

INITIAL POSITION PAPER – PROPOSED INTERIM MEASURES FOR HECTOR’S DOLPHINS

Purpose

1 The purpose of this Initial Position Paper (IPP) is to start consultation¹ on proposals to introduce interim measures to mitigate the impacts of fishing on Hector’s dolphins (including Maui’s dolphins).

Submissions

2 The Ministry of Fisheries (MFish) requests that you provide written comments on the proposals contained in this paper by 23 November 2006.

3 These comments should be sent to Steve Halley, Manager, Environmental Standards, Ministry of Fisheries, ASB House, 101-103 The Terrace, Wellington, or faxed to 04 819 4669, or e-mailed to halleys@fish.govt.nz.

4 If you have any questions about this paper, please contact Elizabeth Raeburn or Steve Halley on 04 470 2600, or e-mail raeburne@fish.govt.nz.

Executive summary

5 MFish and the Department of Conservation (DOC) have been jointly working on a process to develop a Threat Management Plan for Hector’s dolphins. Hector’s dolphins are vulnerable to a range of threats, including some kinds of fishing activities, boat strike and boat noise, marine farming, and various kinds of pollution. The Threat Management Plan will contain strategies to deal with these threats.

6 The development of the draft Threat Management Plan is progressing but has proven more complex than initially envisaged, resulting in delays to the timeline for its implementation. The time required to develop and consult on a draft Threat Management Plan means that measures identified in the completed Plan are likely to be implemented around the middle of next year.

7 The summer period is when dolphins tend to be closer inshore, and is therefore the time of

¹ In accordance with section 12(1) of the Fisheries Act 1996.

year when Hector’s dolphins are at most risk of net entanglement. The Minister of Fisheries is concerned about this risk to the dolphins and wants make sure that fishing threats are being adequately mitigated over the summer and while the Threat Management Plan is being developed (please refer to the Minister’s covering letter). Therefore, the Minister has asked the Ministry of Fisheries to consult on his behalf on proposals for a number of interim measures to be implemented ahead of the Threat Management Plan. As noted in the Minister’s letter, any interim measures introduced will be regarded as short-term measures that can be replaced by longer-term solutions identified in the Threat Management Plan.

8 This document focuses on interim measures for fishing-related threats only. The main fishing related threat to Hector’s dolphins is entanglement with commercial and recreational set net fisheries, and to a lesser extent inshore trawl fisheries. Hector’s dolphins have a close inshore distribution that overlaps with these fishing activities.

9 There are a number of measures already in place to mitigate fishing threats to Hector’s dolphins around New Zealand. MFish has undertaken an assessment of the need for interim measures to be implemented ahead of the Threat Management Plan currently under development. This assessment suggests that there are some threats to the dolphins that may require further mitigation over this interim period. To address these threats, the following measures are proposed:

Population	Proposed interim measure	Proposed interim implementation framework
Te Waewae Bay (south coast South Island)	<p>Either: Commercial fishers setting a net within Te Waewae Bay² must remain in attendance with the net while the net is set throughout the year</p> <p>Or: Commercial set netting is prohibited within 1 nautical mile (nm) of the shore of Te Waewae Bay throughout the year; and Commercial fishers setting a net within Te Waewae Bay must remain in attendance with the net while the net is set (throughout the year)</p> <p>Or: Commercial set netting is prohibited within 1 nm of the shore of Te Waewae Bay from 1 October to 31 March; and Commercial fishers setting a net within Te Waewae Bay must remain in attendance with the net while the net is set (throughout the year)</p> <p>Or: Commercial set netting is prohibited within Te Waewae Bay throughout the year.</p>	Mandatory or voluntary
	<p>Either: Recreational fishers setting a net within Te Waewae Bay must remain in attendance with the net while the net is set throughout the year</p> <p>Or: Recreational set netting is prohibited within 1 nm of</p>	Mandatory

² Te Waewae Bay is defined as shorewards to the mean high water mark (excluding rivers, estuaries and lagoons) from a straight line between the southern most point of Sand Hill Point and the western most point of Pahia Point.

	<p>the shore of Te Waewae Bay throughout the year; and Recreational fishers setting a net within Te Waewae Bay must remain in attendance with the net while the net is set (throughout the year)</p> <p>Or: Recreational set netting is prohibited within 1 nm of the shore of Te Waewae Bay from 1 October to 31 March; and Recreational fishers setting a net within Te Waewae Bay must remain in attendance with the net while the net is set (throughout the year)</p> <p>Or: Recreational set netting is prohibited within Te Waewae Bay throughout the year</p>	
	<p>MFish will discuss the industry's set net Code of Practice (CoP) with South East Finfish Management Ltd. to encourage them to raise fisher's awareness of the CoP to ensure they comply with it, as well as discuss the possibility for including measures to mitigate potential dolphin bycatch by trawlers</p>	Voluntary
East coast South Island	<p>Either: Extend the boundary of the Canterbury recreational set net seasonal (1 October to 31 March) closure northwards to prohibit recreational set netting from the Waiau River to the Clarence River outlet (FMA3/FMA4 boundary, 42°10.0'S and 173°56.0'E) and out to 4 nm</p> <p>Or: Recreational fishers setting a net must remain in attendance with the net while the net is set, when fishing between the Waiau River and the Clarence River and out to 4 nm from 1 October to 31 March</p>	Mandatory
	<p>MFish will discuss the industry's set net CoP with South East Finfish Management Limited and Challenger Finfisheries Management Company Limited to encourage them to raise fisher's awareness of the CoP to ensure they comply with its various components, as well as discuss the possibility for including further measures to mitigate dolphin bycatch by trawlers</p>	Voluntary
Maui's dolphin (west coast North Island)	<p>MFish will initiate discussions with Port Waikato drift net and set net fishers to determine whether set net and drift net fishing represents a threat to dolphins in that area and, if so, whether measures such as voluntary limits, regulated closures or a combination of these should be applied to eliminate any threats, with an aim to have measures in place as soon as practicable</p>	Voluntary or mandatory
	<p>MFish will initiate discussions with commercial and recreational Taranaki set netters to assess the extent to which their fishing might represent a threat to dolphins and, if so, what measures can be applied to eliminate any threats</p>	Voluntary

	MFish will discuss possible trawl mitigation measures with operators to avoid trawling close inshore, especially in winter when dolphins are within the trawl area	Voluntary
West coast South Island	MFish will discuss the industry's set net CoP with Challenger Finfisheries Management Company Limited to encourage them to raise their fisher's awareness of the code to ensure they comply with its various components	Voluntary
Relevant to all populations	Monitoring and enforcement of existing mandatory measures in place	Ongoing
	MFish will actively promote the recreational set net CoP and the need for appropriate set net practice. For example, through targeted newspaper articles and public notices, as well as developing a poster for placement in clubs, fishing shops, etc. Increase awareness through routine presence of Fishery Officers and Honorary Fishery Officers in key recreational areas over summer months.	Voluntary

10 It is possible in some instances that voluntary measures will adequately mitigate fishing threats until the Threat Management Plan is completed. In this case, officials will work with fishers to implement such measures as soon as possible. If the Minister of Fisheries considers mandatory interim measures are required to effectively mitigate fishing threats, these are intended to be implemented by Christmas 2006.

11 MFish also proposes to fix a technical error in the existing Fisheries (Canterbury Set Net Area Amateur Prohibition) Notice 2002 that currently bans the use of recreational set nets from the Territorial Sea Baseline (low tide mark) out to 4 nm between the Waiau and Waitaki Rivers from 1 October to 31 March. MFish proposes to amend the notice to ban the use of recreational set nets from the mean high water mark out to 4 nm between the Waiau and Waitaki Rivers from 1 October to 31 March.

Document structure

12 This paper is structured as follows:

- ◆ The introduction outlines:
 - The threat of fishing to dolphins;
 - The Minister of Fisheries' legislative obligations under the Act; and
 - Provides background information on the Hector's dolphin Threat Management Plan currently under development and proposed interim measures
- ◆ The main body of the paper sets out, by population:
 - Proposed interim measures
 - Population status
 - Current management measures
 - Analysis of proposed interim measures
- ◆ The final section outlines the proposed process for implementation of any interim measures

Introduction

Problem definition – threat of fishing to Hector’s dolphins

13 Hector’s dolphin is New Zealand’s only endemic cetacean and is one of the world’s rarest dolphin species. The species is divided into two subspecies, one of which occurs in South Island waters, and the other in the waters off the west coast of the North Island (Maui’s dolphin).

14 The South Island Hector’s dolphin is ranked as nationally vulnerable by DOC and endangered by the World Conservation Union (IUCN), and is estimated to number around 7,270 individuals. The North Island Maui’s dolphin, with an estimated population size of 111 individuals, is ranked as nationally critical by DOC and critically endangered by the IUCN.

15 Four genetically distinct regional Hector’s dolphin populations have been identified that are connected by little or no gene flow. These are found on the west coast of the North Island, the west coast of the South Island, the east coast of the South Island, and south coast of the South Island (see Figure 1). Te Waewae Bay is considered to be the core area of abundance for Hector’s dolphins on the south coast South Island and is therefore the focus of proposed interim measures for the south coast population.

Figure 1: Map of Hector’s dolphin distribution (indicative only)



16 The estimated sizes of each population are³:

- ◆ Maui's dolphin – 111
- ◆ East coast South Island – 1791
- ◆ West coast South Island – 5388
- ◆ Te Waewae Bay – 89

17 Hector's dolphins are threatened by even low levels of mortality due to slow reproduction rates resulting in low potential for population growth. There are a number of actual and potential threats facing the dolphins, including fishing-related mortality, boat strike, pollution, disease, mining and tourism impacts.

Fishing interactions with Hector's dolphins

18 Hector's dolphins are vulnerable to a range of threats, including net entanglement. The dolphins have a close inshore distribution, which overlaps with commercial and recreational set net fisheries, as well as inshore trawl fisheries. Fishing-related mortality through net entanglement is recognised as a significant threat to Hector's dolphins (see Appendix 2 for further information on fishing threats). Summer is when dolphins tend to be closer inshore, and is therefore the time when Hector's dolphins are at most risk of net entanglement. This summer inshore movement coincides with a peak in recreational and commercial set netting effort over the summer season.

19 From 1997/98, DOC has kept detailed records of all reported incidents of dead Hector's dolphins⁴. Beach-cast reports are usually not able to determine whether the deaths associated with set netting were commercial or recreational, and it is generally only through fisher self-reporting that this can be specified. The level of threat to the dolphins from fishing is difficult to quantify due to very limited observer coverage and limited self-reporting by fishers. Consequently, the figures reported throughout this paper represent the minimum number of dolphin deaths for each population.

20 Over the past three years (since the start of October 2003) there have been 50 known Hector's dolphin deaths. Nineteen of these deaths have been attributed to fishing, with 15 of these caused by set net entanglement, 3 caused by trawling and 1 caused by entanglement in a craypot line. Three deaths were linked to natural causes. The cause of the remainder of known deaths could not be identified with certainty⁵.

21 There have been 19 Hector's dolphin deaths over the past year. Seven⁶ of these deaths have been attributed to set net entanglement and 3 deaths were the result of one trawling incident⁷ (see Appendix 4 for further details on mortalities over the past year). The cause of death for the remainder is unknown.

³ These population estimates are based on the most recent information published in scientific journals. Note there is uncertainty around the precise abundance estimate for the Te Waewae Bay population. This is discussed later in the paper.

⁴ Information about dolphin mortalities in this document has been obtained from the DOC records. For incidents that are not self-reported by fishers and necropsy reports identify the cause of death to be consistent with entanglement, set netting entanglement is assumed. As a result, it is possible that some trawling incidents have been incorrectly attributed to set netting.

⁵ Cause of death often cannot be determined due to the decomposed state of carcasses

⁶ 3 off the east coast South Island; 4 off the west coast South Island

⁷ Off the east coast South Island

Legislative obligations

22 The Minister of Fisheries has obligations under the Fisheries Act 1996 (the Act) to manage the impacts of fishing on protected species such as Hector's dolphins.

23 The purpose (section 8) of the Act is to provide for the utilisation of fisheries resources while ensuring sustainability. 'Ensuring sustainability' is defined in the Act as "maintaining the potential of fisheries resources to meet the reasonably foreseeable needs of future generations" and "avoiding, remedying or mitigating any adverse effect of fishing on the aquatic environment". 'Utilisation' means "conserving, using, enhancing, and developing fisheries resources to enable people to provide for their social, economic, and cultural wellbeing".

24 Section 9 of the Act contains three environmental principles that the Minister of Fisheries must take into account when considering the effects of fishing on Hector's dolphins. These principles are:

- ◆ Associated or dependent species should be maintained above a level that ensures their long-term viability;
- ◆ Biological diversity of the aquatic environment should be maintained.
- ◆ Habitat of particular significance for fisheries management should be protected.

25 Biological diversity is defined in the Act as meaning the variability among living organisms, including diversity within species. As mentioned above, four genetically distinct Hector's dolphin populations have been identified that are connected by little or no gene flow. In particular, in relation to any decision to avoid, remedy or mitigate the effects of fishing on Hector's dolphins, MFish considers the Minister should take account of maintaining:

- ◆ The Hector's dolphin species above a level that ensures long-term viability; and
- ◆ The genetic diversity within the species, including the viability of the four populations, in the aquatic environment.

26 Under section 10 of the Act, decision makers are required to take into account four information principles. Decision makers should take into account the best available information; consider any uncertainty in the information available; be cautious when information is uncertain, unreliable, or inadequate; and not use the absence of, or uncertainty in, any information as a reason for postponing or failing to take any measure to achieve the purpose of the Act.

27 Mandatory interim measures can be introduced by way of Regulation under section 15 of the Act or by Gazette notice under section 11 of the Act (as outlined in more detail below). The prohibition or restriction on the use of a fishing method within a particular area and fishing season falls within the scope of both sections. Section 11 provides an appropriate means of implementing management measures by Gazette notice (if necessary) to maintain biological diversity and to avoid, remedy, or mitigate the adverse effects of fishing on the aquatic environment.

28 The management of fishing-related mortality of marine mammals is guided by a number of legislative provisions, in particular section 15 of the Act. Section 15 is closely linked to the Marine Mammals Protection Act 1978. The Marine Mammals Protection Act 1978 provides for the establishment of population management plans (PMPs) for protected species.

29 Section 15(2)⁸ applies because a PMP is not in place for Hector's dolphin. That section allows the Minister of Fisheries, in the absence of a PMP and after consultation with the Minister of Conservation, to take measures considered necessary to avoid, remedy, or mitigate the effect of fishing-related mortality on any protected species. All marine mammals are “protected species” under the Act. Such measures may include setting a limit on fishing-related mortality and closing areas to fishing for all or part of the year. Section 15(4) allows the Minister of Fisheries to recommend the making of such regulations under s 298 of the Act as are considered necessary or expedient for the purpose of implementing any measures referred to in s 15(2). Where a limit on fishing-related mortality has been set, the Minister is also able to prohibit all or any fishing or fishing methods in an area by Gazette notice under s 15(5)(b) to ensure this limit is not exceeded.

30 Section 11 also provides for the Minister to set sustainability measures, including measures relating to areas and fishing methods, by notice in the Gazette. Such sustainability measures may only be imposed after having taken into account the various statutory considerations set out in section 11. These considerations are set out and discussed in Appendix 1. MFish believes the proposals raise no concerns in relation to New Zealand’s international obligations and the Treaty of Waitangi (Fisheries Claims) Settlement Act 1992 (section 5).

31 MFish also acknowledges the consultation requirements set out in section 12 of the Act, before any sustainability measure can be set or varied. The 5 week consultation period for this IPP is shorter than MFish would usually allow. However, MFish considers that 5 weeks consultation is necessary given the need in certain areas for measures to prevent further fishing-related deaths of Hector’s dolphins over the upcoming summer.

Hector’s dolphin Threat Management Plan

32 MFish and DOC have been jointly working on a process to develop a Threat Management Plan⁹ for Hector’s dolphins. The Threat Management Plan is intended to identify all threats to Hector’s dolphin populations and outline strategies to mitigate those threats. A collaborative process has been undertaken to develop a draft Threat Management Plan for consultation that involves stakeholders from all interest groups.

33 The goals of the Threat Management Plan are:

1. To ensure that the long-term viability of Hector’s dolphins is not threatened by human activities.
2. To further reduce impacts of human activities¹⁰ as far as possible, taking into account advances in technology and knowledge, and financial, social and cultural implications.

34 Appendix 3 outlines progress to date with developing the draft Threat Management Plan. The next stage in that process is to seek input from local stakeholders in regional threat mitigation workshops to identify longer-term solutions to mitigate threats to Hector’s dolphins.

35 As noted earlier, the development of the draft Threat Management Plan is progressing but

⁸ Section 15(2) of the Act states that “In the absence of a population management plan, the Minister [of Fisheries] may, after consultation with the Minister of Conservation, take such measures as he or she considers are necessary to avoid, remedy, or mitigate the effect of fishing related mortality on any protected species, and such measures may include setting a limit on fishing-related mortality.”

⁹ The Threat Management Plan is different to a PMP and is not in statute.

¹⁰ The Ministry of Fisheries mandate is restricted to managing the effects of fishing on the dolphins.

has proven more complex than initially envisaged, resulting in delays to the timeline for its implementation. The time required to develop and consult on a draft Threat Management Plan means that measures identified in the completed Plan are likely to be implemented around the middle of next year.

Interim measures for Hector's dolphins

36 There are a number of measures already in place to mitigate fishing threats to Hector's dolphins around New Zealand. For each of the four Hector's dolphin populations, MFish has undertaken an assessment of the need for interim measures until the Threat Management Plan is completed. Proposals for these interim measures are set out in the following sections.

37 Any measures implemented will be recognised as interim or short-term. Measures eventually implemented through the Threat Management Plan will replace or amend any interim measures introduced, as necessary. The Threat Management Plan process has been developed to comprehensively address all threats, both fishing and non-fishing. Any interim measures introduced to address fishing threats will not pre-determine a desired course of action or preclude an assessment of alternative mitigation measures arising from the Threat Management Plan.

Te Waewae Bay (south coast South Island)

Proposals for interim measures

38 MFish proposes the following interim measures for the Te Waewae Bay¹¹ population:

<p>Either: Commercial fishers setting a net within Te Waewae Bay must remain in attendance with the net while the net is set throughout the year;</p> <p>Or: Commercial set netting is prohibited within 1 nm of the shore of Te Waewae Bay throughout the year; and Commercial fishers setting a net within Te Waewae Bay must remain in attendance with the net while the net is set (throughout the year);</p> <p>Or: Commercial set netting is prohibited within 1 nm of the shore of Te Waewae Bay from 1 October to 31 March¹²; and Commercial fishers setting a net within Te Waewae Bay must remain in attendance with the net while the net is set (throughout the year);</p> <p>Or: Commercial set netting is prohibited within Te Waewae Bay throughout the year.</p>
<p>Either: Recreational fishers setting a net within Te Waewae Bay must remain in attendance with the net while the net is set throughout the year;</p> <p>Or: Recreational set netting is prohibited within 1 nm of the shore of Te Waewae Bay throughout the year; and Recreational fishers setting a net within Te Waewae Bay must remain in attendance with the net while the net is set (throughout the year);</p> <p>Or: Recreational set netting is prohibited within 1 nm of the shore of Te Waewae Bay from 1 October to 31 March; and Recreational fishers setting a net within Te Waewae Bay must remain in attendance with the net while the net is set (throughout the year);</p> <p>Or: Recreational set netting is prohibited within Te Waewae Bay throughout the year.</p>
<p>MFish will discuss the industry's CoP with South East Finfish Management Ltd. to encourage them to raise their fisher's awareness of the code to ensure they comply with its various components when setting nets, as well as discuss the possibility for including further measures to mitigate dolphin bycatch by trawlers. MFish will also work with industry to ensure effective monitoring and reporting frameworks are in place.</p>
<p>MFish will actively promote the recreational set net CoP and the need for appropriate set net practice. For example, through targeted newspaper articles and public notices, as well as developing a poster for placement in clubs, fishing shops, etc.</p>

¹¹ Te Waewae Bay is defined as shorewards to the mean high water mark (excluding rivers, estuaries and lagoons) from a straight line between the southern most point of Sand Hill Point and the western most point of Pahia Point, see Figure 2.

¹² The dates selected for this seasonal closure are for consistency with an existing seasonal set net restriction for Hector's dolphins in Canterbury (see later in paper) and because the timing for implementation of longer-term measures under the Threat Management Plan has yet to be determined with certainty.

39 Appropriate offences and penalties may also need to be established for any new regulatory requirements introduced.

Population status

40 Te Waewae Bay has the smallest South Island Hector's dolphin population. The most recent published and peer reviewed population estimate for Te Waewae Bay is 89¹³ (95% confidence interval = 36-218) individuals. Based on this population estimate, initial PBR analysis¹⁴ to guide the setting of a human-induced mortality limit for the south coast South Island population indicates annual mortality caused by human activities should be zero.

41 The population estimate of 89 dolphins was based on analysis from a boat-based survey undertaken in 1998-99. DOC has since carried out some intensive research on the Te Waewae Bay Hector's dolphin population. This research involved boat-based surveys of the population from April-June 2004 and from December 2004-February 2005. The findings from this study have yet to be peer reviewed, but preliminary results suggest the number of dolphins that use Te Waewae Bay may substantially exceed the previous estimate of 89 individuals. The draft report indicates that there is a photographic catalogue of 330 distinctively marked dolphins that use Te Waewae Bay and DOC believe (based on preliminary analysis) that the population estimate will likely fall between 330 and 650 animals.

42 MFish therefore notes there is uncertainty about the precise abundance of dolphins that use the bay. In accordance with the information principles in the Act, this uncertainty should be taken into account when considering the need for interim measures to avoid, remedy or mitigate the impacts of fishing on Hector's dolphins in Te Waewae Bay.

43 The boat-based surveys carried out by DOC between April 2004 and February 2005 also found that Hector's dolphins were concentrated within 1 km of the coast, along the extent of Te Waewae Bay, with somewhat lower densities along the eastern and western edges of the bay.

Fishing threats to the population

Set netting

44 Commercial and recreational set netting is practiced in Te Waewae Bay. There is no known customary set netting effort in the bay.

45 Recreational set netting in the bay is confined to within 500 m off the shore for small sharks (such as elephant fish and rig) during summer and reef fish (such as butterfly and trumpeter). Fishing mainly takes place over summer and is primarily confined to a limited number of local people who fish on the weekends. There is a campground at Monkey Island, which is located on the eastern side of Te Waewae Bay. Visitors from outside the local area stay at the campground, particularly over the Christmas/New Year holiday, which leads to increased fishing effort (including set netting).

¹³ This population estimate does not include the group of dolphins resident in Porpoise Bay. As shown in Figure 1, Hector's dolphins also utilise the south coast of the South Island to the east of Te Waewae Bay. Further work will be undertaken to identify whether the Porpoise Bay dolphins should be linked with the Te Waewae Bay population or the east coast South Island population.

¹⁴ PBR analysis using the recovery-rate goal estimates the maximum number of animals, not including natural mortalities, that may be removed from a marine mammal stock while ensuring the time to recovery is not delayed by more than 10% with a 95% probability. All references to PBR in the main text of this document relate to analysis based on the recovery rate goal, and numbers of dolphins have been rounded down to the nearest integer. See Appendix 5 for a further description of the PBR analysis for Hector's dolphins

46 At the eastern end from Monkey Island to Pahia Point the rocky area is fished for reef fish. At the western end near the Waikoau River mouth and back along the beach to the eastern end set netters target small sharks. Some recreational fishers set their nets at low tide and retrieve them 13 hours later at low tide again. There is a considerable amount of recreational set netting/dragnetting for flounder in the lagoon of the Waiau River that flows into Te Waewae Bay (note this area is not included in proposals). Flounder set nets are set in shallow water near the sea floor and are considered of less risk to dolphins than nets set to target other fish species.

47 One commercial set netter regularly fishes in Te Waewae Bay. This fisher catches elephant fish within the bay, along with some rig. Another set netter occasionally fishes in the bay as part of fishing all over Foveaux Strait.

48 Information is uncertain around the actual number of dolphin deaths caused by set net fishing in Te Waewae Bay. Of the known deaths on the south coast South Island over the past three years, necropsy results have attributed one dolphin death to set net entanglement. This dolphin was recovered on Orepuke Beach, on the eastern side of Te Waewae Bay (see Figure 2). However, MFish notes that because this area is isolated other deaths may have been missed.

Trawling

49 There is some trawling (around 10-15 vessels) for flatfish in Te Waewae Bay by off season oyster boats and Bluff and Riverton based trawlers. There have been no known Hector's dolphin mortalities caused by trawling off the south coast of the South Island.

Current management measures

50 No mandatory measures are in place to mitigate dolphin bycatch on the south coast South Island.

51 Commercial set netters fishing in Fisheries Management Area (FMA) 5, which encompasses Te Waewae Bay, operate under the South East Finfish Management Ltd voluntary CoP. Under this CoP, fishers are required to adopt a number of fishing practices that reduce the likelihood of dolphin incidental bycatch, including:

- avoiding setting nets where water is shallow, murky or discoloured
- avoiding fishing in areas where Hector's dolphin are known to frequent
- keep set duration as short as possible
- set nets as tight as possible
- maintain an active and alert lookout to spot Hector's dolphins active near the vessel during fishing operations
- not setting nets when Hector's dolphins are active around the fishing vessel
- deployment of pingers (acoustic devices that scare dolphins away from the nets)

52 MFish actively promotes a voluntary set net code of practice for non-commercial fishers and seeks to maximize compliance with the amateur set net fishing regulations. This code applies throughout New Zealand, and encourages wise set netting practices, including:

- using a net designed for the fish species being targeted
- deploying a net with anchors that are suitable for sea conditions to prevent losing nets
- setting a net that can be easily retrieved
- staying with and regularly checking the net

- avoiding setting nets when Hector's dolphins are present
- deploying a net for the shortest soak time possible
- avoiding setting nets overnight

53 MFish has developed a *Set Net Code of Practice* pamphlet for recreational fishers to inform them of the best practices for using set nets, as well as incorporating this information in the recent *Recreational Fisher's Handbook*. The Set Net Code of Practice can be found on the MFish website www.fish.govt.nz and published versions are also available from Ministry of Fisheries offices.

Analysis of proposed interim measures

Set netting

54 Initial PBR analysis based on the published estimate of population size indicates annual mortality caused by human activities should be zero for the Te Waewae Bay population. However, as mentioned above, preliminary findings from a recent DOC study suggest there are higher numbers of dolphins in the bay than were previously estimated. This recent research highlights uncertainty around the status of the Te Waewae Bay population.

55 Notwithstanding this new preliminary information, MFish considers a risk to the population exists from commercial and recreational set netting within the dolphins' range. Te Waewae Bay has the smallest South Island Hector's dolphin population. Set net fishing is a known threat to the dolphins. This is supported by the fact that in 2004 there was a confirmed dolphin death resulting from set net entanglement. There is a voluntary industry CoP in place to mitigate the impacts of commercial set netting on Hector's dolphins but the effectiveness of this voluntary initiative is uncertain. Recreational set net effort is highest over the summer months. There are no mitigation measures in place for recreational set netters, other than Government promotion of a recreational set net CoP. MFish therefore considers that interim measures to mitigate commercial and recreational set netting risk are necessary in Te Waewae Bay to avoid, remedy or mitigate the adverse effects of fishing on the dolphins.

Commercial set netting

56 To address the threat of commercial set netting in the bay, MFish proposes the following options:

- ◆ *Option 1* - Introduce a year round requirement for commercial fishers setting a net within Te Waewae to remain in attendance with their net while the net is set.
- ◆ *Option 2* - Introduce an area closure that prohibits commercial set netting throughout the year within 1 nm of the shore of Te Waewae Bay (see Figure 2) and require commercial fishers setting a net within Te Waewae Bay to remain in attendance with the net while the net is set.
- ◆ *Option 3* - Introduce a seasonal area closure (1 October to 31 March inclusive) that prohibits commercial set netting within 1 nm of the shore of Te Waewae Bay to Pahia Point and a requirement for commercial fishers setting a net within Te Waewae Bay to remain in attendance with the net while the net is set.
- ◆ *Option 4* – Introduce an area closure that prohibits commercial set netting within Te Waewae Bay throughout the year.

57 MFish considers that requiring set netters to stay in attendance with their net will enable a

prompt response to dolphin presence near nets and consequently reduce the risk of entanglement. This proposal applies to the whole area within Te Waewae Bay, and for all months of the year. The commercial set net voluntary CoP states that fishers are to maintain an active and alert lookout to spot Hector's dolphins active near the vessel during fishing operations and states that set nets must not be deployed when Hector's dolphins are active around the vessel.

58 MFish notes that by allowing commercial set netters to continue to operate where dolphin densities appear to be highest in Te Waewae Bay (Option 1), there remains a greater, though unquantified, risk to the dolphin population than if set netting was prohibited in the core area where dolphins are present.

59 MFish's alternative proposals (Options 2, 3 and 4) are therefore to introduce an area closure that prohibits commercial set netting in some or all of Te Waewae Bay. Options 2 and 3 are to prohibit commercial set netting within 1 nm of the shore of Te Waewae Bay, and require commercial set netters to stay with their net when fishing in Te Waewae Bay outside the closed area. Closing this area would provide a buffer zone around the distance from shore that best available information shows dolphins are most commonly sighted, as well as a buffer zone to the east and west of the area where the dolphins appear to be most concentrated. This area closure could be in place year round (Option 2), or could be a seasonal closure from 1 October to 31 March (Option 3), which is the time of year when set net entanglements are most likely to occur. A seasonal closure would provide opportunity for commercial set netters to use the whole of Te Waewae Bay during the winter months, but would present greater risk to dolphins than a year round area closure.

60 Although Hector's dolphin sightings are concentrated close to the coast (even when standardised by survey effort), dolphins are also sighted in locations throughout the bay. MFish therefore proposes a fourth option, which is to close the whole of Te Waewae Bay to commercial set netting throughout the year. While this proposal reduces commercial set netting risk to dolphins to the greatest extent, it accordingly has the greatest impact on utilisation. A decision to implement Option 4 will mean that the one main Te Waewae Bay commercial set netter will no longer be able to fish using the set net method at any location within the bay, and it will also impact on the other commercial set netter who occasionally fishes in Te Waewae Bay.

61 MFish notes that there is uncertainty about extent of overlap between the dolphins and commercial set net fishing in the bay. In accordance with the information principles in the Act, the Minister must take this uncertainty into account when making decisions on interim measures to mitigate the impacts of commercial set netting in Te Waewae Bay.

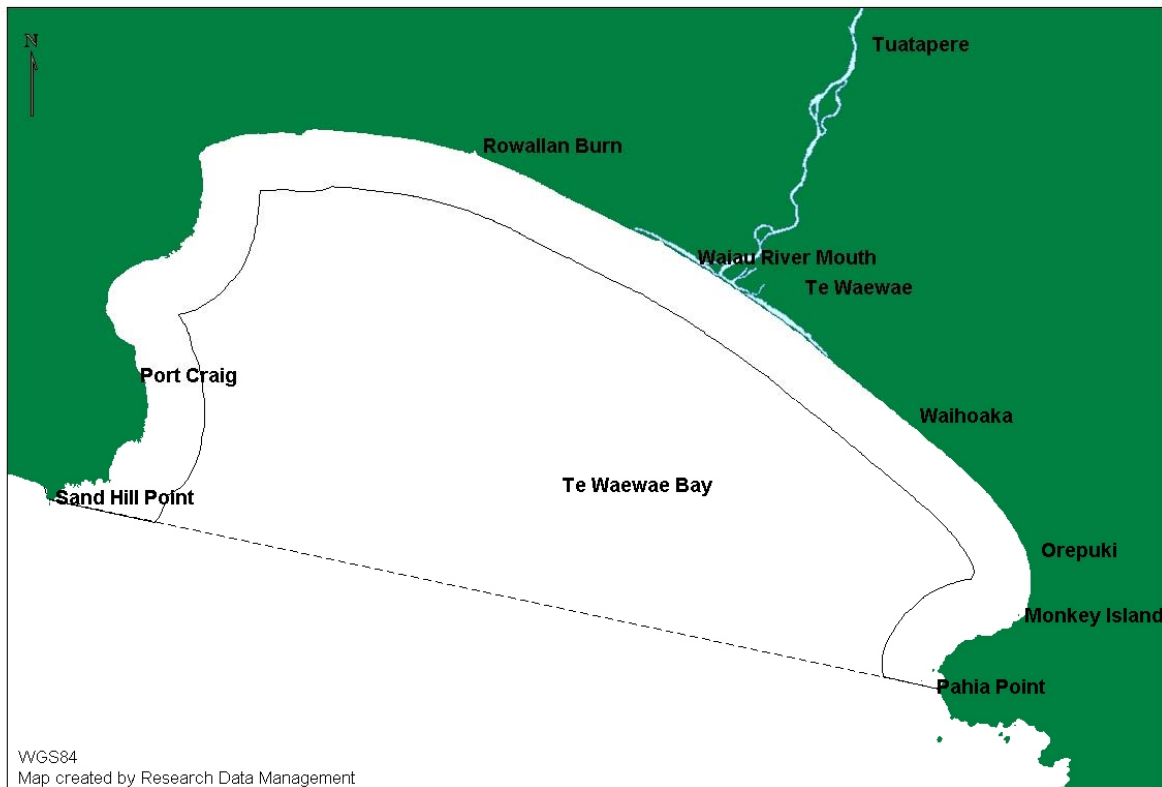
62 Because set net effort is reported by statistical area, it is difficult to use catch effort and landing data to assess the value of the set net fishery within Te Waewae Bay, which makes up part of statistical area 30. Noting the limitations of the data, MFish has calculated the average estimated catch by set netting for the top 6 species caught in statistical area 30 over 5 complete fishing years, from 1 October 1999 to 30 September 2005¹⁵ (see Appendix 6). Average estimated catch for these 6 species is 280, 430 kg, with an estimated value of \$481, 584 (based on estimated catch by port price). While this information does not provide the level of detail necessary to estimate the value of

¹⁵ Complete data for the 2005/06 fishing year is not yet available, as there may still be some outstanding forms yet to be returned. This analysis is based on reporting from the catch/effort (estimated greenweight catch) section of the Ministry of Fisheries Commercial Catch Effort and Landing Returns forms, rather than landings data. This is because landings are reported on a trip basis, and therefore the data could include landings from statistical area 30 using set nets as well as landings from different statistical areas or landings taken using a different gear type (and hence may be misrepresentative of the amount of fish taken by set netting in statistical area 30).

the Te Waewae Bay commercial set net fishery or the impact of the proposals on affected commercial set netters, it does provide some context for considering the economic implications of any measures proposed.

63 MFish welcomes any additional information from stakeholders on the economic impact of these proposals for commercial set netters in Te Waewae Bay.

Figure 2: Indicative boundary of proposed 1nm closed area in Te Waewae Bay (solid line) and of proposed measures that apply to the whole bay (dotted line)



Implementation

64 Commercial set net controls in Te Waewae Bay could be mandatory or voluntary. MFish notes that commercial set netters in Te Waewae Bay fall under the jurisdiction of South East Finfish Management Ltd.; hence there are governance arrangements in place that would increase the likelihood that voluntary measures will be effective. That there is only one commercial fisher (occasionally two) in the bay also increases the likelihood of compliance with voluntary measures. Nevertheless, voluntary measures cannot be enforced by MFish in the same way that regulatory-type measures can.

65 Alternatively, introducing mitigation measures using legislative mechanisms available in the Act gives MFish the ability to enforce non-compliance and increase the certainty of implementation. Therefore, MFish's preference is for any proposed commercial set netting closure or net attendance requirement (if approved) to be made mandatory.

Recreational set netting

66 Recreational set netting in Te Waewae Bay is generally restricted to locals who fish on the weekend. Similarly to commercial set netting, MFish proposes three alternative options for mitigating the impacts of recreational set netting on Hector's dolphins in the bay:

- ◆ *Option 1* - Introduce a year round requirement for recreational fishers setting a net within Te Waewae Bay to remain in attendance with their net while the net is set.
- ◆ *Option 2* - Introduce a year round area closure that prohibits recreational fishing throughout the year within 1 nm of the shore of Te Waewae Bay (see Figure 2) and require recreational fishers setting a net within Te Waewae Bay to remain in attendance with the net while the net is set.
- ◆ *Option 3* - Introduce a seasonal area closure (1 October to 31 March inclusive) that prohibits recreational fishing within 1 nm of the shore of Te Waewae Bay and a requirement for recreational fishers setting a net within Te Waewae Bay to remain in attendance with the net while the net is set.
- ◆ *Option 4* – Introduce an area closure that prohibits recreational set netting within Te Waewae Bay throughout the year.

67 MFish believes that introducing a requirement for recreational fishers to stay in attendance with their net when it is set within Te Waewae Bay would reduce soak times and enable prompt response to dolphin presence in the vicinity of the nets, thereby substantially reducing the risk to dolphins. Option 1 would provide for greater recreational use within the bay than prohibiting set netting within some or all of Te Waewae Bay (Options 2, 3 and 4). However, similarly to the proposed commercial controls, MFish notes that allowing recreational set netting to continue where dolphin densities appear to be highest constitutes a greater, though unquantified, risk to the dolphins than excluding set netting from the core dolphin area within Te Waewae Bay. Under this option, MFish will work to raise local fishers' awareness of good set netting practice, including retrieval of their nets when dolphins are near the fishing gear.

68 Two alternative proposals are to prohibit (year round or seasonally) recreational set netting out to 1 nm from shore in Te Waewae Bay and require recreational fishers to remain in attendance with their net when set netting in the bay outside the closed area/seasonal restriction.

69 MFish notes that the proposed closed area out to 1 nm would probably stop all recreational set net fishing in Te Waewae Bay as all set net activity occurs near to shore. There are few alternative sites suitable for recreational set netting because of the rough and exposed conditions on the open coastline. Recreational set netting and dragnetting that currently occurs in the lagoon of the Waiiau River (that flows into Te Waewae Bay) would still be permitted because this area is outside the boundary of the proposed closure. Summer is when recreational set netting effort is at its peak, with comparatively little set netting effort occurring over the winter.

70 The proposed area closure could be in place year round (Option 2), or could be a seasonal closure from 1 October to 31 March (Option 3). A seasonal closure would allow recreational set netting over winter, which generally occurs in reef areas close inshore for butterfish and moki.

71 Although it is likely that 1 nm year round closure would essentially prevent all recreational set netting; there is a possibility that recreational set netters would move further offshore to set their nets. Because dolphins are sighted in locations throughout the bay, MFish proposes a fourth

option, which is to close the whole of Te Waewae Bay to recreational set netting throughout the year. This proposal provides greater certainty that recreational set netting does not overlap with the dolphins' range in Te Waewae Bay and will likely have a similarly significant impact on recreational set net use as Option 2.

72 When making final decisions on these proposals for set netting measures in Te Waewae Bay, the Minister will need to weigh up the utilisation impact of prohibiting set net fishing in Te Waewae Bay against the benefits of more effective mitigation of set netting risk to dolphins. Stakeholder submissions on the extent of fishing activity in Te Waewae Bay, and the impacts and benefits of these proposals are welcomed.

Implementation

73 Proposals for recreational set netting restrictions are mandatory only. This is because recreational fishers do not have governance arrangements in place to ensure effective implementation of voluntary measures. In addition, recreational fishers coming in to the region on holiday are unlikely to be aware of, or support, voluntary measures. Because it is difficult to ensure recreational fishers will comply with voluntary measures, MFish considers that statutory measures are the most effective means to manage recreational set netting interactions with Hector's dolphins.

Trawling

74 While there is no reported information confirming that trawlers have caught dolphins off the south coast, trawl vessels operating in Te Waewae Bay are a potential threat to the population. MFish considers that this threat will best be addressed through the Threat Management Plan process but will engage with industry in the interim to discuss the possibility for incorporating trawl mitigation measures into the South East Finfish Management Ltd. CoP.

Summary of rationale for interim measures proposed

75 Te Waewae Bay has the smallest South Island Hector's dolphin population (even in light of new information on the population's status). MFish considers that commercial and recreational set netting presents a risk to the Te Waewae Bay Hector's dolphin population. There is uncertainty around the extent to which current voluntary initiatives mitigate this risk. MFish is therefore proposing either an area closure (seasonal or year round) or a requirement for fishers to stay near their nets when set netting in Te Waewae Bay.

76 The governance arrangements in place for commercial fishers in Te Waewae Bay mean there is an increased likelihood that these measures can be implemented effectively on a voluntary basis. However, because there is a significant sustainability concern for the Te Waewae Bay population, MFish's preference is for the proposed measures, if approved, to be implemented by regulatory amendment or Gazette notice as this will provide greater certainty to the Minister that his obligations under the Act are being met. Similarly, should any measures be introduced to mitigate the threat of recreational set netting to Hector's dolphins in Te Waewae Bay, it is MFish's preference that these are implemented on a mandatory basis.

77 MFish considers that the proposed mandatory measures to mitigate the impacts of set netting on dolphins in Te Waewae Bay, combined with voluntary initiatives to address remaining fishing activities in the bay (such as trawling), will adequately mitigate fishing threats until the Threat Management Plan is completed.

East coast South Island

Proposals for interim measures

78 Proposals for managing the impacts of fishing on the east coast South Island Hector's dolphin population are:

Either:

Extend the boundary of the Canterbury recreational set net seasonal closure northwards to prohibit recreational set netting from the Waiau River to the Clarence River outlet (FMA3/FMA4 boundary, 42°10.0'S and 173°56.0'E) and out to 4 nm;

Or:

Recreational fishers setting a net must remain in attendance with the net while the net is set, when fishing between the Waiau River and the Clarence River and out to 4 nm from 1 October to 31 March.

MFish will discuss the industry's CoP with South East Finfish Management Ltd. and Challenger Finfisheries Management Company Ltd. to encourage them to raise their fisher's awareness of the code to ensure they comply with its various components, as well as the possibility for including further measures to mitigate dolphin bycatch by trawlers. MFish will also work with industry to ensure effective monitoring and reporting frameworks are in place

MFish will actively promote the recreational set net CoP and the need for appropriate set net practice (to apply outside closed areas). For example, through targeted newspaper articles and public notices, as well as developing a poster for placement in clubs, fishing shops, etc.

79 Appropriate offences and penalties may also need to be established for any new regulatory requirements introduced.

Proposal to fix technical error

80 MFish has identified a technical error in the Fisheries (Canterbury Set Net Area Amateur Prohibition) Notice 2002 (No. F208) that was introduced following an MFish review to assess whether further mitigation measures were needed for South Island Hector's dolphins. The intent of this notice is to ban the use of recreational set nets in the Canterbury set net area (Waiau River to the Waitaki River and out to 4 nm) from 1 October to 31 March, with a shorter ban in flounder areas in Banks Peninsula and exception of certain reefs in the Timaru reef area¹⁶. The shore boundary of this closure is currently the Territorial Sea Baseline.

81 The Territorial Sea baseline is defined as the low tide mark. Therefore, the current notice does not apply to the area of coastline between the low tide mark and the mean high water mark. To satisfy the original intent of the notice, MFish proposes to amend notice F208 to ban the use of recreational set nets from the mean high water mark (proceeding straight across rivers, estuaries or lagoons) out to 4 nm between the Waiau and Waitaki Rivers from 1 October to 31 March, with the same shorter ban as previously in flounder areas and exception of certain reefs in the Timaru reef area.

¹⁶ See Appendix 7 for a map of the recreational set net closed areas.

Population status

82 The east coast South Island population has an estimated size of around 1790¹⁷ individuals. High densities of Hector's dolphins off the east coast are:

- in Akaroa Harbour;
- between Banks Peninsula and Rakaia River;
- on the east coast of Banks Peninsula;
- in Cloudy and Clifford Bays;
- in Queen Charlotte Sound; and
- between Cape Campbell and Motunau.

83 Studies around Banks Peninsula have shown that in summer Hector's dolphins are mostly found close to shore in water less than 20 m deep and in winter the dolphins move out to deeper waters (20-100 m). Hector's dolphins have been encountered during offshore aerial surveys at distances of 16.3 nm offshore in summer and 18.2 nm offshore in winter.

84 Initial PRR analysis to guide the setting of a human-induced mortality limit for the east coast South Island population indicates that 4 dolphins can be removed from the population each year.

Fishing threats to the population

Set netting

85 Commercial, customary and recreational set net fishing occurs on the east coast of the South Island. Set netters generally target elephant fish, rig and school shark.

86 An observer programme designed to assess the incidental catch of Hector's dolphins in commercial set net shark fisheries operating in Pegasus Bay-Canterbury Bight set net fishery (Statistical Areas 020 and 022) was carried out during the 1997-98 fishing year. During the survey a total of seven Hector's dolphins were observed caught in set nets, of which one was released alive. All events involving Hector's dolphins occurred near shore in shallow depths of less than 30 m. Using these observer data, a total bycatch of 18 Hector's dolphin interactions was estimated for 1997-98 set net fisheries in Statistical areas 020 and 022. Measures have been put in place to mitigate dolphin bycatch off the east coast South Island since this observer programme was undertaken. These are outlined in the following section.

87 Over the past three years, six Hector's dolphin deaths have been attributed to set net bycatch (3 resulting from commercial set netting¹⁸, 3 unknown¹⁹).

Trawling

88 Red cod and flatfish are mainly targeted by inshore trawlers off the east coast of the South Island.

¹⁷ This population estimate includes the extent of coastline that incorporates Porpoise Bay. Further work will be undertaken to identify whether dolphins in Porpoise Bay should be linked with the Te Waewae Bay population or the east coast South Island population.

¹⁸ 2 separate incidents in Otago, both during December 2005

¹⁹ 2 Separate incidents in Canterbury, one in February 2005 and the other in September 2005

89 There was also some observer coverage of the inshore trawl fishery in the Pegasus Bay-Canterbury Bight area in 1997-98 to determine whether Hector's dolphins were being captured in that fishery. One Hector's dolphin was observed caught. Before the observer programme, 5 dolphins were known to have been caught by trawlers off the east coast South Island. Three of these incidents occurred in Pegasus Bay.

90 Since the observer programme, there have been 4 known dolphin mortalities caused by trawling. Three of these were the result of one trawling incident in April this year. This incident was reported by the fisher involved and occurred off Wairau Bar in Cloudy Bay, Marlborough.

Current management measures

91 The Banks Peninsula Marine Mammal Sanctuary²⁰ (1140 km²) was created in 1988. The Sanctuary allows limited recreational set netting between 1 March and 31 October. Recreational set netting is otherwise prohibited, and there is no commercial set netting allowed within the Sanctuary.

92 As mentioned above, a seasonal closure has been in place since 2002 that bans the use of recreational set nets out to 4 nm between the Waiau and Waitaki Rivers from 1 October to 31 March.

93 In addition to introducing the Fisheries (Canterbury Set Net Area Amateur Prohibition) Notice 2002, the then Minister of Fisheries (Hon Pete Hodgson) agreed to a set net mortality limit of 3 dolphins per year in the Canterbury set net area (Waiau River to the Waitaki River and out to 4 nm) from 1 October to 30 September. If the limit is reached²¹, the Minister is able to close the commercial set net fishery under s 15(5) for the remainder of the fishing year. The limit was put in place as an interim measure pending a Population Management Plan for Hector's dolphins that was under development by DOC at the time. This Population Management Plan was not implemented.

94 There are a number of voluntary measures in place to reduce the impacts of fishing. Similarly to FMA5, commercial set netters fishing in FMA3 (which encompasses most of the east coast South Island) operate under the South East Finfish Management Ltd voluntary CoP. As part of this CoP, commercial fishers in the Canterbury area have changed the pattern of their fishing operations and now spend more time fishing outside the immediate coastal waters where Hector's dolphins are usually found. Commercial set netters do not fish within 4 nm of the Canterbury Bight coast from October to January. The South East Finfish CoP also requires commercial trawlers and set netters to stay outside 1 nm between the southern boundary of the Banks Peninsula Marine Mammal Sanctuary and the Waitaki River throughout the fishing year.

95 The northern part of the east coast falls within FMA7, which is under the jurisdiction of Challenger Finfisheries Management Company Limited. Commercial set netters in FMA7 operate under the Challenger Finfisheries CoP, which, similarly to the South East Finfish CoP, encourages set net fishers to implement a variety of practices to minimise interactions with Hector's dolphins²².

96 At Kaikoura, local recreational fishers have agreed to not use set nets near open beaches. There is a long-standing agreement amongst local fishers to not use set nets in the vicinity of Porpoise Bay. This restriction appears to be effectively enforced by the local community and

²⁰ A map of the Banks Peninsula Marine Mammal Sanctuary is provided in Appendix 7

²¹ This limit has not been reached since it was set.

²² Examples of measures set out in the Challenger CoP are given in the west coast South island section of the document.

commercial fishers. There have been no known set net entanglements in Porpoise Bay.

Analysis of proposed interim measures

Set netting

Recreational set netting

97 The area to the north of the current Canterbury recreational set net closure is a popular area for recreational set netting and is therefore an area of risk to Hector's dolphins. To address this threat, MFish proposes the following options:

- ◆ *Option 1* - Extend the boundary of the Canterbury recreational set net seasonal closure northwards to prohibit recreational set netting from the Waiau River to the Clarence River outlet (FMA3/FMA4 boundary, 42°10.0'S and 173°56.0'E) and out to 4 nm.
- ◆ *Option 2* - Introduce a seasonal (1 October to 31 March inclusive) requirement for recreational fishers setting a net between the Waiau River and the Clarence River and out to 4nm to remain in attendance with the net while the net is set.

98 Since the Canterbury set net notice has been in place, there have been two confirmed entanglements north of the seasonal closure area during the summer months. It is unknown whether these entanglements were the result of commercial or recreational set netting. MFish considers there may be benefit in extending the current northern boundary of the recreational closure to the Clarence River outlet in Kaikoura (see Figure 3) as an interim measure to reduce the likelihood of dolphin deaths over the peak summer season. This measure would apply over the same timeframe as the current Canterbury set net regulations, thereby prohibiting recreational set netting from 1 October to 31 March. Alternatively, introducing a mandatory requirement for recreational fishers to stay with their nets when fishing in this area from 1 October to 31 March would provide for recreational use and would reduce risk to dolphins, albeit less so than a complete exclusion of recreational set netting activity.

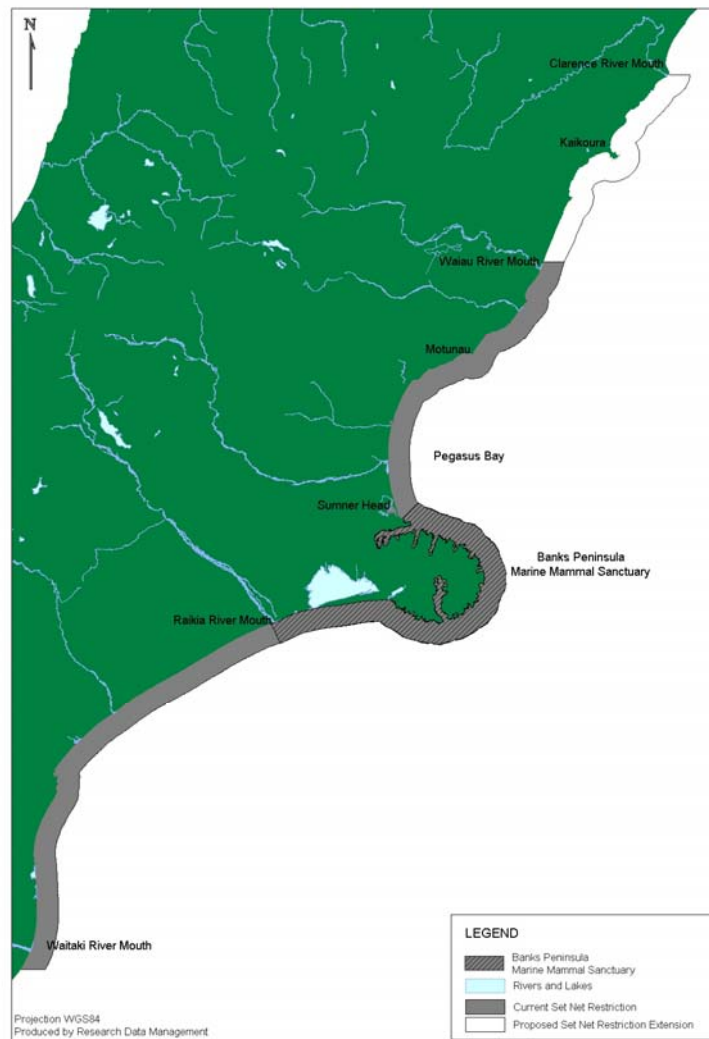
99 When making final decisions on these proposals, the Minister will need to weigh up the utilisation impact of extending the current boundary of the seasonal Canterbury recreational set net closure against the benefits of more effective mitigation of set netting risk to dolphins. Stakeholder submissions on the extent of recreational fishing activity in this area, and the impacts and benefits of these proposals are welcomed.

Commercial set netting

100 Low levels of observer coverage²³ of the commercial fishery make it difficult to determine the success of industry's initiatives to mitigate Hector's dolphin mortalities in the Canterbury area. There have been no dolphin mortalities reported by commercial set netters within the Canterbury area in the last 3 years. There have been three recent entanglements (2 separate incidents) in commercial set nets off Otago. There is a process currently underway to establish regulations in the East Otago Taiapure that will require commercial and recreational set netters to stay with their nets when they are set. Consultation on this measure is due to begin in the near future. This Taiapure covers the coastline in the region where the three dolphins were caught but the offshore boundary does not encompass the specific location where one of the incidents occurred.

²³ Due to practicality problems associated with placing observers on board small vessels

Figure 3: Indicative boundary of proposed extension to seasonal recreational set net restriction



101 A recent study found that in summer, the proportion of sightings inside the 4 nm offshore boundary of the Banks Peninsula Marine Mammal Sanctuary was 79% but this dropped to just over 35% in winter. The results of the study suggest that at certain times of the year, a high proportion of the dolphins around Banks Peninsula may move offshore into areas where they are at risk from commercial set nets. This new information highlights a potential risk to dolphins from commercial set netting offshore from the sanctuary. MFish considers the need for further measures around Banks Peninsula would be most appropriately investigated as part of the Threat Management Plan.

102 MFish considers that efforts by the South East Finfish Management Ltd. and Challenger Finfisheries Management Company have shown that the fishing industry in FMA3 and FMA7 is able to organise itself collectively. MFish acknowledges the steps industry has taken with implementing measures and does not believe that further measures are necessary to mitigate risk to dolphins from commercial set netting off the east coast of the South Island at this time. To increase certainty that voluntary measures are being implemented, MFish will work with industry to ensure effective monitoring and reporting frameworks are in place. The threat of commercial set netting along the extent of the east coast South Island will be addressed through the Threat Management Plan.

Customary set netting

103 Following the aforementioned MFish review to assess whether further mitigation measures were needed for South Island Hector's dolphins, the then Minister (Hon Pete Hodgson) accepted MFish advice that customary set netting would take into account the need to avoid, remedy or mitigate the effect of set net fishing-related mortalities. Noting this, MFish considers that interim measures are not needed to manage customary set netting interactions with Hector's dolphins, with this threat best addressed through the Threat Management Plan process.

Trawling

104 MFish does not consider interim measures are required to mitigate the impacts of trawling on Hector's dolphins on the east coast South Island. Since October 1989 there have been 6 reported dolphin deaths by trawlers. Three of these deaths were the result of a single incident in April of this year in FMA7 near Blenheim. This suggests that trawling interactions with the dolphins are a relatively rare event. However, MFish acknowledges that low levels of observer coverage mean it is difficult to ascertain the actual level of risk to the dolphins from trawling. MFish considers that the threat of trawling will be best addressed through the Threat Management Plan process. Officials will engage with industry in the interim to discuss incorporating trawl mitigation measures into the Challenger Finfisheries CoP and further measures in to the South East Finfish CoP.

Summary of rationale for interim measures proposed

105 The interim measures proposed for the east coast South Island population are based on:

- ◆ The estimated size of the east coast Hector's dolphin population (about 1790 animals);
- ◆ Initial PBR analysis to guide the setting of a human-induced mortality limit for the east coast South Island population indicates that 4 dolphins can be removed from the population each year;
- ◆ The number of known fishing related mortalities over recent years. Over the past three years, 10²⁴ of the 24²⁵ known dolphin deaths have been definitely attributed to fishing-related mortality on the east coast South Island. Most of these mortalities occurred over the past year, when there were 3 deaths consistent with set net entanglement and 3 deaths from one trawl incident. This past year's known mortality exceeds the indicative limit of 4 dolphin deaths per year for this population;
- ◆ For dolphin incidents where cause of death has been identified, set net entanglement is the most commonly attributed cause;
- ◆ Industry has governance arrangements in place and commercial set netters are required to implement a number of mitigation measures through voluntary CoPs.
- ◆ The summer is when recreational set netting effort is at its peak;
- ◆ The area to the north of the current Canterbury recreational set net closure is known to be popular for recreational set netters and is therefore an area of risk to Hector's dolphins;
- ◆ There are difficulties ensuring recreational fishers comply with voluntary measures.

²⁴ 6 set net; 3 trawl; 1 craypot line

²⁵ 10 fishing related; 2 natural; remainder unknown

Maui's dolphin (west coast North Island)

Proposals for interim measures

106 MFish proposes the following interim measures for the Maui's dolphin population:

MFish will initiate discussions with Port Waikato drift net and set net fishers to determine whether set net and drift net fishing represents a threat to dolphins in that area and, if so, whether measures such as voluntary limits, regulated closures or a combination of these should be applied to eliminate any threats – aiming to have any such measures in place as soon as practicable.
MFish will initiate discussions with commercial and recreational Taranaki set netters to assess the extent to which their fishing might represent a threat to dolphins and, if so, what measures can be applied to eliminate any threats – aiming to have such measures in place by Christmas if there is clearly a need to do so within this timeframe.
MFish will discuss possible trawl voluntary measures with operators to avoid trawling close inshore, especially in winter when dolphins are within the trawl area.
MFish will continue monitoring of compliance with the west coast/Manukau entrance closed areas, particularly during the summer months.
MFish will publicise west coast/Manukau entrance closed areas.
MFish will maintain awareness of any new information on dolphin movement in harbours.

Population status

107 The most recent estimate of the size of the Maui's dolphin population was obtained from an aerial line-transect survey in 2004. The estimate of 111 animals suggests that Maui's dolphin may be the rarest marine mammal in the world.

108 Initial PBR analysis to guide the setting of a human-induced mortality limit for the Maui's population indicates annual mortality caused by human activities should be zero.

109 In the past Maui's dolphin range extended on the North Island west coast from the Taranaki region, north to Glinkes Gully (near Dargaville). However, verified sightings information seemed to indicate that in recent years the dolphin's historic range has contracted to a "core area" between the Manukau Harbour entrance and Port Waikato/Raglan Harbour. Outside this core area there have been occasional sightings northward to the Kaipara Harbour and south as far as Mokau, and recently possibly further.

110 In summer, Maui's dolphins show a strong preference to be in the stirred up water of the surf zone and mostly within 1 nm of shoreline. In the winter this preference is not so strong and some dolphins have been seen as far out as 3 to 4 nm – the apparent offshore limit of their range.

111 The extent to which west coast harbours may be part of the dolphins range is unclear at present. Dolphins have been seen at the entrance to the Manukau Harbour in an area now closed to set netting. There have been reports of sightings in other harbours, but these have been infrequent and of uncertain reliability. There is an ongoing study in the Manukau and Kaipara Harbours that involves the use of acoustic detection PODs (porpoise detection devices) to detect dolphin movement. There are reports that these PODs have detected dolphins. However, while the PODs have recorded what may be dolphins, there have been very few actual sightings in the relatively shallow harbour waters where (compared to the coast) there is frequent boat traffic.

Fishing threats to the population

112 Set netting was identified as the main threat to Maui's dolphin. In response both commercial and amateur set netting has been prohibited within 4 nm of the coast from Mananui Bluff to Pariokariwa Point and in the entrance to the Manukau Harbour²⁶. There has only been one reported death (not set net related) since the current set net closed area came into effect. However, there are other potential threats that need to be assessed if no deaths per year are to be achieved every year. They are: trawling, drift netting, harbour fisheries, and set netting south of the closed area.

Trawling

113 There is a sizable trawl fishery on the North Island west coast for species such as snapper and trevally. Trawling is prohibited within 1 nm of the shore, with extensions out to 2 nm at harbour entrances. There is also a Voluntary Trawl Agreement in place that requires vessels to not trawl within 2 nm from shore between Awakino River mouth and Port Taranaki²⁷. This means that in summer, when Maui's dolphins appear to spend most of their time close to shore inside the prohibited area, trawling should not be a significant threat. At other times of the year, sightings information indicates that the dolphins are further out, where trawl tow position data show that the trawlers operate.

Drift netting

114 Drift nets are used to catch mullet at the Waikato Heads. A dead Maui's dolphin was found wrapped in a section of what other fishers were sure was a drift net of the kind used in this fishery. Recreational fishers also use drift nets at Port Waikato, which are sometimes not securely anchored so that they are easily lost. All the fishing occurs within the river, but it is a short distance from the river out to sea, so lost nets can float out with the current. Port Waikato is within the dolphins' "core area". Consequently, lost nets are a potential threat here.

Harbour set netting

115 There are reasonably intensive commercial, recreational and customary set net fisheries in all west coast harbours. As indicated above, it is not possible at present to confirm whether harbours are part of the dolphins' range. There have been occasional sightings over the years and reports that the acoustic PODs have detected dolphin movement, but with the exception of the Manukau Heads area, nothing conclusive enough to confirm that there is a threat.

Taranaki

116 The coastal closed area finishes at Pariokariwa Point just north of the Taranaki Bight. It is to the south of the southernmost reliable sighting at the time, making an allowance for the extra distance (around 20km) a dolphin could cover in its home range. It was apparent that Maui's dolphin had once been common in Taranaki, but indications were that their range had both contracted and moved north. However, DOC has recorded several recent sightings further south than the existing closed area. Consequently, this may be the same situation that previously led to the closed area to the north, with dolphins occurring within a set net fishing area.

²⁶ See Appendix 7 for map of the closed area

²⁷ Although it is outside the known range of Maui's dolphin, at South Taranaki between Cape Egmont and the Rangitikei River outlet there is a Voluntary Trawl Agreement that does not allow single trawling within 2 nm and does not allow pair trawling within 4nm. These measures were put in place to improve recreational fishing access.

Current management measures

117 On the basis of stranding reports and necropsies it became apparent that set nets posed the greatest risk to Maui's dolphin. Because of this, beginning in 2002 MFish has progressively closed all of the confirmed (on the basis of reliable sightings) Maui's habitat (Manganui Bluff to Pariokariwa Point) to both commercial and non-commercial set netting. Following reliable reports of dolphin sightings in the entrance to the Manukau, this area was also closed to set netting. The current area closures have been in place since October 2003.

118 There have been no reports of beach cast dolphins with signs of death caused by set nets since the current area closures have been applied. MFish has directed considerable compliance effort into patrolling these closed areas to ensure they are observed. This has resulted in a significant reduction of the threat of set netting to Maui's dolphins.

Analysis of proposed interim measures

Port Waikato

119 The commercial mullet fishery at Port Waikato is very much a summer fishery, as is recreational netting. This is also the time when the dolphins are close inshore. MFish has compiled information on both the fisheries and dolphins as a basis for discussion with fishers and the community on possible measures to reduce risks to the dolphins. It is not possible at present to determine the risks associated with the fishing there and as a consequence whether there is a need for controls of some kind. However, there is certainly a potential risk associated with lost nets drifting out to sea. MFish intends to initiate discussions with Port Waikato fishers to identify what kinds of measures would most effectively mitigate any threats until the Threat Management Plan is completed. The Threat Management Plan will provide an opportunity to determine whether any interim measures are sufficient, or whether a more comprehensive regulatory/voluntary regime is needed.

Taranaki

120 Sightings information in Taranaki indicates there may be dolphins where set netting occurs. The set netting is mainly commercial. MFish proposes working with fishers in Taranaki to establish whether their fishing may represent a threat to the dolphins and, if so, what measures (voluntary/regulatory) would be most effective in eliminating the threat. If it is evident that measures are needed urgently, the intention would be to implement voluntary measures by Christmas, with consideration of possible longer-term mandatory measures as part of the Threat Management Plan process.

Trawling

121 MFish considers that trawling is not an especially urgent issue over summer when the dolphins are close to shore. However, at some stage it will be useful for officials to meet with the trawl operators to discuss issues such as the presence of dolphins where trawlers are known to tow and the possibilities of observer coverage. Over the upcoming 2006-07 summer, there are 100 planned observer days (10% of effort) on inshore trawlers on the west coast North Island. MFish proposes to discuss possible interim trawl voluntary measures with operators to avoid trawling close inshore, especially in winter when dolphins are within the trawl area.

122 While there is no information confirming that trawlers have caught Maui's dolphins, these

vessels are at least a potential threat, with longer-term mitigation measures most appropriately pursued as a component of the Threat Management Plan.

Harbours

123 MFish does not consider interim measures are required in the west coast North Island harbours, given that at this stage it is not possible to confirm whether harbours are part of the dolphins' range. MFish will maintain contact with the researchers using the acoustic PODs. If it appears that the PODs are picking up regular, conclusive dolphin movement, it would be useful to determine if a sightings survey could be run in parallel as a way of verifying the acoustic information. This will be investigated further as part of the Threat Management Plan.

124 Fishery Officers can continue to monitor and ensure compliance with the set net closed area and, whenever possible, ensure awareness of the legislative requirements for the area.

Summary of rationale for proposed interim measures

125 Maui's dolphin has a small estimated population size of 111 animals, and initial PBR analysis to guide the setting of a human-induced mortality limit for the Maui's population indicates annual mortality caused by human activities should be zero.

126 The main threat to Maui's dolphins has been mitigated through the commercial and amateur set net area closure on the west coast North Island. Other potential threats to Maui's dolphins have been identified that MFish considers may require mitigation. The extent to which these threats represent a risk to Maui's dolphins is uncertain, and MFish therefore proposes to initiate discussions with the relevant stakeholders to determine whether measures are required and, if so, what kind of measures would most effectively mitigate threats until the Threat Management Plan is completed.

West Coast South Island

Proposals for interim measures

127 MFish proposes the following interim measures for the west coast South Island:

MFish will actively promote the recreational set net CoP. For example, through targeted newspaper articles and public notices, as well as developing a poster for placement in clubs, fishing shops, etc.

MFish will discuss the industry's CoP with the Challenger Finfisheries Management Company to encourage them to raise their fishers' awareness of the code to ensure they comply with its various components.
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Population status

128 The largest population of Hector's dolphins is present off the South Island's west coast, with an estimated population size of around 5390 individuals. Figure 1 illustrates the main areas of high abundance. Surveys carried out on the west coast of the South Island suggest that the dolphins mostly reside within 5 nm from the shore, with no dolphins sighted outside 6 nm.

129 Initial PBR analysis to guide the setting of a human-induced mortality limit for the west coast South Island population indicates that 11 dolphins can be removed from the population each year.

Threats to the population

Set netting

130 Commercial set netting generally occurs throughout the west coast South Island with most fishing effort concentrated from Westport to Hokitika. Most set netting targets school shark and rig, and can occur relatively close to shore dependent on water depth.

131 Most recreational set netting occurs around towns and settlements. The main species targeted are flatfish, various shark species, and elephant fish. There is anecdotal information to suggest that in some areas fishers are staking nets above low tide mark and setting nets 90° to the shore.

132 Information from DOC suggests that about 5-6 Hector's dolphins (minimum) are found dead each year. Most recorded deaths are found in Buller Bay and around Hokitika. Over the past three years, there have been 8 known fishing-related mortalities. These have all been attributed to net entanglement, with four deaths the result of one recreational set netting incident. It is not known if the other four entanglements were caused by recreational or commercial set nets.

Trawling

133 Commercial trawling generally occurs throughout the west coast South Island with most fishing effort concentrated from Westport to Hokitika. The majority of trawlers use bottom trawl gear to target a wide range of species including red cod, hoki, tarakihi, elephant fish, stargazer, and ling. Trawling can occur relatively close to shore dependent on species targeted and water depth relative to shore. There are two known separate trawling incidents that resulted in dolphin mortalities off the west coast South Island. These incidents both occurred in 1988 and each resulted

in two dolphin deaths.

Current management measures

134 There are no legislative or regulatory management measures in place along the west coast South Island to address fishing interactions with Hector's dolphins. However, there are two voluntary set netting CoPs in place, as outlined below.

Commercial set netting

135 A voluntary CoP applies throughout FMA7, which covers the west coast South Island where Hector's dolphins are present. This Code is implemented by the Challenger Finfisheries Management Company Limited and applies to all commercial set net fishers operating under the Company's jurisdiction. The purpose of the Code is to avoid and mitigate the incidental capture of Hector's dolphins in commercial set nets throughout FMA7.

136 The Code encourages set net fishers to implement a variety of practices to minimise interactions with Hector's dolphins including:

- avoid setting nets in shallow estuaries, harbours and river mouths when water is cloudy or discoloured
- avoid setting nets when Hector's dolphins are around and maintaining a lookout when gear is deployed
- encourage the use of acoustic pingers on nets
- keep set net duration to a minimum
- set nets as tight as possible
- recover nets as quickly as possible.

Non-commercial set netting

137 Similarly to elsewhere in New Zealand, MFish actively promotes a voluntary set net code of practice for non-commercial fishers on the west coast South Island.

Trawling

138 No voluntary measures apply to trawling activities along the west coast South Island.

Analysis of proposed interim measures

139 MFish does not see a need to urgently progress management measures for the west coast South Island at this time. Rather, an evaluation of the need for longer-term management measures to address fishing interactions will be progressed through the Threat Management Plan process. This position is based on:

- the size of the west coast Hector's dolphin population (i.e., about 5400 animals);
- the extent of mortalities caused by fishing interactions (i.e., 8 known over past 3 years); and
- information from initial PBR analysis to guide the setting of a human-induced mortality limit (i.e. 11 animals).

140 Although MFish considers urgent measures are unnecessary on the west coast South Island, there are a number of actions that can be undertaken to reduce the risk of fishing interactions with

Hector's dolphins over the upcoming summer, such as increasing awareness of both the industry and recreational set net CoPs. Longer-term measures to address fishing related threats will be examined as part of the Threat Management Plan.

Interaction of Threat Management Plan with the west coast Marine Protected Area (MPA) process

141 The MPA Policy is being implemented on the west coast and officials involved in this process have identified a conflict with running a parallel process to develop the Hector's dolphin Threat Management Plan. To resolve this conflict, work on the development of proposals to manage threats to dolphins on the west coast South Island (as part of the Threat Management Plan) is proposed to be delayed until at least July 2007, when the MPA strategy is expected to be completed for this region.

Process for implementation of interim measures

142 It is possible in some instances that voluntary initiatives will adequately mitigate fishing threats until the Threat Management Plan is completed. In this case, officials will work with fishers to implement such measures as soon as possible.

143 If the Minister believes mandatory interim measures (i.e. regulations or Gazette notice) are required to effectively mitigate threats, MFish considers there is benefit in implementing any such measures as soon as possible because the summer is when dolphins are at most risk of entanglement.

144 As noted earlier, MFish acknowledges the 5 week consultation period for this IPP is shorter than MFish would usually allow. However, MFish considers that 5 weeks is necessary in the circumstances given the urgent need in certain areas for the implementation of measures to prevent further fishing-related deaths of Hector's dolphins. The 5 week consultation will enable mandatory interim measures, if appropriate, to be implemented as soon as possible and in any case before the Christmas/New Year holiday season when the threat of recreational set netting to the dolphins is likely to be at its peak.

Appendix 1: Section 11 Statutory considerations

145 In forming the management options, MFish has also considered the statutory obligations described in section 11 of the Act. These are summarised below.

- a) **Section 11(1)(a):** Hector's dolphins have a close inshore distribution that results in an overlap with commercial and recreational set net fisheries, as well as inshore trawl fisheries. In considering whether to set or vary the sustainability measures proposed, the Minister must take into account any effects of fishing on the aquatic environment, in particular the presence of Hector's dolphins in these areas. These effects are outlined in detail for each Hector's dolphin population in the main body of this IPP.
- b) **Section 11(1)(b):** There are a range of existing measures that apply to areas in order to mitigate the impacts of fishing on Hector's dolphins, such as the west coast North Island closure to commercial and amateur fishing and the Canterbury recreational set net seasonal closure. These measures are outlined in more detail in the main body of this IPP. Existing controls have been considered when making recommendations for setting or varying any sustainability measure for areas where Hector's dolphins are present. Total Allowable Catches may also restrict fishing effort for fish stocks where there is potential for interactions with Hector's dolphins.
- c) **Section 11(1)(c):** MFish has no information to suggest that Hector's dolphins are prone to significant fluctuations in abundance. Hector's dolphins have low reproduction rates resulting in low potential for population growth.
- d) **Section 11(2)(a), (b) and (c):** There are no known statements in any regional policy statement, regional plan, or proposed regional plan under the Resource Management Act 1991 that are relevant to the setting or varying of any sustainability measure for areas where Hector's dolphins are present. There are objectives and implementation activities in the conservation management strategies made under the Conservation Act 1987 that generally support the protection and conservation of marine mammals, including Hector's dolphins. None of the proposals apply to areas within the Hauraki Gulf, and therefore sections 7 and 8 of the Hauraki Gulf Marine Park Act 2000 are not relevant here.
- e) **Section 11(2A)(a and c):** Relevant conservation services are planned observer coverage on inshore trawlers in FMAs 1, 9, 8 and 7 (258 days, 10% of effort), and planned observer coverage for set net vessels in FMAs 3, 5 and 7 over the 2006-07 fishing year (165 days, 3% of effort). Information from observer programmes could support decisions relating to commercial trawl and set net fisheries in the future.
- f) **Section 11(2A)(b):** The Minister approved a fisheries plan for SPO 7 under s 11A(1) of the Act on 4 May 2006. The Challenger Finfisheries Management Company is the owner of the plan and is responsible for administering the major components of the plan including the commercial fishing area closure, catch limits, supporting research, ongoing education, and the set net CoP.

Appendix 2: Overview of fishing threats to Hector's dolphins

146 The entanglement and drowning of cetaceans in fisheries is of worldwide concern. The first indication of this problem in Hector's dolphins was in 1973. Reports of incidental capture of Hector's dolphin by fishing activities show that the dolphins are most vulnerable to the set net fishing method. Further information about fishing methods known to be of risk to dolphins is below.

Fishing threats to Hector's dolphins

Set net fisheries

The vulnerability of Hector's dolphin to entanglement, particularly in inshore set nets, has been well established through a combination of interviews with fishers, observer programmes and necropsies of bycaught and beach-cast animals. Hector's dolphins have a close inshore distribution that results in an overlap with commercial and recreational set net fisheries, and Hector's dolphins are known to have been entangled in set nets throughout their range.

Trawl fisheries

147 Hector's dolphins have also been known to become caught by inshore trawl vessels where nets are towed along the sea floor or in midwater. Interactions with Hector's dolphins appear to be limited to inshore trawl operations operating in waters of less than 100 m depth, and this may be due to their observed habitat preference for these shallower, inshore waters. Total reported instances of Hector's dolphins caught in trawl nets are low compared to set nets. However, the focus of observer programmes and interview programmes to assess dolphin bycatch has tended to be on set net fishers. The catch rate (per day fishing) appears to be lower for trawl than set net fisheries.

Drift net fishery

148 There is a commercial and recreational drift net fishery in the mouth of the Waikato River targeting mullet. There has been one report of a dolphin becoming entangled in a lost net. This threat relates specifically to the Maui's dolphin population.

Craypotting

149 There have been three known incidents²⁸ of Hector's dolphins becoming entangled in a craypot line. All of these incidents have occurred in the Nelson/Marlborough region. An Expert Panel²⁹ workshop was held in April 2006 to assess the threats to Hector's dolphins. An outcome of this workshop was that craypot entanglement was categorised as being of lower significance than other threats (including non-fishing threats such as pollution, vessel traffic and coastal development) facing the dolphins. MFish therefore considers craypotting is unlikely to cause a risk to the dolphins that requires urgent mitigation. This threat is not examined further in the document.

²⁸ One incident in: 1989; 1997; and in 2004. All three resulted in death of the dolphin involved.

²⁹ The Expert Panel consists of experts on Hector's dolphins and/or the threats that they face.

Appendix 3: Hector's dolphin Threat Management Plan

150 Our work to date has focused on developing the draft Plan. MFish and DOC have:

- Compiled reference material
 - i) Prepared an information brief that summarises much of what we know about the dolphins, their biology, the threats they face, and the measures that have been adopted to reduce those threats;
 - ii) Developed and trialled a threat management methodology based on the Australia/New Zealand risk management standard;
 - iii) Prepared a draft Communications Plan.
- Developed a set of draft management objectives
- Convened a multi-stakeholder Advisory Group³⁰ and an Expert Panel
- Identified and analysed the threats facing the dolphins

³⁰ The Advisory Group was established in 2005 and provides non-government input into the Threat Management Plan. Members are viewed as stakeholders who provide information, rather than representatives in a steering or consultative role. The role of the Advisory Group is to provide advice on development of the Plan to Officials.

Appendix 4: Hector's dolphin mortalities since October 2005

	Reporting Date	Specific Species	Call From	DoC Conservancy	Specific Location	Likely Cause	Additional Comments
1	2/11/2005	Hector's Dolphin	Public	West Coast	Neils Beach, Jacksons Bay	Entanglement	One of 4 Hector's dolphins that had been entangled in same net (recreational) at Neil's Beach.
2	2/11/2005	Hector's Dolphin	Public	West Coast	Neils Beach, Jacksons Bay	Entanglement	One of 4 Hector's dolphins that had been entangled in same net (recreational) at Neil's Beach.
3	2/11/2005	Hector's Dolphin	Public	West Coast	Neils Beach, Jacksons Bay	Entanglement	One of 4 Hector's dolphins that had been entangled in same net (recreational) at Neil's Beach.
4	2/11/2005	Hector's Dolphin	Public	West Coast	Neils Beach, Jacksons Bay	Entanglement	One of 4 Hector's dolphins that had been entangled in same net (recreational) at Neil's Beach.
5	23/11/2005	Hector's Dolphin	Public	Nelson/Marlborough	Fossil Point at the base of Farewell Spit	Unknown	Newborn (likely to be less than 3 weeks old) as postnatal hairs still on upper mandible
6	4/12/2005	Hector's Dolphin	Public	Southland	Orepuki Beach	Unknown	Newborn washed up on beach.
7	4/12/2005	Hector's Dolphin	Public	Wellington	Pekapeka Beach	Euthanased	Newborn found alive on beach. Odds of survival deemed nil.
8	6/12/2005	Hector's Dolphin	Public	West Coast	1 km South of Karamea	Unknown	Very decomposed carcass at least 1 wk old.
9	11/12/2005	Hector's Dolphin	Public	West Coast	Okarito Beach	Unknown	Found on beach by local.
10	15/12/2005	Hector's Dolphin	Public	Southland	Te Wae Wae Bay	Unknown	This animal had been beachcast for approx one week.
11	17/12/2005	Hector's Dolphin	Public	Otago	Off Warrington Beach	Entanglement	This is one dolphin of two involved in this single incident - reported caught by commercial fisher in set net
12	17/12/2005	Hector's Dolphin	Public	Otago	Off Warrington Beach	Entanglement	This is one dolphin of two involved in this single incident - reported caught by commercial fisher in set net
13	9/01/2006	Hector's Dolphin	Public	Otago	15.2 nm East of Seacliffs	Entanglement	Recovered from commercial set net by fisher. Had set 3 nets (mesh size 7 inches) at about 15 metres depth overnight, targetting rig and school shark.
14	1/02/2006	Hector's Dolphin	Public	Canterbury	South of Patiti Point, Timaru	Unknown	Carcass not recovered
15	4/04/2006	Hector's Dolphin	Fisher	Nelson/Marlborough	0.5nm off Wairau Bar, Marlborough	Trawler caught	This is one dolphin of three involved in this single commercial trawl fishery incident, carcass not recovered
16	4/04/2006	Hector's Dolphin	Fisher	Nelson/Marlborough	0.5nm off Wairau Bar, Marlborough	Trawler caught	This is one dolphin of three involved in this single commercial trawl fishery incident, carcass not recovered
17	4/04/2006	Hector's Dolphin	Fisher	Nelson/Marlborough	0.5nm off Wairau Bar, Marlborough	Trawler caught	This is one dolphin of three involved in this single commercial trawl fishery incident, carcass not recovered
18	21/04/2006	Hector's Dolphin	Public	West Coast	Seaview (north of Hokitika)	Unknown	Skeletal remains only - head missing. Sp ID to be confirmed by pathologist and DNA
19	4/09/2006	Hector's dolphin	Public	West Coast	Twin Beach, Heaphy Track, Caldervale, Buller	Unknown	First seen on beach - spring tides and some rough seas both before and after. No obvious unnatural injuries.

Appendix 5: Potential Biological Removal

151 The Potential Biological Removal (PBR) level is the maximum number of animals, not including natural mortalities, that may be removed from a marine mammal stock while allowing that stock to reach or maintain its optimum sustainable population. The PBR is calculated by the following formula:

$$\text{PBR} = N_{\text{MIN}}^{1/2} R_{\text{MAX}} F_{\text{R}}$$

Where:

N_{MIN} = the minimum population estimate of the stock;

$1/2 R_{\text{MAX}}$ = one-half the maximum theoretical or estimated net productivity rate of the stock at a small population size; and

F_{R} = a recovery factor between 0.1 and 1.0³¹

152 The term Optimum Sustainable Population means, with respect to any population stock, the number of animals that will result in the maximum productivity (Maximum Net Productivity Level – MNPL) of the species, population, subpopulation or stock in question, keeping in mind the carrying capacity of the habitat and the health of the ecosystem of which they form a constituent part. For marine mammals, this level is thought to be between 50% and 85% of carrying capacity (K) and is more likely to be at the lower end of that range.³²

153 The minimum population estimate of the stock (N_{MIN}) is defined as the 20th percentile of a log-normal distribution based on an estimate of the number of animals in the stock. This is equivalent to the lower limit of a 60% 2-tailed confidence interval.³³

154 The maximum theoretical productivity rate is 0.04 for cetaceans. This value is used as a default in the absence of species specific information. When data are available on the productivity rate, they should be used.

155 The recovery factor is intended to compensate for uncertainty and possible unknown estimation errors. A recovery factor of 0.1 often is the default used for endangered stocks of marine mammals.³ A recovery factor of 0.5 has been suggested for stocks of indeterminate status.

156 The MNPL goal of the PBR approach was developed to achieve the goals given in the US Marine Mammal Protection Act, *i.e.*, to maintain the population above its maximum net productivity level. This level will be at 50% – 85% of carrying capacity.

157 For Hector's dolphin, it is recommended that the Recovery-Rate goal is applied. This goal will allow a population known to be at a low level relative to its pre-exploitation level to recover at

³¹ Wade, P.R. 1998. Calculating limits to the allowable human-caused mortality of cetaceans and pinnipeds. *Marine Mammal Science* 14(1): 1-37.

³² Taylor, B.L. and D.P. DeMaster. 1993. Implications of non-linear density dependence. *Marine Mammal Science* 9: 360-371.

³³ Barlow, J., S.L. Swartz, T.C. Eagle and P. Wade. 1995. U.S. marine mammal stock assessments: Guidelines for preparation, background, and a summary of the 1995 assessments. NOAA Technical Memorandum NMFS-OPR-95-6. September 1995.

a rate close to its maximum as possible. In this case, a recovery factor (F_R) of 0.15 will achieve the goal of not delaying the time to recovery by more than 10% with 95% probability.

158 Earlier studies suggested an R_{MAX} of about 1.8. The Hector's dolphin Technical Working Group meeting of 31 August 2006 suggested that an R_{MAX} of 3.4% is appropriate based on the modelling work of Davies and Gilbert (2003).³⁴

159 Therefore, an estimated maximum net productivity level of 3.4% and a Recovery Rate of 0.15 are appropriate for Hector's dolphin when the PBR Recovery-Rate goal is applied.

³⁴ Davies, N.M. and D.J. Gilbert. 2003. A risk analysis of an endangered dolphin subspecies using a temporal-spatial age-structured model. Final report for MFish Research Project MOF2002/03D, Objectives 1, 2, & 3 (revised). November 2003.

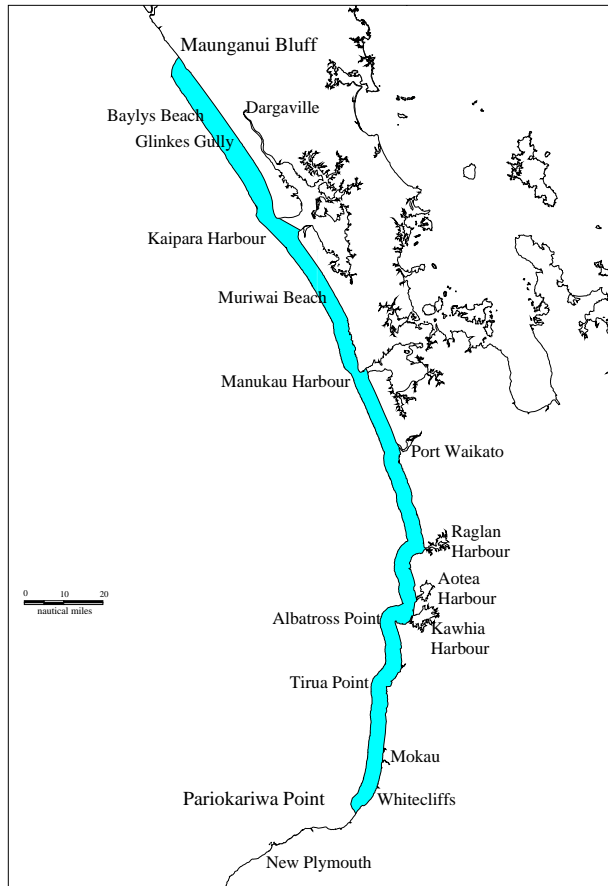
Appendix 6: Average estimated catch (by set net method) in statistical area 30 by volume and value

Key species	Average Volume landed (kg)*	Average Value landed (\$)*
School shark	192,373	338,225
Rig	38,062	105,517
Spiny dogfish	38,933	15,111
Elephant fish	6,453	11,684
Butterfish	3,273	9,260
Stargazer	1,337	1,787
Total	280,430	481,584

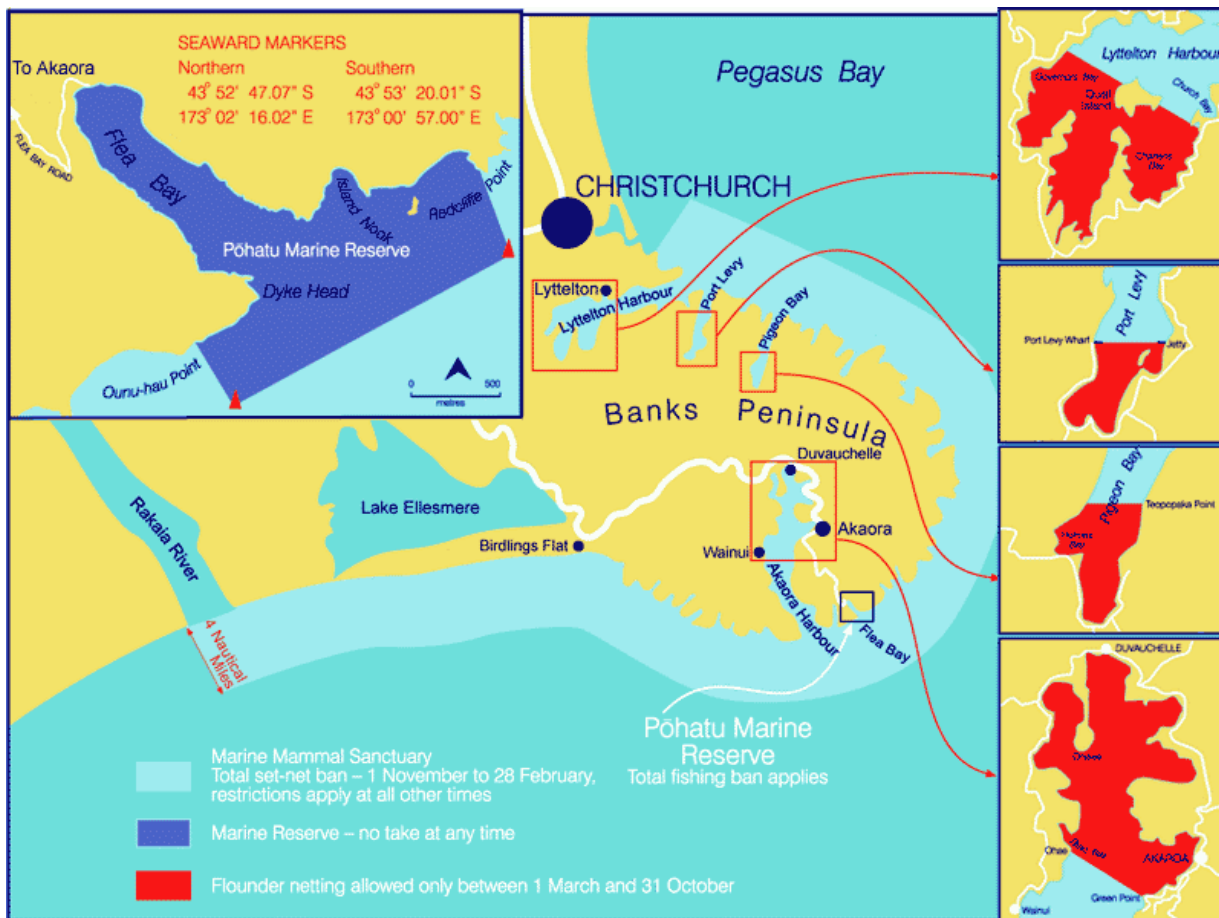
* Average figures provided for the period 1 October 1999 to 30 September 2005

Appendix 7: Current mandatory area closures

Area closed to amateur and commercial set netting (four nautical miles) on west coast North Island



Banks Peninsula Marine Mammal Sanctuary (east coast South Island)



Canterbury seasonal closure to recreational/amateur set netting from 1 October to 31 March (east coast South Island)

