

7.4. East Coast Of The South Island

The East Coast of the South Island (ECSI) population of Hector's dolphin extends between Cape Farewell (near Golden Bay) in the north and Slope Point (south of Waikawa Harbour in the Catlins) in the south. This area covers the northern part of Fisheries Management Area 7 (Farewell Spit to the Clarence River) and Fisheries Management Area 3 (Clarence River to Slope Point). The ECSI population encompasses the Nelson/Marlborough, Canterbury, and Otago Conservancy regions of DOC.

Areas where Hector's dolphins are not regularly found have been excluded from the area to which proposed measures apply. These excluded areas include Tasman Bay, Golden Bay, Marlborough Sounds (**except** Queen Charlotte and Port Underwood)⁷⁹ and river mouths, estuaries, lagoons, inlets and harbours, with the following named exceptions. Estuaries and harbours that **are** included in the proposal boundaries are the Avon-Heathcote Estuary, Lyttelton Harbour, Akaroa Harbour and Timaru Harbour.

7.4.1. Population characteristics

The ECSI Hector's dolphin population comprises approximately 1790⁸⁰ (95% confidence interval 1246 – 2843) individuals, of which about 900 are found around Banks Peninsula (see Map 9 for distribution of Hector's dolphins on the ECSI). Relatively high densities are also found in the following areas:

- ⇒ Cloudy Bay and Clifford Bay
- ⇒ Queen Victoria Rocks to Kaikoura Peninsula
- ⇒ Waiau River to the Waitaki River
- ⇒ Waianakarua River to Moeraki
- ⇒ Curio and Porpoise Bays

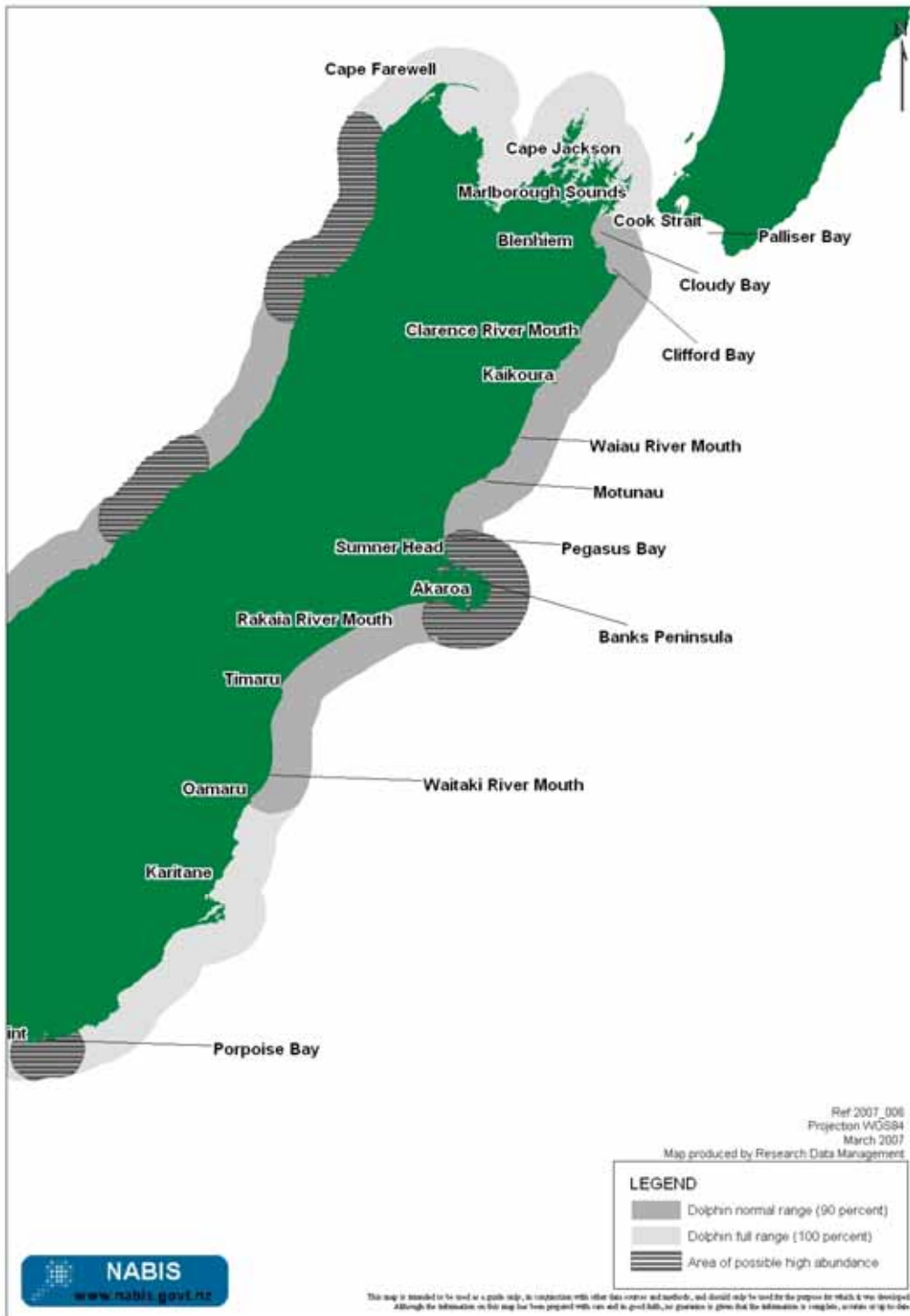
Hector's dolphins on the ECSI are generally found in waters less than about 100m deep year round. In many areas, they are more strongly concentrated in shallow water close to shore during summer, and relatively more dispersed in winter. Studies around Banks Peninsula have shown that in summer Hector's dolphins are mostly found in water less than 20m deep and in winter the dolphins move out to deeper waters (20-100m). Researchers' and fishers' observations indicate that Hector's dolphins are more commonly found in murky water that is often associated with river mouths, and in bays sheltered from the south.

Genetic analysis has shown that the ECSI population's genetic diversity has declined and that there has been a significant decline in abundance in at least parts of its range⁸¹. However, there is a high level of uncertainty around the extent of population decline on the ECSI as there were no systematic surveys of Hector's dolphin abundance before 1984-85. Population estimates since this time are unable to be compared because different methodologies were used to undertake the population surveys.

⁷⁹ Hector's dolphins are present in very low numbers in Golden Bay, and are not present in Tasman Bay and Pelorus Sound.

⁸⁰ This population figure includes the extent of coastline that incorporates Porpoise Bay.

⁸¹ Pichler, F. B. 2002. Genetic assessment of population boundaries and gene exchange in Hector's dolphin. Department of Conservation Science Internal Series 44. 37 p



Map 9: Distribution of Hector's dolphins on the ECSI⁸²

⁸² Indicative only

7.4.2. Fishing threats to the population

The ECSI population is threatened by relatively low levels of human-induced mortality. Population Biological Removal (PBR) analysis⁸³ suggests the ECSI population can sustain 2 - 4 deaths each year (not including natural mortalities). This analysis has a recovery factor built into it, meaning that at the level of removals estimated by the analysis, the population should increase in size. PBR analysis using a default input value⁸⁴, suggests that the population could sustain around 13 human-induced mortalities annually.

Fishing threats identified as facing the ECSI population are:

- ◆ Set netting (amateur and commercial)
- ◆ Trawling (mid-water, bottom, and pair)
- ◆ Rock lobster potting.

DOC's incident database⁸⁵ indicates that since 1988, there have been 161 reported Hector's dolphin mortalities on the ECSI. Of these, there are 104 mortalities where the cause of death was able to be assessed (i.e. cause of death was not assessed, was not able to be assessed due to condition of the carcass or the information is currently not available for 57 individuals). The number of mortalities attributable to a specific cause of death (52 mortalities) is set out in Table 10 below⁸⁶.

⁸³ When the Recovery Rate Goal is applied; see Appendix 3 for a description of the PBR analysis for Hector's dolphins. PBR is only one of a number of factors in determining appropriate management action. There is currently debate around the inputs to the PBR analysis for Hector's dolphins, leading to a range of estimated potential removals. MFish and DOC intend to have the Hector's dolphin PBR analysis independently reviewed to resolve this issue.

⁸⁴ Recovery Factor default value of 0.5, see Appendix 3

⁸⁵ The DOC incident database contains information about all reported Hector's dolphin incidents (mortalities, strandings, etc). An unknown number of incidents go unreported, and therefore the figures presented represent a minimum number of mortalities. Further detail around the DOC incident database, and its limitations, is provided in Part I of this document.

⁸⁶ In addition to the cases where the cause of death was able to be definitely attributable to a particular source, there were also 9 cases where the cause of death was concluded on the basis of the evidence to be probable entanglement, 25 cases where the cause of death was concluded to be possible entanglement, 7 cases where human interaction was a possibility and another 7 cases where a cause of death was not able to be determined by the pathologist. In the remaining cases, 15 were not assessed for a cause of death, details are not currently available for 15 individuals and in 27 cases, the carcass was too decomposed to allow a cause of death to be assessed. Possible or probable entanglements do not distinguish between the various types of nets e.g. trawl or set nets. Set net entanglement is generally assumed and, as such, some trawl related entanglements could be incorrectly attributed to possible or probable set net entanglement.

Table 10: Reported Hector’s dolphin mortalities with a confirmed cause of death on the ECSI since 1988.

Cause of death	Number	Percentage of reported deaths with confirmed cause	Percentage of total reported mortalities
Known set net entanglement	30 (commercial set net: 16, recreational set net: 3, unknown set net: 11)	58% (31% commercial; 6% recreational; 21% unknown)	19% (10% commercial; 2% recreational; 7% unknown)
Trauma – unknown source	5	10%	3%
Known trawler bycatch	6	12%	4%
Rock lobster pot entanglement	3	6%	2%
Boat strike	1	2%	1%
Natural	7	13%	4%

Table 9 indicates that fishing is the most significant known threat facing Hector’s dolphins on the ECSI, being responsible for around 75% of mortalities with a confirmed cause (around 25% of all reported mortalities). Further details about the nature and extent of fishing threats to the ECSI population are provided below.

MFish notes the extent of Hector’s dolphin mortalities from fishing is difficult to quantify, as there is no formal monitoring of amateur set netting and there has been limited observer coverage of the commercial set net and trawl fisheries⁸⁷. Therefore, reliance is placed on fisher self-reporting or interview surveys of marine mammal incidental capture. Reporting of the incidental capture of marine mammals is mandatory under the MMPA but it is unknown what proportion of interactions goes unreported. Consequently, the figures reported on fishing-related dolphin mortalities on the ECSI represent the minimum number of deaths.

7.4.2.1. Set netting

Set netting is the main known threat to Hector’s dolphins on the ECSI. Since the start of 1988, set netting has accounted for around 58% of dolphin mortalities with a confirmed cause. The nature and extent of the threat from commercial and amateur set netting to Hector’s dolphins is different (due to differences in net types used and fishing locations, etc), and consequently these sectors are addressed separately.

Amateur set netting

Fishers set net mainly for butterfish (greenbone) over kelp/reef areas close inshore. Set netting for flatfish occurs in inner harbours and bays. Some amateur set netting takes place on open beach areas for small sharks (elephant fish, rig, school shark and spiny dogfish) in summer. There is set netting for moki on open mud and sandy substrates adjacent to submerged rocks and cliff faces.

The vulnerability of Hector’s dolphins to entanglement in amateur set nets on the ECSI has been established through a combination of interviews with fishers, beach cast animals and fisher self-reporting.

Since 1988, there have been 3 confirmed entanglements attributed to amateur set netting off the ECSI (6% of all mortalities where cause of death can be confirmed). All of these occurred in the North

⁸⁷ Due to practicality problems associated with placing observers on board small vessels.

Canterbury region off open beach areas. Other deaths attributed to net entanglement have occurred but it cannot be determined whether amateur or commercial fisheries were the cause (11 definitely attributed to entanglement; 9 probable entanglements; and 25 possible entanglements). The “possible” and “probable” net entanglements relate to carcasses that show evidence of entanglement (for example, some sign of net marks) but the cause of death cannot be determined with certainty.

The summer inshore movement of Hector’s dolphins coincides with a peak in amateur set net effort. The DOC database indicates that since the start of 1988, two out of the three confirmed amateur set net-related Hector’s dolphin incidents occurred between 1 December and the end of February, with all three occurring between 1 October and 31 March. Of the confirmed net-related incidents where the sector (amateur/commercial) cause is unknown, all but one (91%) occurred between 1 December and the end of February.

MFish cannot determine whether the increase in set netting mortalities in summer is correlated with increased fishing activity (in accordance with the dolphins’ inshore movement) or with a higher likelihood of people reporting beached carcasses during the warmer summer months. However, Mfish believes it is reasonable to expect that set netting outside the summer months poses a lower risk to dolphins because of lower amateur set net usage during these months.

As noted above, there are a range of different finfish species targeted by amateur set netters off the ECSI, and there is evidence to suggest that risk to Hector’s dolphins can vary with respect to target species. Available information on set net incidents⁸⁸ suggests that, of all set netting practices, overnight fishing solely for flatfish and daytime fishing solely for butterfish poses the least risk of dolphin mortalities. Mfish is not aware of any dolphin mortalities caused by nets set only for butterfish that are confined to within kelp/reef areas of the ECSI. Hector’s dolphins are occasionally seen in reef/kelp areas but fishers observations suggest these areas are not favoured by Hector’s dolphins.

MFish considers that the configuration of nets used to target flatfish are less likely to catch dolphins than the type of set net used to target other species. Flatfish nets are set within 0.5m of the bottom in the tidal headwaters of harbours and larger bays. The nets are made of a small number of fine meshes (ie, usually 9-12) with a low breaking strain that hangs loosely to trap flatfish. There has been one confirmed entanglement in a flatfish net (December 1987 in the inner Akaroa Harbour area). Mfish welcomes stakeholder views on the level of risk posed to Hector’s dolphins from set nets targeting butterfish and flatfish.

Set netting for moki adjacent to reefs, small sharks (elephant fish, rig and school shark and spiny dogfish) in open coastal areas, and herring and red cod in inner harbour areas, is known to have caught Hector’s dolphins⁸⁹, and is therefore considered by Mfish to have a higher risk of dolphin entanglement than netting for flatfish. This is because fishing for these species involves using nets with larger mesh sizes and have more than double the number of meshes used to catch flatfish. These nets are usually made of courser mesh set tightly to form a wall that acts to catch the fish by their gills. In addition, these species are targeted in areas that are regularly frequented by Hector’s dolphins.

⁸⁸ From the DOC incident database and interview surveys of fishers (refer next section)

⁸⁹ Nets set by amateurs for small sharks caught 2 dolphins off eastern Banks Peninsula in January of 1986 and 1988. A net set to catch herrings in inner Akaroa Harbour caught a dolphin in January 1988. Some amateurs set nets for moki off sandy/muddy areas next to kelp/reef areas by extending their nets that have been set for butterfish, and this scenario has been known to catch dolphins. In the mid 1980s there were 2 mortalities associated with nets set for moki and butterfish and another in a moki net in 2002.

Customary set netting

The DOC incident database lists no mortalities attributable to customary set netting on the ECSI.

Customary fishing is now managed under a regulatory framework as a result of the Treaty of Waitangi (Fisheries Claims) Settlement Act 1992. In order to undertake customary fishing, customary fishers must first obtain an authorisation from a Tangata Tiaki/Kaitiaki or tangata whenua representative appointed for that area.

MFish understands that the use of set nets for customary fishing in the area Hector's dolphins inhabit is not authorised by Tangata Tiaki/Kaitiaki. Customary set netting is confined to within coastal harbours, lagoons and lakes where there are no dolphins. As such, MFiSh considers there is currently no threat from customary set netting to Hector's dolphins on the ECSI. MFiSh welcomes stakeholder views on this.

Commercial set netting

Commercial set netting on the ECSI overlaps with Hector's dolphin distribution and has been attributed to more Hector's dolphin mortalities than amateur set netting in recent years. This may be in part due to observer monitoring and better awareness of reporting requirements rather than a reflection of the actual proportion of mortalities attributable to each sector. Most known set net entanglements have occurred in summer inside 4nm or inside the 20m water depth contour.

Approximately 62 commercial set netters (operating about 66 vessels) fish on the ECSI. Fishers target sharks with nets up to 800m long; elephant fish and rig normally in waters less than 50m deep, 1-20nm offshore; spiny dogfish and school shark normally in waters between 10m-100m deep, ~1nm offshore, to waters 100m deep, ~ 5-20nm offshore (except the Kaikoura Canyon). Fishers also catch butterfish, moki and trumpeter with short (up to 60m) nets in kelp/reef areas close inshore. Commercial set netting in the inshore area generally takes place in summer from October to March.

Table 11 below characterizes the main commercial set net fisheries on the ECSI using estimated catch and effort data reported from statistical reporting areas 17, 18, 20, 22, 24, and 26 over the past three fishing years. Not all the catch and effort (and value) listed in Table 11 can be attributed to the ECSI area that overlaps with Hector's dolphins because the statistical reporting areas cover a much wider area. However, the characterization illustrates the nature and extent of set netting on the ECSI and helps to assess potential costs to fishers of measures to avoid, remedy, and mitigate the adverse effects of fishing on Hector's dolphins (see later in section).

Table 11 ECSI set net characterisation from estimated catch and effort reporting in statistical reporting areas 17, 18, 20, 22, 24, and 26. Value is estimated from the port price for the corresponding year⁹⁰.

Fishery		2003-04	2004-05	2005-06
Spiny dogfish	Catch (tonne)	410	235	283
	Fishers	22	20	26
	Vessels	26	24	27
	Value (\$)	\$204,180	\$98,700	\$138,670

⁹⁰ Port prices are calculated by surveying Licensed Fish Receivers (LFRs) to see what they are paying for each species. Survey replies may be skewed because (i) industry know they are used to set cost recovery levies (ii) the survey does not differentiate harvest method – fish caught by one method over another may command a price premium (iii) ownership structure can influence port price and (iv) port price does not reflect price differential for different grades of fish.

Fishery		2003-04	2004-05	2005-06
Tarakihi	Catch (tonne)	318	162	199
	Fishers	13	15	15
	Vessels	20	20	19
	Value (\$)	\$422,940	\$233,847	\$282,580
School shark	Catch (tonne)	166	216	127
	Fishers	32	34	33
	Vessels	40	39	36
	Value (\$)	\$298,855	\$407,520	\$218,863
Rig	Catch (tonne)	165	160	169
	Fishers	36	38	35
	Vessels	44	43	37
	Value (\$)	\$495,049	\$434,667	\$440,527
Elephant fish	Catch (tonne)	152	155	162
	Fishers	27	28	26
	Vessels	30	32	27
	Value (\$)	\$363,797	\$235,083	\$237,600
Seal Shark	Catch (tonne)	152	156	123
	Fishers	7	8	8
	Vessels	11	10	8
	Value (\$)	\$109,835	\$240,240	\$252,150
Moki	Catch (tonne)	55	52	52
	Fishers	30	38	32
	Vessels	37	44	35
	Value (\$)	\$61,913	\$60,840	\$60,320
Flatfish	Catch (tonne)	102	156	63
	Fishers	28	33	31
	Vessels	25	35	31
	Value (\$)	\$305,929	\$490,360	\$198,870
Warehou	Catch (tonne)	19	39	13
	Fishers	14	24	16
	Vessels	17	26	16
	Value (\$)	\$20,100	\$38,090	\$12,177
Stargazer	Catch (tonne)	20	18	21
	Fishers	12	13	12
	Vessels	18	16	12
	Value (\$)	\$21,015	\$18,000	\$24,990
Butterfish	Catch (tonne)	18	23	19
	Fishers	15	13	16
	Vessels	17	16	18
	Value (\$)	\$57,254	\$77,203	\$69,540

Fisher logbook information from 1995 to 2006 in statistical areas 020 and 022 indicates that there is more commercial set netting effort between 4nm and 15nm from shore than within 4nm from shore⁹¹. Between 1995 and 2006, over 80% and 60% of commercial set net effort (net length) occurred outside 4nm in statistical areas 020 and 022, respectively.

⁹¹ Data provided by NIWA

Information on commercial set net effort using log book data from 1995 to 2006 in statistical areas 020 and 022 indicates that there is more commercial set netting activity between 4 – 15nm from shore than within 4nm from shore.⁹² Between 1995 and 2006, over 80% and 60% of commercial set net effort (net length) occurred outside 4nm in statistical areas 020 and 022, respectively.

Commercial set netting has been responsible for 16 of the 52 (31%) Hector’s dolphin mortalities with a confirmed cause on the ECSI since 1988. Most of these occurred in the Canterbury region (see Table 12 below).

Table 12: Mortalities attributable to commercial set netting on the east coast of the South Island since 1988.

DOC Conservancy	Number of mortalities
Canterbury	11
Otago	4 (3 incidents)
Nelson/Marlborough	1
Total	16

As previously mentioned, there have also been some deaths attributed to net entanglement where it cannot be determined whether amateur or commercial fisheries were the cause (11 definitely attributed to entanglement with the type of net unknown, plus 9 probable entanglements; and 25 possible entanglements).

The summer inshore movement of Hector’s dolphins coincides with the peak commercial set net effort over the summer months. From the database, 14 out of the 16 (88%) confirmed commercial set net-related Hector’s dolphin incidents occurred between 1 December and the end of February, with all 16 (100%) occurring between 1 October and 31 March. Of the confirmed set net-related incidents where the sectoral (amateur/commercial) cause is unknown, 91% occurred within these three and six month periods. These data indicate that inshore set netting in summer poses more risk to Hector’s dolphins than set netting in winter.

As indicated above, there is a high level of uncertainty around the actual number of Hector’s dolphin deaths attributable to commercial set netting because the level of fisher self-reporting is unknown. Some observer coverage has been undertaken, aiming to improve information on the level of interaction between the commercial set net fishery and Hector’s dolphins as follows.

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. Voluntary measures have been put in place by commercial fishers to mitigate dolphin bycatch off the ECSI since this observer programme was undertaken (see next section on existing threat management).

⁹² Data provided by NIWA

There has been some observer coverage on the ECSI since 1997-98. In 1999-00 and 2000-01, 54 and 20 days coverage were achieved, respectively (statistical areas 020 and 022). In 2005-06, 17 sets were observed in statistical area 024⁹³. In 2006-07, 7 set net events were observed in statistical area 024⁹⁴ and 122 sets were observed in area 018⁹⁵. During the observer programme, one Hector's dolphin was observed caught in a commercial set net targeting school shark south of Kaikoura in December 2006.

In Tasman/Golden Bay (statistical area 038), which are not included in the areas to which proposals apply, there have been 183 observed set net events over the last two fishing years (2005-07), and no Hector's dolphins were observed caught.

7.4.2.2. Commercial trawling (mid-water, bottom and pair)

Trawling off the ECSI constitutes a threat to Hector's dolphins, albeit less so than set netting. Total reported instances of Hector's dolphins caught in trawl nets are low compared to set nets. Around 12% of reported mortalities with a confirmed cause on the ECSI have been attributed to trawling.

There are about 94 trawl fishers operating about 108 vessels (<46m) on the ECSI to target a wide range of inshore species including barracouta, red cod, silver warehou, flatfish and various other target and bycatch species. MFish currently has little information to determine the overlap between trawl effort and Hector's dolphins' range, as fishers are generally not required to provide fishing location information at a finer spatial scale than statistical area. As a generalization, in the inshore fishery flatfish, red gurnard, rough skate, and elephant fish are caught in waters less than 50m deep. Lemon sole, red cod, red gurnard, tarakihi, warehou, spiny dogfish, and barracouta are caught between 50m and 100m. In the middle depth fishery between 100m and 200m the main trawl species are red cod, barracouta, warehou, ghost shark, jack mackerel, and spiny dogfish.

Table 13 below characterizes the main commercial trawl fisheries (vessels <46m) on the ECSI using estimated catch and effort data reported from statistical reporting areas 017, 018, 020, 022, 024, and 026. Not all the catch and effort (and value) listed in Table 13 can be attributed to the ECSI area that overlaps with Hector's dolphins because the statistical reporting areas cover a much wider area. However, the characterization illustrates the nature of trawling on the ECSI and helps to assess potential costs to fishers of measures to avoid, remedy, and mitigate the effects of fishing on Hector's dolphins (see later in section).

Table 13 ECSI trawl characterisation captured from estimated catch and effort reporting in statistical reporting areas 017, 018, 020, 022, 024, and 026. Value is estimated from the port price for the corresponding fishing year⁹⁶. Analysis excludes vessels >46m.

Fishery		2003-04	2004-05	2005-06
Barracouta	Catch (tonne)	5007	3413	4489
	Fishers	56	60	64
	Vessels	75	72	64
	Value (\$)	\$2,155,594	\$1,450,306	\$1,660,947
Red cod	Catch (tonne)	6774	3043	2598

⁹³ Targeting school shark and spiny dogfish

⁹⁴ Targeting blue nose and butterfish

⁹⁵ Targeting tarakihi, ling, school shark and butterfish

⁹⁶ Port prices are calculated by surveying Licensed Fish Receivers (LFRs) to see what they are paying for each species. Survey replies may be skewed because (i) industry know they are used to set cost recovery levies (ii) the survey does not differentiate harvest method – fish caught by one method over another may command a price premium (iii) ownership structure can influence port price and (iv) port price does not reflect price differential for different grades of fish.

Fishery		2003-04	2004-05	2005-06
	Fishers	108	105	92
	Vessels	129	122	104
	Value (\$)	\$4,119,269	\$1,805,513	\$1,506,840
Silver warehou	Catch (tonne)	451	388	318
	Fishers	32	36	32
	Vessels	65	70	60
	Value (\$)	\$383,515	\$305,227	\$250,160
Spiny dogfish	Catch (tonne)	2446	1665	1824
	Fishers	57	62	61
	Vessels	74	78	72
	Value (\$)	\$1,217,886	\$699,508	\$893,770
Tarakihi	Catch (tonne)	1022	1020	1020
	Fishers	60	63	62
	Vessels	74	76	72
	Value (\$)	\$1,850,955	\$1,819,294	\$1,771,361
Warehou	Catch (tonne)	649	1244	608
	Fishers	42	36	31
	Vessels	55	50	39
	Value (\$)	\$686,546	\$1,214,521	\$569,921
Flatfish ⁹⁷	Catch (tonne)	1062	964	808
	Fishers	95	100	86
	Vessels	111	111	97
	Value (\$)	\$3,185,057	\$3,030,872	\$2,550,683
Rough skate	Catch (tonne)	685	860	618
	Fishers	89	85	76
	Vessels	105	99	87
	Value (\$)	\$337,815	\$338,415	\$228,797
Jack mackerel	Catch (tonne)	120	43	19
	Fishers	28	28	22
	Vessels	40	38	28
	Value (\$)	\$30,247	\$6,384	\$3,103
Elephantfish	Catch (tonne)	649	629	636
	Fishers	43	41	42
	Vessels	56	51	52
	Value (\$)	\$1,552,067	\$954,399	\$932,637
Ghost shark	Catch (tonne)	539	478	349
	Fishers	46	46	36
	Vessels	63	58	49
	Value (\$)	\$278,187.33	\$228,057.93	\$183,625.69
Red gurnard	Catch (tonne)	737	742	876
	Fishers	96	101	85
	Vessels	112	113	96
	Value (\$)	\$1,155,765	\$1,176,084	\$1,365,064

Hector's dolphin mortalities from trawling have generally occurred in shallow water less than 20m in depth and all known trawl-related mortalities have occurred within 2nm of the shore. There is little direct verifiable evidence of the nature (type of trawl used) of these incidents. However, trawl fishers stress that

⁹⁷ Includes all flatfish species codes.

the use of flatfish trawl gear with low headline, no wing doors, and a smaller sweep area, together with low tow speed (4-6kn) enables dolphins to swim away from the net. Some fishers therefore believe flatfish trawling poses minimal risk to Hector's dolphins. MFish welcomes further stakeholder information on the level of risk to Hector's dolphins posed by flatfish trawling relative to other trawling activities.

There was 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 in a trawl in water less than 20m depth of the Canterbury Bight when the fisher was targeting red cod. Observer coverage was too low to estimate the total number of dolphins caught in the trawl fishery. Before the observer programme, five dolphins were known to have been caught by trawlers off the ECSI. Three of these incidents occurred in Pegasus Bay.

Since the observer programme, there have been four known dolphin mortalities caused by trawling. Three of these were the result of one trawling incident in April 2006. This incident was reported by the fisher involved and occurred 0.5nm off the Wairau Bar in Cloudy Bay, Marlborough. The other incident occurred off the Canterbury Bight in 1999 and was also reported by the fisher involved.

In addition to the 1997-97 observer programme, since 1991 salmon verifiers have been placed on large trawlers (>23m long) from 7 December to 14 February in the salmon conservation area off the south-east coast of Banks Peninsula. No Hector's dolphin mortalities have been observed on these vessels.

The salmon conservation area extends offshore off Banks Peninsula for 7nm from Okains Bay to Akaroa Harbour. Water depth in this area steadily increases to around 70 – 80m. Water depth increases more rapidly nearer the south end of the area. Consequently, trawling for red cod occurs closer (~ 1nm) to the shore in this area. Since 1991 verifiers have observed around 790 fishing days, mostly in the salmon conservation area, ranging from 5 to 126 days each year. Trawling for red cod in the salmon conservation area is usually conducted with a 120 foot standard wing trawl with a net height of 1.5-2m. When trawling for barracouta and red cod the net height is raised to around 3m.

7.4.2.3. Rock lobster potting

There have been three known incidents of Hector's dolphins becoming entangled in buoy lines of pots set to catch rock lobsters⁹⁸. All of these incidents have occurred at Kaikoura. This is likely to be because rock lobster fishers in the highly tidal Kaikoura area use longer lengths of buoy line to prevent loss of pots⁹⁹. The longer lengths of buoy line are a threat to Hector's dolphins as they can become caught up in the rope that hangs loose at lower tides. There is a high level of uncertainty around the actual number of Hector's dolphin deaths attributable to rock lobster potting because the level of fisher self-reporting is unknown.

7.4.3. Existing threat management

There are a range of voluntary and regulatory measures in place on the ECSI to reduce the impacts of fishing on Hector's dolphins.

7.4.3.1. Current measures for amateur set netting

There are a number of measures currently in place to mitigate the impacts of amateur set netting on ECSI Hector's dolphins. Map 10 provides an illustration of the current mandatory amateur set net restrictions that apply.

⁹⁸ One incident in: 1989; 1997; and in 2004. All three resulted in death of the dolphin involved.

⁹⁹ This loss can occur when strong currents and tidal movements pull the marker buoys underwater.

The Banks Peninsula Marine Mammal Sanctuary was established in 1988 and covers an area of 1170 km² from Sumner Head in the north to the Rakaia River in the south, out to 4nm offshore. Set netting is currently restricted in the sanctuary by a combination of fisheries and marine mammal sanctuary rules.

Amateur set netting can take place in the sanctuary for six months from 1 April to 30 September during daylight hours using one 30m net and staying with the net. In the flounder areas, recreational set netting is allowed at any time of the day for eight months from 1 March to 31 October with a 60m net and attendance is not required.

Set netting is not permitted at the southern end of Moeraki Peninsula and parts of Otago Peninsula and Harbour. No overnight set netting is allowed within 300m of Motunau Island and Banks Peninsula except in the flounder areas.

Since 2002, a seasonal closure has been in place in the Canterbury set net area (Waitaki River to the Waiiau River and out to 4nm, including the Banks Peninsula Marine Mammal Sanctuary) that prohibits the use of amateur set nets from 1 October to 31 March. A shorter ban applies in flounder areas in Banks Peninsula and reefs in the Timaru area.

In addition to the measures introduced in 2002, the then Minister of Fisheries (Hon Pete Hodgson) agreed to a set net mortality limit of three dolphins per year in the Canterbury set net area from 1 October to 30 September.¹⁰⁰ If the limit is reached, the Minister is able to consider measures to address the problem. The limit was put in place as an interim measure pending the development of a Population Management Plan for Hector's dolphins by DOC.

Another interim measure was introduced in late 2006 to mitigate dolphin bycatch in amateur set nets until the TMP is completed. This measure requires amateur fishers to stay with their nets in the Kaikoura area (between the Waiiau and Clarence Rivers and out to 4nm) from 1 October to 31 March.

The Minister of Fisheries has also recently approved a proposal from the East-Otago Taiapure-Local Fishery Committee that recreational fishers be required to stay with their set nets when fishing within their Taiapure area. This area extends from near Waikouaiti to near Purakanui. This measure is scheduled to be in place by regulation by 1 October 2007 (following approval by Cabinet).

In addition to measures introduced for the purpose of mitigating set netting impacts on Hector's dolphins, there are a number of restrictions that apply nationally to amateur set netting that may help to reduce the likelihood of Hector's dolphin bycatch on the ECSI. In particular:¹⁰¹

- ⇒ The use of stakes to secure nets is prohibited.
- ⇒ Set nets must not exceed 60m in length.
- ⇒ Only one set net (maximum 60m) and one bait net (maximum 10m with a mesh size of 50mm or less) can be carried on a boat at any one time.
- ⇒ Nets must not be set within 60m of another net.

MFish actively promotes a voluntary set net code of practice (CoP) for amateur fishers on the ECSI. Some of the provisions of this code can also help to reduce the likelihood of Hector's dolphin interactions. This code encourages wise set netting practices, including:

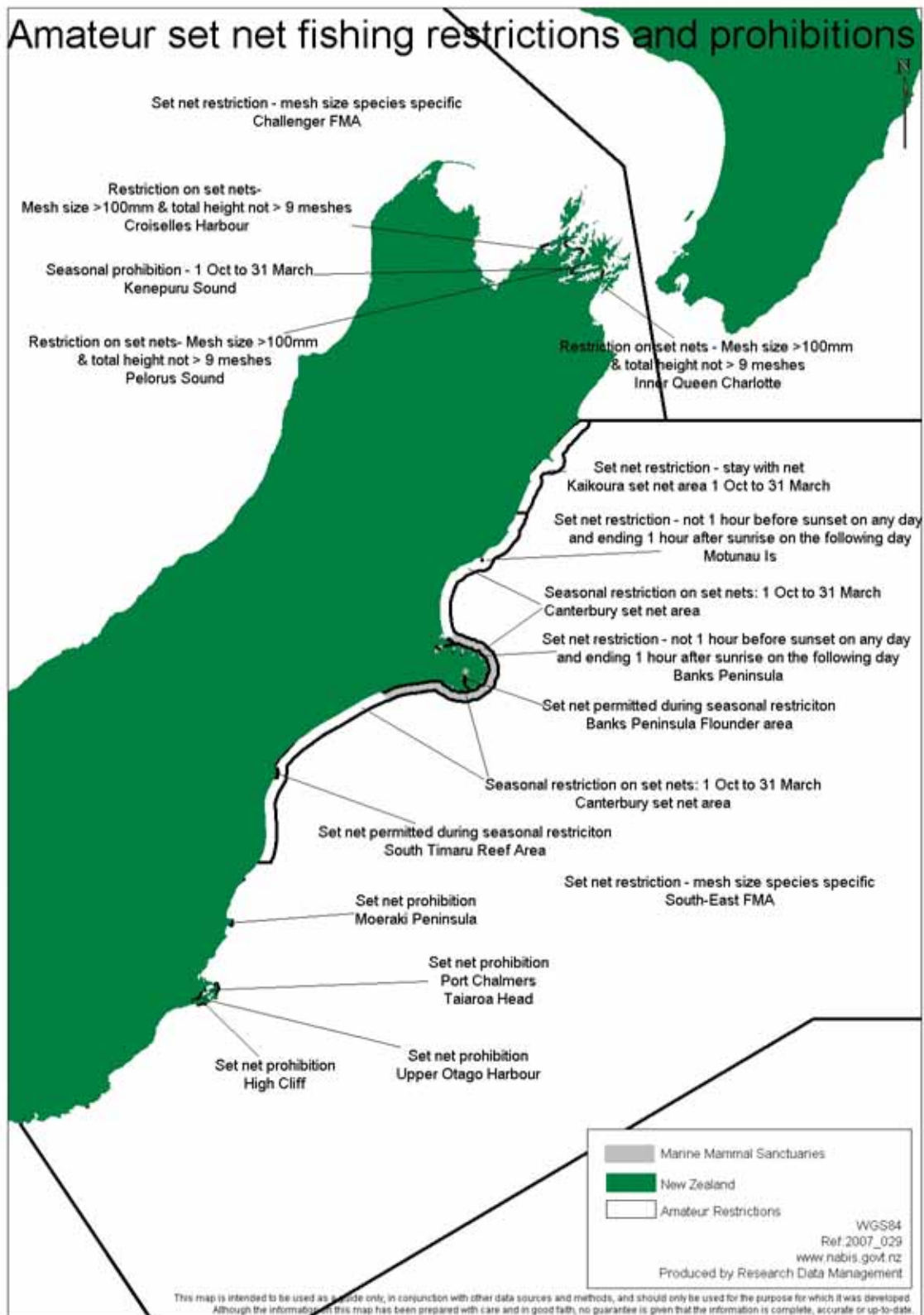
- ⇒ Using a net designed for the fish species being targeted

¹⁰⁰ This is not a Fishing Related Mortality Limit for the purposes of s 15 of the FA96. This is an indicative figure for the Minister of Fisheries to take action if required.

¹⁰¹ Refer west coast South Island section for relevant regulations.

- ⇒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

In addition to the MFish amateur set net CoP, the Kaikoura area is subject to a voluntary CoP (developed by local fishers) that includes an agreement to not use set nets in open beach areas. North Otago fishers also voluntarily support no overnight setting of nets and other netting practices that reduce the likelihood of dolphin mortalities.



Map 10: Current mandatory amateur set net restrictions on the ECSI

7.4.3.2. *Current measures for commercial set netting*

There are a number of measures currently in place to mitigate the impacts of commercial set netting on Hector's dolphins along the ECSI, although some were not implemented specifically for this purpose. Map 11 illustrates the current mandatory commercial set net restrictions that apply.

In 1989 surface set netting was banned between the Clarence River and Slope Point. A review of set netting in early 1990's resulted in commercial set nets being restricted to 1 km in length and fishers generally are not allowed to set more than 3km each day¹⁰². Set net soak times must be less than one day, except in the Canterbury area where a two-day soak period is allowed between October and December.

Within the Banks Peninsula Marine Mammal Sanctuary, commercial set netting can take place from 1 March to 31 October during daylight hours using one 30m net and staying with the net. In the flounder areas commercial set netting is allowed at anytime of the day with a 60m net and attendance is not required. Commercial set netting is otherwise prohibited.

Commercial set netting is not permitted at the southern end of Moeraki Peninsula and parts of Otago Peninsula and Harbour. No overnight set netting is allowed within 300m of Motunau Island and Banks Peninsula except in the flounder areas. In addition, there is a seasonal closure (January to April) to commercial set netting within a 1nm circle of the mouths of the Waiau, Hurunui, Waimakariri, Rakaia, Ashburton, Rangitata, Orari, Opihi, Waitaki and Clutha Rivers.

The aforementioned set net mortality limit of 3 dolphins per year in the Canterbury set net area from 1 October to 30 September similarly applies to commercial set netting.

The Hon Jim Anderton has also recently approved a proposal from the East-Otago Taiapure-Local Fishery Committee that commercial fishers be required to stay with their set nets when fishing within their Taiapure area. This measure is scheduled to be in place by regulation by 1 October 2007 (following approval by Cabinet).

There are also a number of voluntary measures in place to reduce the impacts of commercial set netting on Hector's dolphins. Commercial set netters fishing in FMA3 (which encompasses most of the ECSI) operate under the South East Finfish Management Ltd (SEFML) voluntary CoP. The northern part of the east coast falls within FMA7, which is under the jurisdiction of Challenger Finfisheries Management Company Limited (CFMCL). Commercial set netters in FMA7 operate under the CFMCL CoP. Under these CoPs, fishers are encouraged 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)

¹⁰² Some set netters that set more than 3km of net per day are able to use the amount they historically used in the early 1990s

As part of the SEFML CoP, MFish understands that 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 or have reduced the amount of set net effort by going trawling instead¹⁰³. Commercial set netters do not fish within 4nm of the Canterbury Bight coast from October to January. They also, all year, where possible, avoid fishing inside the 40m depth contour from the Clarence River to the Waitaki River. The SEFML CoP also requires commercial trawlers and set netters to stay outside 1nm between the southern boundary of the Banks Peninsula Marine Mammal Sanctuary and the Waitaki River throughout the fishing year.

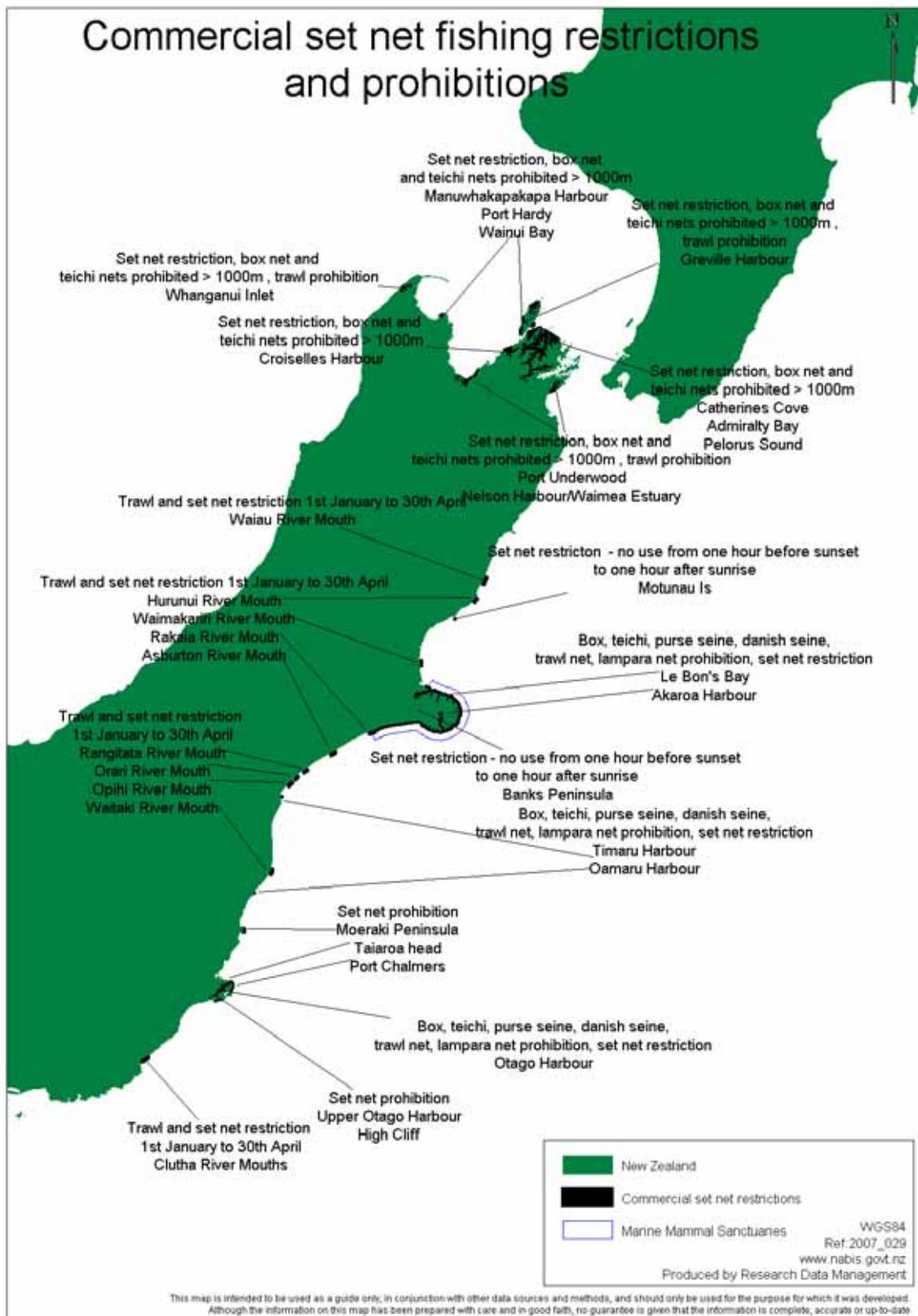
In addition to measures introduced specifically for mitigating Hector's dolphin bycatch, there are also some mandatory measures that apply nationally to commercial set netting and may help reduce the chance of Hector's dolphin entanglement on the ECSI. These measures include:

- ⇒ Commercial fishers cannot use more than 3000m of net per day¹⁰⁴; and
- ⇒ Commercial fishers must not leave set nets in the water for more than 24 hours without under-running the net and removing fish that have been caught¹⁰⁵.

¹⁰³ Based on fisher information supplied to AMP working groups

¹⁰⁴ Regulation 65 (3), Fisheries (Commercial Fishing) Regulations 1986

¹⁰⁵ Regulation 3E of the Fisheries (South-East Area Commercial Fishing) Regulations 1986



Map 11: Current mandatory commercial set net restrictions on the ECSI

7.4.3.3. *Current measures for trawling*

Trawling is banned in Pegasus Bay from the Waimakariri River to Okains Bay on Banks Peninsula to protect the elephant fish egg laying area. To minimize the bycatch of salmon there is also a seasonal closure (7 December to 14 February) in the Banks Peninsula Salmon Conservation Area (Okains Bay to Akaroa Harbour and out to 7nm) to trawlers greater than 23m in length or 250kv power, apart from certain named vessels¹⁰⁶. In addition, for salmon protection, there is a seasonal closure (January to April) to trawling within a 1nm circle of the mouths of the Waiau, Hurunui, Waimakariri, Rakaia, Ashburton, Rangitata, Orari, Opihi, and Waitaki Rivers.

Trawling is banned in inner Golden Bay (inside an area between Pakawau Bridge to Tata Islands to Tata Beach) between 1 November and 30 April. Trawling is also banned in around Separation Point, to protect bryozoan beds and in Nelson Harbour/Waimea Estuary, Greville Harbour, Queen Charlotte Sound, and inner Pelorus Sound all year round. Trawling is only permitted within outer Pelorus Sounds subject to various method restrictions between 1 April and 31 August.

Map 12 illustrates the mandatory trawl and Danish seine restrictions that apply on the ECSI.

Additional voluntary restrictions include:

⇒ Canterbury Bight: voluntary trawling ban within 1nm of the coast all year round

⇒ Tasman Bay: voluntary trawling ban applies within the inner waters of Golden and Tasman Bays between 1 November and 30 April

¹⁰⁶ It is these vessels that have salmon verifiers placed on them between 7 December to 14 February, see previous section.



Map 12: Current mandatory trawl restrictions on the ECSI

7.4.3.4. *Current measures for rock lobster potting*

There are no statutory management measures to mitigate capture of Hector's dolphins in the buoy lines of rock lobster pots. Some rock lobster fishers have recently voluntarily weighed their buoy lines at intervals to keep the line taut and below the surface. MFish welcomes stakeholder views on the likely effectiveness of this measure.

7.4.4. *Additional threat management*

This section considers whether additional threat management is necessary to manage the effects of fishing on ECSI Hector's dolphins by discussing:

- ⇒ The effectiveness of current threat management; and
- ⇒ Relevant considerations for the Minister when determining whether measures are necessary to avoid, remedy or mitigate the effects of fishing on the ECSI population.

7.4.4.1. *Effectiveness of current threat management*

Amateur set nets

Interview surveys of amateur fishers were carried out by researchers from 1984-88 (before implementation of the Banks Peninsula Marine Mammal Sanctuary) to estimate the magnitude and dynamics of Hector's dolphin incidental catch around Banks Peninsula and nearby coastal areas. Results from these surveys estimated that the incidental catch of Hector's dolphins in amateur set nets over five years from 1984-88 was 11 with a further 12 of unknown cause in Akaroa Harbour¹⁰⁷.

Since 1988, there have been three confirmed mortalities attributed to amateur set netting off the ECSI. There have been no Hector's dolphin mortalities confirmed to be the result of amateur set netting on the ECSI since the Canterbury area amateur set net prohibition came into effect in December 2001. MFish cannot determine whether these apparent reductions in bycatch levels are the result of measures introduced or failure of amateur fishers to report entanglements (ie, some interactions may have gone unreported).

There have been three known Hector's dolphin mortalities on the ECSI from net entanglement (three separate incidents - one in Canterbury and two in Kaikoura) since 2001 where it is unknown whether amateur or commercial nets were the cause.

MFish considers that a risk remains to Hector's dolphins from amateur set netting on the ECSI under the current voluntary and mandatory restrictions, in particular because:

- ⇒ Set netting is the most significant known threat to Hector's dolphins
- ⇒ Amateur set netting on the ECSI occurs within Hector's dolphins range
- ⇒ The ECSI is a popular area for recreational set netters, particularly over the summer months (where set netting is permitted)

¹⁰⁷ Later interviews by the Ministry of Agriculture and Fisheries in the early 1990s of fishers who caught 11 of these dolphins indicated that 4 were caught in moki set nets, 2 in moki/butterfish set nets (i.e. set for moki and butterfish) and one in a net that was set illegally for salmon. In addition, 2 were caught in set nets fishing for rig off the eastern bays of Banks Peninsula and 2 caught and released alive from a herring net and another unknown net set in the inner Akaroa Harbour area. Where known, these incidents occurred between Christmas Day and the end of January.

Commercial set nets

Low levels of observer coverage of the commercial fishery make it difficult to evaluate the success of commercial fishers' initiatives to mitigate Hector's dolphin mortalities.

Interview surveys carried out in the 1980s and early 1990s estimated between 86 and 200 dolphins were caught in commercial set nets from 1984 to 1988 (ie, before implementation of the marine mammal sanctuary) in the Banks Peninsula and nearby coastal areas. Since this time, there have been 16 confirmed commercial set net-related mortalities. MFish cannot determine whether this apparent reduction in dolphin bycatch is the result of sanctuary measures, voluntary industry initiatives, or failure of commercial fishers to report entanglements.

In the sanctuary, commercial set netting is banned within 4nm, except between 1 March and 31 October when commercial fishers can set nets under the same restrictions as amateur fishers. A recent study found that in summer, the proportion of sightings inside the 4nm offshore boundary of the 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. There have been no reported entanglements from this offshore area.

There have been a number of commercial set net mortalities in the Otago region in recent years. One incident occurred in December 2002 off Potato Point (Otago). Another three entanglements (two separate incidents) in commercial set nets occurred off Otago in the 2005-06 summer period. As mentioned above, the Minister of Fisheries has recently approved measures requiring commercial set netters to stay with their nets in the East Otago Taiāpure. This Taiāpure 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. MFish considers that this measure, once implemented, will reduce risk to Hector's dolphins within the Taiāpure area but not the threat of set netting in the wider Otago area.

There have been no dolphin mortalities reported by commercial set netters in the Canterbury area in the last nine years. However, there have been three unknown Hector's dolphin mortalities from net entanglement (ie. unknown whether amateur or commercial set nets caused the mortalities).

Scientists have used data collected in the 1997-98 observer programme in models that estimate trends in the ECSI population through time. These studies have focused on the impacts of commercial set netting because the absence of scientifically rigorous data on the nature and extent of other threats precludes their use in the modelling. Difficulties with estimating past entanglement rates and uncertainty in abundance estimates means there is uncertainty associated with the results of this modelling work. In general, findings have suggested that the ECSI Hector's dolphin population has declined and is likely to continue to decline under current management regimes for commercial set netting.¹⁰⁸

MFish considers that a risk to Hector's dolphins exists from commercial set netting on the ECSI under the current management regime, in particular because:

- ⇒ Set netting is the most significant known threat to Hector's dolphins
- ⇒ Commercial set netting on the ECSI occurs within Hector's dolphins range
- ⇒ Where sectoral cause has been identified, commercial set netting has been responsible for the most Hector's dolphin mortalities in recent years (four in the past five years)

¹⁰⁸ For example, Slooten, E. (2007). Conservation management in the face of uncertainty: Effectiveness of four options for managing Hector's dolphin bycatch. *Endangered Species Research*: 3, pp 169-179.

Effectiveness of current trawl measures

MFish acknowledges that current voluntary initiatives in place are likely to reduce the threat of trawling. Since SEFML implemented its ban on trawling within 1nm in the Canterbury Bight, there have been no reported trawl mortalities in this area (although the level of fisher self-reporting is unknown).

Nevertheless, MFish considers that risk to Hector's dolphins from trawling on the ECSI exists under the current management regime, in particular because:

- ⇒ Trawl-related mortalities have occurred on the ECSI in recent years, including one incident in 2006 that resulted in three Hector's dolphin deaths (off the Wairau Bar in Cloudy Bay).

7.4.4.2. Need and scope for additional threat management

Whether the Minister considers it necessary to implement further measures to manage the effects of fishing related mortality on Hector's dolphins depends ultimately on the balance between sustainability and utilization the Minister considers appropriate. This will involve consideration of a range of factors, including:

- ⇒ Population biology (for example, size and productivity)
- ⇒ Nature and extent of fishing threats to the population
- ⇒ Effectiveness of current management measures
- ⇒ Effectiveness of measures proposed to avoid, remedy or mitigate the effects of fishing
- ⇒ Costs to fishers of measures proposed to avoid, remedy or mitigate the effects of fishing

Information on population biology, nature and extent of fishing threats and effectiveness of current measures has been outlined in the sections above. An analysis of the effectiveness and costs of proposed measures is provided in the ensuing sections. In summary, MFish considers that the following points are particularly relevant to the Minister's decision-making:

- ⇒ Hector's dolphin is a threatened species;
- ⇒ The ECSI population is the second largest Hector's dolphin population in New Zealand;
- ⇒ PBR analysis indicates that the ECSI population can withstand 2-4 human-induced mortalities per year and still increase in size, while the current abundance of around 1800 individuals could be maintained at mortality levels closer to 13 animals per year when applying the recovery factor default value of 0.5 and not taking into consideration possible population fragmentation;
- ⇒ There is evidence the population has undergone a decline in genetic diversity and may have undergone a decline in abundance;
- ⇒ Fishing is the most significant known threat facing Hector's dolphins on the ECSI (being attributable to 75% of all Hector's dolphin mortalities with a confirmed cause since 1988);
- ⇒ Set netting has caused around 58% of the dolphin deaths on the ECSI since 1988 where cause of death can be determined;
- ⇒ Trawling and rock lobster potting pose lesser risk to the population but nevertheless contribute to the overall effect that fishing is having on the ECSI population;
- ⇒ An un-quantified number of fishing-related mortalities go unreported;

- ⇒The genetic continuity of the population may be susceptible to fishing impacts (through localised depletion);¹⁰⁹ and
- ⇒The effectiveness of current measures is uncertain but there is evidence that fishing-related Hector's dolphin mortalities are continuing under the current management regime.

MFish considers relevant to the Minister's decision is uncertainty in information around the status of the ECSI population and the nature and extent of fishing impacts. In particular:

- ⇒There is evidence to suggest that in the past fishing has had an adverse effect on the population (there is evidence of population decline and set netting is the most significant known threat) but this is uncertain due to a lack of comparable population abundance estimates through time and difficulties with estimating past fishing-related mortality levels;
- ⇒The nature of PBR analysis, or any modelling exercise relying on estimated biological and variable inputs, does not necessarily lend itself to decision making with certainty;
- ⇒Fishing is the most significant known threat to the ECSI population but the actual number of fishing-related deaths cannot be ascertained. MFish does not believe that reported mortalities reflect all fishing related mortalities. MFish has had anecdotal reports of net-marked Hector's dolphin carcasses that have been placed above the beach and out of sight. MFish cannot determine the extent of this practice but considers it is one indicator that fishing related Hector's dolphin mortalities are likely to be higher than reported, and that this introduces uncertainty relevant to the Minister's deliberations.

MFish notes that the Minister should take this uncertainty into account when making decisions on the need for further measures on the ECSI. The Minister should take into account best available information; be cautious when information is uncertain; and should not use absence of, or uncertainty in, any information as a reason for postponing or failing to take any measure to achieve the purpose of the FA96.

7.4.5. Options

MFish has prepared a range of options for managing fishing threats to the ECSI Hector's dolphin population. The spectrum of options ranges from *status quo* through to more restrictive options that reduce residual risk of fishing-related mortalities to a greater degree, but accordingly have a greater impact on current users. When making final decisions on the proposals, the Minister of Fisheries will need to determine which course of action over what timeframe will result in an acceptable level of risk from fishing activities to Hector's dolphins on the ECSI, taking into account the utilisation implications associated with each option. It is within the Minister's discretion to choose a mix of options, as well as variations to the options proposed (for example, different proposal boundaries) based on relevant considerations (see previous section). Map 13 illustrates the proposed boundaries of the various options set out below.

7.4.5.1. *Status quo*

The nature and extent of fishing threats to the ECSI population, and an analysis of effectiveness of current measures (i.e. *status quo* management) and consideration of the need for further measures have been outlined in the sections above. In light of this information, the Minister may consider that the effects of fishing-related mortality are acceptable and consequently further measures to avoid, remedy or mitigate the effects of fishing-related mortality on the ECSI population are not necessary. MFish notes that the *status quo* is a valid option given uncertainty over the nature and extent of the impact of fishing-related

¹⁰⁹ Hector's dolphin do not move large distances. This characteristic means that local groups are connected by gene flow only with immediately adjacent groups, which increases the susceptibility of local dolphin groups to becoming reproductively isolated.

mortality on Hector’s dolphins and the impact on fisheries users of further measures. MFish notes that the previous sections have outlined information about the existing threat of fishing to Hector’s dolphins on the ECSI, and therefore further analysis of *status quo* is not provided below. Analysis of the effectiveness and costs of the alternative proposals has been undertaken relative to the current (*status quo*) situation.

7.4.5.2. Set netting

MFish proposes the following options to manage the effects of amateur and commercial set netting on the ECSI population.

As previously mentioned, these proposals do not apply to Tasman Bay, Golden Bay, Marlborough Sounds (**except** Queen Charlotte and Port Underwood), river mouths, estuaries, lagoons, inlets and harbours, with the following named exceptions. Estuaries and harbours that **are** included in the proposal boundaries are the Avon-Heathcote Estuary, Lyttelton Harbour, Akaroa Harbour and Timaru Harbour.

Status Quo – Existing management (refer Existing Threat Management Section)	
Option 1 – Existing mandatory management measures and codes of practice inside 12nm from the coast (mean high water mark - MHW) between Cape Jackson and Slope Point (extended to 18nm from the Waiiau River to the Waitaki River) plus additional measures as follows:	
Amateur set netting:	
Mandatory measures:	Mandatory attendance with a set net; Maximum of one set net per person and per boat; No overnight setting of nets (between one hour before sunset to one hour after sunrise); and Maximum net length of 30 m (fishers are permitted to use a net that has a maximum length of 60 m when targeting flatfish)
Voluntary measures:	Hand in unused or unwanted nets to MFish
Commercial set netting:	
Voluntary measures:	Adherence to the existing voluntary set net code of practice
Mandatory measures:	Additional monitoring of set netting (for example, observer coverage or video monitoring ¹¹⁰)

¹¹⁰ See Part III section on monitoring

Option 2 – Amateur and commercial set netting is prohibited inside 2nm or 4nm from shore (MHW) between Cape Jackson and Slope Point with provisions for some set netting for 6 or 9 months. All sub-options have the additional set net measures as per option 1

Either:	Option 2(a)	<p>Set net prohibition applies inside 2nm from shore – this option includes the following three alternatives:</p> <p>Prohibition applies all year round with set netting for butterfish and flatfish allowed in designated areas for nine months of the year (1 March to 30 November) with the restrictions listed below; or</p> <p>Prohibition applies all year round with set netting for butterfish and flatfish allowed in designated areas for six months of the year (1 April to 30 September) with the restrictions listed below; or</p> <p>Prohibition applies all year round</p>
Or:	Option 2(b)	<p>Set net prohibition applies inside 4nm from shore – this option includes the following three alternatives:</p> <p>Prohibition applies all year round with set netting for butterfish and flatfish allowed in designated areas for nine months of the year (1 March to 30 November) with the restrictions listed below; or</p> <p>Prohibition applies all year round with set netting for butterfish and flatfish allowed in designated areas for six months of the year (1 April to 30 September) with the restrictions listed below; or</p> <p>Prohibition applies all year round</p>

MANDATORY RESTRICTIONS (amateur and commercial)

Attendance with a set net
 Maximum of one set net per person and boat
 No overnight setting of nets (between one hour before sunset to one hour after sunrise) except in designated flounder areas; and
 Maximum net length of 30 m for butterfish¹¹¹ set nets and 60 m for flatfish set nets¹¹²

DESIGNATED AREAS (approximate boundaries, refer to Appendix 6 or MFish website www.fish.govt.nz for indicative maps of the designated areas)

Designated flatfish set net areas

Queen Charlotte Sound – Inside Cape Jackson to Cape Koamaru and East Head to West Head
 Banks Peninsula - Inner Lyttelton Harbour, Port Levy, Pigeon Bay and Akaroa Harbour

Designated butterfish set net areas out to 100m from MHW

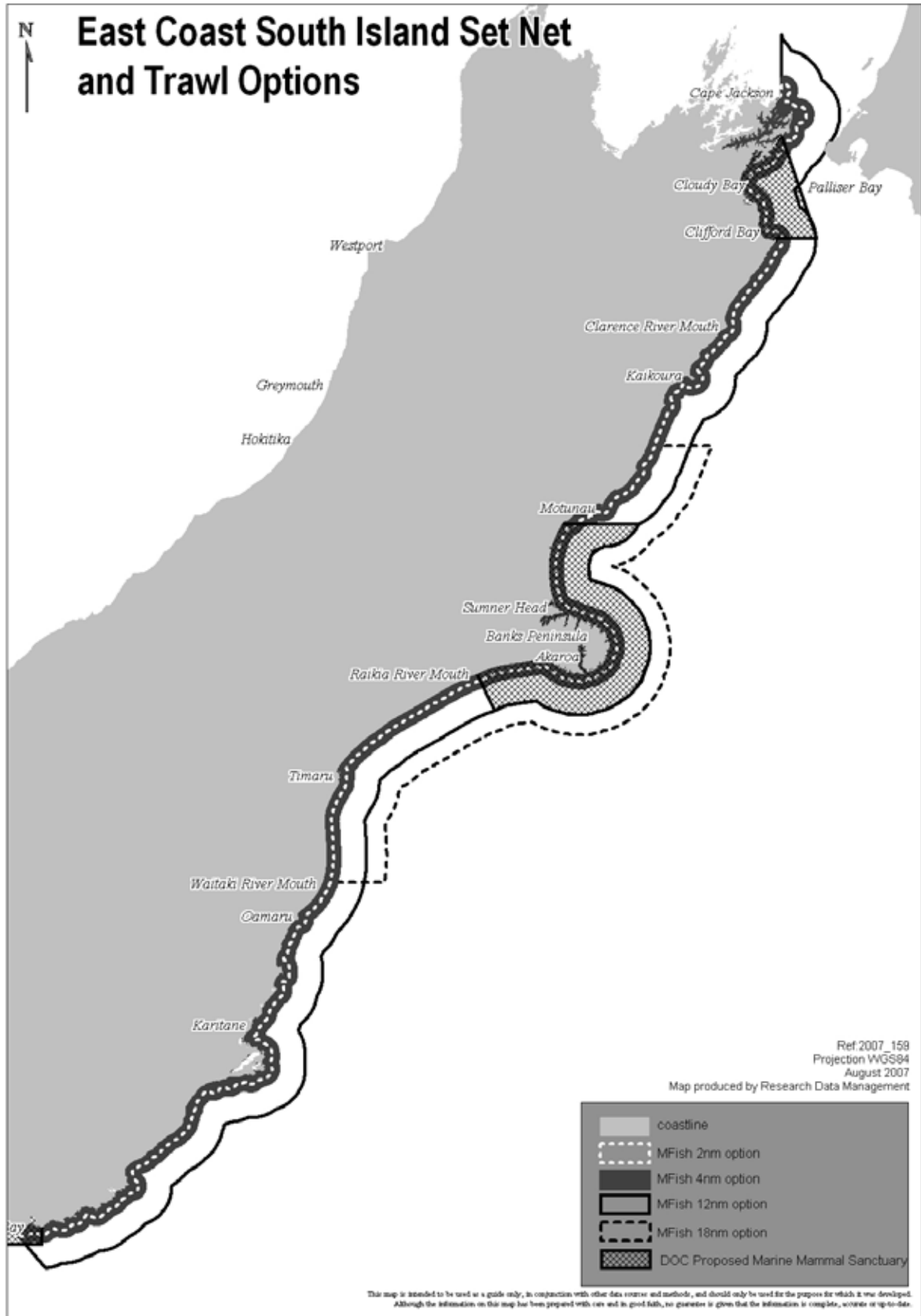
¹¹¹ Butterfish nets must be no more than 30 m long, 25 meshes deep, and a maximum diameter of the net mesh of 0.5 mm mesh diameter, and minimum of 114 mm mesh size (means revoking current 108 mm mesh size for butterfish), and anchored at each end with a weight no lighter than 5 kg and 14 net floats on the float line

¹¹² Flatfish nets must be no more than 60 m in length, 9 meshes deep, and 0.3 5mm mesh diameter and no less than 125mm mesh size, and anchored at each end with a weight no lighter than 3kg

Tory – Cape Koamaru to Robertson Point
Northern Kaikoura – Waipapa Bay (200m north) to Rakautara (800m south of township)
Kaikoura Peninsula – Port Kean to Atia Point
Southern Kaikoura – Rileys Lookout to Karakanui
Banks Peninsula areas – Sumner Head to Lake Forsyth except flatfish areas
Timaru - Timaru Reef Area
Kakanui – Kakanui to 1km south of Orere Point
Moeraki – Moeraki Point to Tawhiroko Point
Shag Point – Main north road to DOC reserve at Point
Waikouaiti – Pleasant River to Cornish Head
Seacliff – Karitane Point to Warrington
Toko – Akatore Creek to Coal Point
Kaka Point – 500m north of Kaka Point to Campbell Point

Option 3 – All amateur and commercial set netting is prohibited inside 12nm from shore (MHW) between Cape Jackson and Slope Point (extended to 18nm from the Waiau River to the Waitaki River)

MFish notes that the level of commercial set net monitoring required under Option 1 and 2 will be commensurate with the level of risk mitigation achieved. For example, Option 1 allows all current set net activity throughout Hector's dolphins' range on the ECSI to continue, whereas Option 2 prohibits set net activity throughout parts of the dolphins' range (2-4nm). As such, MFish considers it may be acceptable to have lower levels of monitoring under Option 2 compared to Option 1; given the costs to industry associated with monitoring programmes and the relatively lower level of residual risk associated with Option 2. Please refer to Part III for more information about the proposed monitoring approach.



Map 13: Indicative boundaries of measures proposed for the ECSI

Analysis of amateur set net options

Option 1

Option 1 applies to amateur set netting activities in areas where set netting is currently permitted on the ECSI.

Under Option 1, all recreational fishers will continue to comply with the existing amateur set net restrictions and codes of practice plus additional mandatory measures as follows:

- ⇒Mandatory attendance with a set net;
- ⇒Maximum of one set net per person and boat;
- ⇒No overnight setting of nets (between one hour before sunset to one hour after sunrise);
- ⇒Maximum net length of 30 m (60 m for flatfish set nets)

The proposed measures focus on requiring amateur fishers to stay with their net when set and reduce the number and length of nets used at any one time. The reason for not proposing a reduction in length of nets set for flatfish is because these nets are configured and set in such a way that MFish considers they pose low risk of Hector's dolphin entanglement.¹¹³

Under Option 1, MFish would invite amateur fishers to hand in any unused or unwanted set nets. The handing in of unused or unwanted nets would remove the potential latent effort within the amateur set net fishery. MFish could consider ways to reward fishers who hand in nets such as t-shirts, posters, or school donations. Officials will also work to raise amateur fishers' awareness of good set netting practice, including retrieval of nets when dolphins are nearby.

◆ *Effectiveness*

Under Option 1, fishers must stay with their net at all times when set. This measure is likely to lower the risk of dolphin entanglement in amateur set nets in the following ways:

- ⇒Create the opportunity for fishers to remove their net from the water if a dolphin appears within the vicinity of the net. In addition, net attendance may enable fishers to release any net entangled dolphin that is alive (if the fisher is able to get to a netted animal within 2 – 3 minutes).
- ⇒Decrease the number of nets deployed – mandatory net attendance is likely to discourage fishers from using a set net in preference to other fishing methods (MFish Compliance report that mandatory net attendance at Kaikoura during last summer produced a notable decline in amateur set net usage).
- ⇒Reduced net soak times in the water due to the requirement for fishers to stay by their net while it is set.

Additional restrictions of no overnight setting and smaller maximum net length are likely to further reduce the risk of net entanglement.

Although the risk of Hector's dolphin mortality associated with amateur set netting will be reduced under this option, potential for dolphin entanglement will remain. Allowing set nets in areas and at times of the

¹¹³ Flatfish nets are set within 0.5m of the bottom in the tidal headwaters of harbours and larger bays. The nets are made of a small number (usually 9) of fine mesh with a low breaking strain that hangs loosely to trap flatfish.

year where dolphins are present constitutes a greater, albeit unquantified, risk than excluding set nets from areas seasonally or totally within the dolphins range (as proposed under Options 2 and 3).

MFish notes that an additional benefit of this option is that the above proposed restrictions will likely result in better quality fish and less wastage (due to reduced soak times, for example), and there will also be a reduced likelihood of nets being lost in inclement weather.

◆ *Impacts on fishers*

Option 1 will provide for greatest amateur set netting use along the ECSI in comparison with proposed measures under Options 2 and 3. Option 1 will enable amateur fishers to continue to use set nets in all areas where set netting is currently permitted but require them to more actively manage their net when fishing. Presently, MFish encourages all set net fishers to voluntarily adopt the CoP but is unable to require fishers to comply. Under this option, the proposed measures will become mandatory and MFish will be able to take necessary actions if fishers fail to comply with these measures.

The main utilisation impact of Option 1 is the requirement for fishers to stay with their net. Possible implications include preventing fishers from using different fishing methods at any one time or setting more than one net in different locations. Fishers often set their net at the start of a fishing trip, travel to another area to hand gather or hook and line for fish, and then retrieve the net on the way home. A requirement for fishers to stay with their net while set would essentially prevent this activity.

It is possible that fishers will catch smaller quantities of fish during a single fishing trip as a direct result of a reduced soak time and net length. A requirement for fishers to stay with their net is also likely to reduce the amount of winter set netting due to unsuitable weather conditions.

MFish welcomes stakeholder views on the health and safety implications, and utilisation impacts, of Option 1.

Option 2 (a&b)

Option 2 proposes to prohibit all amateur set netting out to either 2nm (Option 2a) or 4nm (Option 2b), with provisions for some flatfish and butterfish set netting in designated areas at certain times of the year (sub options i and ii). Butterfish areas have been designated because available information suggests that, of all set netting practices, nets set solely to target butterfish and flatfish pose the least risk of Hector's dolphin mortalities. Given that nets set to target flatfish are believed to pose a lower risk of Hector's dolphin entanglement, MFish considers there is also rationale for allowing some flatfishing in certain designated areas outside the summer months.

The reason for proposing a maximum net length for butterfish nets that is shorter than the currently permitted 60m maximum length is because this will help ensure that nets set in reef areas for butterfish do not extend out into non-reef habitat. Nets set adjacent to reef areas, or extended out from reef areas, are known to have caught Hector's dolphins. Consequently, MFish considers that a maximum length of 30m for butterfish set nets should help reduce the likelihood of Hector's dolphin entanglement. MFish also notes that experienced butterfish fishers generally only use nets less than 30m in reef areas.

Amateur set netting along the coast would be restricted to the main butterfish or flatfish fishing grounds for 6 or 9 months, or essentially eliminated, depending on whether sub-option (i), (ii) or (iii) is chosen. Sub-option (i) would allow restricted set netting in designated areas for 9 months from 1 March – 30 November, while sub-option (ii) would allow this netting for a shorter 6 month period (1 April – 30 September). Proposed measures under Option 1 (i.e. mandatory net attendance, no overnight setting, etc) for amateur fishers would also apply at the time of year when set netting in designated areas is permitted. The only nets that could be used in these areas would be defined to prevent fishers using these areas to target other fish species. MFish notes that the Minister can choose to introduce some or all of the identified designated areas.

MFish considers that a 2nm set net closure is likely to effectively prohibit all amateur set netting on the ECSI. This is because most amateur fishers set their nets either directly from or very close to shore. MFish considers there is likely to be little difference (both in terms of mitigation effectiveness and impacts on use) in extending the closure out to 4nm as fishers are unlikely to travel further than 2nm from shore to set a single net, particularly if they need to stay in attendance with that net while it is set (as proposed). As such, based on information MFish currently has, all amateur set netting on the ECSI would probably be eliminated under sub-option (iii), which does not provide for any inshore amateur set netting.

◆ *Effectiveness*

MFish considers that Option 2 is likely to significantly reduce risk to Hector's dolphins from amateur set netting. Measures proposed under Option 2 will mean that amateur set netting considered to be of highest risk to Hector's dolphins (targeting small sharks, moki, red cod and herrings) is prohibited throughout the year.

While the full year closure to all set netting (sub-option iii) affords the greatest certainty around protection for Hector's dolphins, MFish considers that allowing set netters to target butterfish and flatfish in designated areas outside the summer months will probably constitute only a marginal increase in risk to Hector's dolphins (due to the relatively lower risk of Hector's dolphin entanglement associated with nets set solely for butterfish and flatfish).

October to March is the time of year when most amateur set net entanglements have occurred, with a large proportion of those occurring between the months of December and February. The longer (6 month) closure affords a greater level of protection than the shorter 3 month closure to all set netting.

MFish notes that the proposed shorter (3 month) closure will reduce the time over which set netting is prohibited in the Canterbury set net area. This will accordingly lead to an increased risk of dolphin entanglement within the Canterbury area than currently exists. However, this increased risk would be partially mitigated by the requirement to remain in attendance with the net. MFish notes that the Minister could choose to proceed with sub-option (i) but leave the current 6 month restriction in place across the Canterbury set net area, thereby ensuring that there is no increased risk of entanglement within the Canterbury region.

MFish notes that because amateur fishers are unlikely to set nets further offshore than 2nm, a full year closure to all set netting (sub-option iii) will likely eliminate the threat of amateur set netting under both Option 2a (2nm closure boundary) and 2b (4nm closure boundary). Nevertheless MFish considers Option 2b provides greater certainty that amateur fishers will not move further offshore to set their nets.

The area inhabited by the ECSI Hector's dolphin population is popular for amateur set netting, particularly over summer. As such, MFish considers that Option 2 will effectively reduce the likelihood of Hector's dolphin entanglement in set nets because it prohibits all amateur set netting at the time of year when dolphins are closer inshore. Allowing set netting in designated areas outside summer (sub-options i and ii) will constitute a greater, albeit unquantified, threat to Hector's dolphins than if set netting was banned year round, as proposed under Options 2a(iii), 2b(iii) and Option 3 below.

◆ *Impacts on fishers*

MFish considers the main utilisation impacts associated with Option 2 are that set netting for butterfish and flatfish will not be allowed for 3, 6 or 12 months of the year (sub-options i, ii, and iii, respectively), and set netting for other species will be eliminated. As mentioned above, MFish considers there is little difference in terms of impacts on use between option 2a and 2b because fishers are unlikely to travel further than 2nm from shore to set a net.

MFish therefore considers amateur set netting on the ECSI would likely be eliminated under both sub-options 2a(iii) and 2b(iii), resulting in a highly significant impact on use. This impact could be lessened

by providing for some restricted butterfish and flatfish set netting at certain times (i.e. 6 or 9 months) of the year, as proposed under sub-options (i) and (ii).

Amateur fishers catch flatfish and butterfish using set nets. Set netting is the only practical method to catch flatfish in the deeper parts of the shallow bays and harbours of Banks Peninsula, although flatfish can be drag netted in these areas but only out to about 300m from shore. Butterfish can only be caught in reasonable numbers using set nets – other methods such as lining and scoop nets are less effective and catch few butterfish.

There is already a seasonal amateur set net ban (1 October-31 March) out to 4nm along a large extent of the east coast of the South Island (between the Waiau and Waitaki Rivers). In the flounder areas within the Banks Peninsula Marine Mammal Sanctuary, amateur set netting is allowed at any time of the day from 1 March to 31 October. Therefore, fishing for flatfish in Banks Peninsula and in the Timaru reef designated areas would increase by one month under sub-option (i), and would be reduced by two further months under sub-option (ii). The present six month closure around Banks Peninsula would be reduced to 3 months under sub-option (i), thereby providing for greater utilisation than the *status quo* in this area. The proposed shorter (3 month) closure for all the ECSI has been put forward by Canterbury amateur fishers to significantly reduce the risk of amateur set netting to dolphins and to simplify administration and compliance. In addition, they support the prohibition period because it reduces the opportunity to catch small sharks and less netting will take place when butterfish are breeding. Furthermore they consider mandatory net attendance will effectively reduce the likelihood of Hector's dolphin interaction with set nets.

Set netting considered by MFish to be of highest risk to Hector's dolphins (targeting small sharks, moki, red cod and herrings) will no longer be permitted under this option. For these species, lining may be a viable method to catch these fish, although catch rates are likely to lower than achievable by set netting.

Sub-options (i) and (ii) provide for greater set net use than Option 3 (complete set net ban) because they allow butterfish and flatfish set netting in designated areas at certain times of the year. However, sub-option (iii) will likely have comparable impacts as a complete ban on amateur set nets from Cape Jackson to Slope Point due to the close inshore nature of amateur set netting.

MFish welcomes stakeholder views on the likely utilisation impacts associated with this option.

Option 3

Option 3 constitutes a full set net ban to 12nm and out to 18nm in the Canterbury area (between the Waiau and Waitaki Rivers) from Cape Jackson to Slope Point. The reason for including the 18nm distance offshore in the Canterbury set net area is because research on distribution around Banks Peninsula have seen Hector's dolphins out to about 18nm from shore in winter. Hector's dolphins are further offshore in the Canterbury area because waters around Banks Peninsula do not reach the 100m depth contour as close to shore as in other parts of the coast.

◆ *Effectiveness*

This option essentially eliminates the threat of amateur set netting (with the exception of any non-compliance) and therefore provides significant protection to Hector's dolphins on the ECSI. There are likely to be only small additional benefits in terms of risk avoidance to that achieved under sub-option (iii) of Options 2a and 2b (as MFish believes both of these options will also eliminate amateur set netting on the ECSI). Nevertheless, a closure to 12nm offshore will increase certainty that amateur fishers will not move further offshore to set their nets.

◆ *Impacts on fishers*

There are not likely to be any additional impacts on use to those which would occur under sub-option (iii)

of Options 2a and 2b. Namely, all amateur set netting will be prohibited on the ECSI, which clearly has significant implications for utilisation. The most significant impact will be on fishers who wish to target butterfish, which is an important amateur fishery. This is because butterfish cannot be easily caught using alternative methods. Fishers will still be able to drag net for flounder but some of the areas currently accessible for flounder fishing when using a set net will be beyond 300m from the shore. Other species targeted by set nets (for example, moki and small sharks) are able to be fished by alternative methods such as line fishing. A prohibition on set nets is likely to mean lower catch rates of these species for amateur fishers.

MFish welcomes stakeholder information on the likely utilization impacts associated with this option.

Analysis of commercial set netting options

Option 1

Option 1 is the *status quo* with increased monitoring of commercial set netting. As proposed, this option will require fishers to continue to apply ‘safe netting’ practices outlined in the CoP. Officials will work the SEFMC and CFMC to encourage fisher compliance with current CoPs.

A monitoring programme to estimate the level of interaction between commercial set netting and Hector’s dolphins would be implemented by Government under this option. The monitoring programme would also be used to verify fisher compliance with CoPs.

◆ *Effectiveness*

Allowing fishing with set nets in areas and at times of the year Hector’s dolphins are usually present constitutes a greater, albeit un-quantified, risk of fishing-related mortality than excluding set net fishing within parts, or the whole, of the dolphins range (Options 2 and 3).

Low levels of observer coverage of the commercial fishery make it difficult to determine the success of industry’s initiatives to mitigate Hector’s dolphin mortalities, and therefore to assess the current level of risk to Hector’s dolphins on the ECSI under *status quo* management.

MFish notes that under the current voluntary arrangements, Hector’s dolphins continue to be entangled in commercial set nets and commercial set netting has been responsible for the highest number of dolphin deaths with a confirmed cause over recent years. Information from fishers suggests compliance with the current CoP is good, and therefore ensuring “adherence to the voluntary CoP” as proposed under this option may not alter current levels of risk to Hector’s dolphin on the ECSI. This approach, if agreed by the Minister would, therefore accept that commercial set netting on the ECSI under the existing management arrangement poses an acceptable risk to Hector's dolphins.

The key benefit of the monitoring programme is that it will allow the level of interaction between commercial set nets and Hector’s dolphins to be observed with increased certainty.

◆ *Impacts on fishers*

MFish considers the main economic impact of this option is the cost of the monitoring programme. Most of the inshore target fisheries – sharks, elephant fish, flatfish, and butterfish – would be most affected but some of the deeper water fisheries would also be captured by the monitoring proposal (ie, fisheries prosecuted in inshore canyons).

There are approximately 66 set net vessels operating in the area covered by the ECSI Hector’s dolphin section that may need to adopt monitoring under Option 1 (or elect to fish outside the area covered by the monitoring proposal). Fisheries Observers typically cost \$800 to \$1000 per day, and electronic monitoring equipment around \$10,000 to install, such that total monitoring costs could potentially be

expensive.

MFish believes Option 1 would only be a reasonable course of action provided there is sufficient certainty that all fishers comply with the existing CoP. MFish invites the industry to submit information on the current level of compliance with the code including ways to measure the level of compliance and what actions could be taken on individual fishers who do not comply with specific measures. MFish considers there is also a need for independent verification that fishers comply with the CoP, including the placement of fisheries observers and/or monitoring equipment on set net vessels fishing within the dolphins' range

MFish welcomes stakeholder information on the likely utilisation impacts and costs associated with this option.

Option 2 (a&b)

Option 2 proposes to prohibit all commercial set netting out to either 2nm (Option 2a) or 4nm (Option 2b) between Cape Jackson and Slope Point, with provisions for some flatfish and butterfish set netting in designated areas at certain times of the year (sub options i and ii). Butterfish areas have been designated because best available information suggests that, of all set netting practices, nets set to target butterfish and flatfish pose the least risk of Hector's dolphin mortalities. Given that nets set to target flatfish are believed to pose a lower risk of Hector's dolphin entanglement than nets set to target other species (such as rig), MFish considers there is also rationale for allowing some flatfishing in certain designated areas outside the summer months. MFish notes that it is open to the Minister to choose to introduce some or all of the identified designated areas.

The reason for proposing a maximum net length for butterfish nets that is shorter than that proposed for flatfish is because this will help ensure that nets set in reef areas for butterfish do not extend out into non-reef habitat. Nets set adjacent to reef areas, or extended out from reef areas, are known to have caught Hector's dolphins, and therefore MFish considers that a maximum length of 30m for butterfish set nets should help reduce the likelihood of Hector's dolphin entanglement.

Commercial set netting for butterfish and flatfish along the coast would be restricted to the main fishing grounds for 6 or 9 months of the year depending on whether sub-option (i) or (ii) is chosen (flatfish and butterfish are valuable commercial and non commercial fisheries on the ECSI – see Table 11). The only nets that could be used in these areas would be defined to prevent fishers using these areas to target other fish species. Commercial set netting for these species on the ECSI would be eliminated under sub-option (iii).

Under sub-options (i) and (ii), additional restrictions would apply to commercial set netters fishing within the designated areas, as follows:

- ⇒Mandatory attendance with a set net
- ⇒Maximum of one set net per person and boat;
- ⇒No overnight setting of nets (between one hour before sunset to one hour after sunrise)
- ⇒Maximum net length of 30 m for butterfish set nets and 60 m for flatfish set nets.

Proposed measures for commercial fishers under Option 1 (i.e. strict adherence to the existing voluntary CoP and additional monitoring) would also apply to commercial set netting activities offshore from the 2nm or 4nm boundaries proposed under Option 2.

◆ *Effectiveness*

MFish considers that Option 2 is likely to significantly reduce the risk of Hector's dolphin entanglement in commercial set nets.

Measures proposed under Option 2 will mean that set netting considered to be of highest risk to Hector's dolphins (mainly targeting small sharks and moki) is prohibited throughout the year within 2nm or 4nm from the shore (where dolphin densities are highest, particularly in summer). Commercial set netting further offshore from the proposed offshore boundaries will be allowed to continue (under the current voluntary CoP) and therefore, this constitutes a greater, though unquantified risk, than prohibiting commercial set netting throughout the dolphin's range (Option 3).

The 4nm offshore boundary (Option 2b) clearly provides greater protection to Hector's dolphins than the closer inshore boundary proposed under Option 2a because there is less overlap between commercial set netting activity and Hector's dolphins' inshore range.

Under both options (2a and 2b), fishing close to shore for butterfish or flatfish will either be prohibited throughout the year (sub-option iii) or restricted to designated areas for 9 or 6 months under restrictions that reduce risk to the dolphin (sub-options i and ii).

Since 1988, the period from October to March is the time of year when all commercial set net entanglements have occurred, with most of those occurring between the months of December and February. While the longer (6 month) complete seasonal closure affords a lower level of certainty around threat mitigation than a year round closure to inshore set netting, MFish considers sub-option (ii) will still provide a substantial level of threat reduction because this is the time of year when all known commercial entanglements have occurred. The proposed shorter (3 month) closure covers off the period when a large proportion of entanglements have taken place. However, this shorter closure accordingly incurs an increased risk of dolphin entanglement in the designated fishing areas. Nevertheless, MFish considers that allowing set netters to target butterfish and flatfish in designated areas outside the summer months will probably constitute only a marginal increase in risk to Hector's dolphins (due to the relatively lower risk of Hector's dolphin entanglement associated with nets set solely for butterfish and flatfish).

Option 2 will more effectively mitigate risk from commercial set netting to the ECSI Hector's dolphin population than Option 1, as commercial set netting will not be allowed along much of the inshore part of the dolphins' range (thereby reducing the overlap between Hector's dolphins and the activity that poses a threat to them). Allowing set netting in designated areas outside the summer period will constitute a greater, albeit unquantified, threat to Hector's dolphins than if set netting was banned year round, as proposed under Options 2a(iii) and 2b(iii). Because commercial set netting will continue outside the proposed offshore boundaries under Option 2, the risk of interaction with Hector's dolphins is greater than if set netting was prohibited throughout the dolphins' range, as considered under Option 3 below.

◆ *Impacts on fishers*

Based on catch effort returns from last summer (first time this was available), the impact on commercial fishing of closures to set netting out to 2nm (Option 2a) or 4nm (Option 2b) is likely to be most significant for fishers that fish for rig, elephant fish and deep water species fished close to the shore. The impact will be greatest on those that set net in areas where deeper waters are closer to the shore. In these areas (such as the Kaikoura Canyon) the 4nm boundary could be reduced to allow deepwater set netting closer to the shore.

The impacts of prohibiting set netting out to 2nm or 4nm could be lessened by providing for some restricted set netting in designated areas at certain times of the year, as proposed under sub-options (i) and (ii).

However, the impact of only allowing set netting in designated areas over the 6 or 9 month periods

proposed may be significant as this precludes set netting over the summer months, when a lot of fishing currently occurs. These measures also mean commercial fishers will have to operate close inshore in a similar manner to amateur fishers to catch butterfish and flatfish, and will have to move further offshore to catch other species. Sub-option (iii) prohibits all inshore set netting throughout the year (including within designated areas) and this will have significant implications for the butterfish, and possibly moki and trumpeter fisheries – all of which are targeted by commercial fishers with short (up to 60m) nets within, or adjacent to, kelp/reef areas close inshore.

Analysis of the locations of sets of commercial fishers suggests that most fishers are able to fish outside 2 and 4nm. However a significant amount of set netting occurs within 4nm of the coast. The economic impact of commercial fishers having to set net outside 2nm or 4nm is not known but MFish considers points relevant to Option 2 include:

- ⇒ 2nm and 4nm set prohibitions will have considerable negative effects on commercial fishers. Fisheries most likely to be affected are butterfish, rig, and elephant fish. Potential effects include:
 - Declining catches
 - Increased cost as fishers are restricted to fishing further offshore
 - Some fishers may retire from the fishery if increased costs outweigh returns
 - ITQ for target fishstocks may devalue.
- ⇒ Net setting requirements inside designated areas (i.e. one net per person per boat, smaller nets, and mandatory set net attendance) will have large impacts on fishing effort in the inshore set net fishery to the extent that catch may not reach the critical mass necessary for fishers to operate viable businesses. The species likely to be affected are flatfish and butterfish.
- ⇒ MFish also notes that increased fishing costs may drive up fish prices.

Additional costs associated with this option are the costs of monitoring set net activity inside 12-18nm. MFish notes that the monitoring costs outlined under Option 1 are also relevant to Option 2, although the level of monitoring required may be less due to the lower level of residual risk achieved under Option 2.

Because commercial set netting will continue outside the proposed offshore boundaries under Option 2, the impact on commercial utilisation is less than if commercial set netting was prohibited throughout the dolphins' range (Option 3). MFish invites commercial fishers to provide information to better assess the utilisation impacts associated with Option 2.

Option 3

Option 3 constitutes a full set net ban to 12nm between Cape Jackson and Slope Point, extended out to 18nm in the Canterbury area (between the Waiiau and Waitaki Rivers).

◆ *Effectiveness*

This option avoids potential interactions between Hector's dolphins and commercial set nets to a greater extent than Options 1 and 2, and therefore provides the greatest protection from fishing-related mortality. Option 3 is likely to effectively eliminate the threat of commercial set netting to Hector's dolphins on the ECSI (with the exception of any non-compliance), and therefore reduces residual risk to the lowest levels of all options proposed for commercial set netting.

◆ *Impacts on fishers*

The proposed 12-18nm closure is likely to incur the greatest utilisation impact of all options proposed. It would eliminate most commercial set netting on the ECSI. Elephant fish is able to be caught by trawlers but this method is not size selective and can catch large numbers of juveniles. Rig is mainly taken as part of the rig and school shark target species. Rig is caught as a bycatch of target fishing for red cod and flatfish but these species are not able to be easily targeted as they are able to swim faster than a moving trawl.

In addition, the proposed closures are likely to have a significant impact on the school shark and spiny dogfish fisheries along the ECSI because of the extended continental shelf. School shark and spiny dogfish can be caught on long lines but the method is not favoured at present. Set netting for ling, groper and other deeper water species could only occur outside the 12-18nm boundary unless provision is made for deepwater set netting inside 12-18nm in waters greater than 100m depth, which are outside the dolphins' range.

MFish considers points relevant to Option 3 include:

⇒ A 12 to 18nm prohibition will have effectively stop all inshore set netting and most deep water set netting on the east coast of the South Island. Effects will include:

- Declining catches and fish supply
- Increased effort and cost as fishers are restricted to fishing further offshore (where able) or adopting other fishing methods that may be less efficient
- Some fishers may retire from the fishery if increased costs outweigh returns
- ITQ for target fishstocks may devalue.

MFish considers the characterizations in Table 11 are relevant to the assessment of cost associated with Option 3.

MFish welcomes stakeholder information on the likely utilisation impacts associated with this Option 3.

Customary set netting

MFish understands that currently Tangata Tiaki/Kaitiaki are not authorising customary fishers to set net on the open coast or within harbours, inlets or bays. As such, MFish considers there is currently no threat from customary set netting to Hector's dolphins on the ECSI. Accordingly, MFish considers that there is no need to consider measures to manage customary set netting at this time. It is possible that the proposed prohibitions on amateur set netting might lead to an increase in authorisation applications for customary set netting. MFish will work with Tangata Tiaki/Kaitiaki to raise awareness of the issues associated with set netting and Hector's dolphins, and support continuing non-issuance of authorisations for set netting in areas where Hector's dolphins are present. MFish invites tangata whenua to comment on how the proposed measures may affect them.

7.4.5.3. Commercial trawling (mid-water trawling, bottom trawling and pair trawling)

Proposals for managing the impacts of trawling on the ECSI Hector's dolphin population are outlined below.

As previously mentioned, these proposals do not apply to Tasman Bay, Golden Bay, Marlborough Sounds (**except** Queen Charlotte and Port Underwood), river mouths, estuaries, lagoons, inlets and

harbours, with the following named exceptions. Estuaries and harbours that **are** included in the proposal boundaries are the Avon-Heathcote Estuary, Lyttelton Harbour, Akaroa Harbour and Timaru Harbour.

Status Quo – Existing management (refer Existing Threat Management Section)
Option 1 – Further develop and implement voluntary code of practice and additional monitoring of trawling inside 12nm from shore (MHW) between Cape Jackson and Slope Point (extended to 18nm from the Waiau River to the Waitaki River)
Option 2 – Trawling prohibited inside 2nm from the shore (MHW) between Cape Jackson and Slope Point except for vessels targeting flatfish with low headline height nets, and the measures as per Option 1
Option 3 – Trawling prohibited inside 2nm from the shore (MHW) between Cape Jackson and Slope Point and measures as per Option 1

MFish notes that the level of monitoring required under each of these options will be commensurate with the level of risk mitigation achieved. For example, Option 1 allows all trawling activity throughout Hector’s dolphins’ range on the ECSI to continue, whereas Option 3 prohibits all trawling activity within 2nm (the distance within which all known trawl interactions have occurred). As such, MFish considers it may be acceptable to have lower levels of observer coverage to monitor interactions outside 2nm; given the costs to industry associated with monitoring programmes and the relatively low level of residual risk associated with Option 3. Refer to Part III for more information about the proposed monitoring approach.

Analysis of options

Option 1

Option 1 requires trawl fishers fishing inside 12nm from shore (inside 18nm from shore between the Waiau and Waitaki Rivers) to develop and implement a CoP to mitigate the risk of all forms of trawling (mid-water, pair, and bottom trawl) on Hector’s dolphins. Presently, the SEFMC CoP is limited to the 1nm closure in the Canterbury Bight.

A monitoring programme of commercial trawl activity to assess the extent to which trawl vessels interact with Hector’s dolphins would also be implemented by Government under this option. The monitoring programme would also be used to independently verify fisher compliance with the CoP.

◆ *Effectiveness*

This option requires fishers to adopt further ‘safe-fishing’ practices when trawling within the dolphins’ range. These practices could include using trawl gear that reduces the likelihood of interacting with dolphins such as low headline gear, no wing doors and low tow speed. Other measures could include:

- ⇒ Fishing away from areas where dolphins are sighted or known to occur;
- ⇒ Fishing away from discoloured or murky waters;
- ⇒ Quickly retrieving trawl gear if dolphins appear;
- ⇒ Maintaining a constant lookout when gear is deployed; and
- ⇒ Keeping tow duration to a minimum.

MFish invites industry to submit information about developing an improved code for trawl fishing on the ECSI including how the level of compliance could be measured, and what actions could be taken on

individual fishers who do not to comply with, or breach, specific measures. As noted, MFish considers there is also a need for independent verification that fishers comply with the CoP and to quantify any trawl mortalities of Hector's dolphins.

A CoP would help mitigate potential trawl/Hector's dolphin interactions, while a monitoring programme would help ensure compliance with a CoP and provide additional information on the nature and extent of trawl/dolphin interactions.

◆ *Impacts on fishers*

The main economic impact of this option is likely to be the cost of the monitoring programme. MFish cannot determine with accuracy the number of vessels that need to cover monitoring costs that can, for fisheries observers, reach up to \$1000 per day. There are approximately 108 inshore trawl vessels (<46m) operating on the ECSI that may require fisheries observer coverage under Option 1. Video monitoring equipment is also an option that MFish can investigate with fishers, although installation and operating costs are also expensive (eg, around \$10,000 installation cost and ongoing operating and auditing costs).

MFish welcomes stakeholder views on the costs associated with implementing a comprehensive trawl CoP, as well as increased monitoring of inshore trawl fishing.

Option 2

All known trawling-related Hector's dolphin mortalities have occurred within 2nm from shore. MFish notes that trawling for flatfish is likely to have a lower likelihood of dolphin bycatch (compared with other trawl gear) because flatfish trawl gear has a low headline height, no wing doors, and a smaller sweep area.

Option 2 proposes, in addition to Option 1, banning trawling (mid-water, bottom, and pair) within 2nm from shore. Under this option, vessels targeting flatfish using low headline gear (<1 m high) would still be allowed to fish within the proposed 2nm closure.

Similarly to Option 1, Option 2 also has an increased monitoring component associated with all trawl activity within 12-18nm from shore. Vessels trawling within 12-18nm will also be encouraged to operate under voluntary measures to reduce the likelihood of trawl interactions (as outlined in Option 1).

◆ *Effectiveness*

MFish considers that risk of interactions between trawlers on the ECSI and Hector's dolphins would be reduced further than Option 1 if trawl vessels were excluded within 2nm of the coast because:

⇒ All reported interactions between Hector's dolphins and trawlers on the ECSI have occurred within 2nm of the shore

⇒ Hector's dolphin density is highest in close inshore areas than further out (particularly in summer)

⇒ Trawling in shallow waters probably presents a greater risk to dolphins because there is less available water column above or below trawl gear for the dolphins to swim away from the net.

Lower density of dolphins and deeper water offshore suggests low probability of interactions between trawlers and Hector's dolphins outside 2nm. Increased monitoring can be used to determine with greater certainty the level of interaction, if any, of trawl vessels and Hector's dolphins outside 2nm.

Option 2 makes allowance for flatfish trawling because the trawl gear designed to target flatfish has a low headline height net type that dolphins can rise above in shallow water. Used in conjunction with

proposed measures under Option 1, MFish considers flatfish trawling will pose a relatively low risk to Hector's dolphins.

◆ *Impacts on fishers*

This option provides for some utilisation within the proposed 2nm closure as commercial fishers will still be able to target flatfish. MFish is unable to determine the extent of effects of this option on other trawl fisheries because trawl fishers are generally not required to provide position and depth of bottom trawl information. However, target trawl fisheries that might be affected include red cod, tarakihi, and barracouta. For example 104 vessels caught red cod, 96 vessels caught red gurnard and 76 vessels caught tarakihi and the 2005-06 fishing year. Given the distributional nature of these fisheries it is likely fishers would face some additional costs to target these species only outside 2nm. As such, it is possible that the catch and value of these local fisheries may decrease (see Table 13). MFish welcomes stakeholder information to better quantify the costs of this proposed option.

MFish acknowledges that introducing a restriction that allows low headline trawl nets only to be used within 2nm may be difficult to enforce. However, similarly to Option 1, Option 2 also has an increased monitoring component associated with all trawl activity within 12 - 18nm from shore, and this should assist with compliance monitoring (see monitoring cost comments in Option 1).

MFish invites submissions from fishers that discuss the utilization impacts of Option 2.

Option 3

Option 3 proposes to prohibit all trawl fishing within 2nm from shore. Measures proposed under Option 1 (i.e. CoP) would also apply when trawling outside 2nm.

Option 3 also has an increased monitoring component associated with trawl activity inside 12nm – 18nm (as outlined in Option 1).

◆ *Effectiveness*

Proposed measures under Option 3 will give greater certainty of avoiding the risk of trawling on Hector's dolphins, and is the most risk averse option. MFish considers the benefit of Option 3 over Option 2 is likely to be marginal given that the risk associated with low headline height trawl gear is thought to be low. Prohibiting all forms of trawling within 2nm effectively encompasses waters out to about 10-20m water depth in many areas and will protect a significant proportion of the ECSI Hector's dolphin population from the threat of trawl gear.

◆ *Impacts on fishers*

A 2nm trawl closure may have a significant impact on the inshore commercial trawl fishery. Presently commercial fishers target a range of inshore species, particularly flatfish. It is therefore likely that the impact on use for trawl flatfishing will be most significant, as flatfishing is generally carried out closer inshore than targeting for other species. During the 2005-06 fishing year at least 97 vessels caught flatfish. Impacts on other fisheries are more difficult to assess but MFish considers the impact assessment in Option 2 above gives an indication of other trawl fisheries that may also be impacted by Option 3.

MFish is unable to quantify the economic impact of the proposed 2nm closure on the inshore trawl fisheries. MFish invites industry to provide information to better assess this impact, as well as any other costs that might be associated with this Option.

7.4.5.4. *Rock lobster potting (amateur and commercial)*

Option – CRA 5 fishers at Kaikoura to voluntarily weigh their pot buoy lines when setting pots in areas where tidal movements are strong.

Assessment of management option

MFish considers that the best option to reduce the likelihood of Hector’s dolphin entanglement in rock lobster pot buoy lines is to work with Te Korowai, CRA 5 quota holders and amateur fishers to ensure their code of practice includes the use of appropriate weights at suitable distances along pot buoy lines to prevent pot lines from hanging loose in the water.

MFish has little information to propose technical specifications under this option but considers CoPs are the most appropriate way to do so until further information is available. MFish also believes that it likely that weights and distances along the buoy line will vary according to fishing conditions and that it is unlikely there will be a solution that fits all that could be made mandatory.

MFish invites submissions from stakeholders on measures that could be incorporated in a code of practice to address this issue.