

# Māui Dolphin

*Cephalorhynchus hectori maui*

Popoto

Note: Māui's dolphin is now considered an erroneous usage of the Māori name

## Small dolphin, big sea



Māui dolphin. Martin Stanley/DOC

## Quickfacts

The rarest dolphin in the world?

The current range of the Māui dolphin in relation to existing protection areas is uncertain

Latest census indicated a small increase in population size from 55 to 63 adults

## The world's rarest dolphin?

The world that the Māui dolphin now inhabits is very different from the one it inhabited 150 years ago, 50 years ago, or even 5 years ago. Over that time it has survived a massive increase in the amount of fishing undertaken in New Zealand's waters and big changes in how those fish are caught. It has also survived exposure to new diseases and harmful chemicals due to an increasing amount of agricultural and industrial run-off. While the Māui dolphin has been able to survive these massive changes, their numbers are now just a fraction of those that previously inhabited the North Island's inshore coast. Unfortunately, we never knew how many Māui dolphins actually existed. Before 2002 they were considered to be an isolated group of the endangered Hector's dolphin *Cephalorhynchus hectori*, which is found mainly around the South Island coast. In 2002, scientists classified the Māui dolphin as a new subspecies of Hector's dolphin following research on both the



genes and physical features. It is thought that Māui dolphins evolved from Hector's dolphins subsequent to the post-glaciation submergence of the Cook Strait area 15,000 to 16,000 years ago (although the maximum depth separating the North and South islands is about 150 m and it is known that Hector's dolphins can cross this depth). The Māui dolphin is named *Cephalorhynchus hectori maui* and Hector's dolphin is named *Cephalorhynchus hectori hectori*, and together the two subspecies are known as the New Zealand dolphin *Cephalorhynchus hectori*. There are three other dolphin species in the *Cephalorhynchus* genus: the Chilean dolphin *Cephalorhynchus eutropia* that is found along the southwestern South American coast, Heaviside's dolphin *Cephalorhynchus heavisidii* that inhabits the southwest South African coast and Commerson's dolphin *Cephalorhynchus commersonii* that is found around the Falkland Islands and southeastern coast of South America as well as the Kerguelen Islands in the Indian Ocean. All inhabit shallow coastal waters.

While Māui dolphins are nearly indistinguishable from Hector's dolphins, they differ in their genetic composition, are larger, with a longer and thicker snout, and have a slightly different patterning on their underside. Both subspecies have the characteristic rounded 'mickey mouse ear' dorsal fin which distinguishes them from the other dolphins that occur in New Zealand waters. Māui dolphins live in small groups of up to 12 animals, and individual dolphins can move at least 80 km. There is uncertainty about the distribution of Māui dolphins, because of their similarity to Hector's dolphins which can also occur in the same area. Currently, Māui dolphins are thought to range from Maunganui Bluff to Whanganui, but are most commonly found between the Manukau and Raglan harbours. The southern extent of that range is uncertain, and is based on a historical stranding of a Māui or Hector's dolphin (subspecies unknown) in the late 1980s. Māui dolphins may range offshore to about the 100 m depth isobath, however depth may not be a good predictor of Māui dolphin distribution as the majority of sightings are in shallow waters in and just behind the surf zone. Towards the extremity of their range and at greater depths they are likely to be very rare. New Zealand dolphins feed on a range of small fish (mostly red cod, the similar ahuru, arrow squid, sprat, sole and stargazer that are usually less than 10 cm long) that inhabit the surface, midwater or seafloor of inshore shallow waters. They probably live for around 20 years and females begin breeding at seven to nine years, producing a single calf every two to four years.

With the recognition that Māui dolphins were distinct came an increased focus on their distribution and biology, as well as some conservation measures. This increased effort uncovered some worrying information: the Māui dolphin is much, much rarer than some people had previously thought. In 2006, the population was estimated (using aerial surveys) as between 48 and 252, with the actual number likely to be closer to 111 individuals (Slooten et al. 2006). In 2011 the population was estimated (using genetic genotype mark-recapture methods) at between 48 and 69 individuals older than 1 year

old, with the actual number likely to be close to 55 individuals. The genotype mark-recapture research also uncovered that two female Hector's dolphins were present with Māui dolphins, although there is no evidence to date that the two subspecies can interbreed. In 2012 the annual number of mortalities within the Māui dolphin population was estimated at between 1 and 8.5 dolphin deaths each year, with a median number of 5.27 dolphin deaths - a rate 76 times higher than can be sustained – and the population was estimated to be declining. In 2015 a further estimate of between 43 and 47 individuals was proposed by the NABU International Foundation for Nature. This estimate is based on extrapolating the 2012 population trends, under a scenario that the current Māui dolphin protection measures only partially work, but the accuracy of this estimate is untested. The genotype mark-recapture research was repeated in 2015 & 2016 by Dr Scott Baker (Oregon State University) and Dr Rochelle Constantine (University of Auckland), and provided an updated estimate of between 57 and 75 adult Māui dolphins, with 63 being the most likely number.

The realisation that there are so few Māui dolphins led to their being classified as Nationally Critical in 2009, together with increasing calls for conservation measures. Whether the Māui dolphin is the most endangered small cetacean (whales, dolphins and porpoises) in the world is unknown, as the Mexican vaquita *Phocoena sinus* (a porpoise) also has good claim to this dubious title. Another contender, the baiji or Chinese river dolphin *Lipotes vexillifer*, was recently declared functionally extinct.

## Conservation in a complicated world

Conservation of the Māui dolphin has been complicated. It is important to remember the roles and responsibilities of the organisations and individuals who have an interest in Māui dolphin conservation. The New Zealand Government has ultimate legal responsibility for the conservation of New Zealand's flora and fauna under acts of parliament, statutory documents, international agreements and directions of the current Government, which it needs to balance with its responsibilities for New Zealand's economic and social wellbeing. Exercising these responsibilities is primarily through directions from the relevant Minister who each have specific legal statutes they must consider. For the Māui dolphin the responsible Ministers are those of Conservation and Primary Industries. The Minister's departments (the Department of Conservation (DOC) and the Ministry for Primary Industries (MPI)) have responsibility for turning these Ministerial Directions into actions, as well as implementing those required under legislation and international agreements, incorporating community views when possible. DOC has the responsibility of managing the conservation of Māui dolphin which includes both the statutory and technical aspects, and MPI has the responsibility of managing the adverse impacts of fishing on the Māui dolphin.

There are a variety of groups that have an interest in Māui dolphin conservation. Non-governmental organisations (NGOs) are one such group, and function at local, national, and international levels. Some NGOs have a conservation focus; others have a commercial focus. Conservation NGOs are a combined voice of their membership who in the main want swift and comprehensive conservation measures enacted. The industry NGOs are also a combined voice of their membership who on the whole want favourable conditions for their industry to operate in. Both groups of NGOs are powerful lobbyists to the Government and lobbying occurs both directly with government officials and publicly through various media. Those using media sometimes focus on the contentious to increase the impact of their cause on the public. Conservation NGOs are very aware that successful conservation projects are those that closely incorporate the aspirations of local communities and businesses. Industry NGOs are likewise very aware that incorporating a conservation ethic into their businesses can make their operating environment easier, and can increase profitability through added-value outcomes.

Another group with an interest in Māui dolphin conservation are scientists and research institutions. They have an academic interest: for example, what is the ecology of Māui dolphin? Its genetic structure? Its behaviour? Its role in the coastal ecosystem? And what are the best techniques to employ in its conservation? However, a scientist's research requires funding, and as funding bodies allocate funds to the topics they considered important, they influence what research is undertaken.

Because of the extremely endangered status of the Māui dolphin, the government, NGOs and scientists have a high level of involvement. This has resulted in multiple viewpoints being presented, some of which conflict. The data that is available to inform conservation decisions is patchy, of differing reliability and in some cases is extrapolated from what we know of related species or situations. There are also different interpretations of the same data. Apart from issues with available data, another barrier to making sound conservation decisions is that our knowledge of the marine environment is very patchy and research into marine issues is difficult and usually costly. As the ranges of Māui and Hector's dolphins overlap, and they cannot be separated by sight (individually-distinctive markings or fin shapes are mostly only discernible on close examination of high quality photographs), it is problematic deciding where conservation measures should be applied.

It is against this backdrop that the conservation of Māui dolphins has progressed.

In 2003 the Ministry of Fisheries (now the Ministry for Primary Industries) introduced restrictions on the use of set nets within 4 nautical miles along part of the North Island's west coast, between Maunganui Bluff (Northland) and Pariokariwa Point (northern Taranaki) and in the entrance of the Manukau Harbour. Trawling was

prohibited in this area out to one nautical mile along the coast and out to two nautical miles in areas adjacent to harbours and river mouths.

DOC and MPI began preparing a Hector's and Māui Dolphin Threat Management Plan which was released as a draft for public submission in 2007 ([link](#)). In 2008, after submissions from the public, scientists and other organisations a West Coast Marine Mammal Sanctuary (MMS) was established between Maunganui Bluff and Pariokariwa Point out to 7 nautical miles within which seismic surveys and seabed mining is restricted. In addition the then Ministry of Fisheries expanded the 2003 areas where set nets and trawling are banned ([map](#)). This expanded area was challenged by some members of the commercial fishing industry and consequently the expanded restrictions on set nets were not fully implemented until 2011.

An important and recurring argument during the setting of the MMS boundaries and the fishing-related restrictions that would apply was uncertainty over the exact range of Māui dolphins, both offshore and alongshore (and particularly in the Taranaki area). In January 2012 a Māui or Hector dolphin was caught in a set net off the Taranaki coast ([link](#)). In March 2012 a DOC-commissioned study estimated the number of Māui dolphins older than 1 year of age at between 48 and 69 individuals, with the actual number likely to be close to 55 individuals. These two events led DOC and MPI to seek submissions on some interim measures to protect Māui dolphins along the Taranaki coast ([link](#)). Adoption of some of these interim measures was initially put on hold pending a review of the Māui dolphin component of the Hector's and Māui Dolphin Threat Management Plan. In the interim a ban on set net use within 2 nautical miles along the Taranaki coast to the south of the MMS and extending to the coast adjacent to the town of Hawera was put in place in July 2012 ([map](#)). Commercial set net use along this coast out to 7 nautical miles was restricted to vessels with an MPI observer aboard.

As part of the Threat Management Plan review process DOC and MPI convened a panel of marine mammal experts who evaluated the available data and assessed the likely risks to Māui dolphin survival. The results from this process were then used to formulate the 2012 'A Risk Assessment of Threats to Māui Dolphin' ([PDF](#)) which was used to inform the review of the Māui dolphin component of the 2008 Hector's and Māui Dolphin Threat Management Plan. A Consultation Paper ([link](#)) which sought submissions from the public, scientists and other organisations was released in September 2012. In September 2013, after consideration of submissions, the Minister of Conservation announced his intention to consult further on varying the MMS to include extra fishing-related protection measures in the Taranaki region ([link](#)). In November 2013, following the consultation process, the Minister of Conservation and the Minister for Primary Industries announced proposal package of measures that would be implemented ([link](#)).

In addition to these measures, a Code of Conduct for Minimising Acoustic Disturbance to Marine Mammals from Seismic Surveys Operations ([link](#)) (which included a map of New Zealand's marine areas considered by DOC as of Ecological Significance ([map](#))) was released in August 2012. A voluntary code of conduct applying to inshore boat racing is also to be pursued and a multi-stakeholder Māui Dolphin Research Advisory Group (RAG) ([link](#)) was established in 2014. The RAG published the 2014-2019 Māui dolphin five-year strategy and research plan in 2015 ([link](#)).

That area-based protection (such as that in place for the Māui dolphin) can work is attested by the 5.4% local increase in survival of Hector's dolphins in the Banks Peninsula Marine Mammal Sanctuary (Slooten 2013), but that unless sufficient area is included, coverage may not be not enough to offset losses of animals outside of the protected areas.

A review of the Hector's and Māui Dolphin Threat Management Plan is scheduled for 2018. This revision will incorporate all new information that has come to light in the intervening period.

## Threats to Māui dolphin survival

In 2012 a panel of New Zealand and international experts on marine mammal research and ecology assessed the risk that human activities, at their current intensity and using current knowledge, posed to the survival of the Māui dolphin (see Table below) as part of the 2012 Risk Assessment of Threats to Māui Dolphins ([PDF](#)). This expert panel considered that the bycatch of Māui dolphins in set nets and trawl nets posed the greatest risk of mortality over the subsequent five year period. This assessment is reinforced by the frequency of net entanglement being diagnosed in Māui dolphin post-mortems ([link](#)): between 1921 and July 2012, entanglement is implicated in six of the 12 dead New Zealand dolphins from the North Island's west coast for which cause of death could be determined by an autopsy. Hector's dolphins are known to congregate and follow inshore trawling boats around Banks Peninsula, probably because they obtain food in some way. The degree to which current fishing effort impacts on Māui dolphins is uncertain.

Recently, the diseases Brucella and Toxoplasmosis have both been found in Māui dolphins and the impact of these diseases is currently being investigated.

Table: Estimated number of Māui dolphin mortalities per year caused by human activities in 2012.

Threat	Estimated number of Māui dolphin mortalities		
	Median	Lower estimate	Upper estimate
Fishing	4.97	0.28	8.04
Commercial set net bycatch	2.33	0.02	4.26
Recreational/customary set net bycatch	0.88	0.02	3.14
Commercial trawl net bycatch	1.13	0.01	2.87
Recreational driftnet bycatch	0.05	0.01	0.71
Trophic effects of fishing	0.01	<0.01	0.08
Vessel noise/disturbance from fishing	<0.01	<0.01	0.1
Mining and oil activities	0.1	0.01	0.46
Habitat degradation from mining & oil activities	0.03	<0.01	0.17
Noise (non-trauma) from mining & oil activities	0.03	<0.01	0.23
Noise (trauma) from mining & oil activities	0.01	<0.01	0.13
Pollution (discharge) from mining & oil activities	<0.01	<0.01	0.13
Vessel traffic	0.07	<0.01	0.19
Boat strike from all vessels	0.03	<0.01	0.1
Vessel noise/disturbance from other vessels	0.02	<0.01	0.12
Pollution	0.05	<0.01	0.36
Oil spills	0.02	<0.01	0.15
Agricultural run-off	<0.01	<0.01	0.12
Industrial run-off	<0.01	<0.01	0.11
Sewage and stormwater	<0.01	<0.01	0.11
Trophic effects of pollution	<0.01	<0.01	0.06
Plastics	<0.01	<0.01	0.01
Disease	<0.01	<0.01	0.36
Stress-induced diseases	<0.01	<0.01	0.35
Domestic animal diseases	<0.01	<0.01	0.07
<b>Total</b>	<b>5.27</b>	<b>0.97</b>	<b>8.39</b>

The marine environment inhabited by Māui dolphins is also naturally hazardous: they are at risk of being eaten by sharks or killer whales, and young calves can become fatally separated from their mothers during storms.

## Current conservation efforts

The current restrictions along the west coast of the North Island for protecting Māui dolphins are laid out in the following table (see also this map).

Protection type and area	Protection Measure
<b>Seismic survey</b> Maunganui Bluff to Oakura Beach, 12 nm offshore	Regulated under rules specified in the WCNI Marine Mammal Sanctuary Notice. Seismic surveys are to follow the Code of Conduct for Minimising Acoustic Disturbance to Marine Mammals from Seismic Surveys Operations ( <a href="#">link</a> ) within the MMS
<b>Seabed mineral mining</b> Maunganui Bluff to Oakura Beach, out to 2 nm and 4 nm offshore	Seabed mineral mining prohibited under the WCNI Marine Mammal Sanctuary Notice.
<b>Set net restrictions</b> Maunganui Bluff to Waiwhakaiho River, out to 7 nm offshore Waiwhakaiho River to Hawera, out to 2 nm offshore Waiwhakaiho River to Hawera, between 2 nm to 7 nm offshore	Commercial and recreational set netting prohibited Commercial and recreational set netting prohibited Commercial set netting prohibited, unless a Ministry for Primary Industries fisheries observer is on board (currently an observer is present for 100% of fishing effort)
<b>Trawling restrictions</b> Maunganui Bluff to Manukau Harbour, and Port Waikato to Pariokariwa Point, out to 2 nm offshore Manukau Harbour to Port Waikato, out to 4 nm offshore	Commercial trawl fishing is prohibited Commercial trawl fishing is prohibited
<b>All West Coast North island harbours</b> Maunganui Bluff to Manukau Harbour, and Port Waikato to Pariokariwa Point, from 2 nm to 7 nm offshore and from Manukau Harbour to Port Waikato, from 4 nm to 7 nm offshore	Commercial trawl fishing is prohibited Ministry for Primary Industries Observer Coverage is being phased in over four years. Observer coverage in the March 2014 – February 2015 period was ~ 11% of trawl fishing days in that area. Coverage between March 2015 and June 2015 was ~30%.
<b>Drift net restrictions</b> Waikato River	Commercial and recreational drift netting prohibited.

In addition, it is illegal to harm or harass a marine mammal under the Marine Mammals Protection Act 1978 ([link](#)) and a fine of \$250,000 can be imposed. People's behaviour around marine mammals is restricted under the Marine Mammals Protection Regulations 1992 ([link](#)) and DOC has issued guidelines for how to interact with marine mammals ([PDF](#)).

The World Wildlife Fund for Nature (WWF) has launched a mobile phone app for people to report sightings of Māui dolphins which is available on the Google Play Store and the Apple App Store. You can also call 0800 DOC HOT to report a sighting or visit the DOC website and submit your sightings information through an online sightings form ([www.doc.govt.nz](http://www.doc.govt.nz)).

Whale and Dolphin Conservation recently commissioned research which showed that 80% of New Zealanders are willing to help pay for New Zealand dolphin conservation, and are also willing to pay a small premium (\$1 to \$3 per kg or \$0.5 to \$1 per piece) for fish that is caught in a sustainable way ([PDF](#)).

The potential changes in the Māui dolphin population which could be expected under the current conservation measures were computer-modelled by Dr Liz Slooten of Otago University ([link](#)) in 2015. In 1000 repeats of the model using the Māui dolphin and fishery data available to date, and based on current conservation measures, there was a 97% probability of decline to 50% of the current population in 20 years. When the modelling as repeated based on an expanded MMS, there was a lower (12%) probability of decline to 50% of the current population in 20 years. DOC and MPI have been requested by the International Whaling Commission (IWC) to work further with Dr Slooten to develop the robustness of this model.

Gemma McGrath has been investigating ways to involve people in the conservation of Māui dolphin. She has produced a music CD featuring 11 tracks from various artists including the Black Seeds, Minuit, Fur Patrol, Pitch Black and Sola Rosa, which she sells to raise funds for Māui dolphin conservation ([link](#)). She also worked with the Awatere Valley's Tohu Wines ([link](#)) to produce a special Māui dolphin wine.

The following research topics proposed by the RAG are currently being undertaken:

- Quantifying causes of death to the Māui and Hector's dolphin populations through necropsy of fresh carcasses.
- Assessment of the risk posed to marine mammals (including Hector's and Māui dolphins) from commercial fisheries.

- Determining the abundance of Māui dolphins and other demographic parameters through genetic mark-recapture on a five yearly basis. The New Zealand government has commissioned a 2-year genetic mark-recapture abundance study being undertaken by Dr Scott Baker (Oregon State University, [Link](#)) and Dr. Rochelle Constantine (University of Auckland, [Link](#)), to inform whether existing conservation measures are resulting in an increase in the Māui dolphin population size. Twelve surveys were conducted in February and March 2015 across much of the confirmed range of Māui dolphin. The team encountered 44 groups numbering up to 12 individuals, and 48 samples were collected for genetic analysis. Of these samples, 38 were from Māui dolphins and 2 from Hector's dolphins. There appears to be a bias towards females in the population with a ratio of 13 males and 27 females encountered (although this includes the two Hector's dolphins, one of which was sampled on the previous surveys).
- Sightings of dolphins, detection of potential captures, and monitoring interactions between Māui dolphins and trawl fisheries through Observer Coverage along the west coast of the North Island.
- Sightings of dolphins, detection of potential captures, and monitoring interactions between Māui dolphins and the set net fishery through Observer Coverage in Taranaki.
- Development of updated Hector's and Māui dolphin distribution maps using improved information gained through the Marine Mammal Risk Assessment project.
- Investigation of Māui and Hector's dolphin range outside the core range, through validation of public sightings.
- Determination of fine scale habitat use of Māui dolphins through the core of their range.
- Estimation of capture rates and total captures of protected species using statistical modelling of observer and catch-effort data, and assessment of factors that contribute to captures of protected species (including Hector's dolphins and potentially Māui dolphins).

In addition, the following research topics have been proposed by the RAG:

- Undertaking a risk analysis of Toxoplasmosis in the marine environment to quantify the prevalence of Toxoplasmosis in Māui dolphins and factors affecting their susceptibility to the disease.
- Determining the alongshore and offshore extent of Māui dolphin distribution utilising a

range of survey methods. DOC and MPI are planning on convening a Māui RAG-Technical group in 2016 to develop a plan for assessing the distribution of Māui dolphins. DOC and MPI propose to use C-POD acoustic detectors as one potential component of the Māui dolphin's distribution project, either investigating Māui dolphin's use of harbours starting with the Manukau Harbour, or investigating their offshore distribution in key areas along the west coast North Island. The use of C-POD acoustic detectors was discussed at the November 2015 Māui RAG-Stakeholder meeting and a pilot study will be undertaken in February/March 2016.

- Assessing Māui dolphin population structure and/or connectivity between Cephalorhynchus populations using genetic analysis of planned and opportunistic biopsy samples.
- Assessment of the age structure of the Māui dolphin population using genetic analysis in order to improve information on population parameters, which would in turn improve the precision of abundance estimates using mark-recapture methods.
- Assessing the probability of, and time to extinction, as well as the effect of alternative management strategies on the population viability of Māui dolphins.
- Determination of the historic range of Māui dolphins through genetic methods to resolve the uncertainty around the southern extent of the Māui dolphin population.
- Test the feasibility of alternative fishing gear to set nets that also avoids snapper bycatch.
- Determine evolutionary distinctiveness between Hector's and Māui dolphins in order to predict the potential for interbreeding of the two subspecies.

## What has been the impact of Māui dolphin conservation on the fishing industry?

New Zealand's fishing industry is worth an estimated \$1.2 to \$1.5 billion dollars (1% of GDP) to the economy, and it is also a major employer. Along the North Island's west coast approximately 106 fishers operate 133 vessels using set nets to target flatfish, grey mullet, yellow-eyed mullet, rig, kahawai, trevally, school shark, warehou (and other species) worth around \$2.41 million, and approximately 28 fishers operate 39 vessels using trawl nets to target gurnard, snapper, trevally, baracoutta, terakihi (and other species) worth around \$10.6 million in 2012 ([link](#)). The people involved in the fishery vary between single boat operators to fishing fleet-sized businesses. Prior to the

expansion of fishing restrictions under the 2008 Threat Management Plan, these fishing activities overlapped the assumed Māui dolphin range, with the amount of overlap depending on the type of fishing method and the time of year ([link](#)). Limited information is available on the amount and distribution of fishing effort by recreational fishers and set netters.

The effects that the Māui dolphin conservation measures have had on the fishing industry are largely unknown, and are difficult to evaluate since the changes are so recent. A study of 100 set net fishers following the initial 2003 Māui dolphin conservation restrictions found little impact on catch and the effort of fishers (Stewart and Callagher 2013). In another example, following restrictions on surface set netting at Kaikoura to protect dusky dolphin, fishers appear to have abandoned surface setting and instead employed other techniques. In a similar marine mammal conservation situation overseas (Australian gummy shark fishery, data from WWF's IWC document SC/65b/SMxx) where fisheries were restricted to protect marine species, the fishery value initially declined by 50%, and of 15 set net vessels, 7 ceased fishing or moved to another area, 3 switched to hook fishing, and 5 continued set netting, but outside the protected area. To switch a boat from using set nets to hooked lines costs between \$56,000 to \$224,000 (depending on boat size and set up) and an increase in operating costs is expected. Also, hook fishing in this fishery is considered less efficient (and therefore more expensive than set netting), however there is a small price premium because of the increase in quality of the catch. In New Zealand it is not as easy for set net operators to convert to a hook set up, as hook fishing in this area catches many snapper, for which the operator may not have sufficient annual catch entitlement.

Research in New Zealand has shown that New Zealanders are willing to pay a small premium (\$1 to \$3 per kg or \$0.5 to \$1 per piece) for fish that is caught in a sustainable way ([PDF](#)). Maybe Māui and Hector's dolphin-safe fish 'n' chips are not too far away??

## Further conservation required?

A number of additional conservation measures have been proposed, but not yet implemented. A brief overview of these is given here.

### **Extending the extent of the MMS and fishing-related restrictions to cover most of the Māui dolphin range**

The IWC, the International Union for the Conservation of Nature (IUCN) and other organisations and scientists maintain that the existing fisheries restrictions cover only a portion of the assumed Māui dolphin range and that the fisheries restrictions need to be extended south to Wanganui and outward by an additional 13 nautical miles to 20 nautical miles offshore, or to the 100 m depth isobath. Within this area only fishing

methods other than set nets and trawling should be used. See page 75 of the IWC's Report of the Scientific Committee ([PDF](#)) and page 11 of the Report of the Sub-Committee on Small Cetaceans ([PDF](#)). In response, the NZ Government maintains its position that DOC and MPI will continue to monitor the Māui dolphin population, along with the effectiveness of the current measures to support population recovery. A full review of the Hector's and Māui Dolphin Threat Management Plan is scheduled for 2018 during which time all updated information will be considered.

### **Employing marine mammal safe fishing methods**

The fishing industry has already displayed leadership in adopting new fishing techniques to minimise their impact on New Zealand's seabirds ([link](#)) and New Zealand sea lion ([link](#)). Pingers (sonic warnings) have been used on set nets in the United States of America to successfully deter harbour porpoises, and they are sometimes used on set nets around Banks Peninsula, but their effectiveness is unclear. Currently, several conservation and fishing organisations are investigating how fishing methods can be made safer for marine mammals like Māui dolphins, and evaluating the economics of transitioning a fishing boat to another fishing method. One promising development in the trawling industry is a new net design which allows fish to be landed live ([link](#)), and while the impact of this net has not been tested in New Zealand dolphins' waters, it is worthy of consideration. Developing new fishing technologies is expensive, and trials will need to be robust enough to satisfy oversight by conservation organisations before consideration could be given to their being employed. Likewise, the cost of converting a boat to another fishing method is expensive, and for smaller operators this cost is prohibitive in comparison with their normal profit.

### **Protecting a corridor to link the Māui and Hector's dolphin populations**

It has been suggested that protecting the shallow area of sea between Whanganui and the South Island would increase the movement of Hector's dolphins into areas where Māui dolphins occur, and that this could potentially lead to interbreeding between the two subspecies, leading to an increase in the number of dolphins and an alleviation of the poor genetic diversity that remains in Māui dolphins. There are some problems with this approach: Hector's dolphins already occur in the areas frequented by Māui dolphins, there is no evidence either for or against recent interbreeding between the subspecies, and any progeny of breeding between Māui and Hector's dolphins would be a hybrid (a blend between the two dolphin subspecies) and would have unknown fertility.

## What next for Māui dolphin?

The threats to the survival of Māui dolphin are:

1. The perilously small population size.
2. Their vulnerability to set nets and some trawl nets.
3. The difficulty of achieving conservation results over large areas and when there are multiple and often conflicting demands.
4. Our limited knowledge on how to sustainably manage our marine areas.

Successfully protecting Māui dolphins from these threats must be achieved in order for a conservation programme to succeed. However, there is a great deal of contrasting views on what still needs to be done. Ideally, this should be done by:

1. Continuing existing conservation measures.

The existing MMS and restrictions need to continue until the Māui dolphin population has recovered in size.

2. Collaboratively working with the fishing industry to develop Māui dolphin-safe fishing techniques.

Eliminating the threat that some forms of fishing pose to Māui dolphins could be a win-win outcome for all involved: the Māui dolphin are safe and fishing can continue using appropriate techniques. There is a long and difficult way to go to reach this point. New fishing techniques will need to be developed, the fishing industry would need to evaluate these on operational and economic grounds, trials of the new techniques will be needed, and the results of the trials will need to be robust enough to satisfy oversight by conservation organisations before consideration could be given to their being employed in the MMS. Assistance will be needed to develop new techniques, trial their effectiveness (both as fishing tools and their impact on Māui dolphins), and to assist fishers to transition to new technologies.

3. Continually monitoring the effectiveness of conservation measures.

It is vitally important to know whether the Māui dolphin conservation efforts are working, and the best way of evaluating this is to measure if there are more (or less) dolphins when compared with the number of dolphins that were present when the

conservation programme began. If there are more dolphins than before, then the conservation efforts are working (particularly if this increase is repeated each time the numbers are counted). If the numbers are decreasing then a change in the conservation programme will be needed. The method that is currently used to count Māui dolphin is to identify each individual dolphin using the genes obtained from a small piece of skin obtained by shooting a dart into the dolphin's side. Multiple trips traversing the core of the assumed Māui dolphin range over are used.

## What is the Endangered Species Foundation doing?

The Endangered Species Foundation is supporting the Māui dolphin by:

1. Presenting an un-biased view of Māui dolphin conservation activity.
2. Having an observer on the Research Advisory Group which is involved in evaluating Māui dolphin research.
3. Raising funds to support activities that help the fishing industry transition to Māui dolphin-safe fishing. Currently, \$13,500 is needed to complete research on the economic costs and benefits of the fishing industry transitioning to other fishing methods. A further \$150,000 per annum is needed to provide expert input into transitioning the fishing industry into Māui dolphin safe fishing methods.
4. Looking to support other, smaller, projects with a public involvement outcome. We are currently seeking \$4,000 to distribute the book "Dolphins down under: understanding the New Zealand dolphin" to all New Zealand schools.

## More information

Website: Department of Conservation. [Link](#)

Website: New Zealand Whale and Dolphin Trust. [Link](#)

Website: WWF NZ. [Link](#)

Website: Forest & Bird. [Link](#)

Website: Project Jonah. [Link](#)

Website: Seafood New Zealand. [Link](#)

Website: Seismic Surveys. [Link](#)

Website: Let's Face It. [Link](#)

Website: Save our Māui dolphin. [Link](#)

Website: New Zealand Federation of Commercial Fishermen. [Link](#)

Website: Whale and Dolphin Conservation. [Link](#)

Website: International Union for the Conservation of Nature (IUCN). [Link](#)

Website: NABU International Foundation for Nature. [Link](#)

Māui Dolphin Day. [Link](#)

- Scientific paper: Critically low abundance and limits to human-related mortality for the Maui's dolphin. By Rebecca M. Hamner, Paul Wade, Marc Oremus, Martin Stanley, Phillip Brown, Rochelle Constantine, C. Scott Baker. *Endangered Species Research* Vol. 26, pages 87-92, 2014.
- Book: Dolphins down under: understanding the New Zealand dolphin. By Liz Slooten and Steve Dawson. Otago University Press, Otago, 2013.
- Scientific paper: Long-range movement by Hector's dolphins provides potential genetic enhancement for critically endangered Maui's dolphin. By Rebecca M. Hamner, Rochelle Constantine, Marc Oremus, Martin Stanley, Phillip Brown and C. Scott Baker. *Marine Mammal Science* Vol. 30, pages 139-153, 2013.
- Scientific paper: Effectiveness of area-based management in reducing bycatch of the New Zealand dolphin. By Elisabeth Slooten. *Endangered Species Research* Vol. 20: 121-130, 2013.
- Scientific paper: Industry response to the 2003 set net restrictions for protection of Maui's dolphin. By James Stewart and Peter Callagher. *Marine Policy* Vol. 42, pages 210-222, 2013.
- Scientific paper: Hector's dolphin diet: The species, sizes and relative importance of prey eaten by *Cephalorhynchus hectori*, investigated using stomach content analysis. By Elanor Miller, Chris Lalas, Steve Dawson, Hiltrun Ratz, Elisabeth Slooten. *Marine Mammal Science*, 2012.
- Report: A risk assessment of threats to Maui's dolphins. By R.J.C. Currey, L.J. Boren, B.R. Sharp, Peterson, D. Ministry for Primary Industries and Department of Conservation, Wellington, 2012.
- Report: An updated, annotated bibliography for Hector's (*Cephalorhynchus hectori hectori*) and Maui's (*C. hectori maui*) dolphins. By S. du Fresne, D. Burns and E. Gates. DOC Research and Development Series No. 332. Department of Conservation, Wellington, 2012. [PDF](#)
- Scientific paper: How the law lets down the 'Down-Under dolphin' – fishing-related mortality of marine animals and the law in New Zealand. By Nicola R. When. *Journal of Environmental Law*, doi:10.1093/jel/eqs017, 2012.
- News article: Maui's dolphin – deep trouble. By James Franham. *New Zealand Geographic* Jul-Aug 2011. [Link](#)
- Scientific paper: PCBs and organochlorine pesticides in Hector's (*Cephalorhynchus hectori hectori*) and Maui's (*Cephalorhynchus hectori maui*) dolphins. By K.A. Stockin, R.J. Law, W.D. Roe, L. Meynier, E. Martinez, P.J. Duignan, P. Bridgen, B. Jones. *Marine Pollution Bulletin* Vol. 60, pages 834-842, 2010.
- Scientific paper: Observations of Hector's dolphins (*Cephalorhynchus hectori*) associating with inshore fishing trawlers at Banks Peninsula, New Zealand. By William Rayment and Trudi Webster. *New Zealand Journal of Marine and Freshwater Research* Vol. 43, pages 911-916, 2009. [PDF](#)
- Scientific paper: Conservation management in the face of uncertainty: effectiveness of

four options for managing Hector's dolphin bycatch. By Elisabeth Slooten. Endangered Species Research Vol. 3: 169-179, 2007.

Scientific paper: A new abundance estimate for Maui's dolphin: What does it mean for managing this critically endangered species? By Elisabeth Slooten, Stephen Dawson, William Rayment and Simon Childerhouse. Biological Conservation Vol. 128, pages 576-581, 2006. [PDF](#)

Scientific paper: Management of gillnet bycatch of cetaceans in New Zealand. By Stephen M. Dawson and Elisabeth Slooten. Journal of Cetacean Reserve Management Vol. 7, pages 59-64, 2005.

Scientific paper: Geographical variation in Hector's dolphin: recognition of new subspecies of *Cephalorhynchus hectori*. By Alan N. Baker, Adam N. H. Smith, and Franz B. Pichler. Journal of the Royal Society of New Zealand Vol. 32, pages 713-727, 2002. [Link](#)

## Photos



Māui dolphin. Steve Dawson

**This webpage represents the views of the Endangered Species Foundation of New Zealand and not necessarily those of other individuals or organisations involved in the conservation of this species.**

**Have a comment on this page, more information, or a photograph we could use?  
Send it to us [info@endangeredspecies.org.nz](mailto:info@endangeredspecies.org.nz)**