

# NEW ZEALAND MARINE SCIENCES SOCIETY

TE HUNGA MĀTAI MOANA O AOTEAROA



19<sup>th</sup> August 2019

Consultation: Hector's and Māui Dolphin Threat Management Plan

Department of Conservation

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## Hector's and Māui Dolphin Threat Management Plan

This submission is made on behalf of the membership of the New Zealand Marine Sciences Society (NZMSS). It is made in good faith in my role as President of the NZMSS and in accordance with the Code of Ethics and Rules of the Royal Society of New Zealand.

NZMSS welcomes the opportunity to comment on the Hector's and Māui Dolphin Threat Management Plan. In general NZMSS supports the most conservative management options proposed for protecting both Hector's and Māui dolphins, and in particular for Māui dolphins which are on the brink of extinction. NZMSS also recommends that the threat of any future fisheries-related bycatch be managed urgently and we suggest a number of additional protection measures. Our detailed submission is attached.

Please contact me at the email address provided below for any further information regarding this submission.

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President

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**NZMSS submission on:**

***Protecting Hector's and Māui Dolphins - Consultation on proposals for an updated Threat Management Plan (June 2019; Department of Conservation and Fisheries New Zealand)***

### **The New Zealand Marine Sciences Society**

The New Zealand Marine Sciences Society (NZMSS) was formed in 1960 as a constituent of the Royal Society of New Zealand, to encourage and assist marine science and related research across a wide range of disciplines in New Zealand and to foster communication among those with an interest in marine science.

NZMSS is a professional science body and a non-profit organization that provides access to and within the marine science community. We identify emerging issues through annual conferences, annual reviews, a listserv and our website <http://nzcss.org/>. NZMSS membership covers all aspects of scientific interest in the marine environment and extends to the uptake of science in marine policy, resource management, conservation and the marine business sector. We speak for members of the Society on matters of interest on marine research in New Zealand and we engage with other scientific societies as appropriate. Our current membership comprises almost 300 members.

Our submission is consistent with the Royal Society of New Zealand Code of Ethics and Rules, in particular principles 2.1 Integrity and professionalism, 4.1 Compliance with the law and relevant standards, and 10.1 Protection of the environment ([www.royalsociety.org.nz/organisation/about/code](http://www.royalsociety.org.nz/organisation/about/code) ).

### **Submission structure:**

This submission is structured with the following sections:

1. Summary of NZMSS views on the Threat Management Plan review
2. Response to questions posed in Consultation Document Parts A to D
3. Feedback on the science inputs that informed the TMP review
4. Future research and monitoring needs and direction?

## **1. Summary**

NZMSS acknowledges the complexity of the problems faced with managing Hector's and Māui dolphins and appreciates the attempts to bring together the available information into a risk assessment framework to guide management action. NZMSS recognises that this is the most complex spatial model that has been used to estimate risk to these dolphins. Like all models, there is uncertainty and biases, and some of these have been acknowledged and examined. However, we recommend that the results from the model be treated cautiously and that the most precautionary approach to managing these dolphins be taken. Our main reasons for this are explained in section 3, but in summary:

1. Overall observer coverage is very low and likely results in an under-estimate of bycatch rate (e.g. the number of dolphins caught per day fishing). This likely leads to an underestimate of fishing mortality in the commercial fishery.
2. Recreational fishing is not incorporated into the risk assessment or estimated as a source of mortality because there are no data on this available. This leads to an underestimate of overall fishing mortality.
3. Estimates of non-fishing sources of mortality are based solely on necropsy data from Hector's and Māui dolphins found dead on beaches with a known cause of death. This is a very limited data set in terms of sample size ( $n=38$ ) and there is complete uncertainty on how the proportional cause of death relates to sources of mortality in wild populations. For example, the largest estimated source of mortality in the risk assessment is toxoplasmosis, but this is based on the occurrence of nine beach-cast individuals that are thought to have died from the disease over the last 12 years. Whilst acknowledging the uncertainty in these estimates, it is likely that the modelling-approach and data used has led to a large overestimate of mortality resulting from toxoplasmosis, particularly given that a similar proportion of beach-cast dolphins were killed by fishing over the same period.
4. There is a lack of comparability between estimates of mortality from non-fishing sources such as toxoplasmosis (based on necropsy data) and mortality estimates from commercial fishing (fisheries observer data). For consistency, and also as an objective means of conveying the uncertainty in mortality estimates based on necropsy data, total fishing mortality should have also been estimated based on necropsy data.

Despite these limitations the consultation document presents a very clear picture that disease is a far more serious source of mortality than bycatch. NZMSS is concerned that the presentation and comparison of mortality estimates for toxoplasmosis and fishing in the opening table (Overview p6) is an oversimplification and does not allow for an informed and accurate interpretation of the uncertainty and lack of comparability between these two estimates. Despite the footnote, this Table obscures the complexity and limitations, and squarely points to toxoplasmosis as the most important source of mortality. This is therefore likely to mislead public or stakeholders submitting on the document and we urge Fisheries NZ/DOC to take this into consideration when reviewing and summarising submissions, and deciding on appropriate management action.

NZMSS believes that all threats to the dolphins (particularly for Māui and vulnerable sub-populations of Hector's dolphins), should be managed and significantly reduced. Managing the effects of disease (such as toxoplasmosis) is likely to be difficult, involve multiple approaches, and there is considerable uncertainty over the likely effectiveness of management actions and the time frames involved. Other major threats, such as fishing, seismic surveying and seabed mining, are all directly related to human activities so can be more effectively managed spatially and over shorter timer frames. NZMSS therefore supports the most conservative management options proposed for protecting both Hector's and Māui dolphins, and in particular for Māui dolphins which are on the

brink of extinction. In addition, NZMSS recommends that the threat of any fisheries bycatch should be managed urgently and include the following protection measures:

1. Additional protection is needed in the following areas:
  - The North Island east coast
  - Marlborough Sounds
  - South-east of Bank's Peninsula
  - Otago-Catlin's coast
2. Prohibition of the use of un-attended recreational set nets throughout the known range of Hector's and Māui dolphins.
3. Increase targeted observer coverage

NZMSS encourages investment in monitoring of Hector's and Maui dolphin populations to assess population status and progress towards management goals research. We also recommend investment in research that will address clear knowledge gaps identified by the TMP; this includes long-term data collection and re-analysis of existing data using new analytical and/or quantitative methods, and better quantification of risks, including the prevalence and effects of toxoplasmosis. This should include consideration of new and emerging research approaches, including population health assessments, genomics tools, telemetry, long-range survey drones, acoustic arrays.

## **2. Response to Consultation Document Questions**

### **Part A: Summary of proposals for the guiding vision and objectives**

*Do you agree with the new vision statement and goals for the TMP? Why or why not? Are there any changes you would suggest?*

Yes. However, they should be tightened up to lead to measurable goals.

*Do you agree with the desired population outcomes? Why or why not? Are there any changes you would suggest?*

The desired population outcomes (95% of carrying capacity for Māui and 90% of carrying capacity for Hector's), if achieved, would ensure the vision statement for the TMP is realised and as such, seem appropriate. However, it is unclear how estimates of carrying capacity and population size would be made especially with other potential constraints, such as climate change, on these coastal dolphins. There also needs to be an effective method of monitoring against these population outcomes, and commitment from agencies to resource regular monitoring and reporting.

*Do you agree with the updated objectives? Is there anything else that should be considered?*

The objectives need to be measurable. DOC and Fisheries NZ will need to resource, regularly measure and report on progress against these.

The research objectives are helpful but need to be firmed up to ensure the information on toxoplasmosis, population size and trends, fisheries impacts etc is sufficient to measure progress towards the stated management goals.

### **Part B: Proposals for sustainability measures under the Fisheries Act 1996**

*Do you have additional information about the subpopulation sizes and/or fishing-related deaths that you would like to share?*

No.

*Which of the options do you prefer for Māui dolphins? Why? Would you make any changes to your preferred option?*

Given that Māui dolphins are critically endangered we support Option 4.

We note that Option 4 expands the set net ban area to include extensive offshore areas and major harbours on the North island west coast, both of which are not included in the other options. NZMSS recognises that the use of harbours by dolphins is highly variable (both among different harbours and within harbours) and a broad-brush ban on set nets in harbours may not be considered appropriate. NZMSS therefore would at least recommend the banning of the use of **un-attended** set nets (both commercial and recreational) within harbours, i.e. this would allow set nets to continue to be used in certain areas of harbours as long as they are attended by fishermen, such that entrapped dolphins and other by-catch can be released.

The North Island east coast, from Wairarapa up to the southern Bay of Plenty, is an area where dolphins are sighted. The origins of these dolphins are unknown but most likely come from the larger population of Hector's around the north east coast, South Island. This is an area that requires further investigation. Currently, no protection is proposed for dolphins in this region. At a minimum NZMSS would recommend the prohibition of un-attended set nets in this region to reduce by-catch risk.

We also note that a better understanding of the species identity of the dolphins in the broader Taranaki region is needed.

*Do you agree with the local population outcomes for Hector's dolphins? Why or why not?*

We agree that having local population outcomes (of 80% carrying capacity) provides a safeguard against the possibility of the depletion of one local population to low levels, whilst still achieving the overall outcome of 90% for the entire population. However, as for the overall population outcomes, there needs to be an effective method of monitoring against this to ensure that it is achieved.

*Which of the options do you prefer for Hector's dolphins? Why? Would you make any changes to your preferred option?*

Our preferred option is Option 3 for set-net and trawl as this removes fisheries risk in areas where the number of Hector's dolphins caught is the highest. In addition, we recommend protection is extended in the following areas:

- Marlborough Sounds – It is unclear why a large section of the Marlborough Sounds is excluded from the proposed set net closures. At a minimum NZMSS would recommend the prohibition of un-attended set nets in this region to reduce by-catch risk.
- South-east of Bank's Peninsula. The habitat modelling in the risk assessment did not indicate high dolphin abundance here, which is why it seems to have been missed out. While there are lower densities in this area compared to the surrounding high density areas, it is still an area of high dolphin sightings<sup>1</sup> and warrants a larger area of protection.
- Otago-Catlin's coast – this region includes some of the smallest Hector's dolphin populations, for example off the Otago coastline and in Porpoise Bay (Catlins). The number of dolphins caught in these areas is relatively low, because the populations are small and fishing effort is currently low. However, the offshore extent of the set net ban should be extended to 12nm to protect against future changes in fishing effort.
- The east coast, North Island from Wairarapa up to the southern Bay of Plenty is an area where dolphins are sighted. As stated above the origins of these dolphins are unknown but

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<sup>1</sup> Rayment et al. 2010 Aquatic Conservation 20: 106-116, MacKenzie & Clement 2014 AEBR 123

most likely come from the larger population of Hector's around the north east coast, South Island. This is an area that requires further investigation. At a minimum NZMSS would recommend the prohibition of un-attended set nets in this region to reduce by-catch risk.

*Do you agree with the proposed fisheries monitoring objectives? Why or why not?*

No. The fisheries monitoring objectives are very limited and vague. The suggestion seems to be that MPI will come up with a plan for effective monitoring of fisheries-related deaths by December 2019. By way of comparison, the USA has clear objectives for effective fisheries bycatch monitoring. These should be used to help develop a monitoring plan for New Zealand.

*Do you have additional information about fisheries monitoring that you would like to share?*

No.

*Do you agree that driftnet fishing should be explicitly prohibited? If so, should it be prohibited only in the areas subject to set-net prohibitions or should there be a complete prohibition in New Zealand?*

NZMSS supports the complete prohibition of driftnets throughout New Zealand due to the high bycatch risk posed.

### **Part C: Proposal for a Toxoplasmosis Action Plan**

*Do you agree with the establishment of a toxoplasmosis action plan? Why or why not?*

As toxoplasmosis is a confirmed cause of death in both Hector's and Māui dolphin, and acknowledging the need to address all threats to the Māui dolphin, we agree with the proposal to develop a Toxoplasmosis Action Plan.

*Do you agree with the two objectives and associated performance plans? Why or why not?*

Yes. We should strive to reduce toxoplasmosis deaths to near zero, although at this stage it is unclear how this would be achieved. Therefore it is imperative to increase our understanding of how the disease affects dolphins. We stress that research into the effects of toxoplasmosis does not preclude decisive action on eliminating the risks we know can be managed, i.e. fisheries related mortality.

*Do you have any suggestions for specific research or actions that could be incorporated into the Toxoplasmosis Action Plan?*

Development of a Toxoplasmosis Action Plan should be by way of a technical group comprising the full range of expertise.

This should be aligned with established international efforts to manage this mortality risk to other marine mammals.

It should be aligned with general health assessment work to concomitantly evaluate other known disease risks e.g. brucella, tuberculosis and the potential for co-morbidity factors.

### **Part D: Management of other non-fishing threats**

*Do you agree or disagree with the proposal relating to marine mammal sanctuary extensions? Why or why not?*

Yes. The West Coast North Island extension would reduce barriers to population connectivity between Hector's and Māui dolphins, and provide protection throughout more of their natural

range. Similarly, the extensions to the Banks Peninsula sanctuary provide protection throughout more of the range of Hector's dolphin distribution.

*Do you agree or disagree with the offshore distances in the proposal relating to marine mammal sanctuary extensions? Why or why not?*

Yes, as it takes in the likely range of the dolphins' distribution.

*What suggested amendments do you think should be considered and why?*

There needs to be careful consideration of the offshore limits of protected areas throughout the dolphins' range as there are differences in habitat use around the South Island (see MacKenzie & Clements series of aerial survey reports). Currently the offshore range and winter extent of Māui dolphins remains unknown and this needs to be addressed urgently.

*Which of the options do you prefer for seismic surveying? Why? Would you make any changes to your preferred option?*

Option 3 (prohibition within sanctuaries) is preferred, as it would provide protection from adverse effects of seismic surveying throughout Māui dolphin habitat. Options 1 and 2 would likely provide less protection and it would be reliant on compliance with, and enforcement of, the Code and/or consent conditions.

*Which of the options do you prefer for seabed mining? Why? Would you make any changes to your preferred option?*

Option 3 (12nm within the existing West Coast MMS) plus Option 4 (2nm within the southern extension to the West Coast MMS), as the most precautionary approach, are the most appropriate for effective protection of Māui dolphin.

*Do you agree or disagree with the offshore distances in the proposal? Why or why not?*

There needs to be careful consideration of the offshore limits of protected areas throughout the dolphins' range as there are differences in habitat use around the South Island (see MacKenzie & Clements series of aerial survey reports). Currently the offshore range and winter extent of Māui dolphins remains unknown and this needs to be addressed urgently.

*Do you agree with a moratorium on new permits for viewing Māui dolphins? Why or why not?*

Yes, given the critically endangered status of Māui dolphin and the known impacts of tourism observed on other dolphin populations.

*Do you agree with no other changes for dolphin watching and vessel traffic for Māui and Hector's dolphins? Why or why not?*

All current tourism permits targeting Hector's dolphins need to operate within their permitted conditions and no new permits for tourism activities should be issued in areas where there are concerns about other stressors or mortality risks

Some consideration should be given to further vessel restrictions, in particular powerboat racing which regularly occurs inside Māui dolphin habitat. Vessels entering areas where Māui's dolphin are known to occur could be required to reduce their speed (e.g. along the lines of the requirement for vessels entering the Hauraki Gulf, to reduce ship strike of whales).

*What alternative proposals relating to non-fishing threats, beyond those set out above, do you think should be considered and why?*

Climate change is a critically important issue that has the potential to shift habitat use patterns by Hector's and Māui dolphins. This needs to be addressed as an area of importance within the TMP as it may alter future management actions. All on-water activities such as dredging, near-shore boat racing, construction, and habitat modification on land near coastal habitat need to address potential impacts on vulnerable coastal populations

### **3. Comment on science inputs to the TMP review**

We understand there was a significant body of new information that provided input into the TMP review, and informed the options outlined in the consultation document. This, combined with the spatial risk assessment<sup>2</sup>, does represent an advance on the information which informed the previous TMP reviews in 2012 and 2007. However, we would like to comment on some aspects of the science inputs that should be further refined or investigated.

#### **Recreational fishing mortality**

We understand that deaths from recreational fishing were not estimated in the spatial risk assessment due to lack of data with which to estimate the vulnerability parameter in the SEFRA model. Recreational set-netting potentially represents a significant threat, and the implications of not including this in the risk assessment should be further explored. In particular, it seems possible that by not including recreational fishing mortality, estimates of non-fisheries causes of death may have been inflated. A separate study that modelled the population dynamics of Māui dolphins, indicated that commercial fisheries deaths appear to have been underestimated by a factor of 15-20 times. The best fitting model, used the series of bycatch estimates provided by MPI as a relative index of bycatch. If the MPI estimates are an accurate estimate of bycatch, then an additional impact is necessary to explain the population decline, either disease (including toxoplasmosis) or recreational fishing mortality (a combination of both, or another as yet unmeasured impact)<sup>3</sup>.

While increased information on recreational set-netting could improve fishing-related mortality estimates, NZMSS believes that a more effective and immediate approach to eliminating this source of mortality would be to **prohibit un-attended recreational set-netting within the known range of Māui/Hector's dolphins**. Set-nets are a non-selective form of fishing that pose a threat to many non-target species, including a wide range of marine mammals, seabirds, sharks and fish, so prohibition would have wider conservation and fisheries value.

#### **Fisheries observer coverage**

Fisheries observer coverage is low, with coverage of 1-3% in the gillnet fleet and lower in the trawl fleet<sup>4</sup>. Furthermore, observer coverage is not focused only on areas with Hector's and Māui dolphin. Although we understand that the SEFRA model approach is spatially-explicit and so can account for this to some degree, the total number of observed captures is low (16 in total between 1995 and 2017; Table 11 in Roberts et al. 2019), and the model is fit to this small amount of data. Low observer coverage is known to under-estimate the bycatch rate, implying that commercial fisheries

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<sup>2</sup> Roberts, J.O.; Webber, D.N.; Roe, W.T.; Edwards, C.T.T.; Doonan, I.J. (2019). Spatial risk assessment of threats to Hector's/Māui dolphins (*Cephalorhynchus hectori*). Fisheries New Zealand Aquatic Environment and Biodiversity Report No. 214. 168 p.

<sup>3</sup> Cooke, J.; Constantine, R.; Hamner, R.M.; Steele, D.; Baker, C.S. (2019). Population dynamics modelling of the Māui dolphin based on genotype capture-recapture with projections involving bycatch and disease risk. Fisheries New Zealand Aquatic Environment and Biodiversity Report No. 216.

<sup>4</sup> Roberts, J.O.; Webber, D.N.; Roe, W.T.; Edwards, C.T.T.; Doonan, I.J. (2019). Spatial risk assessment of threats to Hector's/Māui dolphins (*Cephalorhynchus hectori*). Fisheries New Zealand Aquatic Environment and Biodiversity Report No. 214. 168 p.



deaths may be underestimated by the model<sup>5</sup>. Roberts et al. (2019) do recommend that observer coverage should be increased on set net vessels, where fisheries overlap with high dolphin densities (see page 72).

### **Estimating the incidence of non-fishery causes of death**

The mortality estimates of the incidence of non-fishery causes of death (including predation, toxoplasmosis and other disease) rely on the diagnosed cause of death of beach-cast dolphins (31 individuals from 2007-2018), and assumes that this proportion is representative of different causes of death in the wild population. The proportional cause of death in the necropsy records are likely to be different from those in the wider population due to a range of biases (spatial, seasonal, sex-bias, buoyancy etc.) and therefore it is unknown how representative these data are in terms of sources of mortality in wider populations. Although uncertainty associated with this assumption is quantified in the risk assessment outputs (reflected in the large ranges), there is the potential for bias (in either direction), and several additional sources of unquantified uncertainty. Therefore, while the mortality of nine beach-cast individuals with toxoplasmosis suggests it is a significant and important source of mortality, any estimates of mortality due to toxoplasmosis based on these data need to be treated very cautiously due to the low sample size (31 individuals) and uncertainty in representativeness. This was recognised by the expert panel who concluded that *“we are not convinced that it is appropriate for the toxoplasmosis necropsy data to receive the full modelling treatment: the uncertainties and potential biases in these data are too large. If the effects of the disease are as large as they appear, and the deaths are additional to other causes, we would expect the populations of Hector’s dolphins to be in rapid free-fall towards extinction.”* (point 32, p.12)

### **Comparability of estimates of mortality between toxoplasmosis and fishing**

Estimates of fishing and non-fishing related mortality were based on very different data sets and the uncertainty and biases associated with this are not clearly articulated in the discussion document. Fishing mortality estimates were based on fisheries-observer data, where there are 15 observed deaths in the fishery from 1995-2017. Eight of these deaths in the 1997-1998 observer programme (about 40% observer coverage) and a further seven deaths in the two decades since 1998 (about 1-3% observer coverage). This led to an estimate of about 50 Hector’s and Māui dolphin mortalities per year currently. In contrast, non-fishing mortality was based on the necropsy data from beach-cast individuals between 2007 and 2018 (31 individuals), which led to high estimates of mortality from toxoplasmosis and very high uncertainty.

As discussed above, it is unknown how representative the beach-cast data are in terms of the proportion of different sources of mortality, yet one type of mortality (fishing) was excluded from estimates of mortality based on these data. However, based on the 38 beach-cast dolphins with a diagnosed cause of death between 2007 and 2018, a similar number of deaths were attributed to bycatch (7 individuals, 18%) and toxoplasmosis (9 individuals, 24%). It is unclear why fishing was excluded from this analysis as (1) it would provide an additional source of fishing mortality data that is statistically comparable to the other non-fishing related sources of mortality (i.e. subject to the same questions of representativeness and sample size) and (2) this would encompass recreational fishing effects that are otherwise not accounted for in the risk assessment.

As it stands the very high mortality estimates for toxoplasmosis vs. fishing are at odds to the relative proportions of this mortality observed in beach-cast individuals. Inclusion of an estimate of fishing

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<sup>5</sup> GAMMS 2016. Guidelines for preparing marine mammal stock assessment reports pursuant to section 117 of the Marine Mammal Protection Act. National Marine Fisheries Service, National Oceanic and Atmospheric Administration of the USA  
<https://www.nmfs.noaa.gov/op/pds/index.html>

mortality using the beach-cast data would have allowed a more balanced interpretation of the uncertainty and problems associated with estimates of mortality based on the limited number of beach-cast individuals.

#### **Response to recommendations made by the expert panel**

There appears to be no formal written response to recommendations made by the expert panel at the Hector's and Māui Dolphin Threat Management Plan Risk Assessment Workshop in July 2018<sup>6</sup>. We understand that the risk assessment was revised and further scenarios were modelled following the workshop, but the lack of a formal written response makes it difficult to assess how the panel's recommendations were incorporated (or not) into the final risk assessment.

#### **4. Future research and monitoring needs and direction**

Given the extensive amount of data provided for this assessment (not all of it used) and the novel use of the modelling framework on a very high-profile species, we strongly recommend funding the analysis of recognised areas of importance. For example, climate change modelling, population health assessments including disease risk, offshore ranging behaviour of Māui dolphins and vulnerable Hector's dolphin populations, better demographic profiles of sub-populations (genetic markers), and social license to enact protection.

An immediate discussion on how to improve the modelling framework, including a better understanding of the sources (and direction) of bias, and resolve some of the uncertainty in the current modelling approach. This will help focus research and future data collection, and ensure improved assessments through-out the duration of this TMP and for the next review.

There must be open dialogue within New Zealand and with international experts on new research approaches in light of the science discussions that evolved during the TMP process, including but not limited to health assessments, telemetry, translocation, dynamic protected areas, long-range drone surveys, remote sensing analytics, acoustic arrays.

A mechanism for all data to be maintained in a secure, curated archive to enable rapid analysis when decisions need to be made that affect conservation and industry critical decisions. This includes research, industry, NGO, government agency and any other source of important information to ensure the future viability of these endemic dolphins.

There needs to be a strategic framework for future research directions and regular reporting on the efficacy of management actions over short and long time-frames.

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<sup>6</sup> Taylor, B., Lonergan, M. & Reeves, R. Hector's and Māui Dolphin Threat Management Plan Review, Risk Assessment Workshop, 9-13 July 2018. Panel Recommendations <https://www.doc.govt.nz/globalassets/documents/conservation/native-animals/marine-mammals/maui-tmp/hectors-risk-assessment-workshop-panel-recommendations-appendix-1.pdf>