

# ***Option 5:***

**Protecting Māui and Hector dolphins while ensuring people impacted by change are protected, too.**

*OPTION 5: a proposal by Sanford Ltd, Moana New Zealand and WWF-New Zealand in response to the New Zealand Government consultation for an updated Threat Management Plan.*

Prepared with the assistance of contributing partner Endangered Species Foundation of New Zealand.

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# Contents

Foreword.....	5
Our action plan – Option 5.....	5
Option 5: Vision.....	7
Toxoplasmosis.....	7
Toxoplasmosis research and communications agency.....	7
The agency’s research arm will:.....	7
The agency’s communications arm will:.....	8
Requests to Government.....	8
Fishing.....	8
Threat Management Plan fisheries management objectives.....	9
Management strategies.....	10
Māui dolphin habitat.....	10
Monitoring and tracking.....	11
Cameras must complement people.....	11
Innovation in dolphin-safe gear modifications.....	12
Real Time Risk Reduction Management Measures.....	12
Requests to Government.....	15
Sightings recommendations.....	15
Spatial management recommendations.....	15
Option 5 fishing partner recommendations.....	16
WWF recommendations.....	16
Different recommendation.....	17
Transitioning.....	17
Other threats to Hector’s and Māui dolphins.....	18
Key land-based impacts.....	18
Pollution.....	18
Climate change.....	18
Plastics.....	18
Requests to Government.....	19
Threats from the oil, gas and minerals mining industry.....	19
WWF’s requests to Government.....	20
Complex governance and lack of coordination.....	21
Requests to Government.....	21

More science required to inform effective management .....	22
Requests to Government .....	22
Further actions agreed by the Option 5 partners .....	23
Changing the way we live: ensuring the wellbeing of people who depend on fishing.....	23
Possible impacts.....	24
Requests to Government .....	25
Principles underpinning a just transition for people who depend on fishing.....	25
Applying the principles.....	25
The Option 5 partners are committed to a just transition for the affected fishing industry. We stand ready to work with the Government to make this happen. ....	26
Resourcing the Transition .....	27
Conclusion.....	27
Appendix 1 .....	28
Stories from fishers – what are they facing, what does effective transitional support mean? .....	28
Appendix 2 .....	30
Land based impacts on the Māui dolphin habitat .....	30
The problem.....	30
Toxoplasmosis.....	30
Sedimentation.....	31
Agricultural runoff and other pollutants from land .....	31
Storm water and sewerage.....	32
Plastics.....	32
Climate change and Māui dolphins.....	32
Recommendations for managing land-based impacts .....	32
Management actions to control the influx of sediment, nutrients and contaminants .....	33
Management actions to restore the capacity of Waikato catchment to absorb and settle sediment, contaminants and toxoplasmosis .....	33
Restoring natural water filtration communities .....	33
Working with other organisations, communities and people .....	34
Management of plastics pollution .....	34
Recommendations re: climate change .....	34
Appendix 3 .....	36
Managing threats from the oil, gas and minerals mining industry to Māui dolphins .....	36
Oil, gas, and minerals mining threats .....	36
Recommended management of seismic surveying impacts on Māui dolphins within the Marine Mammal Sanctuary .....	38

Recommended management of seismic surveying impacts on Māui and Hector’s dolphins outside the Marine Mammal Sanctuary .....	38
Appendix 5 .....	40
TMP Research programme .....	40
Science about populations.....	40
Science about dolphin distribution .....	41
Electronic/ GPS tagging study to understand habitat use and dolphin health.....	42
Improve the risk assessment model .....	42
Mitigation development .....	43

# Foreword

New Zealand's native Māui dolphins – some of the rarest in the world – are on the verge of extinction.<sup>1</sup>

In 2016 Sanford Ltd, Moana New Zealand and WWF-New Zealand created an historic partnership to protect Māui dolphins. Referred to as the Moana and Sanford Māui Dolphin Protection Plan,<sup>2</sup> we recognised the grave threats to Māui dolphins, committed to some spatial closures and created a range of innovative management measures to mitigate risk. Evidence shows our plan is working.<sup>3</sup>

Now, in 2019, we have carefully considered the Government's *Protecting Māui and Hector's dolphins: consultation on proposals for an updated Threat Management Plan* and we have found it wanting.

While there is no doubt New Zealand must protect its dolphins, protection must not come at the expense of our people. People who will be impacted by changes implemented to protect dolphins must be protected too.

We believe New Zealand needs to be bolder than what has been proposed. We believe the threat management plan needs to be much more robust, to not just adequately protect our dolphins – but to also protect our people, industry and communities. Toxoplasmosis must be considered a serious threat and be addressed. And while the research must continue, there needs to be more action, and the time for action is right now.

So, we got together to come up with an alternative.

## Our action plan – Option 5

We have developed an alternative option to those proposed by the Government.

Called Option 5, this is the start of an action plan the Government can put to immediate effect. Our plan is designed to be robust enough to protect our dolphins but protect every individual affected by change, too.

And what's more, our plan has the potential to put New Zealand in a world-leading position, as our measures to protect both dolphins and people go further than ever before. These include:

- implementation of new systems to expedite gathering of much-needed data and information to help real time information sharing and best practice decision making;
- new practices that the Option 5 fishing partners are ready to roll out across their fishing vessels and their contractors to integrate management and science to reduce any residual risk to Māui dolphins; and

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<sup>1</sup> <https://www.doc.govt.nz/nature/native-animals/marine-mammals/dolphins/maui-dolphin/facts/>

<sup>2</sup> <https://www.sanford.co.nz/assets/Sanford-and-Moana-Maui-Protection-Plan-2016.pdf>

<sup>3</sup> information provided to Moana and Sanford by MPI 14/08/19

- implementing new dolphin-safe education programs that will compliment those already running in aquaculture hosted by DOC to ensure our teams on the water are as well-trained, correctly informed and highly skilled in dolphin-safe fishing as possible.

In addition to the measures the Option 5 fishing partners are taking on the water, we have put together a plan to address other threats to Māui dolphins. Toxoplasmosis is of critical importance, so we've come up with a solution to bring together research and plan for action. We have investigated the need for better governance. We've considered how to bring about much needed science and information to achieve real time decision-making. And we've outlined possibilities on how we can protect the people impacted by the changes we need to make in order to save our dolphins.

As in any partnership, the Option 5 partners don't always agree. There are a few instances in this document where the fishing partners make different recommendations to WWF and vice-versa. We think it's good to sometimes agree to disagree and remain committed to working together wherever possible.

Option 5 is about people as much as it is about dolphins. We cannot ignore the fact that lives are at stake – lives of dolphins and lives and livelihoods of people [see Appendix 1]. Every decision will impact businesses, communities, iwi, hapu, whanau, and individuals. Therefore, we have no choice but to move forward in a thorough and cautious manner.

In Option 5, we have focused on the Māui dolphin habitat as the area where both fishing partners Moana and Sanford fish. While many of the practices and principles in Option 5 may be usefully applied to the Hector's dolphin habitat, we do not make suggestions here about possible changes to fishing practices in the South Island. Moana do not fish in this area. Sanford do, and will make a submission on Hector dolphins before the submission deadline. WWF will make a submission on or before 5pm Friday 23 August.

The Option 5 partners, stand by ready, willing and able to discuss this action plan with Government. We firmly believe it is only when large and small business, industry, civil society and Government come together that we will be able to achieve a plan that is robust enough to offer solutions for both dolphins and people as we work together for a better New Zealand.

Livia Esterhazy, CEO WWF-New Zealand

Steve Tarrant, CEO Moana New Zealand

Volker Kuntzsch, CEO Sanford Ltd

With support of Grant Leach and Rose Hiha-Agnew as joint-chairs of contributing partner Endangered Species Foundation

# Option 5: Vision

*New Zealand's Māui and Hector dolphins are resilient and thriving, and the people, communities and businesses impacted by the changes required to achieve this goal are resilient and thriving, too.*

## Toxoplasmosis

Not enough is known about the disease toxoplasmosis, but we do know it is killing Māui and Hector dolphins.<sup>4,5</sup> Māui dolphin population modelling clearly shows we need to reduce toxoplasmosis by 50%- 75% in the next ten years<sup>6</sup> and we must ensure significant threat reduction in the next five years. New Zealand must commit now to building knowledge on toxoplasmosis and then taking swift and effective action to use this new science to mitigate its negative impacts.

## Toxoplasmosis research and communications agency

The Option 5 partners support the establishment of a Toxoplasmosis Research and Communications Agency. WWF is willing to partner with an academic or research institution leading in toxoplasmosis (such as Massey University) to create this.

This agency will enable expert collaboration and information sharing about toxoplasmosis, building essential knowledge and will establish and implement an effective research and management plan.

### The agency's research arm will:

- identify the strain/s of toxoplasmosis lethal to dolphins and other native species;
- identify where lethal strain/s (geographical or animal-specific) are located – and how and where those strains are entering waterways;
- collaborate with industry to assess and adapt existing diagnostic tools (such as the fluorescence polarisation assay used for diagnosis and control of brucellosis) or create new tools to establish if potential hot spots of contamination can be ring-fenced for targeted management;
- research toxoplasmosis vaccines and assess their suitability for New Zealand conditions; and
- apply focus wherever required as conditions and information changes.

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<sup>4</sup> <https://www.doc.govt.nz/nature/pests-and-threats/diseases/toxoplasmosis-and-hectors-and-maui-dolphin/>

<sup>5</sup> <https://www.doc.govt.nz/our-work/our-work-with-maui-dolphin/maui-dolphin-toxicology-and-disease-research/>

<sup>6</sup> <https://www.mpi.govt.nz/dmsdocument/35004/direct>

## **The agency's communications arm will:**

- raise awareness of toxoplasmosis in New Zealand, the impacts on New Zealand native species like Māui dolphins and others, as well as people;
- raise funds via grant applications and crowdfunding platforms for more toxoplasmosis research; and
- develop a range of social marketing campaigns with specific messages about toxoplasmosis to target audiences (e.g. messages to cat owners about how to dispose of cat faeces to stop it entering waterways, or messages to local councils about hotspots of contamination needing remediation).

## **Requests to Government**

- Reduce the threat of toxoplasmosis by committing funding to rapid development of knowledge and information, taking strong management actions to mitigate risk and establishing clear leadership and accountability for this work.
- Immediately makes available funding to support WWF and the partner institution in the urgent establishment of the Toxoplasmosis Research and Communications Agency plus two FTEs to cover the first twelve months of operation.
- Utilize the Provincial Growth Fund for riparian planting of riverbanks and wetland projects. The fund should also be used to restore natural water filtration communities to control the influx of sediment, nutrients and contaminants such as toxoplasmosis in waterways.

## **Fishing**

In 2016, with the support of WWF, Moana and Sanford created the Māui Dolphin Protection Plan (MSMDPP). The plan is designed to protect our native dolphins – and it is working.<sup>7</sup>

Several spatial closures are already implemented by legislation. Since October 2017 the MSMDPP has voluntarily closed north of New Plymouth to coastal set netting.

Confirming accurate data on the results of this initiative have been very difficult. The Option 5 partners have worked with MPI in detail and appreciate and acknowledge all assistance so far provided. While there is still some uncertainty, it is the best data we have, so we rely on this to make our analysis. When new data comes to light, we will review and adjust accordingly.

It appears that the initiatives of the MSMDPP have reduced the total remaining fisheries risk to Māui dolphins by 16.07%.<sup>8</sup> We need a further risk reduction of around 34% in order to be 95% certain that commercial fisheries impacts are lower than 0.14 deaths per year, which will achieve the goal of allowing dolphin populations to grow to 95% of their unimpacted size.

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<sup>7</sup> information provided to Moana and Sanford by MPI 14/08/19

<sup>8</sup> data provided by MPI 14/08/2019

This existing reduction of 16.07% means we are already well along the path to achieving the goal of at least 50% overall risk reduction, towards which the fishing partners will continue to strive. Achieving this goal will ensure New Zealand meets the expectations of the USA government (and the requirements of the Marine Mammal Protection Act Fish Import Rule) to reduce the risk to Māui dolphins.

Now, in 2019, the Option 5 partners have reviewed the risk assessment data and the outputs to see what more we need to do.

As it was with trying to understand what the Option 5 partners had achieved with the MSMDPP, the process of decision-making around what else we should do going forward was made difficult by the lack of clear data. We sought guidance and interpretative advice from several expert sources<sup>9</sup> however, even they were unable to give us the clarity we believe is needed in a process as important as this.

The need for overall better data is crucial to inform spatial protection, and a rigorous review of the outputs is beyond dispute and must be urgently addressed in any attempt to protect our dolphins. It is only with more reliable data about where the risk is that we can be certain that spatial protection measures are appropriate and fair.

The Option 5 partners have made the following recommendations to set precautionary restrictions while we create a new programme to provide a much more robust data set and increased clarity around dolphin movement and risk. This is defined as and referred to as Real Time Risk Reduction Management Measures in the paragraphs below.

The Option 5 partners agree to the following principles:

1. The fishing partners aim to never harm Māui dolphins while fishing.
2. A clear and quantifiable risk threshold: to ensure fisheries mortality is below the level that enables the Māui dolphin population to recover to 95% of carrying capacity with 95% certainty.
3. Additional proposed management measures (alternatives to closures): amplified monitoring, active risk reduction and trigger points.

## **Threat Management Plan fisheries management objectives**

The Threat Management Plan (TMP) objectives align well with our already established 2016 MSMDPP, which aims to ensure any dolphin deaths arising from fisheries threats do not:

- exceed population sustainability thresholds (set to achieve the recovery to 95% of the unimpacted size with 95% certainty);
- cause localised depletion; or
- create substantial barriers to dispersal or connectivity between subpopulations.

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<sup>9</sup> sources can be disclosed by request

As mentioned above, it appears that the initiatives of the MSMDPP have reduced the total remaining fisheries risk to Māui dolphins by 16.07%.<sup>10</sup> We need a further risk reduction of around 34% in order to be 95% certain that commercial fisheries impacts are lower than 0.14 deaths per year, which will achieve the goal of allowing dolphin populations to grow to 95% of their unimpacted size.

The risk assessment has reinforced that the actions we intuitively thought were needed back in 2016 were the right thing to do. Several additional management strategies can contribute significantly to dolphin protection. These are categorised below under the following headings:

- Māui dolphin habitat
- Monitoring and tracking
- Innovation in dolphin-safe gear modifications
- Modifications and other operational management strategies

## Management strategies

### Māui dolphin habitat

In 2016, the Option 5 partners recognised the Māui dolphin habitat as the area of coastal water and harbours between Maunganui Bluff and Whanganui River Mouth, and out to a depth of 100m.<sup>11</sup> Within this wider habitat the Option 5 partners now recognise a core area from Manganui Bluff to New Plymouth where most of the dolphin sightings occur.

### What we are doing

Since 2016, Moana and Sanford have worked with fishers in this core area to make the following changes to benefit our dolphins. In the habitat north of New Plymouth, Moana and Sanford:

- stopped coastal set netting from October 2017;
- stopped all catch contracts with coastal set netters;
- stopped accepting fish from vessels engaging in coastal set netting;
- supported several fishers to transition away from coastal set netting (by providing them additional catching rights in key choke species); and
- have given advice and support to fishers.

Sanford wishes to record that the decision to observe a 100m contour was an extremely precautionary approach and if future data indicates this is unnecessary Sanford suggest this be re-examined.

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<sup>10</sup> Middleton, D. (August 2019). Impact of the Maui plan on TMP targets for Maui dolphins, 3 pages. Report for Sanford Lt and Moana New Zealand.

<sup>11</sup> The Option 5 partners define the Maui dolphin habitat as Maunganui Bluff in the north to Whanganui River in the south out to 100m depth and within some harbours as per the definition used in the MSMDPP. We consider this to be the best precautionary definition of the habitat until the NIWA spatial habitat modelling has been independently reviewed as recommended by the 2019 IWC Small Cetaceans Scientific Committee (IWC, 2019).

WWF wishes to record that it applauds Moana and Sanford for these voluntary actions. WWF recommends that Government make the set net 100m depth contour restrictions between Maunganui Bluff and New Plymouth regulation until:

1. there is more data to better inform more fine scale spatial management; and
2. Real Time Risk Reduction Management Measures are investigated, tested, applied and reviewed to better inform decision-making and management.

## **Monitoring and tracking**

Cameras on boats and observers on vessels won't save dolphins alone, although they do provide essential data that will better inform decision-making.

However, cameras and observers can help provide more information about the location of dolphins in real time. If mechanisms are in place to ensure that sightings made by cameras and observers are communicated instantly to all vessels in an area where there has been a sighting, and all vessels are then required to follow a regulated 'move on' rule, this does have potential to save dolphins. These Real Time Risk Reduction Management Measures defined below are an essential component of Option 5 that all partners are committed to.

Observers on vessels must be considered key participants in Real Time Risk Reduction Management Measures. Having another expert pair of eyes on the water while fishing boats work adds an additional layer of checks and balances that can prevent a Māui dolphin being harmed during fishing.

The Option 5 partners recommend to Government that all observers are trained and participate in the sightings program and required to lodge any sighting in real time when it occurs. We agree they should also verbally inform the skipper instantly when a sighting occurs.

The Option 5 fishing partners agree that if an observer on a Moana or Sanford vessel verbally advises the skipper that he has seen a Māui dolphin, their skippers will enforce the 'move on' rule accordingly. The Option 5 fishing partners also agree that if their skippers receive an alert via the sightings program that a dolphin has been seen in the vicinity, their skippers will move on accordingly.

## **Cameras must complement people**

The scarcity and financial cost of human observers means we must work smarter and use cameras and where practical artificial intelligence (AI) to provide data and more accurate information on where dolphins are, and the impact of fishing on our dolphins.

## **What we are doing**

In the dolphin habitat south of New Plymouth, Sanford and Moana have proposed all coastal set net fishers install electronic monitoring (cameras and position reporting) and that they carry human observers when requested.

The Option 5 partners support full transparency and video monitoring of all trawl and coastal set netting as soon as possible. In the absence of regulation, Sanford and Moana have committed to give MPI 100% access to all footage for review.

Across the habitat inside the harbours, Sanford and Moana supported set net fishers to use a vessel monitoring (tracking) system by April 2017. The fishing partners also supported action to ensure set netting only happens outside the areas where dolphins swim.

The Option 5 partners support the scheduled Government roll-out of cameras on all vessels in the Māui habitat by the end of 2019.

## **Innovation in dolphin-safe gear modifications**

There is great opportunity to develop gear capable of removing threats to Māui dolphin interactions with fishers. The MSMDPP confirmed the commitment of the fishing partners to embrace and invest in science, technology and innovation to find new ways to protect Māui dolphins.

### **What we are doing**

In the dolphin habitat, Moana and Sanford are transitioning away from conventional trawl. The fishing partners are investing in dolphin avoidance and/or mitigation measures to confidently avoid harm to dolphins. This work is being reviewed by an independent science management panel.<sup>12</sup>

The fishing partners are working on several fronts to design dolphin safe trawling methods and review fishing practices. Other fishing companies have joined with technical support and funding.

Innovation takes time and investment. The Option 5 partners are engaged and working collaboratively on a range of solutions, including (among other things):

- high tech potential solutions to adapt fishing gear and reduce risk;
- real time underwater cameras;
- Dolphin Dissuader and Dolphin Interactive Devices;
- non-invasive tagging programs;
- satellite tracking; and
- aerial drone technology and thermal imagery.

## **Real Time Risk Reduction Management Measures**

The fishing partners Moana and Sanford aim to stretch and continuously improve on MSMDPP commitments. All Option 5 partners want to do more to reduce risk. Amplified monitoring, a sightings notification system, an effective 'move on' rule determined by the regulator and emergency trigger points are all essential components of Real Time Risk Reduction Management Measures.

### **Amplified monitoring**

The Option 5 partners support ongoing, continued 100% VMS coverage, and 100% observation (e-monitoring or human observation). The Option 5 partner support the full and

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<sup>12</sup> MPI are involved in appointing the independent panel. Includes international experts.

complete analysis of camera footage by the regulator using AI technology where practical, as is being done in countries like Australia.

The fishing partners commit to investigate and test systems that can be put in place to enable automatic return to port if e-monitoring equipment malfunctions.

### **Real time sightings notification system**

Sightings of Māui dolphins are critical, not just to understand their habits and behaviours more, but if made in real time and communicated to MPI instantly, could be used to alert fishing vessels and give them time to respond to mitigate risk. The Option 5 partners support implementing real time fleet notifications of real time sightings data from any credible source, to enforce the 'move on' rule to all vessels in an area.

The Option 5 partners would like the Government to commit to a formal review of the data in 18 months from the implementation of the real time sightings notification system. This new data could be used to update risk modelling and look at the current restrictions to understand if they are at the right levels. The Option 5 partners agree this may include relaxing or increasing restrictions as appropriate.

### **The Option 5 fishing partners agree to the following commitments**

Report all sightings in real time:

- Across the Māui dolphin habitat, all fishers on Sanford vessels, or catches for Sanford and Moana, or fishers landing their catch into Sanford or Moana will from October 2019 be required to report any Māui dolphin sightings (or non-sightings) and provide an accurate GPS position of the animal as soon as possible on their electronic catch reporting logbooks (refer below for Government assistance request).
- Working with Government, electronic logbook providers will be advised immediately that they have until 01 December 2019 to add a mandatory field into their software. Failure to do so will mean these systems will no longer be accepted by Sanford and Moana.
- From March 2020 the fishing partners will share all non-sightings data with MPI with the aim of improving knowledge of dolphin locations and practices on the water.

Develop a system for real-time notification of sightings and dolphin detection:

- By January 2020, the Option 5 partners will explore ways to develop a system for instant or automated notification of dolphin sightings and dolphin detection. Data will go to MPI and be instantly shared with all vessels within a to-be-determined zone, including recreational fishers.

Enable an effective 'move on' rule:

- The Option 5 partners recommend details of the scope of the 'move on' rule to be developed in conjunction with the regulator.
- The fishing partners commit to requiring all skippers on Sanford and Moana vessels be required to follow the 'move on' rule if they:
  - see or detect a Māui dolphin;
  - are advised by an observer or any other credible source of a Māui dolphin in their vicinity;
  - receive a notification from the sightings program of a Māui dolphin being in their vicinity; or

- have any other reason to believe a Māui dolphin is in their vicinity.

In the event a Māui dolphin sighting occurs:

- if the trawl net is already in the water, **hauling the net will present danger** to the Māui dolphin, therefore, the vessel will continue trawling and **not haul the net** until all Māui dolphin(s) in the vicinity are out of danger.
- if the trawl net is not yet in the water, the skipper agrees to follow the ‘move on’ rule as determined by the regulator.

Build capacity to fish in a dolphin-safe way:

- Moana and Sanford will develop a Māui dolphin-safe fishing course by April 2020 and require all fishers fishing across the Māui habitat to have completed the course by October 2020. Ongoing training on how to effectively implement the Real Time Risk Reduction Management Measures will be included to build on existing marine mammal training courses already facilitated by DOC, MPI and industry.

### **Emergency trigger points**

Sightings, capture and significant new data all represent emergency trigger points.

In the event of a Māui dolphin capture in a fishing net, the fishing partners agree:

- all Sanford and Moana vessels will immediately cease fishing within a ten nautical mile radius of the incident for 30 days.
- The fishing partners will cooperate with the regulator’s investigation of the incident and follow instructions accordingly.

The Option 5 partners recommend that the regulator should direct the immediate temporary closure/s to be implemented. Regulation should trigger a formal review of industry-wide spatial closures.

The Option 5 partners recommend a defined trigger for urgent review of the spatial protections in the case of any significant new data. What is defined as ‘significant data’ should be informed by risk assessment by the regulator. The urgent review should be undertaken by government and effectively involve relevant stakeholders.

### **Review of data, information and Real Time Risk Reduction Management Measures**

Within 18 months there should be a review of all sightings data and other relevant information to inform an update of the fisheries spatial risk assessment and to enable assessment of the effectiveness of spatial protections. If there has been any significant change in spatial distribution of fisheries risk, review of spatial closures may be justified. This review should be undertaken by Government but should effectively involve relevant stakeholders and ensure all data provided by fishing companies is used.

Any premature death of a Māui dolphin is a conservation disaster. Having an agreed process to investigate and respond to a death (either naturally or occurring as a result of human factors) is critical for all parties. Conversely, any birth of a Māui dolphin calf that survives into adulthood is a conservation success to be recorded and celebrated. We recommend the Government establishes an agreed process for doing the next dolphin population census and agrees on a way to incorporate the sightings data into the TMP and risk assessment. This is critical for all parties concerned.

## Requests to Government

- Government to regulate that all skippers be required to follow the ‘move on’ rule if they:
  - see or detect a Māui dolphin;
  - are advised by an observer or any other credible source of a Māui dolphin in their vicinity;
  - receive a notification from the sightings program of a Māui dolphin being in their vicinity; or
  - have any other reason to believe a Māui dolphin is in their vicinity.
- Government to regulate the immediate temporary closure/s in the event of a Māui dolphin capture in a fishing net. Regulation should trigger a formal review of industry-wide spatial closures.
- The Option 5 partners recommend a defined trigger for urgent review of the spatial protections in the case of any significant new data. What is defined as ‘significant data’ should be informed by risk assessment by the regulator. The urgent review should be undertaken by government and effectively involve relevant stakeholders.
- A review of all sightings data and other relevant information to be undertaken within 18 months by Government but involving relevant stakeholders and ensuring all data provided by fishing companies is used. If there has been any significant change in spatial distribution of fisheries risk, review of spatial closures may be justified.
- Government to establish an agreed process for doing the next dolphin population census and agrees on a way to incorporate the sightings data into the TMP and risk assessment.

## Sightings recommendations

- Māui dolphin sightings are of critical importance, so WWF recommends Government support and regulate all sightings initiatives.
- Government to commit to a formal review of the data in 18 months from the implementation of the real time sightings notification system. Any new data may lead to relaxing or increasing restrictions as appropriate.
- WWF recommends the Government require all human observers take part in the real-time sightings notification project and also to verbally advise skippers if they see or detect a Māui dolphin in the vicinity.
- WWF recommends to the Government that a robust sightings campaign is developed, funded and promoted along the west coast of the North Island from Cape Reinga to Wellington, and that key target audiences are encouraged to participate. WWF is willing to develop a campaign along these lines but request Government funding to support and promote.

## Spatial management recommendations

The Option 5 partners agree:

- In the Cape Reinga to Maunganui Bluff region, the Option 5 partners recommend an extension of Government-funded electronic monitoring. All Option 5 partners agree to the trawl net closure to one nautical mile, as per the Government’s TMP consultation paper.

- In the Kaipara and Manukau harbours, the Option 5 partners support the recommendation of set net closures in the additional areas of the harbour that are next to existing areas closed to all recreational and commercial set nets, to reflect the new habitat and sightings data.<sup>13</sup>
- In the Raglan harbour, partners propose the Government maintains the existing set net restrictions at the mouth of Raglan harbour.
- In the Kawhia harbour, partners propose Government implements additional research to actively build on existing science about dolphin use of this harbour. Review findings in 18 months (or sooner if the data suggests necessary).
- The Option 5 partners support the maintenance of trawl closures in all harbours.
- For trawl between New Plymouth and Cape Egmont, the fishing partners recommend no closures or interim measures. The risk assessment estimates 0.00013 deaths per year from trawl, which means closing this area will only reduce overall risk to Māui dolphins by 0.1%. WWF agree that amplified monitoring and regulated real time detection and avoidance via a ‘move on’ rule is a viable alternative to trawl closures considering trawl risk is so low in this area.
- In the Maungauni Bluff to New Plymouth region, Moana and Sanford have already committed to coastal set net restrictions to the 100m depth contour. As this is considered core habitat, WWF recommends making these restrictions a regulation and for the restrictions to be reviewed in 18 months in light of new information being provided by the Real Time Risk Reduction Management Measures and sightings information.

### Option 5 fishing partner recommendations

The Option 5 fishing partners Moana and Sanford alone recommend:

- Between New Plymouth and Cape Egmont Moana and Sanford recommend closures to seven nautical miles for set nets but **only** if the Government releases snapper 8 quota. The fishing partners commit to assisting in the transition process.

### WWF recommendations

WWF alone recommends the following further spatial changes. As Sanford and Moana have minimal or no operations in the following areas they do not wish to comment.

- From Cape Egmont to Hawera, WWF recommend Government put in place a four nautical mile closure to set nets with all risk reduction measures in place and commit that real time sightings will trigger the ‘move on’ rule. WWF recommend another formal review of the data from the area in 18 months (or earlier if the data suggests necessary). We also recommend the Government prioritises transitional support for set net fishers in this area. For trawl nets, recommend complimenting the current restrictions with Real Time Risk Reduction Management Measures. WWF

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<sup>13</sup> <https://www.doc.govt.nz/globalassets/documents/conservation/native-animals/marine-mammals/maui-tmp/mauis-tmp-discussion-document-full.pdf>

recommend Government extends electronic monitoring into this area, including the use of AI to monitor footage in real time (or as close to real time as possible).

- From Hawera to Wellington, WWF recommend Government regulate a four nautical mile closure to set nets with all risk reduction measures in place and commits that real time sightings of dolphins trigger the 'move on' rule. We recommend another formal review of the data from the area in 18 months (or earlier if the data suggest necessary). WWF recommends a two nautical mile trawl net ban in this Māui and Hector dolphin corridor to allow safe passage. WWF recommend Government extend electronic monitoring into this area, including the use of AI to monitor footage in real time (or as close to real time as possible).
- WWF supports closure to set nets out to four nautical miles in the Maunganui Bluff to Cape Reinga **only** if there is a clear transition plan for the (approximately six) fishers in this area.
- In the Aotea harbour, WWF recommends the area remain closed to commercial set netting and closure also be extended to the recreational fishing sector.
- Between New Plymouth and Cape Egmont, WWF recommends closures to seven nautical miles for set nets, and that Government provides a clear and effective transitional plan for all affected commercial set net fishers. Set net still pose a risk to Māui dolphins in this area and protection out to seven nautical miles will reduce the overall risk by 11%<sup>14</sup>.

## Different recommendation

In the region between the Maunganui Bluff and New Plymouth, the Option 5 partners make different recommendations on spatial changes:

- The Option 5 fishing partners Moana and Sanford recommend a restriction of trawling to beyond four nautical miles.
- WWF recommends a restriction of trawling to beyond seven nautical miles.

In this area the Option 5 partners all recommend a defined trigger for review of any spatial protections in the case of any new significant data<sup>15</sup> or by 18 months (whichever comes first) and for restrictions to be updated based on the data.

## Transitioning

The Option 5 partners all agree that transitioning fishers need support. Since the implementation of the MSMDPP there are fewer set net fishers operating in the core area, and the fishing partners have worked to assist in transition solutions. Remaining fishers may need additional support to transition away from coastal set netting. Fishers that are being pressured to cease set netting in areas outside of the core Māui habitat are likely to contribute very little to risk reduction. It is fair and right these fishers are compensated.

- The fishing partners request Government to bring forward a Snapper Total Annual Catch review. Fishers transitioning to dolphin-safe fishing are being blocked, by not

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<sup>14</sup> <https://www.doc.govt.nz/globalassets/documents/conservation/native-animals/marine-mammals/maui-tmp/mauis-tmp-discussion-document-full.pdf>

<sup>15</sup> 'significant new data' is informed by a risk assessment by the regulator

having catching rights for the key species they are more likely to catch when using trawl nets or a longline than their current set net. The main choke species inhibiting transitioning along the West Coast of the North Island is snapper. Scientific research over the last two years<sup>16</sup> conclusively agrees there has likely been a fivefold increase in snapper biomass in the dolphin habitat.

- The Option 5 partners request Government work proactively with all fishers and affected businesses to support transitioning. Any trawling deployed by Moana and Sanford will be using a dolphin-safe method by December 2022. The fishing partners are committed, with Government support, to remove all dolphin-unsafe net fishing from the Māui dolphin habitat and all Option 5 partners urge Government to support others involved in trawling to do the same. The Option 5 partners believe it is essential we support a process where Government engages with set netters on a transitioning process.

## Other threats to Hector's and Māui dolphins

As well as toxoplasmosis and fisheries risks, several land-based impacts (and impacts related to both offshore and onshore mining and exploration) impact the Hector's and Māui dolphins and their habitats. We consider these impacts in greater detail in Appendices 2 and 3.

### Key land-based impacts

#### Pollution

Sedimentation, contaminants and pollution from land-based threats accumulate and compound, degrading the health and productivity of the entire marine environment. This in turn affects Hector's and Māui dolphins' overall health, their ability to reproduce and survive into adulthood – and to be resilient to disease.<sup>17</sup>

#### Climate change

Hector's and Māui dolphins may be adversely affected by changes in their habitats from increasing water temperatures, marine heat waves, turbidity, acidification and food source movement. All these changes can arise from climate change.

#### Plastics

If dolphins eat plastics, it can result in reduced nutritional uptake, damage to their digestive systems, exposure to toxic chemicals and it potentially changes to their behaviour patterns. Micro plastics can be a major problem for marine ecosystems as fish eat the small particles.

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<sup>16</sup> Adam Langley, CPUE SNA8 analysis; WCNI trawl survey 2018

<sup>17</sup> Weir, J. (2018). Review of Hector's and Māui dolphin diet, nutrition and potential mechanisms of nutritional stress. Report written for the Department of Conservation and WWF-New Zealand.

## Requests to Government

- Increase funding for effective community initiatives to improve the water quality of the Waikato river. This should include the Waikato Waipā Restoration Strategy, which enables restoring wetlands so they are able to perform their water purification role and managing highly erodible land through native or exotic reforestation and retirement of marginal lands.<sup>18</sup>
- Expand riparian fencing and planting to filter water entering waterways and explores opportunities to use the Provincial Growth Fund for funding the planting of riverbanks.
- Fund and coordinate efforts to manage plastic pollution. This should include improving the design and capability of municipal waste management systems, including the collection, transportation and storage of plastics, as well as recycling.
- Enable the isolation of plastic fragments from the washing of synthetic clothes and synthetic rubber tire fragments, which together account for more than two thirds of the primary micro plastic now flowing into the ocean.
- Further develop and improve habitat modelling, so it more effectively represents the dynamic changing environment and updates the modelling regularly.
- Pass a fair, ambitious version of the Zero Carbon Bill to set a net zero emissions goal by no later than 2050.

## Threats from the oil, gas and minerals mining industry

The major threats from the oil, gas and minerals industry to the Hector's and Māui dolphins are from seismic surveying and seabed mining.

Seismic surveying can physically harm Hector's and Māui dolphins and even cause death.<sup>19</sup> There are also a wide range of non-lethal effects, both direct and indirect, that may affect the health and growth of the Hector's and Māui populations.<sup>20</sup> Seabed mining (such as the operation proposed by Trans-Tasman Resources in the southern range of Hector's and Māui dolphins) may pose significant disturbance to Hector's and Māui dolphins and cause habitat degradation (through constant underwater noise and sediment plumes for the 35-year period of the proposed operation).<sup>21</sup>

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<sup>18</sup> Neilson, K., Michelle Hodges, Julian Williams and Nigel Bradly (2018). Waikato Waipā Restoration Strategy. Waikato Regional Council in association with DairyNZ and Waikato River Authority <https://waikatoriver.org.nz/wp-content/uploads/2018/05/Waikato-Waip%C4%81-Restoration-Strategy.pdf>

<sup>19</sup> Lucke, K., D. Clement, V. Todd, L. Williamson, O. Johnston, L. Floerl, S. Cox, I. Todd, and C.R. McPherson. 2019. Potential Impacts of Petroleum and Mineral Exploration and Production on Hector's and Māui Dolphins. Document 01725, Version 1.0. Technical report by JASCO Applied Sciences, Cawthron Institute, and Ocean Science Consulting Ltd. for the Department of Conservation, New Zealand.

<sup>20</sup> Lucke, K., D. Clement, V. Todd, L. Williamson, O. Johnston, L. Floerl, S. Cox, I. Todd, and C.R. McPherson. 2019. Potential Impacts of Petroleum and Mineral Exploration and Production on Hector's and Māui Dolphins. Document 01725, Version 1.0. Technical report by JASCO Applied Sciences, Cawthron Institute, and Ocean Science Consulting Ltd. for the Department of Conservation, New Zealand.

<sup>21</sup> <http://kasm.org.nz/stopsandmining/assets/Opening-Submissions-kasm-final.pdf>

WWF believe New Zealand's current regime is inadequate to protect the highly vulnerable Hector's and Māui dolphin populations from the impacts of seismic surveying and seabed mining. The regime needs to be strengthened. But in the short term, immediate precautionary management needs to be put in place [see Appendix 3].

### **WWF's requests to Government**

The following recommendations are made by WWF alone.

- Extend the Marine Mammal Sanctuaries to create spatial protection of threats from oil, gas and mineral mining throughout the habitats of the Māui and Hector's dolphins, and the Māui – Hector's dolphin corridor (transition zone) south of New Plymouth to Wellington.
- Prohibit sand mining in the extended Marine Mammal Sanctuaries, including from areas where there are existing permits.
- Prohibit seismic surveys in the extended Marine Mammal Sanctuaries, with a buffer zone to ensure sound entering the sanctuary is below defined noise exposure thresholds to ensure it will not threaten or slow the recovery of the Hector's and Māui dolphin populations. Existing permits should not be exempt from prohibition.

# Governance and research

The current state of the Hector's and Māui dolphin populations is symptomatic of a number of key challenges. These include:

- the number and diversity of risk factors impacting their health and habitats (as outlined in this document);
- the complex legislative and governance frameworks that exist to manage these risk factors and the lack of a coordinated response; and
- the lack of knowledge, science and understanding of these species, their behaviour and their habitats.

To ensure the best possible outcome for the dolphins (and the individuals and communities potentially affected by the necessary changes) the Government must clarify and improve this landscape.

## Complex governance and lack of coordination

These challenges, and their management, currently fall in the scope of multiple government ministries, departments and key stakeholders. The legislative framework results in delays, roadblocks, lack of coordination and an inability to react quickly. A coordinated response is required to ensure the recovery of Hector's and Māui dolphin populations and their habitats.

The Government must urgently work to understand what should be done. Any solution must be independent from and sitting over and above existing structures and agencies. This response needs to provide the ability for the full picture to be understood, for action to be coordinated, and provide accountability. The Government must commit to putting the appropriate framework in place.

## Requests to Government

The Option 5 partners believe it is critical that an independent, decision-making authority be put in place to expedite effective action for Hector's and Māui dolphins. The following recommendations are given with that intention:

- We request the Government establishes an independent **Commissioner for the Marine Environment** to oversee a review of the governance landscape, spearhead the changes needed to ensure the recovery of these dolphin species (and the health of the marine environment generally) and help transition individuals and communities affected.
- Alternatively, we call on the Government to ask the Parliamentary Commissioner for the Environment to investigate the 'big picture' and provide recommendations to Government. This investigation should happen urgently and include:
  - The efficacy of the legal regime provided by existing legislation – particularly the Fisheries Act 1996 and Regulations, the Conservation Act 1987, the Marine Mammals Protection Act 1978, the Marine and Coastal Area (Takutai Moana) Act 2011, the Crown Minerals Act 1991 and Regulations, among others. Particular

scrutiny must be given to management of complex ‘mountains to the sea’ issues such as toxoplasmosis as well as cumulative land-based impacts.

- Consideration of how the current legal regime interacts and how to streamline and remove complexity to ensure the clearest process and best outcomes.
- Consultation with local and international expertise, through sector-based focus groups and individual interviews. This recommendation is given with the caveat that getting all the experts around the table has not worked so far for our dolphins – now is the time for swift and decisive action.
- Advice to Government on the best structure for a coordinated response – whether an independent **Commissioner for the Marine Environment**, or a different approach, using new or existing structures and frameworks.
- Consideration of establishing other potential measures, with the goal of safeguarding the Māui and Hector’s dolphins by increasing the quality of freshwater and marine habitats.

## More science required to inform effective management

Not enough is known about Hector’s and Māui dolphins, their habitat and their movements. A comprehensive research program is required to build the science required for effective conservation. We recommend a more well thought out and strategic planning process to build a comprehensive five- to ten-year research plan. As set out in Appendix 4, the research plan must:

- build understanding about Hector’s and Māui populations (size, trend, age structure and health) through epigenetic aging and genetic recapture studies;
- build science about dolphin distribution, through acoustic studies, public sightings in low dolphin density areas, electronic/ GPS tagging to understand habitat use and to enable health assessment, and drone technology;
- improve the risk assessment model through:
  - a. improving the accuracy of fishing effort;
  - b. the estimate of catchability for different fisheries and gear types;
  - c. better accounting for environmental variability in habitat modelling;
  - d. improving understanding of the relationship between the dolphins and environment.
- and develop effective dolphin bycatch mitigation options, including a project to test and develop effective dolphin deterrent devices for trawl – and trawl nets that can detect and instantly release a dolphin alive.

## Requests to Government

- The Option 5 partners request the Government boosts funding for science. There are multiple priorities. The existing arrangements for prioritizing research are ineffective and too slow.
- The Prime Minister’s Science Advisor should investigate and report on the current state of science about Hector’s and Māui dolphins and their habitats – and advise on priorities for a five-year research program. This report should be done by the end of 2019. The Government must commit to act swiftly on this advice and implement the research programme.

## Further actions agreed by the Option 5 partners

- The Option 5 partners believe all New Zealanders have a part to play in increasing knowledge and understanding of these dolphins and their habitats. A number of recommendations put forward in the fisheries section of this document rely on real-time sightings data, which is not currently available. The efficacy of these management measures is dependent on gathering the maximum number of dolphin sightings practicable to enable fishers to move out of the way.
- We acknowledge that time is of the essence, and we will immediately take action to identify key research needs, facilitate and partner with anyone relevant to develop research, innovations and technology, and to work to facilitate funding for research via various sources (such as corporate sponsorship, crowdfunding, philanthropic sources, grants and any other possibilities).
- WWF will partner with the Māui 63 Charitable Trust<sup>22</sup> to expedite aerial drone surveillance and habitat monitoring. This will inform marine conservation with the ultimate objective of having drones in the sky constantly, providing real-time footage and information about the location of every single Māui dolphin.
- WWF will identify and work with partners where possible to expedite dolphin health survey work, electronic DNA analysis, acoustic modelling, tagging and any other technologies that help in building the most robust understanding of Māui and Hector's Dolphin habitat possible.
- When the recommendations of the Parliamentary Commissioner for the Environment and the Prime Minister's Science Advisor are acted upon by Government, we will support and streamline their research efforts.

## Changing the way we live: ensuring the wellbeing of people who depend on fishing

*'In fifty years' time, I hope we can look back and say we took on the greatest environmental challenge of our time ... and we won. We just changed the way we live [...] that we fundamentally transitioned our economies and that we are all the better for it.'*

*Jacinda Ardern, Our Planet: Visionary, 2018*

Each of the options proposed in the Government's consultation document involves the restriction or closure of fishing grounds, reductions in the number of fishing permit holders, loss of revenue, and affects both lives and livelihoods. The consultation document estimates hundreds of potential fishers impacted, and hundreds of millions of dollars lost from regional economies. It does not, however, set out a course of action to ensure the fishers, their families, the processing facilities and the wider communities they sustain are effectively supported in that change process.

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<sup>22</sup> a project being currently developed by Associate Professor Rochelle Constantine, University of Auckland (2019)

*‘If the Government doesn’t handle this well, there’ll be dead fishers on their hands. People are really stressed, but hopelessness is the dangerous one.’ – Anonymous fisher speaking to WWF, July 2019*

Given the significant association between rurality and suicide,<sup>23</sup> particularly in remote and economically depressed rural areas with access to lethal suicide methods and limited availability of mental health services, ensuring a fair transition out of the fishing industry is not only required to save dolphins, but also human lives.

In the context of the Government’s well-being budget, future of work programme, and prioritisation of regional development, it is critical all those depending on fishing for their livelihoods are supported so they can survive and thrive, while Māui and Hector’s dolphins can survive and thrive too.<sup>24</sup>

The Government’s current work to ensure a just transition given the climate emergency is a useful exemplar for how to justly transition the fishing industry. This, however, requires dedicated staff and an appropriate level of funding.

## **Possible impacts**

Without support from the Government, impacts could have a ripple effect across regional economies. These impacts would be felt particularly in small communities and towns in the regions. As the 2017 BERL report<sup>25</sup> shows, supporting fishers to transition and stay on the water where possible significantly lowers the overall cost to the economy.

If the Government closed the fisheries in the dolphin habitat, there would be cultural impacts to consider, in addition to the human and economic impacts. Māori customary rights to fishing and fisheries (recognised by the Crown in the Māori Fisheries Settlement 1992) may be directly and significantly affected and could have the effect of extinguishing settlement assets.

There are different views of te ao Māori and multiple sources of mātauranga Māori. Therefore, ensuring a just transition for iwi and Māori fishers means enabling tangata whenua who fish in the dolphin habitat to engage meaningfully in decision-making, while jointly developing and implementing fishing management actions. While a failure to achieve this may negatively affect perceptions of the global ‘New Zealand Inc’ brand, more importantly it would represent a failure to address the needs of a group of New Zealanders. The Option 5 partners believe this is simply not good enough.

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<sup>23</sup> Explaining Patterns of Suicide. A selective review of studies examining social, economic, cultural and other population level influences. Report 1: Social Explanations for Suicide in New Zealand. Ministry of Health, December 2005, available online at: <https://www.health.govt.nz/system/files/documents/publications/explainingpatternssof suicide.pdf>

<sup>24</sup> <https://www.mbie.govt.nz/assets/b1947380f4/just-transition-to-low-emissions-economy-strategic-discussion-cabinet-paper.pdf>

<sup>25</sup> [http://awsassets.wwfnz.panda.org/downloads/berl\\_report\\_transitioning\\_to\\_alternative\\_fishing\\_methods\\_off\\_new\\_zealands\\_west\\_coast.pdf](http://awsassets.wwfnz.panda.org/downloads/berl_report_transitioning_to_alternative_fishing_methods_off_new_zealands_west_coast.pdf)

# Requests to Government

## Principles underpinning a just transition for people who depend on fishing

We recommend the Government applies the principles of a just transition where appropriate. Doing so means Government measures taken to protect our dolphins must:

- be coherent with Government policy in other sectors
- enable the objectives of the Wellbeing Budget 2019
- protect people and communities near the dolphin habitat.

While this is not a reason to apply these principles in its own right, doing so appropriately will enhance perceptions of the 'New Zealand Inc.' brand internationally. Locally, it is likely to be seen as a positive and fair response. The Option 5 partners will work actively to support such a move.

## Applying the principles

A just transition will be different for each affected person and their associated communities. Determining how best to support those affected will require individualised solutions. These are real people, real communities. It is crucial the Government responds to this with kindness, empathy and genuine support. A standardised process with inadequate resources simply will not work.

The Government could provide individualised solutions such as:

- making more ACE available by increasing TACC to facilitate the wider distribution of ACE amongst fishers which will enable transitioning to dolphin safe methods.
- resourcing changes to dolphin safe fishing methods, including research, new tools and techniques and hardware upgrades;
- providing sound and appropriate recruitment and re-training opportunities for fishers without work;
- income support and help in finding alternative livelihoods; and
- access to mental health services and the implementation of proven suicide risk-reduction strategies for the most vulnerable individuals and communities.

*'The Government proposals would push us off the edge, literally out into the canyon, the real deep. There is no way we can catch our ACE out there. I and three other boats would be out of business for sure'. - Anonymous fisher speaking to WWF, July 2019*

The Option 5 partners believe affected individuals need to be able to fully and equally participate in the just transition. The first step in identifying the required individualised solutions is a multiparty dialogue between the Government, affected fishers, iwi, hapu, fishing companies and the public. The cost of transition cannot be borne by one community or one sector. Good resources to help with a multiparty dialogue are provided by the Just

Transition Centre<sup>26</sup> and principle 2 of this resource from the New Zealand Council of Trade Unions.<sup>27</sup> This multiparty dialogue needs to be a conversation that genuinely includes affected people, not a conversation about them. Fishing companies can provide useful guidance in how to keep people on the water, and in finding and financing new opportunities. Tangata whenua have a critical role in guiding transition in accordance with matauranga Māori. Civil society and NGOs also have a critical role to play in both speaking out for the dolphins and unlocking new innovations as well as the opportunities represented by communications and fundraising innovations such as crowdfunding.

*'I've got a skipper and a deckhand. They're young, one has a young family. They'll need a job. They've got skills in fishing but they're going to need something else.'* – Anonymous fisher speaking to WWF, July 2019

Importantly, a just transition requires supporting fishers to stay on the water where possible, or supporting them into good jobs if they can't keep fishing.

*'Fishing is in my blood.'* – Anonymous fisher speaking to WWF, July 2019

Where possible, the Option 5 partners recommend the Government keeps fishers on the water. Where this isn't possible, we recommend the Government provides support to affected fishers to help ensure a successful and positive move to new employment opportunities. It's important the Government recognises fishers won't be able to move into a new career overnight – and they will require support. Fishers' human and labour rights and needs must also be respected.

*'The four local operators would need to be bought out. I'm close to 70 years old and I've been building up my business over the last 5-10 years, hoping to sell it for my retirement. I've invested hundreds of thousands into refitting my boat, new nets, trailer. The Government needs to buy my boat and help pay out my earnings for the next few years to give me something to retire on.'* – Anonymous fisher speaking to WWF, July 2019

**The Option 5 partners are committed to a just transition for the affected fishing industry. We stand ready to work with the Government to make this happen.**

We are acting now, but this transition needs Government action too. The fishing partners have committed that any trawling they deploy in Māui habitat will be Māui-safe by December 2022. We are committed with government support to remove all dolphin-unsafe net fishing from Māui habitat and urge government to support others involved in trawling to also transition to dolphin-safe methods.

We are also working on dolphin safe trawling with Precision Seafood Harvesting. Across the Māui habitat the fishing partners agreed to support a process whereby government engages with set netters on a transitioning process.

WWF has interviewed samples of fishers in Timaru and Kaikōura, and met with individual fishers at key locations within Māui habitat, to explore possible transition options. The

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<sup>26</sup> [https://www.ituc-csi.org/IMG/pdf/just\\_transition\\_-\\_a\\_business\\_guide.pdf](https://www.ituc-csi.org/IMG/pdf/just_transition_-_a_business_guide.pdf)

<sup>27</sup> <http://www.union.org.nz/wp-content/uploads/2019/02/JustTransition.pdf>

Endangered Species Foundation has met with a number of affected fishers, and is happy to lend its expertise and resources to unlock crowd-funding to support people through this transition.

But we can't do this alone. We need the Government to work with us to make sure this is a just transition for people and communities who depend on fishing.

### **Resourcing the Transition**

Resourcing a just transition will require a dedicated unit (consisting of a cross-sector group) hosted within an existing Government agency or led by the proposed Commissioner for the Marine Environment.

The Option 5 partners are ready, able and willing to work with such a unit. We recommend the Government consider secondment opportunities for appropriate-level staff members to lend expertise from the MBIE Just Transitions Unit.

## **Conclusion**

Our native dolphins are precious. Our people are precious. The time for action to help Māui and Hector dolphins and people survive and thrive is now.

Sanford, Moana and WWF are committed to taking our partnership even further to protect our dolphins and our people – but we can only do this with the Government's help. We need to all move forward together to make this possible.

We, the Option 5 partners believe the action plan we have presented is the start of a robust way forward for industry, NGOs and the Government to work together for a better New Zealand.

The Option 5 partners stand by: ready, willing and able to discuss this action plan with Government, the Endangered Species Foundation and anyone else who wants to help find solutions for Hector's and Māui dolphins and New Zealanders.

*WWF wishes to record that the following appendices were compiled by WWF and do not reflect the opinions/views of Sanford and/or Moana.*

## **Appendix 1**

### **Stories from fishers – what are they facing, what does effective transitional support mean?**

An anonymous fisher:

*'If the Government doesn't handle this well, there'll be dead fishers on their hands. People are really stressed, but hopelessness is the dangerous one.'*

The partners in this submission talked with fishers from different locations potentially impacted by the spatial protection measures proposed in the Government's discussion document.

Our purpose in these conversations was to build understanding of the situation people are in, how they'd be affected and if there are any ways they could transition to dolphin-safe fishing. Where people felt they had limited options for transition, we asked them what kind of support might help them navigate the change and mitigate impact on them, their families and communities.

This appendix summarises what we learned.

#### **The potential impacts of spatial fisheries closures on fishers**

Economic impacts will be different for each person affected. Some may lose their ability to fish. Others may find fishing difficult and costly as they move to a new area or use different gear.

One fisher from Kaikoura explained:

*'The Government proposals would push us off the edge, literally out into the canyon, the real deep. There is no way we can catch our ACE<sup>28</sup> out there. I and three other boats would be out of business for sure.'*

Besides the economic impacts of fisheries closures, there would also be cultural impacts. Fishing is more than just an economic activity for the Timaru fishing community. It is a way of life.

*'My whole family – for three generations have been fishermen here.'*

*'We love fishing. We couldn't do anything else.'*

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<sup>28</sup> Annual catch entitlement  
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Taking care of the marine environment and doing everything possible to avoid harming dolphins is also central to local fishing culture in Timaru:

*'If I thought I was a threat to dolphins, I'd be the first to burn the nets.'*

### **Transition options**

Dolphin-safe methods (including long-lining and potting) may be viable in some places, for some people, but not others. For example, for one fisher on the West Coast North Island, transition to longlining is possible as long as he can get the ACE.

*'Sanford is trying to help us by making snapper ACE available. I can trade my kingfish quota to Sanford, for the snapper quota I need to do more longlining.'*

Some need financial support to be able to switch gear types.

*'While I've never seen a Māui dolphin, I know my nets pose some risk to them. I'd stop set netting now if the Government would assist me, but if I stop, I can't pay my bills. If I can get some assistance to get out of immediate debt, then I could set up for longlining. I would need about another 15-20 tonne of Snapper Annual Catch Entitlements (ACE) at a realistic rate. At the moment, the price of snapper ACE is \$6-7/ kilo, this needs to come down to \$3-\$4 kilo for it to be realistic.'*

Others feel their options are limited. For example, in Timaru, the particular character of the fishery limits options.

*'The mix of species, volume of fish and available quota means fishing past four nautical miles becomes more and more difficult until the economics would make it impossible.'*

*'Fishing further out is too dangerous for our small boats.'*

### **Ecological effects of transition**

Fishers highlighted that in some cases, transition to dolphin-safe fishing may have negative consequences for the environment. For example, in Timaru – transition to longline would result in catch of larger female rig. These are the breeders, often full of pups – which would devastate the population. However, some impacts can be mitigated:

*'If I move to more longlining, there is more risk of sea bird bycatch, but with MPI's help, I've got seabird bycatch down to almost zero.'*

### **What kind of support do people need? What does effective transition mean?**

For some people, effective transition means direct financial assistance.

*'The four local operators would need to be bought out. I'm close to 70 years old and I've been building up my business over the last 5-10 years, hoping to sell it for my retirement. I've invested hundreds of thousands into refitting my boat, new nets, trailer. The Government needs to buy my boat and help pay out my earnings for the next few years to give me something to retire on.'*

Others may need retaining and help into a new industry.

*'I've got a skipper and a deckhand. They're young, one has a young family. They'll need a job. They've got skills in fishing, but they're going to need something else.'*

Some people also need crisis counselling and professional emotional support.

*'If the Government doesn't handle this well, there'll be dead fishers on their hands. People are really stressed, but hopelessness is the dangerous one.'*

## **Appendix 2**

### **Land based impacts on the Māui dolphin habitat**

The quality of the Māui dolphin habitat (and the health of the West Coast marine environment) is also affected by a host of land-based impacts – including sedimentation, disease and pollution coming from our town, cities and farms.

#### **The problem**

Land-based threats accumulate and compound, degrading the health and productivity of the marine environment. This in turn affects the food of Māui dolphins and their overall health and ability to reproduce. Māui and Hector's unique physiology (small body, big brain and large calves dependent on milk for a long time) means they have huge energy requirements. The dolphins have to forage and feed all the time. If they don't get enough food at the right time, they will not produce as many healthy calves and will be less resilient to disease. [1]

The Waikato River is the major source of land-based impacts into Māui dolphin habitat. Māui dolphin like turbid/cloudy water. This is where their prey is, and they can hide from predators in such water. As a result, most of the Māui dolphin population is swimming and living in the outfall of the Waikato river.

Water quality of the lower Waikato River is poor. Concentrations of nitrogen, phosphorous and sediment increase in the downstream reaches. Using data from 2007, the Ministry for the Environment ranked the state of all sites in NIWA's National River Water Quality Network. When the nitrate, total nitrogen, dissolved reactive phosphorus and total phosphorus were combined, the Waikato River at Hamilton ranked low at 60 out of 77 sites and downstream at Rangiriri it ranked 70.[2]

#### **Toxoplasmosis**

Toxoplasmosis was identified in the Government's 2019 TMP consultation document as a significant cause of mortality in Māui dolphins.

Toxoplasmosis has also been identified as a significant cause of mortality of the endangered Californian sea otter[X1], Hawaiian monk seals [X2] and Caspian seal [X3].

Toxoplasmosis is transmitted from feral cats into Māui dolphin by toxoplasmosis oocysts being washed from cat faeces into waterways and then out to sea – where they are ingested by Māui dolphin in their food or in water. There are no known vaccines or treatment that can be applied to wild marine mammals.

The route of infection is likely to have been exacerbated by the reduction in the extent and quality of riparian vegetation and wetlands, particularly in the Waikato Basin and lower Waikato River, and the reduction of instream filtering systems that previously would have had much greater capacity to strain particles such as the oocytes from water. Spatial modelling of toxoplasmosis suggests the Waikato River is likely to be the major source of the disease. [3]

## **Sedimentation**

Sediments produced by erosion can choke estuaries and blanket benthic habitats, harming important fish nursery grounds such as sea grass and shellfish beds. This all affects the health and productivity of the marine environment.

Sedimentation/runoff affects water clarity levels. This could impact prey species and the dolphin's ability to locate prey. NIWA's habitat model identifies turbidity/water clarity as a key predictor of dolphin presence.<sup>29</sup> The dolphins prefer a certain range of water clarity/turbidity. Above and below this range of water clarity/turbidity, dolphins aren't found nearly as frequently. Therefore too much sedimentation makes the habitat less suitable.

The major source of sedimentation into the habitat of Māui dolphins comes from the Waikato river and the Waipā River (which feeds into the Waikato river).[4] The sediment comes from erosion of alluvial and volcanic soils from stream beds, banks and terraces throughout the catchment. Farming and forestry practices can increase erosion, unless well managed.

## **Agricultural runoff and other pollutants from land**

Pollutants (such as trace metals) enter the coastal environment from land. These pollutants have wide ranging impacts on the marine environment health.<sup>30</sup> High nutrient concentrations from intensification of agricultural land use are within the Waikato River catchment.[5] Both Hector's and Māui's dolphins have higher than expected concentrations of organochlorine pesticides present than those found in New Zealand, United Kingdom or Australian common dolphins.[6] This is likely to be because Māui and Hector's are a near-shore coastal species, living closer to sources of pollution.

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<sup>29</sup> The main theories on why they prefer turbid waters (but not TOO turbid) is because 1) that is where their ideal prey are found/what they prefer and/or 2) they use these areas for protection/to be more hidden from predators, in particular when they have calves with them (Weir, J. pers comms. 22 July 2019.)

<sup>30</sup> Chandurvelan et al. (2016); Shahidul Islam and Tanaka (2004).

## Storm water and sewerage

Sewage effluent causes contamination of marine wildlife along coastlines.<sup>31</sup> The Waikato River has high contaminant levels from urban stormwater runoff and sewage treatment plants (Waikato Regional Council, 2017a). Raglan also has waste treatment and disposal issues and the community is concerned about the impact on Māui dolphins and their habitat.[7]

## Plastics

Research indicates around a quarter of a million tonnes of plastic debris is floating in the ocean worldwide.<sup>32</sup> Over 690 marine species have been reported as 'impacted by marine litter'.

Around 98% of primary microplastic pollution is from land-based sources, particularly rivers, roads, runoff, storm water and wastewater discharge. Municipal systems for waste disposal and wastewater treatment are simply not up to dealing with the scale of the problem.

Microplastics are similar in size and mass to many types of plankton and other food items for fish. Fish eating plastics can lead to the fish having reduced nutritional uptake, damage to fish digestive systems and toxic exposure. Plastic then moves up the food chain from fish to dolphins.<sup>33</sup>

## Climate change and Māui dolphins

Climate change is causing an increase in marine heat waves, potentially having an impact on Māui and Hector's dolphins particularly through impacts on the quantity and distribution of their prey. For example, during the marine heat wave of 2018, far fewer Māui dolphins were found in their usual core habitat during boat-based surveys over in Jan-Feb 2018. Only 19 Māui dolphin groups encountered, and they were dispersed far more widely (from north of Muriwai to South of Port Waikato), compared with 48 groups of dolphins found in 2017- which were all in a small area near Hamilton's or Cochrane's Gaps.<sup>34</sup>

Other climate change effects may include increase in turbidity in some areas and decrease in others. Turbidity looks to be one of the strongest drivers of dolphin distribution, therefore habitat modelling should be updated regularly and more effectively represent the dynamic changing environment.

## Recommendations for managing land-based impacts

The number and geographic spread of the origins of land-based impacts mean that we need to be holistic about how we act to enable Māui to recover. This means taking action on several fronts: managing problems at their source, stopping contamination and sediment getting into the

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<sup>31</sup> Al-Bahry, et al. (2009).

<sup>32</sup> Eriksen Marcus et al. (2014)

<sup>33</sup> Eriksen Marcus et al. (2014)

<sup>34</sup> Baker et al. (2018)

waterways, and restoring the capacity of the waterways and aquatic communities to absorb contaminants and sedimentation, all before they get to the marine environment.

We recommend government target finding to support the local communities that are doing so much to rectify New Zealand's water quality problems. Expanding initiatives to restore wetlands where they will have the most impact on settling sediment, trialling new approaches such as Kaitiakitanga and Manaakitanga, biofilters, and seagrass meadow restoration together with responsible cat ownership and removal of feral cat populations will all help in absorbing toxoplasmosis, sediment capture and reducing water contamination before they get to the sea. A key area is the Waikato Waipā where there is already a lot of great work going on nurtured by the Waikato Waipā Restoration Strategy which enables restoring wetlands so that they are able to perform their water purification role, and managing highly erodible land through native or exotic reforestation and retirement of marginal lands.[10]

## **Management actions to control the influx of sediment, nutrients and contaminants**

### **Increasing the mauri and health of wetlands**

Studies show that wetlands and healthy estuaries can absorb contaminants including toxoplasmosis. Wetland and estuarine vegetation helps by slowing down the water flow allowing time for settlement and absorption and provides structures in the water that can remove toxoplasmosis through straining and adhesion processes, such as attachment to biofilms.[8] Historically, wetlands (including large stands of kahikatea) covered 42,800ha of the Waikato catchment. Today, only 1.3 percent remains.[9] Work to protect, restore and expand the remaining wetlands should be a high priority for the Māui dolphin TMP.

### **Expanding riparian planting efforts**

Working with existing initiatives, landowners and communities to promote riparian fencing and planting to filter water entering waterways and explore opportunities to utilise the Provincial Growth Fund for funding the planting of river banks.

Key groups in this area are the New Zealand Forest Owners Association, Fonterra and the Million Meters project and the Waikato River Authority

## **Management actions to restore the capacity of Waikato catchment to absorb and settle sediment, contaminants and toxoplasmosis**

### **Restoring natural water filtration communities**

A number of freshwater fauna feed by filtering micro-organisms from water, but as water quality has declined these communities are much reduced. One key species is the kākahi freshwater mussel and a key activity is working with freshwater groups to restore kākahi beds in priority waterways.

The final filter of freshwater before it enters the sea is the estuarine shellfish and eelgrass beds. Again, these have been much depleted and working with coastal communities and local government to begin restoring these very important communities that are a cornerstone to nearshore marine life and kohanga for important species such as snapper.

## **Working with other organisations, communities and people**

Achieving this work will be impossible without the support of a number of organisations, communities and people. Working with Iwi and hapū, MPI, DOC, Northland, Auckland and Waikato Regional Councils, the many territorial authorities, researchers, community groups and landowners towards the goal of safeguarding the Māui dolphin and increasing the quality of freshwater and marine communities.

Other key partnerships will be Waikato River Authority, Billion Trees, Trees That Count, Million Metres, Pest Free NZ, Fonterra, forestry companies, NZ Veterinary Association, SPCA NZ and Biosecurity NZ, Whakaupoko, Wairoa, and Awhitu Landcare Groups.

The work in this section will also provide other benefits such as protecting wild bird populations in areas where feral cats are removed and increasing habitat quality for freshwater and inshore marine life which will also increase the food available to coastal communities.

## **Management of plastics pollution**

In the absence of a legally binding agreement to combat plastic at its sources, one practical step to keep more plastic out of the marine environment would be to improve the design and capability of municipal waste management systems. Such innovation should include the capability to isolate fragments from the washing of synthetic clothes and synthetic rubber tire fragments, which together account for more than two thirds of the primary microplastic now flowing into the ocean. It should also think about how and where we collect, transport, store and process plastic for recycling.

## **Recommendations re: climate change**

- Further develop and improve habitat modelling so that it more effectively represent the dynamic changing environment, and update it regularly.
- Pass a fair, ambitious version of the Zero Carbon Bill to set a net zero emissions goal by no later than 2050
- Maintain the closure of new offshore oil exploration permits

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[2] NIWA, (2010); Vant (2010).

[3] Roberts et al. (2019)

[4] Approximately two-thirds of the sediment load to the lower river comes from the Waipā catchment via the Waipā River and this is now the main contributor to the turbidity in the lower Waikato main stem. (Neilson et al. 2018)

[5] Vant, 2010.

[6] Stockin, K.A., R.J. Law, P.J. Duignan, G.W. Jones, L. Porter, L. Mirimin, L. Meynier, and M.B. Orams. 2007. Trace elements, PCBs and organochlorine pesticides in New Zealand common dolphins (*Delphinus sp.*). *Science of the Total Environment* 387(1): 333-345.  
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[8] Shapiro et al. (2010)

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[X4] [https://www.nzherald.co.nz/lifestyle/news/article.cfm?c\\_id=6&objectid=11694903](https://www.nzherald.co.nz/lifestyle/news/article.cfm?c_id=6&objectid=11694903)

## Appendix 3

### Managing threats from the oil, gas and minerals mining industry to Māui dolphins

#### Oil, gas, and minerals mining threats

The West Coast North Island (habitat of the Māui dolphins) is an active oil gas and minerals industrial area. There are at least 21 existing permitted areas off the West Coast North Island, which allow unlimited exploratory surveys and drills out to the year 2046.[1]

The science about the impacts of seismic surveys on small high frequency cetaceans (such as Māui and Hector's dolphins) has rapidly developed in recent years. Noise produced by seismic surveying is loud enough it can cause Māui and Hector's dolphins physical harm and even death if the animals are close to the noise source. Non-lethal impacts include

- disturbance of essential livelihood behaviours (such as communicating with their social group, finding mates, breeding, feeding and taking care of young)
- displacement from important habitat
- chronic stress
- suppressed immune systems.[2]

Any kind of disturbance of normal feeding and breeding may be having a significant effect on the ability of the Māui dolphin population to recover. The science about Māui and Hector's dolphin physiology shows they have huge energetic requirements, which means they must forage and feed almost all the time. If they are not getting enough food at the right times, they will be less likely to produce and maintain healthy calves and will be less resilient against disease.[3]

Seismic surveys also have indirect impacts on Māui and Hector's dolphins, through degrading the health and productivity of marine ecosystems. New studies show seismic surveys damage shellfish, crustaceans and kill zooplankton (such as larval fish and krill) for kilometres around.[4] Impacts on these low trophic levels have knock-on effects for the whole marine ecosystem.

The Government's TMP consultation document recognises protections for Māui and Hector's dolphins against the impacts of seismic surveying are currently inadequate. The consultation document acknowledges there are fewer protections within marine sanctuaries than there are outside the territorial sea and within the EEZ. Surveys in the EEZ require adherence to the 2013 Seismic Surveying Code of Conduct (the code).

The code is wholly inadequate and out-of-date. A review of the code started in 2015 and resulted in a new draft code in 2017, but this was not adopted. Recommendations from the review have been adopted by regimes in other countries (including Australia). The National Offshore Petroleum Safety and Environment Management Authority has included them in guidance notes. A revised code is urgently required, the review has been shelved and the draft now needs further updating to meet best international standards.

The code falls short of international best practice in several ways. The code:

- allows seismic surveying 24/7 day and night and in bad visibility – which means there is no mitigation for marine mammals at times they are not detectable by Marine Mammal Observers (MMOs). Passive Acoustic Monitoring (PAM) only detects some species and only sometimes – Māui dolphins not included.[5] Best practice (i.e. as used by NOAA around bowhead whales) requires shut-downs at night and in other periods of bad visibility where safety zones are not entirely visible
- requires only one MMO to be on duty at any time, whereas best practice in other parts of the world requires two
- does not require surveyors to stop shooting on line turns, resulting in the potential for continuous noise exposure for the duration of the survey
- has very minimal modelling requirements, uses arbitrary mitigation zones and requires little or no ground truthing. Best practice modelling has moved on substantially from the New Zealand requirements. For example, Australia has adopted model-based mitigation zone (not arbitrary ones) based on requirements under NOPSEMA. Greenland requires models to be produced between different projects – taking into consideration length of exposure and cumulative impacts and there is real-time monitoring off Sakhalin Island. The modelling TWG report includes recommendations significantly different to what is accepted under the current code
- The code does not apply to foreign research seismic surveys, as currently implemented legally. The USA and many other nations also require mitigation from all seismic surveys in their waters - including foreign government surveys (noise is pollution under UNCLOS and thus exclusions for benign foreign research under UNCLOS do not apply).

## **Recommended management of seismic surveying impacts on Māui dolphins within the Marine Mammal Sanctuary**

WWF recommend a precautionary approach to management of seismic surveying impacts on Māui dolphins.

- Extensions of the Marine Mammal Sanctuaries (as proposed by the Government) to enable spatial protection of threats from oil, gas, and minerals mining, throughout essential habitats of the Māui and Hector's dolphins and the Māui – Hector's corridor (transition zone) south of New Plymouth to Wellington.
- Prohibit sand mining on the extended Marine Mammal Sanctuaries, including from areas where there are existing permits.
- Prohibit seismic surveys in the extended marine mammal sanctuary, with a buffer zone to ensure sound entering the sanctuary is below defined noise exposure thresholds to ensure it will not threaten or slow the recovery of the Māui dolphin population. We recommend the Government set noise exposure thresholds to protect Māui and Hector's against Temporary Threshold Shift (TTS) at the NMFS (2018) HF-weighted TTS noise exposure criterion of 140 dB re 1  $\mu\text{Pa}^2 \cdot \text{s}$  SEL or 196 dB re 1  $\mu\text{Pa}$  (PK) (greater of the ranges used). To protect Māui and Hector's from Permanent Threshold Shift (PTS), the threshold should be set to a NMFS (2018) HF-weighted 155 dB  $\mu\text{Pa}^2 \cdot \text{s}$  SEL for impulsive sounds or 202 dB re 1  $\mu\text{Pa}$  (PK) (greater of the ranges used) and a NMFS (2018) HF-weighted 173 dB  $\mu\text{Pa}^2 \cdot \text{s}$  SEL for continuous sounds.[6] Additionally we recommend a behavioural criteria be applied, which initially could apply the NMFS (2014) 160 dB  $\mu\text{Pa}$  (SPL), however this should be reviewed and updated based upon best available science. These recommended thresholds follow the expert advice provided by JASCO Applied Sciences as part of the TMP review.[7]

## **Recommended management of seismic surveying impacts on Māui and Hector's dolphins outside the Marine Mammal Sanctuary**

For areas outside Marine Mammal Sanctuaries, WWF recommend the following management actions.

- Bring the Seismic Surveying Code of Conduct up to international standard. This will include (among other things) survey shutdowns at night and in other periods of bad visibility, where safety zones are not entirely visible.[8]
- PAM has limited effectiveness for animals which vocalise at high frequencies such as Hector's and Māui dolphins, with limited detection range due to the frequencies of concern. If PAM is to be applied, it should be justified and demonstrated it is appropriate, and can detect fauna beyond the distances associated with the TTS and PTS.
- Require best practice impact assessments, including assessment of wider marine environmental effects (e.g. impacts on food webs) and effective modelling of sound threats (sound propagation modelling etc. as part of the impact assessments) to inform mitigation zones and buffers around Marine Mammal Sanctuaries.[9] Some good examples of best practice impact assessments and sound modelling include Polarcus Petrelex 3D Marine Seismic Survey[10] and Sauropod 3D Marine Seismic Survey.[11]
- Mitigation (i.e. set out in the updated code) is compulsory for ALL ongoing surveys including research and surveys by foreign government vessels.
- Change the permitted activity status of seismic surveys under the EEZ Act to require them to need a consent.
- Require public consultation on seismic survey applications to improve transparency and enable interested parties to take part in the permit assessment process and have issues and concerns answered.[12]

[1] <https://www.nzpam.govt.nz/permits/petroleum/>

[2] Lucke, K., D. Clement, V. Todd, L. Williamson, O. Johnston, L. Floerl, S. Cox, I. Todd, and C.R. McPherson. 2019. Potential Impacts of Petroleum and Mineral Exploration and Production on Hector's and Māui Dolphins. Document 01725, Version 1.0. Technical report by JASCO Applied Sciences, Cawthron Institute, and Ocean Science Consulting Ltd. for the Department of Conservation, New Zealand

[3] While energy budgets have not been studied specifically in Hector's dolphins, we know that one of the causes of death that is documented for calves is maternal separation (Roe et al. 2013). It is possible that some of these cases might be related to nutritional stress due to the high energetic demands on the mother. (Weir, J. 2018)

[4] McCauley RD, Day RD, Swadling KM, Fitzgibbon QP, Semmens JM. (2017) Marine seismic survey air gun operations negatively impact zooplankton. *Nat Ecol Evol* 1:0195

[5] DOC reviewed its PAM data and found that as PAM is currently required under the Code, it is ineffective to detect Māui and Hector's dolphins (and many other species). (<http://www.doc.govt.nz/our-work/seismic-surveys-code-of-conduct/preliminary-analysis-of-data-from-seismic-surveys/>)

[6] NMFS. 2018. 2018 Revisions to: Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing (Version 2.0): Underwater Thresholds for Onset of Permanent and Temporary Threshold Shifts. . In: U.S. Dept. of Commer., N. (ed.). NOAA Technical Memorandum Document Number NMFS-OPR-59. National Marine Fisheries Service. 167 p pp.

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[8] WWF is able to provide more analysis of the short comings of the Code of Practice at the Government's request.

[9] As part of the review of the Code of Practice carried out between 2015-17, DOC developed sound modelling report standard for impact assessments. The standards explain what models and methods are acceptable in determining if any given project reaches or exceeds impact levels. While these NZ-build standards, have not been adopted domestically, they have recently been adopted in Australia.

[10] [https://info.nopsema.gov.au/environment\\_plans/25/show\\_public](https://info.nopsema.gov.au/environment_plans/25/show_public)

EP - <https://docs.nopsema.gov.au/A682391>

[11] [https://info.nopsema.gov.au/environment\\_plans/27/show\\_public](https://info.nopsema.gov.au/environment_plans/27/show_public)

EP - <https://docs.nopsema.gov.au/A683046> -

[12] Currently there is no public consultation process for seismic surveying applications in New Zealand. Australia's NOPSEMA has just brought in requirements that applications and the impact

assessments be released for public consultation. This improves transparency and enables interested parties to take part in the permit assessment process, highlighting issues and concerns.

## Appendix 5

### TMP Research programme

The TMP needs to set out a comprehensive research programme to build the science required for effective conservation of Māui and Hector's dolphins. Research for Māui and Hector's has traditionally been opportunistic and ad hoc, taking advantage of small bits of money here and there. We recommend a more well thought out and strategic planning process to build a comprehensive five – ten-year research plan.

We recommend the TMP research plan:

1. Build understanding about Māui and Hector's populations (size, trend, age structure and health) through epigenetic aging and genetic recapture studies.
2. Build science about dolphin distribution through acoustic studies, citizen science (public sightings) in low dolphin density areas, electronic/ GPS tagging of Hector's to understand habitat use and to enable health assessment, and drone technology.
3. Improving the risk assessment model through: improving the accuracy of fishing effort; the estimate of catchability for different fisheries and gear types; better accounting for environmental variability in habitat modelling; and improving understanding of the relationship between the dolphins and environment.
4. Develop effective dolphin bycatch mitigation options including a project to test and develop effective dolphin deterrent devices for trawl, and trawl nets that can detect and instantly release a dolphin alive.

### Science about populations

#### Epigenetic aging of Hector's and Māui dolphins

Recent advances in epigenetics now allow for accurate estimation of an individual's age based on patterns of methylation in DNA extracted from biopsy samples. These age estimates can be integrated into standard capture-recapture work. Epigenetic aging can improve estimates of abundance and effective population size using Parent Offspring Pairs.

#### Genotype recapture studies of Hector's populations to build understanding of genetic connectivity, abundance, trends in abundance, age structure and health

Genetic recapture studies are an effective tool to build knowledge of population size, genetic connectivity, adult survival / population trend and age structure (see below). The biopsies can also be used to build understanding of dolphin health. We recommend that genetic recapture studies be undertaken with important populations for which we have limited information:

- Golden and Tasman Bays

- Kaikoura
- Otago
- South of the south Island
- Cloudy Bay

## **Science about dolphin distribution**

### **Acoustic studies to answer distribution and density questions**

The new habitat modelling predicts the cores of the Māui habitat well where there is high dolphin density, but is much more uncertain outside the core areas – where the dolphins spend less time. We recommend building understanding of distribution in these low dolphin density areas:

- Offshore distribution (including daily and seasonal patterns)
- North of Kaipara
- South from New Plymouth to Wellington
- Within harbours (acoustic studies along with continued fine scale monitoring of fishing effort)

We recommend comprehensive acoustic studies be carried out in these areas. Recent studies have proven the effectiveness of acoustic studies to detect the presence of Māui dolphins. Studies from overseas shows that careful of design of acoustic studies can elicit data on distribution, habitat use and dolphin density.

### **Citizen science to build knowledge of East Coast North Island dolphins and other low-density areas**

The Government’s proposals and science reporting has largely ignored the fact that there are numerous verified sightings of Māui/Hector's on the East Coast North Island. These sightings in Hawkes Bay and Bay of Plenty are in the areas where the new habitat modelling predicts good habitat. There has been no dedicated research about these dolphins and observer coverage on that coast for set net and trawl is zero (or close to zero) in most years. We do not know if the dolphins on the East Coast are transient, or are resident and reproducing.

We recommend a citizen science programme be targeted on the East Coast of the North Island where the habitat modelling shows there is good habitat, as well as in the Northern and Southern ranges on the West Coast. This should involve raising public awareness about how to identify and report sightings of Māui and Hector's dolphins.

A useful survey tool and engagement process has been developed by Worchester Polytechnic, DOC and WWF to engage the public in reporting sightings. The survey has identified the questions that will enable public sightings data to be used in habitat modelling (by enabling an estimate of sighting ‘effort’). We recommend further refining this survey tool so that it can be applied widely for all coastal water users.

### **Electronic/ GPS tagging study to understand habitat use and dolphin health**

Satellite tagging can build knowledge about the daily movements and foraging behaviours of the dolphins and understanding of how and where they are likely to encounter fisheries and other threats. The process of tagging which involves capture of dolphins can enable individual health assessment, including collection of blood for toxoplasmosis detection. Individual health assessment, including collection of blood for toxo detection, is compatible with the capture-release for certain kinds of tagging

We recommend a tagging study be undertaken on Hector's dolphins in an area where better understanding habitat use and distribution is needed to inform spatial protections. Tagging studies for:

- One population from West Coast (with characteristics similar to Māui dolphin habitat]
- One population from East Coast, maybe Banks Peninsula or Cloudy Bay

### **Electronic/ GPS tagging study to understand habitat use and dolphin health**

Drone technology is fast becoming a cost effective tool to build knowledge of habitat use and habitat preference. Drones equipped with high definition cameras and supported by AI technology can enable detection of the dolphins in real time, and to assess water clarity and other environmental factors in the habitat at any given time, and over time.

Large (2-4m wide) fixed-wing unmanned aerial vehicles (UAVs/drones) flown by Civil Aviation Authority trained and accredited drone pilots can be in the air for 3-6 hours at a time, with the ability to fly pre-programmed flight paths or be manually guided, at varying heights and with hovering ability to enable them to look more closely at items of interest.

UAV technology to help overcome some of the challenges that have limited aerial surveys in the habitat to date – including the lack of suitable aircraft in New Zealand, the cost of surveys using aircraft with observers on board, limitations of when the habitat can be surveyed due to weather conditions (although UAV technology can not be used in severe wind and rain) and particularly swell.

## **Improve the risk assessment model**

### **Improve accuracy of fishing effort**

The NIWA modelling assumed fisher reported effort was accurate, and does not include uncertainty about the effort. However, recent implementation of geospatial monitoring shows that these assumptions may be incorrect. Geospatial monitoring will greatly improve accuracy of fishing effort reporting which will enable better estimates of effort/dolphin overlap and risk. We recommend new geospatial data is analysed and estimates of effort are updated (and fixed retrospectively) as appropriate in order to enable model updates.

### **Improve estimate of catchability for different fisheries and gear types**

The modelling has one single estimate of catchability for set net and one for trawl. However, there is likely to be different catchabilities for different fisheries i.e. set net for flat fish versus

set net for ??? and also different gear configurations e.g. large trawlers with high headline heights, versus small trawlers with low headline height.

For set net, there may already be enough observed capture data to detect differences in catchability between fisheries and types of set net i.e. shallow versus deep water. However until there is much more comprehensive monitoring coverage (e.g. enabled perhaps by Electronic Monitoring), we will not have enough data to see the differences in catchability between fisheries and gear types. Dedicated studies with full observer or EM coverage would be required.

### **Better account for environmental variability in habitat modelling**

We recommend dolphin distribution modelling be further developed so that the extremes in environmental variability can be mapped. For example, the temporal and spatial variability in turbidity should be modelled rather than using means/averages over ten years. This ‘environmental variability habitat envelope’, is a science-based way to define a more precautionary area of habitat.

### **Use public sightings and NOMAD data to improve understanding of the relationship between the dolphins and environment**

A key limitation in the habitat modelling is that the sightings used (aerial survey sightings from the South Island) are a snapshot in time. Data sources collected over time, throughout all weather and seasons i.e. public sightings and NOMAD data could be used to improve understanding about the relationships between dolphins and environmental conditions.

### **Mitigation development**

#### **Testing and developing dolphin deterrent device for trawl boats**

There is interest and willingness of fishers to take part and lead science to develop bycatch mitigation options, including the testing of dolphin deterrent device for trawl boats. We recommend a study to test and develop such technology.