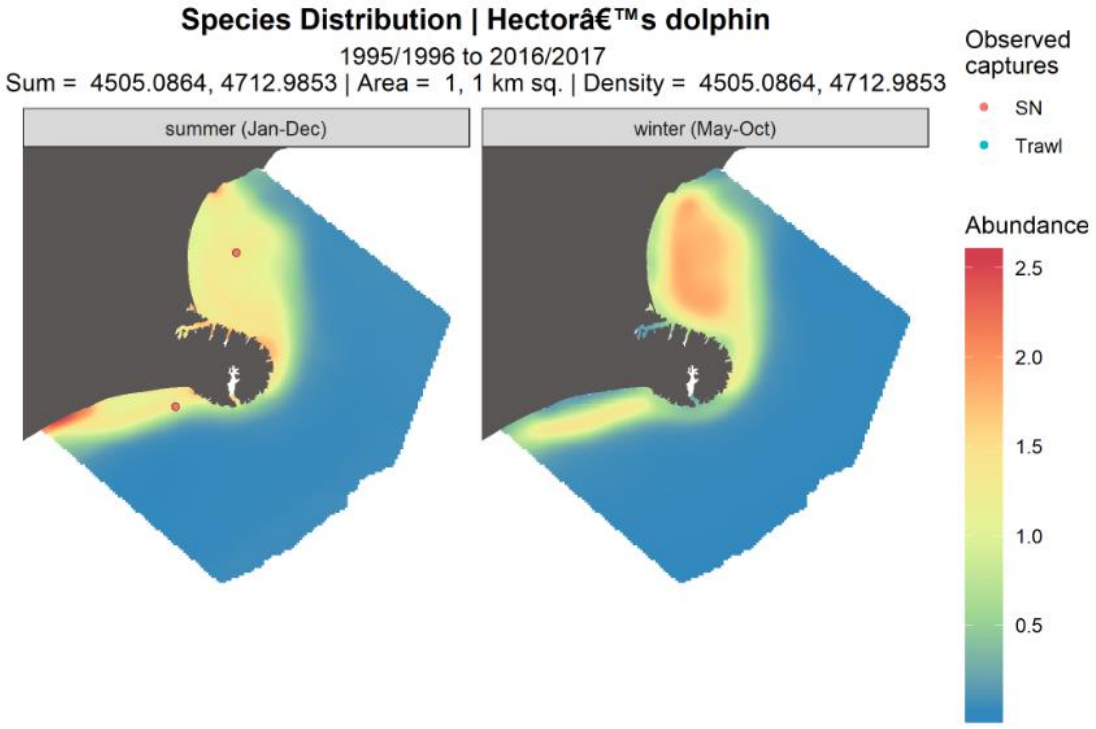
Figure 3 Locations of Hector's dolphin groups encountered on boat-based surveys and opportunistic sightings made by a local ecotourism operator between 2005 and 2013. Red lines correspond to the current boundaries of the set net exclusion zone.

44. However, these research and ecotourism sightings are inconsistent with the spatial distribution of dolphins provided by the habitat model which places the dolphins further to sea where set netting occurs. The existing empirical evidence has been ignored.

45. We are unable to agree that the spatial habitat model provides a reliable distribution of dolphins in the Kaikoura area.

Banks Peninsula

46. The draft TMP adopts an estimated abundance of 4,505 Hector's dolphins for the Pegasus Bay/Banks Peninsula area which extends from Motunau Beach to Gough Bay but excludes the harbours. The spatial distribution used is that derived from the habitat model.



47. The spatial distribution map predicts a concentration of dolphins in the south Pegasus Bay area that is inconsistent with all other known spatial distributions of Hector's dolphins for Banks Peninsula. All other research distributes the dolphins more widely and more densely and more closely spread around Banks Peninsula than the habitat model (see the diagram below from the Proteus ECSI aerial survey report).

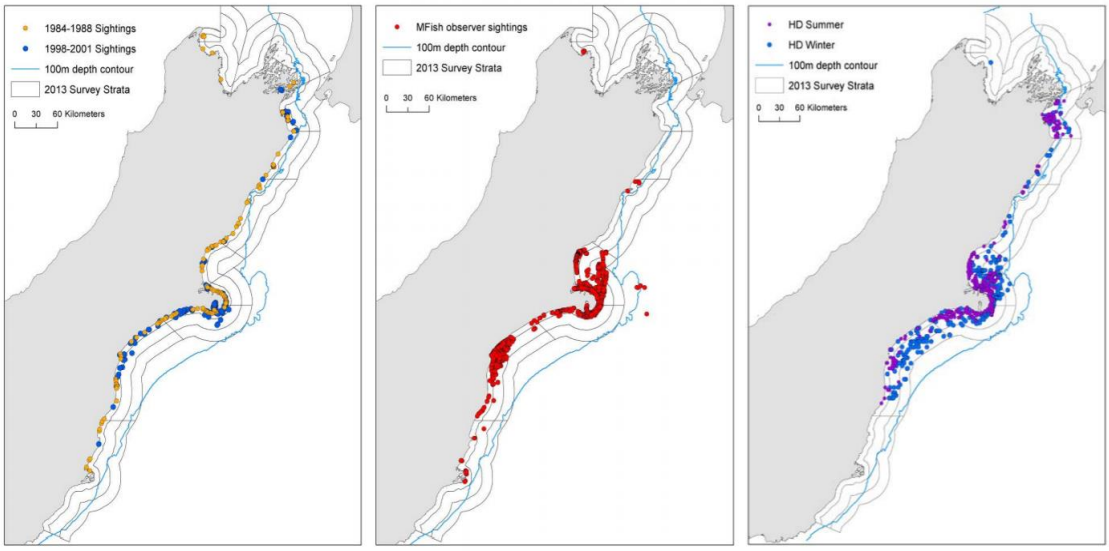
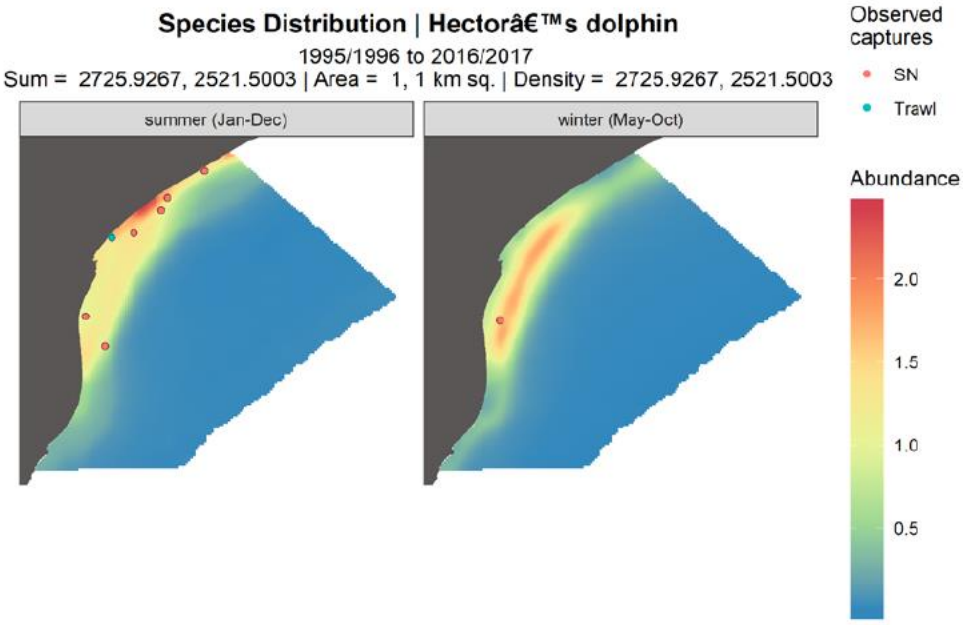


Figure 27: Locations of Hector's dolphin sightings along the ECSI from boat-based surveys (left), Ministry of Fisheries observers 2009-2010 (centre) and present survey (right).

48. We are unable to agree that the spatial habitat model provides a reliable distribution of dolphins in the Banks Peninsula area and would provide a reliable estimate of mortalities or risk.

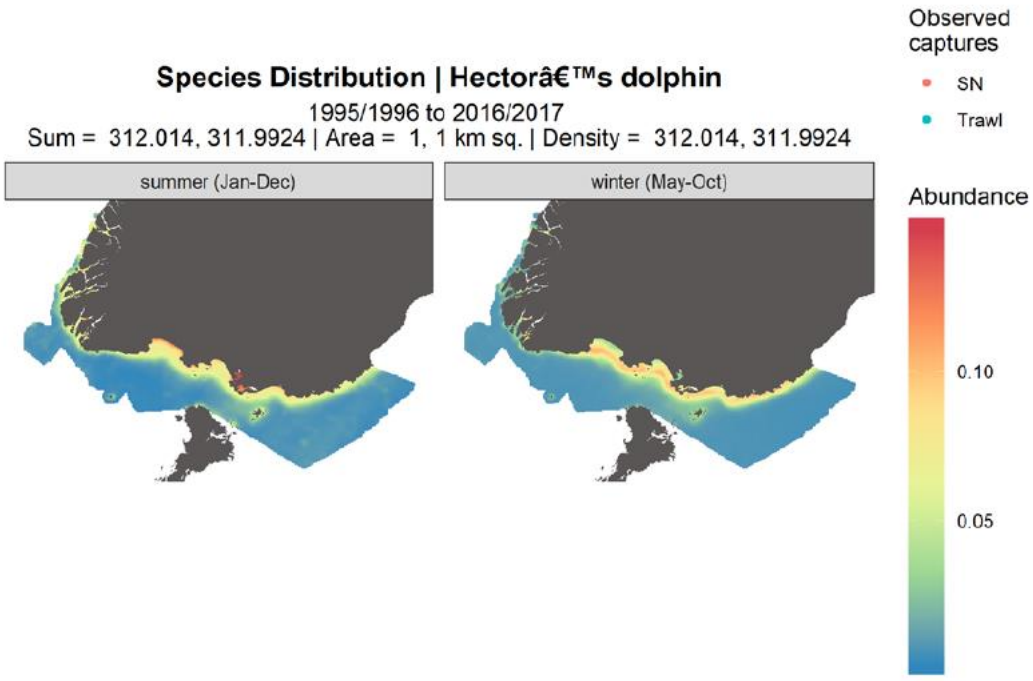
South Canterbury/Timaru

49. The draft TMP adopts an estimated abundance of 2,725 Hector's dolphins for the South Canterbury/Timaru area which appears to extend from Hakatere to Kakanui. The spatial distribution used is that derived from the habitat model. The distribution appears to fit reasonably with the aerial survey distribution.



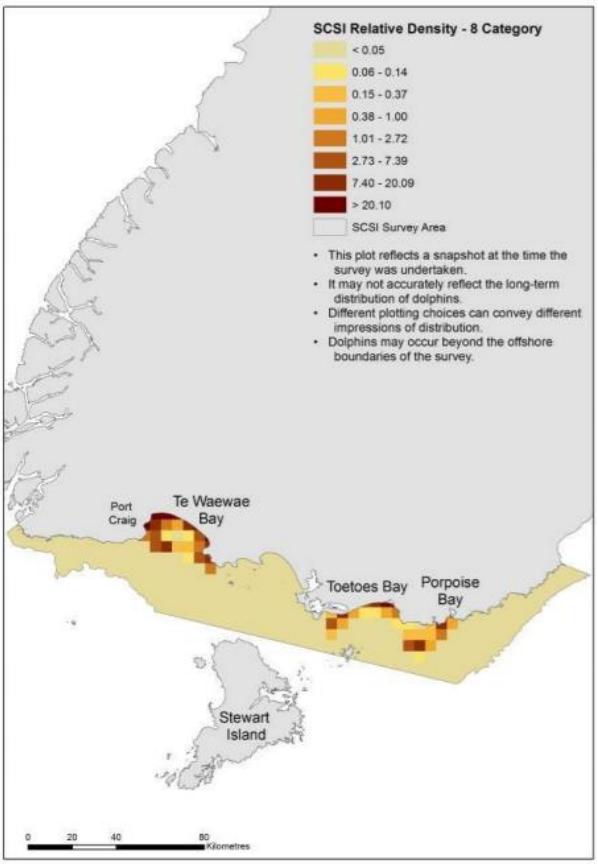
South Coast South Island

50. The draft TMP estimates there are a total of 332 Hector's dolphins in the South Coast South Island sub-population. The area stretches from Nugget Point in the east to Slope Point in the west. The spatial habitat modelling placed 20% of the dolphins inside Te Waewae Bay.



51. This was in strong contrast to the results of the aerial survey in 2016 in which 74% of the dolphins were sighted inside Te Waewae Bay and the survey in 2018 in which 99% of the dolphins were in Te Waewae Bay. As the Bay is subject to significant trawling for flats, the location of the dolphin population is critical to assessing the risk to the dolphins from commercial trawling. The draft TMP provides three scenarios for consideration based on the above distributions.

52. Hector's dolphins are known to frequent the coastline outside the Bay, consequently Scenario 3 (99% of dolphins in the Bay) does not appear reasonable. Inside Te Waewae Bay has historically been considered the core location for the south coast dolphins by fishers and others who know the coastal waters, but all recognise a small number of dolphins exist outside the Bay to the east. We are comfortable with Scenario 2 with 74% of the dolphins being inside the Bay.[23] However, we note the failure of the spatial habitat modelling to provide a credible dolphin distribution.



23 MacKenzie DI, Clement DM (2016) Abundance and distribution of WCSI Hector's dolphin. New Zealand Aquatic Environment and Biodiversity Report No. 168 Supplemental Material 112 p.

APPENDIX 2: Comments on the Fisheries Measures

1. As noted earlier in our discussion, we contend that fisheries measures are not generally required to ensure the long-term viability of either Hector's or Māui dolphins. Both Māui and Hector's dolphins are protected by existing fisheries closures which have resulted in the decline in their numbers being arrested and reversed. The risk assessment has shown that while fishing may have contributed to the past decline in dolphin numbers, fishing is not a threat to the sustainability of the dolphin populations.

2. There is no justification for the closure of yet more space to fishing to protect the sustainability of the dolphin populations.

3. The proposed closures in Māui territory are based on the inappropriate application of a habitat model derived from the heavily populated South Island east and west coasts to an area sparsely populated by Māui dolphins and to areas where no dolphin presence has been recorded or presence has been proven not to exist. The inappropriate application of the habitat model has generated phantom risks to the dolphins and a misplaced perception of the need to implement additional closures to remove those risks. A more reasonable action would have been to filter the distribution by reference to reported sightings and presence and introduce enhanced monitoring of dolphin distributions and enhanced monitoring of fishing activity to verify the level of risk rather than accept the misleading perception of risk and set about closing more fishing space unnecessarily.

4. A similar problem arises for Hector's dolphins. While the habitat model equally fails to provide plausible distributions for any of the Hector dolphin populations, the choice of a population management outcome is inappropriate and contrary to international guidelines for setting such outcomes. The draft TMP proposes a range of closures that are disproportionate to the risks assessed.

5. The demographic and risk assessment provide evidence that fishing is not a threat to the sustainability of Hector's dolphins and no additional closures are warranted. There are areas of higher risk and an appropriate management response would be to verify the level of risk through monitoring of dolphin activity and fishing activity and then take action if the risk was proven to be excessive. Closing space on the basis proposed in the draft TMP is not reasonable or rational on the information available.

North Island

6. The additional fisheries measures proposed in the draft TMP are based on the outputs of the spatial risk assessment. The risk assessment is based on the habitat modelling which projects the following distribution for Māui dolphins in the North Island.

DISTRIBUTION OF MĀUI DOLPHINS (as per Habitat Model)							
Area	**0-4nm**	**4-7nm**	**7-10nm**	**10-12nm**	**12nm-100m deep**	**Over 100m deep**	**Total**
Cape Reinga to Maunganui Bluff	2.7	0.7	0.5	0.2	0.1	1.5	5.7
Maunganui Bluff to Pariokariwa	30.3	13.2	5.4	1.8	2.2	1.4	54.3
Pariokariwa to Cape Egmont	1.7	0.6	0.3	0.1	0.2	2.4	5.3
Harbours							0.9
Total	34.7	14.5	6.2	2.1	2.5	5.3	66.2

7. We have contended and demonstrated that the spatial habitat modelling is unreliable and has created phantom risks that are unsupported by any other evidence of dolphin presence. The removal of those phantom risks in the Cape Reinga to Maunganui Bluff area, in the harbours, in the area beyond 12 nm and in the area to the south of Pariokariwa Point would see the estimated annual Māui dolphin mortalities from fishing reduced from 0.11 to 0.03, i.e. below the maximum allowable mortalities of 0.055 to achieve the 95%:95% outcome desired. On that analysis, no further conservation measures are necessary to mitigate the effects of fishing.

8. We comment in more detail on the measures by area.

Cape Reinga to Maunganui Bluff

9. The spatial modelling estimates that there would be on average 5.7 Māui dolphins present in the Cape Reinga to Maunganui Bluff area at all times. The risk assessment estimates that 0.015 dolphins will die each year in set net activities (1 death every 66 years) in the Cape Reinga to Maunganui Bluff 0-4nm area and 0.0004 dolphins (1 death in 2,500 years) in trawling in the 0-2 nm area.

10. Setnet fishing effort is concentrated in Ahipara Bay at the southern end of Ninety Mile Beach, some 130 kms distant from the last observed dolphins at Bayly's Beach.

11. The assessment of commercial set netting and trawling risk to Māui dolphins in the area from Cape Reinga to Maunganui Bluff is vastly overestimated. The spatial habitat modelling has effectively created a phantom resident population when there is no sightings evidence to support that presence. The phantom presence is then estimated to be exposed to the risk of real fishing and a phantom risk to Māui dolphins generated. Even if it was assumed that the dolphins were not resident but may frequent the area on an occasional basis, the probability of them travelling to the area where set nets are found would be extremely low.

12. The Cape Reinga to Maunganui Bluff region is also considered to be potential habitat should the Māui dolphin population expand and need new habitat. With a current population of 63, it would be many decades of population growth before Māui dolphins ever needed to expand to new territory. There is no scientific or reasonable expectation that Māui dolphins will require the region for habitation. The argument is specious and without basis in fact or science.

13. In any plausible or reasoned analysis, the risk to Māui dolphins in the area is infinitesimally small and is unreasonably assessed by the habitat modelling and risk assessment.

14. The closure proposed for this area under Options 2, 3 and 4 would have the effect of removing all fishing territory for the four set netters but would probably only have a marginal impact on trawlers using the area. The set netters target shark and gurnard and derive the bulk of their fishing revenue from the area proposed for closure. Their catch is sold locally or forwarded to the Auckland Fish Market for sale to the Auckland consumers. At present, they employ six local staff and support seven families. They are the local fishing companies and play an important role in the economy of the area. While over 100 tonnes of fish is taken by trawlers, it is not possible to assess the impact on any vessel operator as FNZ will not release the information to allow that assessment to be made.

15. The impact of the setnet measure will be an annual loss of over $1m value from the Northland economy or over $66m per Māui dolphin mortality projected to be saved.

16. The estimated number of deaths of Māui dolphins caused by set netting and trawling in the Cape Reinga to Maunganui Bluffs and the risk score should be considered to be zero. Closures for the area are unreasonable and will only force a number of fishers from the industry while providing no benefit to the dolphins. There should be no closures until the risk to dolphins is verified by a presence of dolphins.

The Harbours

17. The spatial modelling estimates that there would be on average one Māui dolphin present in the WCNI harbours at all times. The risk assessment estimates that 0.041 dolphins will die each year in set net activities (1 death every 24 years) in the harbours.

18. As noted earlier, the best information available confirms that Hector species dolphins actively avoid habitats with mud as is found in the WCNI harbours and rivers.

19. The WCNI harbours collectively are fished by some 125 plus set netters. We cannot accurately determine the number of fishers affected since FNZ have not provided that information to industry. We have talked to the majority of those fishers and have estimated they have an average of at least 25 years fishing in the harbours. Being on the water for some 200 days a year for 25 years means they represent over 625,000 days of fishing. With the exception of dolphins sighted in the areas already closed to set netting, no Māui dolphins have been sighted by the fishers during those 625,000 days. Any assumption that Māui dolphins frequent the harbour waters is unreasonable.

20. For those fishers affected, there are very few options available. Some may seek to transfer activity to the Hauraki Gulf but the ability of the Gulf to sustain additional fishing pressure is limited. For the majority of the fishers, the closure of the harbours would mean exiting fishing and their livelihood. The 3,000 plus years of fishing experience would have no future. Their vessels and other fishing assets would have no value. For those with mortgages or loans secured on their vessels, mortgagee sales and bankruptcy may be looming. The majority of fishers are second or third generation fishers following in their father's footsteps. Fishing is a family way of life with uncles and brothers and nephews being joined by the common bond of fishing for their livelihood.

21. The harbour set netters often catch species that are not caught by other fishers, in particular rig, flounders, kahawai and mullet. These species provide low cost access to fish protein for many families and are a dietary mainstay for many lower-income New Zealanders.

22. For the 420 quota holders of mullet, flatfish, trevally and kahawai, their ACE will be unable to be caught and substantial asset value losses will occur.

23. The harbours generate some $3.8 m of revenue annually and contribute over $10.5 million annually to the income of their communities. That seems a disproportionate price to pay for the *estimated* 0.04 dolphin saved by removing fishing from harbours. To put it another way, the one dolphin saved results in a loss of aggregate income of over $250m.

Maunganui Bluff to New Plymouth

24. The spatial modelling estimates there would be 5.4 Māui dolphins in the 7-10nm stratum, 1.8 in the 10-12nm stratum, 2.2 in the stratum to 100m, and 1.4 in the stratum of over 100 m deep.

25. The risk assessment estimates that set netting will result in the mortality of 0.012 dolphins (1 every 83 years) in the 7-10nm stratum, 0.002 dolphins in the 10-12nm stratum, 0.003 in the 12nm-100m depth stratum and 0.0005 in the over 100 m stratum. It also estimates that trawling will result in the annual death of 0.009 dolphins in the 2-4nm stratum, 0.0067 dolphins in the 4-10nm stratum and 0.0003 dolphins in the 10-12 or 100 m depth contour stratum. On average it is estimated that trawling will result in one Māui dolphin mortality every 56 years.

26. The draft TMP contains proposals to extend set net and trawl prohibitions beyond the existing limits to 10nm, 12nm and the 100m contour, with trawl being made consistent with the set net limits. The proposals will seek to reduce the fishing mortalities by approximately 18%.

27. There are extensive prohibitions already in place in the region which is the core habitat for Māui dolphins.

28. Māui dolphins have been observed to 10nm in research aerial surveys and recorded in acoustic surveys to 10nm in the high concentration area between South Manukau and Port Waikato. They have not been observed to that distance in other areas of the WCNI. We have analysed the DOC sightings database

and note that, while there are other reported non-research sightings beyond that distance, they have been dismissed as Māui dolphins. We agree with those judgements.

29. However, we note the absence of any valid sightings to the 100-metre depth contour. There are no grounds to support any extension of any prohibitions to that distance in the WCNI.

30. We can see some justification for extending the prohibited areas for set nets beyond the current 7 nm limit. Based on the sightings, an extension as far as 12 nm would be justified but that extension should only apply from Raglan north to North Kaipara. We see no justification for applying that extension further south or north given the decrease in dolphin density in those areas.

31. While we note that trawling in that same area is estimated to result in 0.0157 mortalities per year and should be considered for closure, we believe that mitigation options exist for the trawl sector and if implemented on trawlers operating in the 10 nm space, they will reduce the risk to very low levels. For those vessels, the mitigation options include both use of the PSH gear but also use of a dolphin deterrent device and lesser powered vessels. We consider that such an option is feasible and will further reduce the trawl risk.

32. There are an estimated 25 set netters who target rig, school shark and blue warehou in the waters beyond 7nm. The impact of the proposed measures is relatively light on the fishers as most tend to fish in deeper waters for those targets.

33. There are four trawlers that operate from Raglan. These vessels are less than 20 metres, have low horsepower but provide a living for the skippers and their crew and keep the Licenced Fish Receiver based in Raglan in business. They trawl close to Raglan, their winter fishery being in slightly deeper water and to the north. At present they all use low headline nets, have no verandas and tow and retrieve at low speeds. The vessels are not surveyed for nor equipped for trawling in deeper waters and their gurnard target is not found in deeper water. We consider they pose little threat to the dolphins but their mitigation could be improved by the use of dolphin deterrent devices. Any option other than Option 1 will see them having to exit the fishery. That would result in nine fishers losing their livelihoods, the fish processor closing and the injection of revenue of over $2.4 million into the local community lost. Raglan would cease to exist as a coastal fishing port. Closing the fishery to 4nm at a $2.5m loss of revenue per year, the loss to reduce captures by 1 Māui dolphin would be over $260 million.

34. If closures extend further out beyond the 4 nm mark for trawling, the value of revenue lost to New Zealand will increase significantly as large catches of snapper, gurnard, trevally and john dory are lost. Closures to the 100-metre depth contour would see the jack mackerel fishery affected and fishing revenue losses of over $11m per annum incurred and economic losses over $30m per annum incurred. The jack mackerel fishery is highly observed and run dolphin deterrent devices on their gear. No Māui dolphins have been recorded by observers and no Māui dolphins caught. With no other changes in fishing patterns, the deterrent devices have reduced common dolphin captures from over 102 per year down to virtually zero. Our initial trials with deterrent devices indicate that they are equally effective for Māui and Hector's dolphins and could effectively reduce the prospects of such captures to zero.

35. The Maunganui Bluff to Kawhia area is considered to be the core Māui dolphin habitat. We would not consider the area south of Kawhia to New Plymouth to be core habitat. The spatial habitat model estimates there would be 14 Māui dolphins south of Tirua, with nine of those being between Tirua and Pariokariwa. That estimate is inconsistent with all other surveys of the region which have failed to find any Hector species dolphins in the area. Tirua Point is 30 kms from Kawhia which is the most southern DNA-verified location of Māui dolphins and thus the most southern expectation of the range of dolphins. Pariokariwa Point is a further 70km south of Tirua Point and was set on a precautionary basis in 2008 as the southern limit for Māui dolphin fisheries restrictions. We are unable to agree with the spatial modelling for the distribution of Māui dolphins and with any additional fishing conservation measures for the area from Pariokariwa to New Plymouth.

36. There have been isolated infrequent sightings of Hector species dolphins in the New Plymouth area. The numbers and infrequency of the sightings would be consistent with the recent emergence of Hector's dolphins in the WCNI Māui dolphin territory zone. But to assert that the dolphins are Māui

dolphins is baseless and without any evidence to support that assertion. There should no additional closures south of Pariokariwa Point.

37. A more appropriate and reasonable response might be to increase the efforts to monitor the distribution of the Māui dolphins and verify their use, if any, of the area to the south of Tirua.

The Transition Zone

38. There are at present 10 fishers who operate in the area who are likely to be impacted by the proposed measures. Those fishers primarily target butterfish and moki but may catch other non-QMS species such as perch and crabs. We note that set netting for butterfish is currently provided for in the north of the South Island where set netting is otherwise prohibited. We also note the comments in the PhD thesis of Tom Brough in respect of the foraging behaviour of Hector's dolphins around Banks Peninsula being to avoid rocky and weed areas.[24]

39. We have argued that it is irrational and implausible to project an annual presence of 16 dolphins in the transition zone on either a residential or transitory basis. The draft TMP also considers the area to be potential habitat should the Māui dolphin population expand. If the turbidity model predicted habitat suitability, the Māui dolphin population would need to expand by exponential rates before it was likely to move into the area to the south of Cape Egmont. With a maximum growth rate of only 4.6% per annum and an effective rate of less than that, expansion of the Māui population into the area is not plausible in the near future.

40. The draft TMP also promotes the thought that Hector's dolphins need safe passage to Māui territory to provide genetic diversity benefits to Māui dolphins. While interbreeding should be possible given their genetic composition, there is no evidence of interbreeding at present. Just as interbreeding might reduce the risk of inbreeding depression, so too it might increase the risk of outbreeding depression. Interbreeding would of course result in a hybridisation of Māui dolphins and without the physical differentiation which led to the subspecies classification would lead to their reclassification as Hector's dolphins.

41. The area between Cape Egmont and Hawera currently has a 0-2nm closure and a requirement if fishing between 2 and 7 nm for an observer to be present. There have been over 200 observer days in that area with no dolphins sighted. DOC undertook aerial and boat-based surveys of the area between Hawera and Awakino in an attempt to locate dolphins but ceased the endeavour after four years. They saw no dolphins.

42. Given that there is no resident population and there is no measurable risk to or benefits to Māui or Hector's dolphins from the existing closures, and requirement to carry an observer, we propose that for the area from Cape Egmont to Pencarrow Head:

    (a) There should be no closures to commercial set netting or trawling; and

    (b) The requirement to carry an observer while set netting should be removed.

43. In the event the Government decides to continue with the set net closure, set netting targeting butterfish and moki should be permitted.

[24] Brough TE. (2019). The ecology and conservation of hotspots for Hector's dolphin (Thesis, Doctor of Philosophy). University of Otago.

South Island

44. The draft TMP estimates that the annual mortalities for Hector's dolphins total 59.0 dolphins per year with a 95% upper percentile of 121. Removing WCSI where no additional management interventions are considered necessary from the analysis, the TMP estimates the maximum sustainable mortalities should total 24.88 per year.

SOUTH ISLAND HECTOR DOLPHIN FISHERIES MEASURES					
	Estimated Current Mortalities per year			Maximum Mortalities per year to achieve	
Area	**Set Netting**	**Trawling**	**Total**	**90%:95%**	**80%:80%***
NCSI	0.7	0.3	1.0	0.48	1.6
ECSI	42.4	8.6	51.0	23.6	68.0
SCSI	0.7	0.95	1.65	0.80	1.95
WCSI*	0.3	5.2	5.5	n/a	n/a
TOTAL	**44.1**	**15.05**	**59.15**	**24.88**	**71.55**

* WCSI is excluded since no additional management interventions are proposed for WCSI.

45. The draft TMP proposes the following range of closures for the South Island with the reduction in the number of mortalities that might result.

PROPOSED MEASURES AND IMPACTS FOR SOUTH ISLAND (The figure in brackets is the reduction in annual mortalities)			
Area	**Status Quo**	**Option 2**	**Option 3**
SETNET			
NCSI	No closures	0-4 nm closure (-0.04)	
ECSI	0-4 nm closure	Closures Kaikoura, Pegasus Bay and South Canterbury (-32.3)	More extensive closures Kaikoura, Pegasus Bay to South Canterbury (-38.1)
WCSI	Seasonal closure (2 nm)	No change	No change
SCSI	0-4nm closure	0.7 nm (-0.1)	0-10nm (-0.1)
Estimated annual mortalities remaining	**44.1**	**11.66**	**5.86**
TRAWL			
NCSI	No Closures	0-2 nm closure (-0.12)	
ECSI	0-2nm low headline net	Closures Pegasus Bay and South Canterbury (-5.9)	More extensive closures, Pegasus Bay to South Canterbury (-6.7)
WCSI		No change	No change
SCSI	Closures Te Waewae Bay 0-4 nm	Closures Te Waewae Bay 0-7 nm (-0.85)	Closures Te Waewae Bay 0-10 nm (-0.89)
Estimated annual mortalities remaining	**15.05**	**8.18**	**7.34**
Total Remaining Mortalities	**59.15**	**19.18**	**13.2**

46. We do not accept that further conservation measures are required to reduce the risk to Hector's dolphins from fisheries. There is no requirement to adopt a high management target such as 90% of capacity to enforce a rebuild of the population when it is already increasing and is believed to be close to equilibrium. A lower population target of 80% is more appropriate. That target would not require any reductions in the annual mortalities to achieve the objective, noting that an 80% objective is higher than the level required to achieve long term viability.

47. The options proposed in the draft TMP would result in a reduction in the level of mortalities in excess of that required to achieve the 90%:95% target and as such are unreasonable.

North Coast South Island

48. The draft TMP assumes there are 214 Hector's dolphins resident in Golden and Tasman Bay. This abundance estimate is based on a sole dolphin observed in the aerial survey. The estimate is considered uncertain. We note that the genetics of the dolphins in the Golden/Tasman Bay region are characteristic of the WCSI Hector's dolphin population and are probably migrants from that area. With the NCSI population appearing to have active immigration and emigration of dolphins, the NCSI should not be considered to be a separate management unit with a standing population of 214 dolphins.

49. The draft TMP estimates that current mortalities from set netting are 0.7 per annum and 0.3 from trawling. A reduction of 0.52 mortalities is required to achieve the 90%:95% objective.

50. The draft TMP proposes a 4nm closure for set netting and a 2nm closure for trawling to reduce the expected mortalities.

51. Given the uncertainties as to the population numbers and the distribution, there is no certainty as to the level of risk to dolphins in the region or the proposed measures reducing the risks to the dolphins.

52. We note that there are a significant number of closures, regulated and voluntary, already in place in the Golden/Tasman Bay area which would serve to provide a significant degree of protection to the dolphins and to mitigate the effects of fishing.

53. The proposed option in the draft TMP is based on the proposition there are closures everywhere else, so why not in Golden/Tasman Bay rather than based on an analysis of the scientific evidence available.

54. There are eight setnet fishers and 21 trawlers who currently operate in the NCSI area, over half will be significantly affected by the proposed closures. The proposed closure would see a reduction in annual fishing revenue of around $1.3m and a reduction in the contribution to the local economy of over $3.5m. Decreased catches of flatfish, gurnard and snapper would be expected. With the limited data provided by FNZ, it is not possible to assess the percentage of the Golden/Tasman Bay that would be lost through the proposed closures.

55. It is difficult to see the benefit of forcing some 12 fishers and their crews from their livelihoods to reduce the estimated number of mortalities of Hector's dolphins by one dolphin every two years. One additional Hector's dolphin every two years will not materially change the prospects of a Hector's dolphin population of over 15,700 and which is projected to increase at over 200 dolphins per year. Conversely, the cost to the 12 fishers and their crews is likely to be draconian with little prospect of the fishers recouping their losses or finding an alternative livelihood.

East Coast South Island

56. The draft TMP uses a population of 9,728 Hector's dolphins on the east coast of the South Island based on the 2016 Proteus aerial survey. While some commentators dispute the abundance estimate, we accept the estimate as reliable.

57. The dolphins are then spatially distributed according to the habitat model described earlier. We commented earlier on the quality and predictive power of the model and comment further in the following discussions of local populations. In summary, we consider the model to be inappropriate for the modelling of dolphin density at such a fine scale as used in the risk assessment and consider it potentially provides a distorted assessment of the spatial risk.

58. The management objective of 90% of capacity with 95% certainty is considered appropriate by the draft TMP for the management of risks in the east coast. We disagree with that proposal for the reasons provided earlier and purpose that a lower objective of 80% of capacity with 80% certainty is more appropriate for a population that is thriving and is near capacity. No closures are warranted.

59. Based on the management objective, the draft TMP estimates fishing-related mortalities should not exceed 48.6 per annum, compared with a current estimate of 51.2 mortalities. To achieve a 95% certainty, the draft TMP estimates a reduction of 27.4 deaths is required to achieve that objective. The draft TMP proposes additional conservation measures in Kaikoura, Banks Peninsula and South Canterbury to achieve the reductions.

60. We disagree with the need to reduce the level of mortalities to the level proposed and to introduce additional closures as proposed.

Kaikoura

61. The distribution model projects a Hector's dolphin population of 757 dolphins and estimates a PST at 90% of capacity of 9.5 deaths per year. To achieve a 95% certainty of that outcome would require a reduction in expected mortalities of 5.1 deaths per annum. We contend that 80% is the appropriate population management objective but for the reasons given earlier we would see the level of certainty required to be lower. An 80% level of certainty would see the maximum level of mortalities increased to an estimated level of nine mortalities per year.

62. As stated earlier, we cannot accept the spatial distribution of the dolphins or, as a consequence, the projected number of set net deaths. Our discussions with set net fishers indicate the estimated number of Hector's dolphin captures by Kaikoura set netters is significantly overstated and the number of annual deaths is less than half the assessed risk.

63. The draft TMP proposes two options for set netting in the Kaikoura area, Option 2 being to remove the current exemption at the head of the Kaikoura Canyon and Option 3 being to close the area to 7 nm. It is estimated that there are 10.8 set net mortalities per annum from commercial set netting. The 80%:95% proposal seeks to limit the mortalities to 5.9 deaths per annum. Option 2 would reduce the estimated deaths to eight per annum and Option 3 to 2.7 deaths per annum. Option 3 would result in a reduction of mortalities greater than that desired to achieve the management objective.

64. Both options would effectively mean the existing four set netters, who supply mainly the local market with fish for the restaurant trade and resident consumption, would not be able to access their existing fishing grounds and would be forced to exit the industry unless they were able to re-locate their activities or transition to an alternative gear to catch fish. Given their vessels, the nature of the coast and the fish available, neither a re-location nor a transition will be sufficient to maintain their revenues to enable them to continue fishing. The fishers have some 150 years' experience between them, and it would not be easy for them to find an alternative livelihood. They employ some ten crew from Kaikoura. The proposed options would mean the demise of Kaikoura as a local fishing port and would deny visitors access to locally caught product.

65. Based on the value of their annual catch from set netting, there would be an annual added value loss of some $5.2 million to the local economy. That is a significant loss to Kaikoura. In effect each dolphin that might be saved by the measures would have a cost to the local economy of approximately $0.65 million. It is extremely doubtful that an additional dolphin can replace that value lost. Nor will it be able to generate the employment needed to provide the displaced fishers and allied suppliers with replacement livelihoods.

66. We oppose Options 2 and 3 as proposed in the draft TMP.

67. The Kaikoura fishers have considered the matter and have an alternative proposal that would see some additional area closed to set-netting but not to the extent proposed by the draft TMP. We support that alternative.

Pegasus Bay/Banks Peninsula

68. We are unable to agree with the dolphin distribution that is derived from the spatial habitat modelling. The habitat model estimates there are over 3,300 Hector's dolphins located in the Pegasus Bay area that would be closed to set netting and trawling. That is over 75% of the Hector's dolphins modelled to be located in the wider Banks Peninsula area. That is simply not plausible. The spatial model distribution then creates a higher overlap with both set net and trawl fishing in Pegasus Bay and a higher estimate of deaths.

69. The risk assessment estimates the maximum numbers of death to achieve the 80% objective would be 56.3 deaths per year. The risk assessment estimates 17.4 mortalities, with an upper 95th percentile of 33.4 deaths per year. The estimates indicate that the commercial fishery mortalities are already below that required to allow the Banks Peninsula population to achieve the 80% management objective. There is no need for any further measures to restrict the level of fishing.

70. However, notwithstanding the local population management objective having been attained, the draft TMP then analyses the impacts relative to the wider 90% objective. There is no rationale as to why having achieved the local objective there should be a comparison to the wider 90% objective. Under that scenario, the maximum number of deaths would be 22.6 per year and a reduction of 5.6 deaths per year would be required.

71. The set net option would result in a reduction of 12.1 deaths per annum, compared to the desired 5.6 deaths. The trawl option would reduce the expected mortalities by 1.45 deaths, that being 70% of the estimated total trawl mortalities for the Banks Peninsula locality.

72. We suspect that the risk assessment has provided substantially inaccurate estimates of trawl and setnet deaths for the region. Trawl are probably under-estimated and setnet over-estimated, the aggregate being probably significantly over-estimated.

73. There is effectively only one vessel set netting in the Banks Peninsula area and his activity is concentrated in Pegasus Bay. Nine trawlers operate in the area to be closed for a significant part of their year. Trawling in the Bay is either close to the shore using low headline nets targeting flats or gurnard or further out in deeper water targeting red cod. While the Hector's dolphins captured in recent trawl incidents were inside the hotspot area of the spatial habitat model and captured by larger vessels, an inappropriate distribution of dolphins to that area has resulted in an inappropriately high estimate of dolphin deaths.

74. We cannot accept either the spatial distribution or the estimate of deaths for Hector's dolphins for Banks Peninsula.

75. The catch lost has an added value of over $14.3m in added value to the Christchurch / Lyttleton economy each year and provides employment for some 35 families. That is the annual cost that will be incurred to save an additional six dolphins each year. An additional six dolphins will make no measurable change to the prospects of the Hector dolphin population in either the Banks Peninsula or wider ECSI area.

76. The use of an 80%:80% population target would see no need for any additional measures in the area.

Timaru

77. The habitat model estimates there are approximately 2,400 Hector's dolphins in the South Canterbury/Timaru area. The risk assessment estimates that fishing mortalities in the Timaru area average 19.8 deaths per annum (14.6 from set-net and 5.2 from trawl), the 95th percentile being 42.2 deaths. To achieve the management objective, a reduction of 3.8 deaths per annum is desired. Alternatively, a population setting of 80% of capacity with 80% certainty would see the maximum number of mortalities increased to over 48.

78. For set-netting, the draft TMP proposes only one option other than the status quo – a closure to 12 nm extending from Peraki Bay on Banks Peninsula to Timaru at which point the closure will reduce to be 4nm at the Waitaki River. The proposal would decrease the number of mortalities by 17.5 deaths per

year. For trawling, the draft TMP has two options, Option 2 being a closure from Hinds straight line to the Waitaki and Option 3 being a closure of variable length offshore stretching from Banks Peninsula to the Waitaki River. Option 2 is estimated to reduce mortalities by 4.51 dolphins and Option 3 by 5.24 dolphins.

79. Any single option from those presented in the draft TMP would achieve the reduction in mortalities needed to achieve the population target of 80%. The options proposed are collectively excessive relative to the reductions needed and to that extent raise the issue of what is the underlying agenda.

80. We do not accept any of those proposals as being necessary or appropriate. Estimated mortalities are already within the limits for an 80%:80% management objective.

81. There are seven set net vessels operating out of Timaru, five of those also trawl when not set netting and there are a further nine vessels which only trawl operating out of Timaru. If setnet Option 2 is implemented, the set net fishers will effectively lose all their current fishing grounds. There is little difference to the impact of Options 2 and 3 for the trawl operators and all will sustain significant losses with most losing all access to their fishing grounds. The vessels constitute the entire inshore coastal fishing fleet that operates from Timaru. They maintain a livelihood for some 50 families.

82. There are few options available for the fishers. Most of the vessels are small and are not engineered nor surveyed to fish further out beyond any closure. Many of the skippers only have coastal tickets and cannot legally fish further out. The larger vessels may be able to fish further out but may have to change their species targets and ACE portfolio.

83. In the event that the areas are closed and the vessels lose access to their fishing grounds, there will be repercussions for both Talley's and Sanford who operate processing plants in Timaru. Downsizing of the workforces and possibly the closure of one factory would be expected. That would cost another 15 families their livelihoods.

84. Timaru would not have a viable coastal fishing industry.

85. The affected vessels currently catch in the order of 1,000 tonnes of fish per year. They would generate an injection into the local economy of around $14.0 m per year. Removal of that revenue to meet the requirement to save four dolphins per annum comes at a high price.

86. We cannot support any of the proposed measures, they are excessive, have significant socio-economic, effects, and are unnecessary.

South Coast South Island

87. The risk assessment estimates that fishing mortalities in SCSI average 1.65 deaths per annum (0.7 from set-net and 0.95 from trawl), the 95th percentile being 3.6 deaths. The risk assessment estimates that the level of mortalities would need to be a maximum of 0.8 deaths per year would be needed to allow the population management outcome to be achieved.

88. While the draft TMP offers three scenarios as to the distribution and estimated mortalities of Hector's dolphins with differing levels of aggregate risk, the fishing measures remain the same across the three scenarios.

89. For set-netting, the draft TMP proposes two options – Option 2 would extend the set net ban off Te Waewae Bay to 7nms and reduce the estimated mortality by 0.1 dolphins and Option 3 would extend the ban to 10 nm and reduce the estimated mortalities by 0.1 dolphins per year. For trawling the draft TMP provides two options – Option 2 would ban trawling within the Bay and for 2 nm beyond the Bay and reduce the estimated mortalities 0.85 dolphins per year while Option 3 would extend that ban to 4nm and reduce the expected mortalities by 0.89 deaths per year.

90. There are 12 trawl vessels and five setnet vessels that operate from the Southland ports. While the setters would be generally unaffected by the proposals, half the trawl fleet operates intensively in Te Waewae Bay and would be forced from their most profitable fishery by the proposed closures. The closure area currently provides a livelihood for some 20 fishing families, the prospects for whom would not be optimistic if they were forced from the fishery. Their vessels are small, they operate low headline

nets, trawling at low speeds and posing effectively no risk to the dolphins. The dolphins pursue the trawlers to feed on the small fish disturbed by the passage of the trawl net over the bottom. Increased observer coverage in the trawl fleet in the past has noted the presence of Hector's dolphins but no dolphin captures were reported. In addition to the loss of fishing crews, the small fish processors who operate in the region would need to restructure and downsize their operations, putting an estimated additional six staff out of work.

91. The closures would reduce fishing revenue in the Southland region by some $2.3 m per annum and reduce the injection into the Southland economy by over $6.5m per year. It is difficult to imagine how a reduction of one dolphin death each year to benefit the local dolphin population will result in the need to put some 25 fishers and processors out of work in a local economy that already has poor employment prospects.