Hector's and Maui's Dolphin Threat Management Plan Executive Summary

Your legislative obligations

1 The purpose of the Fisheries Act (the Act) is to provide for the utilisation of fisheries resources while ensuring sustainability. The meaning of sustainability includes ensuring that the adverse effects of fishing on the aquatic environment, including on Hector's dolphins, are avoided, remedied or mitigated.

2 The Act also contains a set of environmental principles that you are required to take into account. The key environmental principles in relation to Hector's dolphins are that associated and dependent species (including dolphins) should be maintained above a level that ensures their long-term viability and that biodiversity of the aquatic environment should be maintained.

3 The Act also provides you with specific powers in relation to managing the effects of fishing on protected species, including Hector's dolphins, which allow you to go beyond the minimum obligations set out by the environmental principles. Section 15 empowers you to take such measures as you consider necessary to avoid, remedy or mitigate the effects of fishing related mortality on any protected species.

4 Section 15 provides you with some discretion around the point at which you consider it necessary to implement management measures, and case law recognises that you are not required to manage protected species in the same manner as would be the case for harvestable species such as fish stocks. For example, objectives for a harvestable fish species might be to allow the maximum level of mortalities (i.e. catch) that is sustainable, but this thinking is not appropriate for a protected species. While not mandatory under the Act, the concept of rebuilding protected species populations to achieve non-threatened status is open to you when considering what effects of fishing are acceptable.

5 You should implement measures if you consider them necessary to avoid, remedy, or mitigate the effect of fishing-related mortality, based on best available information. If you determine management action is necessary, you should choose those measures that do not have an undue or unreasonable impact on utilisation. MFish notes that this does not imply a balance is required between sustainability and utilisation. You can restrict utilisation but only if you are confident those measures are necessary to avoid, remedy, or mitigate the effect of fishing-related mortality on dolphins.

Hector's and Maui's dolphins

6 Hector's dolphins are endemic to New Zealand, meaning that they are only found in New Zealand's waters. The species is divided into two subspecies based on genetic differences: Maui's dolphins occur in the waters of the north-west coast of the North Island and Hector's dolphins occur principally in South Island waters.

7 Hector's dolphin is an inshore coastal species with a limited home range. They are most often seen in murky waters close to shore and generally live in small groups – usually three to five individuals, but larger groups (30-40) are sometimes seen. The dolphins feed on

a variety of inshore species including red cod, yellow eyed mullet, small kahawai, stargazers and sea floor invertebrates.

8 Hector's and Maui's dolphins have some key biological characteristics that make them susceptible to the effects of human-induced mortality, including fishing related mortality. The dolphins:

a) Are relatively short lived (about 20 years);

b) Have a low reproduction rate (a female has a single calf every 2-3 years);

c) Become sexually mature at a relatively late age (about 7-9 years);

d) Have a localised inshore distribution (ie, an overlap with many human coastal activities).

9 Hector's dolphins are one of the world's rarest dolphin species. The Maui's dolphin subspecies is classified as "nationally critical" by the Department of Conservation (DOC) and "critically endangered" by the IUCN. The total population of Maui's dolphin is estimated to be 111 individuals (range 48 – 252). There are no comparative abundance surveys to establish trends over time but other information (outlined in the body of the document) suggests abundance and distribution is smaller now than in the past.

10 The South Island Hector's dolphin subspecies is classified as "nationally endangered" by the DOC and "endangered" by the World Conservation Union. The total population of South Island Hector's dolphins is estimated to be around 7,270 individuals (range 5303 – 9966). This is split between three populations that are genetically distinct and are geographically separated on the east coast, west coast and south coast of the South Island. There are no comparative abundance surveys to establish trends over time but other information suggests abundance has declined at a species level and at a population level in some areas.

Threats to dolphins

11 There are a number of threats facing the dolphin populations. Non-fishing threats include disease, pollution, boat strike, tourism and marine debris. Fishing threats include entanglements in set nets, trawl nets, drift nets and cray pot lines.

12 Fishing threats, and particularly entanglement in set nets, are thought to pose the greatest risk to dolphins. However, there is considerable uncertainty over levels of fishing-related mortality due to low observer coverage of commercial fisheries, no formal monitoring of recreational activity and poor incentives to voluntarily report incidents. Known mortalities are therefore likely to represent only an unknown proportion of actual mortalities.

13 There are a range of measures already in place to reduce threats to dolphins posed by fishing activity. These include regulated area and seasonal closures, gear restrictions and voluntary Codes of Practice. Measures have been introduced incrementally over time. For South Island Hector's dolphins these include:

a) A marine mammal sanctuary around Banks Peninsula;

b) A seasonal amateur set net ban between the Waiau and Waitaki Rivers (from 1 October to 31 March, out to 4 nautical miles from shore); and

c) A requirement for amateur fishers to stay with their nets when fishing at both Te Waewae Bay and Kaikoura (between the Waiau and Clarence Rivers, from 1 October to 31 March).

14 To protect Maui's dolphins in the North Island, commercial and amateur set netting has been prohibited between Maunganui Bluff (north of Dargaville) and Pariokariwa Point (north of New Plymouth), to a distance of four nautical miles offshore. Set netting has also been banned in the Manukau Harbour entrance.

15 The adequacy of these measures for ensuring the sustainability of Hector's and Maui's dolphins is largely unknown, and some residual risk of fishing-related mortalities remains for all four populations.

Threat Management Plan consultation

16 DOC and MFish are the two main agencies responsible for managing the protection of, and ensuring the sustainability of, Hector's and Maui's dolphins. MFish is responsible for ensuring the effects of fishing-related mortality on the dolphins are effectively managed and DOC undertakes research, manages a sightings database and has powers to propose marine mammal sanctuaries. In addition, local government control activities that may result in pollution and tourism impacts on dolphins. Protection of Hector's dolphins therefore extends wider than your obligations under the Act.

17 The Hector's and Maui's dolphin Threat Management Plan (TMP) has been developed to provide an overarching framework for the effective management of threats to Hector's and Maui's dolphins. Collectively, the Government's Vision Statement is that "Hectors dolphins should be managed for their long term viability and recovery throughout their natural range". As part of a long term strategy to achieve this vision, DOC and MFish developed and released for consultation a draft TMP. The draft TMP identified all human induced threats to Hector's dolphin populations including fishing and non-fishing threats and sought stakeholder feedback on potential options to mitigate those threats.

18 The proposals relating to managing fishing threats were characterised in relation to your obligations under the Act, as described above. The draft TMP therefore set out the current management framework and provided a range of options for further action, should you consider it necessary. Options ranged from observer coverage and commitment to voluntary best practice, through some seasonal and spatial closures and gear restrictions, to exclusion of fishing methods from the main summer or year-round range of Hector's dolphins.

Stakeholder views on the TMP

19 The draft TMP generated an enormous amount of interest. About 2,500 submissions were received from a variety of interested parties, along with many postcards, form letters and Ministerials.

20 Submissions revealed that there are considerable differences of opinion between industry, non-commercial fishers/groups, the general public and environmental organisations about the necessity for any additional measures to avoid, remedy or mitigate the effects of fishing-related mortality on Hector's dolphins.

21 Most industry and non-commercial fishers argue that the information presented in the draft TMP is insufficient to suggest a problem, that current management measures are working and that more research and monitoring is required before any further action is taken. On the other hand, environmental groups and most general submitters suggest that there is considerable information on which to base a decision and that strong and immediate additional action is necessary to manage the effect of fishing-related mortality on the species.

22 The fishing industry estimates that the overall cost of the proposals could be $88 million if the most restrictive measures were chosen for each geographical area and fishing method. Industry considers this cost far outweighs any known benefit to dolphins from banning certain types of fishing activity. However, environmental groups and some other submitters note that there are unquantified (by MFish) benefits associated with increased dolphin numbers (resulting from tourism returns and other associated sectors) and that returns from the set net fishery are a very small component of the overall value of the fishing industry (less than 1%).

Key Considerations

23 The need for action will be determined by careful consideration of your obligations under the Act, with a particular focus on your obligations relating to protected species under Section 15 of the Act, as described above. Relevant factors include, but are not limited to:

a) the size and distribution of the species or population;

b) the threats to the population;

c) impacts the various threats are having on the population;

d) effectiveness of current measures in mitigating threats;

e) utilisation impacts associated with different management options to mitigate threats.

24 Overarching all of the above is your assessment of whether any additional measures are considered necessary, or whether current management measures are already sufficient to meet your statutory obligations. If you consider that additional measures are necessary, you should then consider the range of options available to you, including the costs and benefits associated with these options.

25 Because the level of risk, range of current measures and potential options differs between sub-species and between populations, MFish discusses each population and each fishing method separately below.

26 There is a risk of ongoing mortality associated with options that allow continued overlap with fishing, using primarily set net and trawl methods, and Maui's and Hector's dolphins. Currently the extent of fishing related mortality of Maui's and Hector's dolphin is uncertain due to poor incentives to report and lack of independent monitoring. MFish considers it prudent to implement an improved monitoring regime in areas where risk of mortality from fishing remains after any new measures are put in place. However, if implemented, this improved regime will impose costs on industry which should be taken into account when considering the costs and benefits of options outlined.

Maui's dolphin

Population information

27 Maui's dolphin is a very small population (111, range 48-252) that has probably declined from higher levels of abundance. The dolphins are present in highest densities between Manukau Harbour and Port Waikato. Biological factors and low abundance make Maui's dolphin extremely susceptible to the effects of human-induced mortality. Potential Biological Removal (PBR) analysis provides an indication of the susceptibility of a population to the effects of fishing and other human-induced mortality. The PBR analysis presented in this paper indicates that Maui's dolphin can sustain no more than 0.2 human-induced deaths each year (1 every five years).

Nature of existing fishing threats

28 Reported Maui's dolphin mortalities include two net entanglements in 2002, and fishing is the primary cause of human-induced mortality where the cause is known. Set nets are considered to represent the biggest threat to Maui's dolphin. Subsequent to the reported mortalities, in 2003 the Minister of Fisheries prohibited set nets between Maunganui Bluff and Pariokariwa Point out to 4nm and in the Manukau Harbour entrance. This area reflected the known distribution of Maui's dolphin at the time.

29 New information suggests dolphins may occasionally venture outside the set net prohibition area including further south along the coast, into harbours and further offshore than 4nm. However, information on dolphin distribution is sparse and in some cases uncertain. Observer coverage of commercial set net vessels has also been almost nonexistent and no formal monitoring of amateur set netting has taken place, making an assessment of fishing-related mortalities difficult.

30 There are currently no regulated measures in place specifically designed to mitigate threats from trawling. However, a number of areas are closed to trawling for other reasons and these closures lessen the overlap between Maui's dolphin and trawling activity. There is a voluntary trawl prohibition that may also lessen overlap. There have been no reported entanglements of Maui's dolphins in trawl nets, although observer coverage of commercial trawl vessel has been virtually non-existent. Trawl vessels have been known to catch Hector's dolphins off the South Island. MFish, therefore, considers that trawl vessels pose a threat to Maui's dolphins. However, based on reported mortalities of Hector's dolphins, trawling as a method is considered to pose less of a risk of fishing-related mortality than set netting.

31 Commercial and amateur fishers use drift nets (nets that float with the river current) in one localised area on the west coast of the North Island (Port Waikato) to catch mullet and kahawai. MFish considers that Maui's dolphins outside Port Waikato are at risk of entanglement in drift nets that fishers lose in the river current. For example, lost nets can float outside Port Waikato on to the adjacent coast where Maui's dolphin is most common. The prevalence of lost nets is unknown to MFish, but there has been one known Maui's dolphin mortality that is considered to have been most likely caused by a drift net.

Need for further action

32 In light of the status of the population, you should consider whether current management reduces the likelihood of entanglement in fishing gear to an acceptable level. Limited observer coverage and monitoring means that MFish's ability to detect any fishing-related mortality under current management is negligible. The need for further action is therefore largely based on an assessment of risk from overlap of fishing activity and dolphin distribution. MFish considers the likelihood of Maui's dolphin entanglement in fishing gear is a function of (i) the distribution of dolphins and (ii) fishing method and effort.

33 While the existing set net prohibition removes the risk of entanglement along the core distribution of Maui's dolphin, MFish considers that some residual risk remains from:

a) Amateur and commercial set nets outside of the set net prohibition area, where dolphins may occasionally travel;

b) Trawling;

c) Drift nets at Port Waikato.

34 Fishing interests (commercial and non-commercial) are concerned that there is insufficient information to take action and that further research should be undertaken on population size and distribution before action is taken. They consider that there are no fishing related threats to Maui's dolphin not already being actively managed, and none that need urgent management. Fishing interests stress that any action taken will offer negligible (or no) benefit to dolphins but impact greatly on fishers.

35 Environmental groups note that Maui's dolphins are the rarest dolphin in the world. They consider there is sufficient information to take action now to reduce the impact of human induced mortality, in particular the threat posed by fishing. Environmental groups (and many other people who submitted on the draft TMP) argue that you should take a precautionary approach to manage all threats to Maui's dolphin.

36 MFish considers that under current management, there is a low likelihood of fishing-related mortalities occurring. However, in light of the status of the population, information about the distribution of dolphins, and information about threats that have no specific mitigation applied, MFish believes that you should consider whether current management reduces the likelihood of entanglement in fishing gear to an acceptable level. You may consider that additional protection from fishing threats is necessary, as the consequence of even an individual fishing-related mortality is extremely high due to the size of the Maui's dolphin population.

Options

37 Tables 1-3 outline the range of options for avoiding, remedying or mitigating the effects of fishing-related mortality on Maui's dolphins if you consider it necessary. Options range from status quo through to exclusions of fishing methods from the winter or year-round distribution of Maui's dolphin. Each option represents a different combination of effectiveness in reducing risk and social and economic cost to fishers.

38 The set net options are broadly structured around areas outside the existing set net prohibition where dolphins have occasionally been seen, including entrances to WCNI harbours, south to Taranaki, and offshore from 4nm. Trawl options also feature and are

structured around the core dolphin area between Manukau Harbour and Port Waikato, a wider area covered by the existing *set net* prohibition, and south to Taranaki. Drift net prohibition options feature for Port Waikato. The options in Table A3 are broken down further in the Maui's dolphin section of this final advice to reflect the relative threat of entanglement in different areas.

Table 1: Amateur and commercial set net – West Coast North Island

Option	***Impacts/Effectiveness***
Status Quo No change to existing management	Risk of set net entanglement is substantially mitigated. Some residual risk from nets set outside the set net prohibition where dolphins may occasionally be present. No impacts on current fishing activities.
Option 1 Partial area prohibitions in the Manukau & Kaipara Harbours and Port Waikato	Eliminates risk of set net entanglement in the Kaipara Harbour and Manukau Harbour entrances where dolphins may occasionally travel. Also removes entanglement risk from set nets that may break free and drift into dolphin habitat outside Port Waikato. Some residual risk from set nets if dolphins are occasionally present outside these extended boundaries. Most of the impact will be experienced by fishers in the Manukau Harbour. MFish estimates that impacts on industry (including downstream impacts) could equate to lost annual income of less than $1 million and a present value loss of less than $2 million (from relatively small reductions in rig, flatfish, and mullet catches). The impact on some individual fishers will probably be very high. MFish cannot determine the extent of the impact on amateur fishers but considers people may encounter difficulties accessing species that they cannot catch effectively with other fishing methods.
Option 2 Compulsory net attendance and no overnight set netting in all west coast North Island harbours	Option 2 for amateur set netters may lower entanglement risk if dolphins enter the harbours by reducing set net effort and enabling fishers to remove their net from the water if dolphins appear in vicinity. Impacts on use will probably result from reduced amateur set net effort in the harbours and decreased catches of the main amateur target fisheries (flatfish, mullet, and rig), because set netting is the most efficient and effective fishing method for these species. MFish now doubts that Option 2 for commercial set netters would lower entanglement risk because commercial nets are long and would be difficult to haul at a speed that would reduce threat to dolphins if they come into the vicinity. MFish estimates that impacts on industry (including downstream impacts) could equate to lost annual income around $6 million and a present value loss around $15.2 million.
Option 3 Set netting prohibited in west coast North Island harbours, offshore to 12nm, and south to Taranaki	Avoids all risk of set net entanglement on the west coast of the North Island. Option 3 will have a significant impact on current set net activities. MFish estimates that impacts on industry (including downstream impacts) associated with Option 3 could equate to lost annual income of around $10 million and a present value loss of around $25 million. Significant job losses and socio economic impacts are likely to accompany this option. MFish considers it will be very difficult for amateur fishers to utilise some fisheries to the extent they currently do. Amateur set net effort in the harbours and south to Taranaki will cease and catches of the main amateur target fisheries will probably decrease. Opportunity remains for amateur fishers to fish using alternative methods (e.g. hand lining)

Table 2: Trawling – West Coast North Island

Option	***Impacts/Effectiveness***
Status Quo No change to existing management	Some risk of trawl entanglement is currently mitigated by regulatory and voluntary trawl prohibitions inshore where the dolphins are most common over summer. Risk of entanglement remains outside these prohibitions, where trawling overlaps with Maui's dolphins range. Status quo has no impact on utilisation.
Option 1 Additional monitoring of trawl activity between Maunganui Bluff and Pariokariwa Point to 4nm offshore	Risk of entanglement in trawl nets is unchanged (i.e., remains the same as under existing management). Additional monitoring will provide increased certainty over the effect of trawling on Maui's dolphins. This option is unlikely to have a direct impact on the ability of fishers to harvest fish species. However, there will be additional costs associated with increased monitoring, which may be significant. Some fishers may be unable to absorb this extra cost.
Option 2 Trawling prohibited year round in the dolphins' core area (Manukau Harbour to Port Waikato) and seasonally (June to August inclusive) between Maunganui Bluff and Pariokariwa Point to 4nm offshore	Risk of entanglement in trawl nets is eliminated in Maui's dolphins' core area and the likelihood of entanglement is reduced outside the core area by prohibiting trawling during winter (when dolphins move offshore beyond existing regulatory trawl prohibitions). Residual risk remains over the summer months outside the core area, where dolphins are present (albeit at relatively lower densities) and trawling occurs. MFish estimates that impacts on industry (including downstream impacts) could equate to lost annual income of around $3 million and a present value loss of around $11 million. These impacts are mainly driven by catch reductions in three valuable west coast North Island trawl fisheries (snapper, gurnard and trevally). Some of these impacts could probably be compensated by relocating effort outside the Option 2 trawl prohibitions.
Option 3 Trawling prohibited between Manganui Bluff and Cape Egmont to 4nm offshore	Removes risk of trawl entanglement over most of the dolphins range (i.e., with the exception of any dolphins occasionally present further offshore than 4 nm). MFish estimates that impacts on industry (including downstream impacts) could equate to lost annual income of around $10 million and a present value loss of around $42 million. As with Option 2, these impacts mainly arise from catch reductions in snapper, gurnard and trevally. While there may be opportunities for some larger trawl vessels to adjust to Option 3 measures by relocating effort outside 4nm, many trawl vessels will probably be unable to operate beyond 4 nm.

Table 3: Drift netting – West Coast North Island

Option	*Impacts/Effectiveness*
Status Quo No change to existing management	No measures are in place to mitigate this threat, although commercial drift net effort has declined in recent years. Risk of Maui's dolphin entanglement in lost drift nets exists. Whilst nets are probably lost infrequently, MFish does not know how often nets are lost under current practices. No impact on current drift net use.
Option 1 Drift netting prohibited in the lower reaches of the Waikato River at Port Waikato	Reduce the likelihood of dolphin entanglement by shifting all effort upstream so lost nets would have longer to travel and more time to roll up before they reach the coast. Residual risk remains from nets that are lost upstream and reach the coast without rolling up or being retrieved. MFish estimates that impacts on industry (including downstream impacts) could equate to lost annual income of around $220,000 and a present value loss of around $600,000. Commercial drift net fishing will probably cease. MFish considers the overall impact on amateur fishers would not be as large as the impact on commercial fishers. Amateur fishers could probably relocate some effort upstream and still catch sufficient quantities of fish. Some fishers, especially those who normally fish in the lower reaches of Port Waikato, may be affected more than others.
Option 2 Drift netting prohibited in Port Waikato (the lower and upper reaches of the Waikato River)	Eliminates the likelihood of dolphin entanglement in drift nets. Impacts on commercial fishers will probably be similar to those under Option 1 above (lost annual income of around $220,000 and a present value loss of around $600,000). MFish has no information on the degree to which amateur drift net fishers rely on the Port Waikato drift net fishery for anything more than leisure, so cannot determine whether Option 2 would deny fishers a vital food source. Amateur fishers residing around Port Waikato would probably be more affected by Option 2 than non-resident fishers who should be able to relocate to other fishing locations more easily.

39 In the short term (2008/09 onwards) monitoring of WCNI commercial trawl and set net fishing activity can provide a broadly representative rate of bycatch for the summer months, but cannot be used to estimate total annual bycatch. Additional research would not be able to be conducted in time to provide any new information in the short term.

40 In the longer term (2013 onwards) monitoring of WCNI commercial trawl and set net fishing activity can provide year-round representative bycatch rates, if required, but at high cost. Additional research can also be delivered to improve distribution, abundance, and potentially trend information, including through the use of improved modelling.

East Coast of the South Island Hector's dolphin

Population information

41 The East Coast of the South Island (ECSI) population of Hector's dolphin extends between Cape Farewell (near Golden Bay) in the north and Slope Point (south of Waikawa Harbour in the Catlins) in the south.

42 The most recent abundance estimate for the ECSI population is 1791 (range 1246 to 2843), however, there is considerable uncertainty associated with this estimate. There are no comparative abundance surveys to establish trends over time, but other information such as genetic sampling and population modelling suggests dolphin abundance may have declined significantly, though not necessarily recently.

43 The PBR analysis presented in this paper indicates that the ECSI population can sustain no more than 2-13 human-induced deaths each year.

Nature of existing fishing threats

44 Fishing is recorded as the single biggest threat to the ECSI population, with 86 recorded fishing-related mortalities out of a total 255 reported mortalities. However, while these data provide an indication of the nature and perhaps relative risk of different threats, it is not possible to determine the extent of each threat. For fishing threats, MFish considers that the actual level of mortalities is likely to have been higher than recorded or reported, as observer coverage has historically been very low.

45 Fishing methods known to have caused ECSI Hector's dolphin mortalities are commercial and amateur set netting, commercial trawling and commercial rock lobster potting.

46 A range of regulated and voluntary measures are currently in place for commercial and amateur set netting, including:

a) Commercial and recreational set nets are restricted in length and soak time

b) Banks Peninsula Marine Mammal Sanctuary contains seasonal prohibitions and restrictions for commercial and amateur set netting

c) Seasonal amateur set net prohibition in the Canterbury area (between the Waiau and Waitaki Rivers from 1 October to 31 March)

d) Seasonal requirement for amateur fishers to stay with their net when set netting in the Kaikoura area (between the Waiau and Clarence Rivers from 1 October to 31 March)

e) Voluntary Codes of Practice for commercial set netting, including avoiding fishing in areas where Hector's dolphin are known to frequent and using pingers to deter dolphins.

47 There are currently no regulated measures in place specifically designed to mitigate threats from trawling. However, a number of areas are closed to trawling for other reasons and these closures serve to lessen the overlap between hector's dolphin distribution and trawling activity. In addition, some voluntary measures are in place including seasonal exclusions from some bays and areas of coastline. No measures are currently regulated for rock lobster potting, though some fishers may be using voluntary mitigation.

Need for further action

48 Mortalities of dolphins continue to occur under existing management regimes. However, MFish cannot determine with certainty whether existing measures are sufficient to ensure that cumulative mortalities from all fishing methods will not impact on the ability of the population to rebuild, or whether fragmentation of the population will occur if no additional measures are brought in. Observer coverage is often low, amateur fishing is largely not monitored and self-reporting is known to be low across commercial fishers as a whole.

49 Most Industry and recreational fishers generally consider that additional measures are not necessary, based on the information provided in the draft TMP. Environmental stakeholders and the general public typically consider that strong additional measures are necessary.

50 On balance, MFish considers that it is necessary for you to take additional management action to avoid remedy or mitigate the effects of fishing-related mortality on the ECSI Hector's dolphin population. Rebuild of the population is threatened by very low levels of human induced mortality, current management action is only likely to be partially effective, high risk threats such as set netting are largely reliant on voluntary measures and reported mortalities (only an unknown proportion of total mortalities) are still occurring at potentially significant levels (at the lower bound of the PBR).

Options

51 Tables 4-6 outline the range of options for avoiding, remedying or mitigating the effects of fishing related mortality on the SCSI population. Options range from status quo through to exclusions of fishing methods from the summer or year-round distribution of Hector's dolphins. Each option represents a different combination of effectiveness in reducing risk of fishing related mortality and social and economic cost to fishers.

Table 4: Amateur set netting – East Coast South Island

Option	***Impacts/Effectiveness***
Status Quo No change to existing management	Risk from amateur set netting has been mitigated in highest risk areas and times of the year (summer months in Canterbury and Kaikoura). Residual risk remains over the winter in the Canterbury/Kaikoura regions and throughout the year along the remainder of the coast. No impact on current amateur set net usage.
Option 1 Existing measures plus additional restrictions (including mandatory net attendance, no overnight setting, maximum one net per person/boat and shorter net lengths)	Lowers risk of entanglement by reducing set net effort and enabling fishers to remove their net from the water if dolphins appear in vicinity. Residual risk exists if fishers cannot remove their nets from the water in time to prevent dolphin entanglement. MFish considers that these additional restrictions may have a significant impact on amateur utilisation. Effort may be reduced by around 50-85%[1], particularly for species such as flounder that cannot easily be targeted in the daytime.
Option 2 Amateur set netting prohibited between 1 October and 31 March, with restricted set netting for butterfish and flounder between 1 April and 30 September (only in designated areas with Option 1 restrictions)	Avoids risk of entanglement over the summer months when most Hector's dolphins are caught in set nets. Also reduces risk over the winter, as set netting is only allowed in areas and using practice considered to be of low risk to the dolphins. Risk remains in designated areas during winter if dolphins are present and fishers cannot remove their nets from the water in time to prevent entanglement. These measures will have a significant impact on utilisation because amateur set netting for species such as rig and school shark would essentially be prohibited. There is also likely to be a large decrease in butterfish catch (by around 75-90%[2]) because of the summer ban.
Option 3 Amateur set netting prohibited	Avoids any likelihood of entanglement in amateur set nets on the east coast of the South Island. Removes the ability of amateur fishers to set net (other than in some harbours and estuaries that are excluded from the draft TMP proposals) and therefore has a highly significant impact on use.

[1] Based on socio-economic research
[2] Based on socio-economic research

Table 5: Commercial set netting – East Coast South Island

Option	***Impacts/Effectiveness***
Status Quo No change to existing management	Risk of entanglement in commercial set nets has been partially mitigated by current measures (including sanctuary restrictions and voluntary CoPs). Risk of entanglement remains where commercial set netting overlaps with the dolphins' range (i.e., throughout much of the sub-population's distribution). No impact on current commercial set net utilisation.
Option 1 Additional monitoring	Risk of entanglement in commercial set nets is unchanged (i.e., remains the same as under existing management). Additional monitoring will provide increased certainty over the effect of commercial set netting on ECSI Hector's dolphins. This option is unlikely to have a direct impact on the ability of fishers to harvest fish species. However, there will be additional costs associated with increased monitoring, which may be significant. Some fishers may be unable to absorb this extra cost.
Option 2 Commercial set netting prohibited within 2nm of shore (4nm in Canterbury area and <1nm in Kaikoura canyon). Possible exemptions allowing restricted set netting for butterfish and flounder between 1 April and 30 September (only in designated areas with mandatory net attendance, no overnight setting, maximum one net per person/boat and shorter net lengths)	Reduces risk of entanglement in inshore areas over the summer months, where most known commercial set net interactions occur. Also reduces risk over the winter, as set netting in the inshore area would either be prohibited or only allowed in areas and using practice considered to be of low risk to the dolphins. Risk of entanglement remains offshore from the prohibition boundary, where commercial set netting will continue to overlap with the dolphins' distribution. If permitted, residual risk would also exist in designated areas during winter if dolphins are present and fishers cannot remove their nets from the water in time to prevent entanglement. MFish estimates that impacts on industry (including downstream impacts) could equate to lost annual income of between $5.3 and $6.3 million and a present value loss of between $18.1 and $21.5 million.[3]
Option 3 Commercial set netting prohibited out to 12nm offshore, and extended to 18nm in the Canterbury region (Waiau River to the Waitaki River)	Avoids all risk of entanglement in commercial set nets. MFish estimates that impacts on industry (including downstream impacts) could equate to lost annual income of around $8 million and a present value loss of around $27 million. MFish believes this option will effectively close the ECSI set net fishery, as 97% of set net activity currently occurs within 12 nautical miles of shore.

[3] The ranges are based on an assessment of cost for closures across the whole of the ECSI out to 2 and 4 nautical miles, respectively. The recommended boundary for Option 2 varies with water depth and so will probably fall within the range of costs presented.

Table 6: Trawling – East Coast South Island

Option	***Impacts/Effectiveness***
Status Quo No change to existing management	The threat from trawling has been partly mitigated through existing measures, including voluntary CoP area closures and mandatory trawl exclusions in place for other fisheries management purposes. Risk of entanglement remains outside the closed areas where trawling overlaps with the dolphins' range, particularly within 2 nm where all known trawl incidents have occurred. No impact on current trawling utilisation.
Option 1 Further development of a voluntary trawl CoP with additional monitoring	Further mitigates risk by encouraging voluntary adoption of measures to avoid dolphin mortalities and increases certainty around the effect of trawling on ECSI Hector's dolphins. Residual risk remains outside existing closed areas, particularly within 2nm of shore, if voluntary measures are not followed or are not effective. This option is unlikely to have a direct impact on the ability of fishers to harvest fish species. However, there will be additional costs associated with increased monitoring, which may be significant. Some fishers may be unable to absorb this extra cost.
Option 2 Trawling prohibited within 2 nm, with an exemption for trawlers targeting flatfish. Further development of a voluntary trawl CoP with additional monitoring.	Risk of trawling interactions is mitigated by excluding the highest risk trawl gear type from areas where dolphins are known to have been caught. Risk remains from flatfish trawling inside 2 nm and trawling outside 2 nm where it overlaps with the dolphins' range, as these activities still have the potential to cause mortalities. This measure is likely to carry a high cost to fishers. MFish estimates that impacts on industry (including downstream impacts) could equate to lost annual income of around $6.8 million and a present value loss of around $18.5 million.[4] The ECSI trawl fishery is significant, and consequently even a small proportion of lost catch has a substantial cost.
Option 3 All trawling prohibited within 2 nm. Further development of a voluntary trawl CoP with additional monitoring	Further mitigates risk by excluding all trawl vessels from areas from areas where dolphins are known to have been caught. Risk of entanglement remains from trawling outside 2 nm where it overlaps with the dolphins' range. This measure is likely to carry a significant cost to fishers. MFish estimates that impacts on industry (including downstream impacts) could equate to lost annual income of around $18.3 million and a present value loss of around $49.2 million.[5]

[4] These costs may overestimate the impact if species can be easily targeted outside of 2 nautical miles. MFish cannot verify whether some species could be caught in their entirety outside of 2 nautical miles.
[5] These costs may overestimate the impact if species can be easily targeted outside of 2 nautical miles. MFish cannot verify whether some species could be caught in their entirety outside of 2 nautical miles.

Rock lobster potting

52 As proposed in the draft TMP, MFish recommends that stakeholders are encouraged to develop voluntary solutions to manage the risk to dolphins from cray potting (such as through weighting their buoy lines in areas where tidal movements are strong). This could perhaps be achieved through the Fisheries Plan process, and adoption of mitigation practices could be monitored by MFish through periodic inspections by fishery officers. Should voluntary uptake not be significant, proposals for further action would follow.

Monitoring

53 Some of the options allow for overlap of fishing activity and dolphin distribution. Increased monitoring should be considered in combination with these options so that ongoing impacts of fishing can be assessed.

54 In the short term (2008-09 onwards) monitoring of ECSI commercial trawl and set net fishing activity can provide a broadly representative rate of bycatch for the summer months, but would require strong assumptions to estimate total annual bycatch. Additional research would not be able to be conducted in time to provide any new information in the short term.

55 In the longer term (2013 onwards) monitoring of ECSI commercial trawl and set net fishing activity can provide year-round representative bycatch rates, if required, but at high cost. Additional research can also be delivered to improve distribution, abundance, and potentially trend information, including through the use of improved modelling.

South Coast of the South Island Hector's dolphin

Population information

56 The south coast of the South Island (SCSI) population is concentrated in Te Waewae Bay, although dolphins are distributed along other sections of coastline. The most recent published abundance estimate for the dolphin population in Te Waewae Bay is 89. However, a more recent unpublished study estimates that the population using Te Waewae Bay in 2004-05 summer was 403 individuals (range 280-488). There are no comparative abundance surveys to establish trends over time and MFish cannot determine with certainty from modelling and genetic analysis whether the population has increased or declined.

Nature of existing fishing threats

57 Set netting (amateur and commercial) and trawling overlaps with SCSI Hector's dolphins. There are very few mortalities for this population recorded on the DOC database, and no confirmed human-induced mortalities, although there is one possible entanglement. However, there has been no formal monitoring of amateur set net activity, no monitoring of trawl fishing and limited monitoring of commercial set net fishing, particularly within Te Waewae Bay. Assessment of threat from fishing is therefore more focused on considering overlap of fishing effort with dolphin distribution.

58 The threat from amateur set netting is considered to be greatest close to shore in Te Waewae Bay, where both amateur fishing effort and dolphin abundance is concentrated. Commercial set netting occurs off the SCSI and throughout Te Waewae Bay. Dolphins are probably at most risk of commercial set net entanglement inshore during summer when

fishing effort is highest and dolphins are more concentrated close to shore. Trawling also occurs along the SCSI, including Te Waewae Bay, and trawl activity in the inshore area is considered to pose a threat of dolphin mortality.

59 Some regulated measures are currently in place for amateur set netting – amateur fishers are required to stay in attendance with their net when set netting in Te Waewae Bay – and some voluntary measures are currently in place for amateur set netting and commercial set netting and trawling.

Need for further action

60 Most industry and recreational fishers consider that additional mandatory measures are generally not necessary based on the information provided in the TMP, with a preference for voluntary solutions. Environmental stakeholders and the general public typically consider that strong additional measures are necessary.

61 On balance, MFish considers that additional management action is necessary, due to a lack of regulated management measures coupled with very low Potential Biological Removals (PBR), with more risk in the Te Waewae Bay area where dolphins are concentrated. Nevertheless, there is little direct evidence of dolphin mortalities and you should consider whether the above information on risk of mortalities occurring is sufficient for you to consider that additional measures are necessary.

Options

Tables 7-9 outline the range of options for avoiding, remedying or mitigating the effects of fishing related mortality on the SCSI population of Hector's dolphin if you consider it necessary. The options range from status quo through to exclusions of fishing methods from the dolphins' summer or year-round distribution.

Table 7: Amateur set netting – South Coast South Island

Option	***Impacts/Effectiveness***
Status Quo No change to existing management	Risk from amateur set netting has been partially mitigated in the highest risk area (Te Waewae Bay). Risk of entanglement exists along the remainder of the coast. Some risk also remains in Te Waewae Bay if fishers cannot remove their nets from the water in time to prevent dolphin entanglement. No impact on current amateur set net use.
Option 1 Existing measures plus additional restrictions (including mandatory net attendance, no overnight setting, maximum one net per person/boat and shorter net lengths)	Lowers risk of entanglement by reducing set net effort and enabling fishers to remove their net from the water if dolphins appear in vicinity. Residual risk exists if fishers cannot remove their nets from the water in time to prevent dolphin entanglement. MFish considers that these additional restrictions may have a significant impact on amateur utilisation. Effort may be reduced by around 80-90%[6], particularly for species such as flounder that cannot easily be targeted in the daytime.
Option 2 All amateur set netting prohibited in Te Waewae Bay. Outside Te Waewae Bay, amateur set netting prohibited between 1 October and 31 March, with restricted set netting for butterfish between 1 April and 30 September (only in designated areas with Option 1 restrictions)	Avoids risk of entanglement in amateur set nets in the area of highest dolphin abundance, and reduces risk along the rest of the SCSI. Risk remains in designated areas outside Te Waewae Bay during winter if dolphins are present and fishers cannot remove their nets from the water in time to prevent entanglement. MFish considers that impacts on use will probably be high, particularly in Te Waewae Bay, which is the most popular area for amateur set netting on the SCSI.

[6] Based on socio-economic research

Table 8: Commercial set netting – South Coast South Island

Option	***Impacts/Effectiveness***
Status Quo No change to existing management	Risk of entanglement in commercial set nets has been partially mitigated by current voluntary CoP measures. Risk of entanglement remains where commercial set netting overlaps with the dolphins' range (i.e., throughout much of the sub-population's distribution). No impact on current commercial set net utilisation.
Option 1 Additional monitoring	Risk of entanglement in commercial set nets is unchanged (i.e., remains the same as under existing management). Additional monitoring will provide increased certainty over the effect of commercial set netting on SCSI Hector's dolphins. This option is unlikely to have a direct impact on the ability of fishers to harvest fish species. However, there will be additional costs associated with increased monitoring, which may be significant. Some fishers may be unable to absorb this extra cost.
Option 2 Commercial set netting prohibited within 2nm from shore and additional monitoring. Possible exemptions allowing restricted set netting for butterfish between 1 April and 30 September (only in designated areas outside Te Waewae Bay with shorter net lengths)	Reduces risk of entanglement in inshore areas over the summer months, where most known commercial set net interactions occur. Also reduces risk over the winter, as set netting in the inshore area would either be prohibited or only allowed in areas and using practice considered to be of low risk to the dolphins. Risk of entanglement remains offshore from the prohibition boundary, where commercial set netting will continue to overlap with the dolphins' distribution. Residual risk would also exist in designated areas during winter if dolphins are present and fishers cannot remove their nets from the water in time to prevent entanglement. MFish estimates that impacts on industry (including downstream impacts) could equate to lost annual income of around $600,000 and a present value loss of around $2.3 million.[7]
Option 3 (applies to Te Waewae Bay only, but can be implemented in conjunction with Option 2 for the area outside Te Waewae Bay) All commercial set netting prohibited within Te Waewae Bay	Avoids all risk of entanglement in commercial set nets within Te Waewae Bay. Residual risk remains outside Te Waewae Bay where set netting continues to overlap with the dolphins' distribution (for example, offshore from the prohibition boundary) MFish estimates that impacts on industry (including downstream impacts) could equate to lost annual income of around $150,000 and a present value loss of around $650,000.[8] These costs would be in addition to any costs associated with measures implemented outside Te Waewae Bay (e.g. Option 2 costs for the rest of the SCSI are estimated to be around $562,000 and $2.1 million for lost annual income and present value, respectively).

[7] These costings have been estimated based on the proportion of effort within and outside of the Bay in 2006/07, an assumption that may not be robust.
[8] These costings have been estimated based on the proportion of effort within and outside of the Bay in 2006/07, an assumption that may not be robust.

Table 9: Trawling – South Coast South Island

Option	***Impacts/Effectiveness***
Status Quo No change to existing management	There are no specific measures currently in place to mitigate the threat of trawling to SCSI Hector's dolphins. Risk of entanglement exists where trawling overlaps with the dolphins' range, particularly in Te Waewae Bay within 2 nm (all known trawl incidents off other parts of the coast have occurred within 2 nm). No impact on current trawling utilisation.
Option 1 Further development of a voluntary trawl CoP with additional monitoring	Residual risk remains where trawling overlaps with the dolphins' range, if voluntary measures are not followed or are not effective. This option is unlikely to have a direct impact on the ability of fishers to harvest fish species. However, there will be additional costs associated with increased monitoring, which may be significant. Some fishers may be unable to absorb this extra cost.
Option 2 Trawling prohibited within 2 nm, with an exemption for trawlers targeting flatfish. Further development of a voluntary trawl CoP with additional monitoring.	Risk of trawling interactions is mitigated by excluding the highest risk trawl gear type from inshore areas (where dolphins are known to have been caught off other parts of the coast and where dolphins are most concentrated in Te Waewae Bay). Risk remains from flatfish trawling inside 2 nm and trawling outside 2 nm where it overlaps with the dolphins' range (particularly in Te Waewae Bay) as these activities still have the potential to cause mortalities. MFish estimates that impacts on industry (including downstream impacts) could equate to lost annual income of around $492,000 million and a present value loss of around $1.3 million.[9]
Option 3 (applies to Te Waewae Bay only, but can be implemented in conjunction with Option 2 for the area outside Te Waewae Bay) All trawling prohibited within 2 nm inside Te Waewae Bay. Further development of a voluntary trawl CoP with additional monitoring	Further mitigates risk by excluding all trawl vessels from the inshore area in Te Waewae Bay. Risk of entanglement remains from trawling where it overlaps with the dolphins' range (e.g. outside 2 nm and flatfish trawling inside 2 nm along the rest of the SCSI). It is not possible for MFish to assess the impact of this option for Te Waewae Bay area, as it is not known what proportion of effort occurs inside and outside the bay. Cost information is therefore presented as if the option applied to the whole of the SCSI. MFish estimates that impacts on industry (including downstream impacts) of this measure across the whole SCSI could equate to lost annual income of around $1.92 million and a present value loss of around $4.8 million.[10]

[9] These costs may overestimate the impact if species can be easily targeted outside of 2 nautical miles. MFish cannot verify whether some species could be caught in their entirety outside of 2 nautical miles.

[10] These costs may overestimate the impact if species can be easily targeted outside of 2 nautical miles. MFish cannot verify whether some species could be caught in their entirety outside of 2 nautical miles.

62 Some of the options allow for overlap of fishing activity and dolphin distribution, with a recommendation that more information is gathered. For these options, additional monitoring, coupled with research, can be conducted to reduce uncertainty over the level of residual risk, if any, that fishing activity may pose to the dolphin population, and may reveal whether further additional measures are necessary.

63 In the short term (2008/09 onwards) monitoring of SCSI commercial trawl and set net fishing activity can provide a broadly representative rate of bycatch for the summer months for the areas monitored, but would require strong assumptions to estimate total annual bycatch. It may also be necessary to introduce regulations to target observer coverage into high risk areas such as Te Waewae Bay. Additional research would not be able to be conducted in time to provide any new information in the short term.

64 In the longer term (2014 onwards) monitoring of SCSI commercial trawl and set net fishing activity can provide year-round representative bycatch rates for the areas monitored, if required, but at high cost. Additional research can also be delivered to improve distribution, abundance, and potentially trend information, including through the use of improved modelling.

West Coast South Island Hector's dolphin

Population Information

65 The most recent abundance estimates suggest the west cost South Island (WCSI) population is about 5,400 individuals (range 3613-8034) – the largest of all the Hector's dolphin populations. Information about trends in abundance of the WCSI population is ambiguous. Modelling studies suggest abundance has declined. Genetic research detected no evidence of a decline in abundance. Anecdotal evidence from fishers suggests abundance is stable if not increasing.

Nature of existing fishing threats

66 Fishing (particularly set netting) is the biggest single cause of death of WCSI Hector's dolphins where the cause is known. Set netting (amateur and commercial) and trawling overlaps with the dolphin distribution, resulting in mortalities. However, the exact number of fishing-related mortalities is uncertain because there are few incentives for fishers to report mortalities, very little independent monitoring, and evidence to suggest that the actual number of fishing-related mortalities is probably higher than reported.

67 There are currently no regulated measures for any fishing method specifically targeted at mitigating dolphin mortalities, however, some voluntary measures are currently in place for amateur set netting and commercial set netting.

Need for further action

68 Industry and amateur fishers consider that the current level of reported mortality is well within a biologically acceptable level and that information on the status of the population and the nature and extent of threats is so uncertain that Ministers will be unable to make informed and meaningful decisions. Some submitters argue that threats to dolphins are already managed by existing measures.

69 Environmental groups consider that the options presented do not go far enough to enable the population to increase. They consider that more restrictive measures are necessary because the WCSI has the largest population of Hector's dolphins and needs adequate protection to ensure the long-term viability of the overall species. Environmental submitters also highlight the intrinsic and social value of the dolphins.

70 MFish considers the effect on the WCSI dolphins of fishing-related mortality is probably the lowest of all of the Hector's dolphin populations because of the size of the WCSI population. MFish therefore considers the need for action to reduce fishing related-mortality may be less for the WCSI population than for other Hector's dolphin populations. However, the WCSI population currently has no regulated measures in place, making the population vulnerable to potentially high levels of fishing-related mortality. Local fragmentation may also be a concern in areas of high fishing activity. MFish considers that management action is open to you should you consider it necessary, for this population and/or the species overall

Options

71 Tables 10-11 outline the range of options for avoiding, remedying or mitigating the effects of fishing related mortality on the WCSI population of Hector's dolphins if you consider it necessary. There is a range of options open to you from status quo through to exclusions of fishing methods from the dolphins' summer or year-round distribution.

Table 10: Amateur and commercial set netting – West Coast South Island

Option	***Impacts/Effectiveness***
Status Quo No change to existing management	Risk of entanglement in commercial and amateur set nets has been partially mitigated by current voluntary CoP measures. Risk of entanglement remains where set netting overlaps with the dolphins' range (i.e., throughout the sub-population's distribution). No impact on current set net utilisation.
Option 1 For amateur fishers: existing measures plus additional restrictions (including mandatory net attendance, no overnight setting, maximum one net per person/boat and shorter net lengths) For commercial fishers: adherence to voluntary CoP and additional monitoring	Lowers risk of entanglement in amateur set nets by reducing set net effort and enabling fishers to remove their net from the water if dolphins appear in vicinity. Residual risk exists if amateur fishers cannot remove their nets from the water in time to prevent dolphin entanglement. MFish considers that these additional restrictions may have a significant impact on amateur utilisation. Effort may be reduced by between 90-100%.[11] Risk of entanglement in commercial set nets is unchanged (i.e., remains the same as under existing management). Additional monitoring will provide increased certainty over the effect of commercial set netting on WCSI Hector's dolphins. This option is unlikely to have a direct impact on the ability of fishers to harvest fish species. However, there will be additional costs associated with increased monitoring, which may be significant. Some fishers may be unable to absorb this extra cost.
Option 2 Commercial and amateur set netting is prohibited inside 2 nm or 4 nm for either three months (1 December to last day February) or six months (1 October to 30 April), plus Option 1 measures.	Reduces entanglement risk by eliminating amateur and commercial set netting inshore in summer when dolphins are closest to the coast and set net activity is traditionally high. The 4 nm and six month prohibitions reduce entanglement risk more than the 2 nm and three month prohibitions. Risk of entanglement will remain during months when set netting is permitted, and offshore from the seasonal boundaries. MFish estimates that impacts on industry (including downstream impacts could equate to lost annual income of around 630,000 and a present value loss of around $2 million. MFish considers that these additional restrictions may have a significant impact on amateur utilisation. Effort may be reduced by between 50-100%.[12]

[11] Based on socio-economic research
[12] Based on socio-economic research

Table 11: Amateur and commercial set netting – West Coast South Island - continued

Option	***Impacts/Effectiveness***
Option 3 Commercial and amateur set netting prohibited inside 6nm	Substantially mitigates risk by eliminating set netting throughout almost all of the populations' distribution (WCSI dolphins rarely travel further than 6 nm from shore). Residual risk of entanglement in set nets exists if dolphins occasionally travel further offshore then 6 nm (where commercial set netting will continue) and in Golden Bay where there is a low abundance of dolphins.[13] MFish estimates that impacts on industry (including downstream impacts) could equate to lost annual income of around $630,000 and a present value loss of around $2 million (mainly from a large reduction in rig catch and a moderate reduction in school shark catch). MFish considers that this measure will have a significant impact on amateur utilisation. Effort may be reduced by between 95-100%.[14]

[13] Golden Bay was not included in the area to which the proposals apply.
[14] Based on socio-economic research

Table 12: Trawling – West Coast South Island

Option	***Impacts/Effectiveness***
Status Quo No change to existing management	There are no measures currently in place to mitigate the threat of trawling to WCSI Hector's dolphins. Risk of entanglement remains where trawling overlaps with the dolphins' range, particularly within 2 nm where all known trawl incidents have occurred. No impact on current trawling utilisation.
Option 1 Development of a voluntary trawl CoP with additional monitoring	Mitigates risk by encouraging voluntary adoption of measures to avoid dolphin mortalities and increases certainty around the effect of trawling on WCSI Hector's dolphins. Residual risk remains, particularly within 2 nm of shore, if voluntary measures are not followed or are not effective. This option is unlikely to have a direct impact on the ability of fishers to harvest fish species. However, there will be additional costs associated with increased monitoring, which may be significant. Some fishers may be unable to absorb this extra cost.
Option 2 Trawling prohibited inside 2 nm from shore with an exemption for trawlers targeting flatfish. Development of a voluntary trawl CoP with additional monitoring.	Risk of trawling interactions is mitigated by excluding the highest risk trawl gear type from inshore areas where dolphins are known to have been caught. Risk remains from flatfish trawling inside 2 nm and trawling outside 2 nm where it overlaps with the dolphins' range, as these activities still have the potential to cause mortalities. MFish estimates that impacts on industry (including downstream impacts) could equate to lost annual income of around $3 million and a present value loss of around $8.6 million. Almost half of this loss comes from the red cod fishery.
Option 3 All trawling prohibited within 2 nm. Development of a voluntary trawl CoP with additional monitoring.	Further mitigates risk by excluding all trawl vessels from inshore areas. Risk of entanglement remains from trawling outside 2 nm where it overlaps with the dolphins' range. MFish estimates that impacts on industry (including downstream impacts) could equate to lost annual income of around $8 million and a present value loss of around $21 million. Flatfish and red cod account for almost 70% of the revenue lost under Option 3.

72 Some of the options allow for overlap of fishing activity and dolphin distribution, with a recommendation that more information is gathered. For these options, additional monitoring, coupled with research, can be conducted to reduce uncertainty over the level of residual risk, if any, that fishing activity may pose to the dolphin population, and may reveal whether further additional measures are necessary.

73 In the short term (2008-09 onwards), monitoring of WCSI commercial trawl and set net activity can provide a broadly representative rate of bycatch for the summer months, but would require strong assumptions to estimate total annual bycatch. The likely cost of this monitoring for WCSI is around $325,000 for each year that it is conducted. Additional research would not be able to be conducted in time to provide any new information in the short term. MFish considers that additional monitoring for the WCSI, where the rate of interaction (not entanglement) between trawl vessels and dolphins is reported to be high, will provide an opportunity where fisher reporting can be verified and residual risk clearly identified.

74 In the longer term (2014 onwards), monitoring of WCSI commercial trawl and set net activity can provide year-round representative bycatch rates, if required. The likely cost of this information is potentially very high ($500,000 per year).

75 Additional research can also be delivered to improve distribution, abundance, and potentially population trend information, including through the use of improved modelling. The cost of this research ranges from $150,000 to $200,000 depending on the type of information required. MFish considers that as the WCSI is regarded as the strong hold of the national population that a research plan and funding could be approved that enables baseline data on abundance to be generated, so that trends of the WCSI population can be closely monitored in the future.

Customary impacts

76 Many customary fishers responded to options in the draft TMP and commented that set net prohibitions would impact the customary fishing right and that set net and trawl prohibitions would have an impact on the commercial component of the fisheries settlement.

77 Tangata whenua who fish under the amateur fishing regulations (i.e., not with a customary permit) will be impacted by set net bans. However, the customary fishing regulations enable Tangata Tiaki to issue authorisations in contradiction to amateur set net prohibitions. Tangata Tiaki can choose whether or not to allow permits to be issued. MFish intends to discuss risks around use of set nets with representatives in areas depending on decisions made.

78 MFish consider that quota is the medium of the commercial portion of the treaty settlement. Quota is issued within the constraints defined in legislation. Ensuring sustainability, including managing the effects of fishing is one of those constraints. The constraints apply equally to all quota. MFish does not believe the Act requires you to have special regard for quota owned by Maori in relation cost implications.

79 However you should have regard to the impacts on utilisation generally when considering the cost and benefits of measures proposed if you decide that action to mitigate the effects of fishing on the Hector's dolphin is necessary.

Overall decision-making framework

80 You are required to make a determination of whether additional measures are necessary to meet your statutory obligations under the Act and, if you consider measures necessary, what those measures should be. The most relevant section of the Act is Section 15, which empowers you to take such measures as you consider necessary to avoid, remedy or mitigate the effects of fishing related mortality on any protected species. Before making such a determination you should assess the information contained in this advice paper, including taking into account stakeholder views, and advice by MFish.

81 Should you consider additional measures to be necessary, each section presents a range of options to further mitigate risk to dolphin populations or sub-species. Each option represents a different mix of likely effectiveness and potential cost, both socially and economically. Options progress from status quo, then additional monitoring and research, up through to spatial closures and/or gear restrictions.

82 To create an overview of the information and options we have categorised the options for mitigation from status quo to spatial method restrictions into groups across populations. This will enable you to consider examples of groups of measures which broadly mitigate risk to the same degree and could be considered depending on the various levels of risk you consider acceptable to each population or the species as a whole. Although not a linear progression, cost can be thought of increasing as mitigation increases. The suites of measures are broadly characterised as follows:

a) No additional measures necessary;

b) No additional mitigation but better information required;

c) Some key additional measures necessary, alongside gathering better information;

d) Substantive additional measures across all methods/sectors;

e) Measures to reduce risk to lowest possible levels.

83 In general terms risk from fishing related mortality varies between populations due to levels of fishing effort, levels of mortality and population size. The effect of fishing related mortality will be greatest on small populations because the level of mortality they can sustain is less. This is confirmed by PBR information for each population. Maui's dolphin is the smallest population, followed by the SCSI population of Hector's dolphin and then ECSI and WCSI Hector's populations.

84 MFish consider that based on size of the populations WCNI, SCSI, ECSI and WCSI could be thought of as a hierarchy in relation to the risk of impacts from fishing related mortality. Small populations are at the greatest risk from current impact and therefore measures likely to significantly mitigate risk could be considered to manage or prevent that impact (depending on your assessment of the effectiveness of existing management measures). Due to the potential risk of fishing related mortality to those small populations monitoring may not be an appropriate response. This is because any level of mortality will likely have a significant impact on the population. Alternatively for the larger populations, monitoring may form a more valid option in isolation to other measures because it will provide information on nature and extent of existing impacts and existing impacts would unlikely result in a substantial rapid decline (i.e. next few years) in population numbers based on historical information.

85 MFish note that Table 12 is provided for illustrative purposes. Each region contains particular costs and benefits which should be considered separately.

Table 13: Desired Management Outcomes

		Desired management outcome				
		Existing management adequate	No additional mitigation but better information required	Some key additional measures necessary, alongside gathering better information	Substantive additional measures across all methods/sectors	Measures to reduce risk to lowest possible levels
Possible measures	WCNI	Status quo for all methods and sectors	Research into distribution and abundance Monitoring of commercial trawl activity (Option 1 commercial trawl)	Some additional restrictions on amateur and commercial set net use (Option 1 or 2 amateur and commercial set net) Exclusion of trawl activity out to 4 nm in dolphins' core area throughout the year and seasonally in other parts of their range (Option 2 commercial trawl) Restrictions on drift netting in lower reaches of Waikato River (Option 1 drift net) Research into distribution and abundance	Some additional restrictions on amateur and commercial set net use (Option 1 and 2 amateur and commercial set net) Exclusion of trawl activity out to 4 nm (Option 3 commercial trawl) Restrictions on drift netting in upper and lower reaches of Waikato River (Option 2 drift net)	Closure of all amateur and commercial fisheries in harbours, offshore to 12 nm and south to Taranaki (Option 3 amateur and commercial set net) Exclusion of trawl activity out to 4 nm (Option 3 commercial trawl) Restrictions on drift netting in upper and lower reaches of Waikato River (Option 2 drift net)
	ECSI	Status quo for all methods and sectors	Research into distribution and abundance Monitoring of commercial set net and trawl activity (Option 1 commercial set net and commercial trawl)	Some additional restrictions on amateur set net use (Option 1 amateur set net) Some additional restrictions on commercial set net activity within inshore area and monitoring of commercial set net (Option 2 commercial set net) Monitoring of commercial trawl activity (Option 1 commercial trawl) Research into distribution and abundance	Closure of all amateur and commercial set net fisheries within the dolphins' range (Option 3 amateur and commercial set net) Restrictions on highest risk commercial trawl activity and monitoring of commercial trawl activity (Option 2 commercial trawl)	Closure of all amateur and commercial set net fisheries within the dolphins' range (Option 3 amateur and commercial set net) Closure of all commercial trawl fisheries in areas where dolphins are known to have been caught (Option 3 commercial trawl)
	SCSI	Status quo for all methods and sectors	Research into distribution and abundance Monitoring of commercial set net and trawl activity (Option 1 commercial set net and commercial trawl)	Some additional restrictions on amateur set net use (Option 1 amateur set net) Some additional restrictions on commercial set net activity within inshore area and monitoring of commercial set net (Option 2 commercial set net) Monitoring of commercial trawl activity (Option 1 commercial trawl) Research into distribution and abundance	Closure of all amateur and commercial set net fisheries within Te Waewae Bay and restricted set netting along rest of coast (Option 2 amateur set net; Option 2 and 3 commercial set net) Restrictions on highest risk commercial trawl activity and monitoring of commercial trawl activity (Option 2 commercial trawl)	Closure of all amateur and commercial set net fisheries within Te Waewae Bay and restricted set netting along rest of coast (Option 2 amateur set; Option 2 and 3 commercial set net) Closure of all commercial trawl fisheries in Te Waewae Bay and restrictions on highest risk trawl activity along rest of coast (Option 2 and 3 commercial trawl)
	WCSI	Status quo for all methods and sectors	Research into distribution and abundance Monitoring of commercial set net and trawl activity (Option 1 commercial set net and commercial trawl)	Some additional restrictions on amateur set net use (Option 1 amateur set net) Adherence to voluntary CoP and additional monitoring of set net and trawl activity (Option 1 commercial set net and commercial trawl) Research into distribution and abundance	Some additional restrictions on amateur and commercial set net activity within inshore area and monitoring of commercial set net (Option 2 amateur and commercial set net) Restrictions on highest risk commercial trawl activity and monitoring of commercial trawl activity (Option 2 commercial trawl)	Closure of all amateur and commercial set net fisheries within the dolphins' range (Option 3 amateur and commercial set net) Closure of all commercial trawl fisheries in areas where dolphins are known to have been caught (Option 3 commercial trawl)