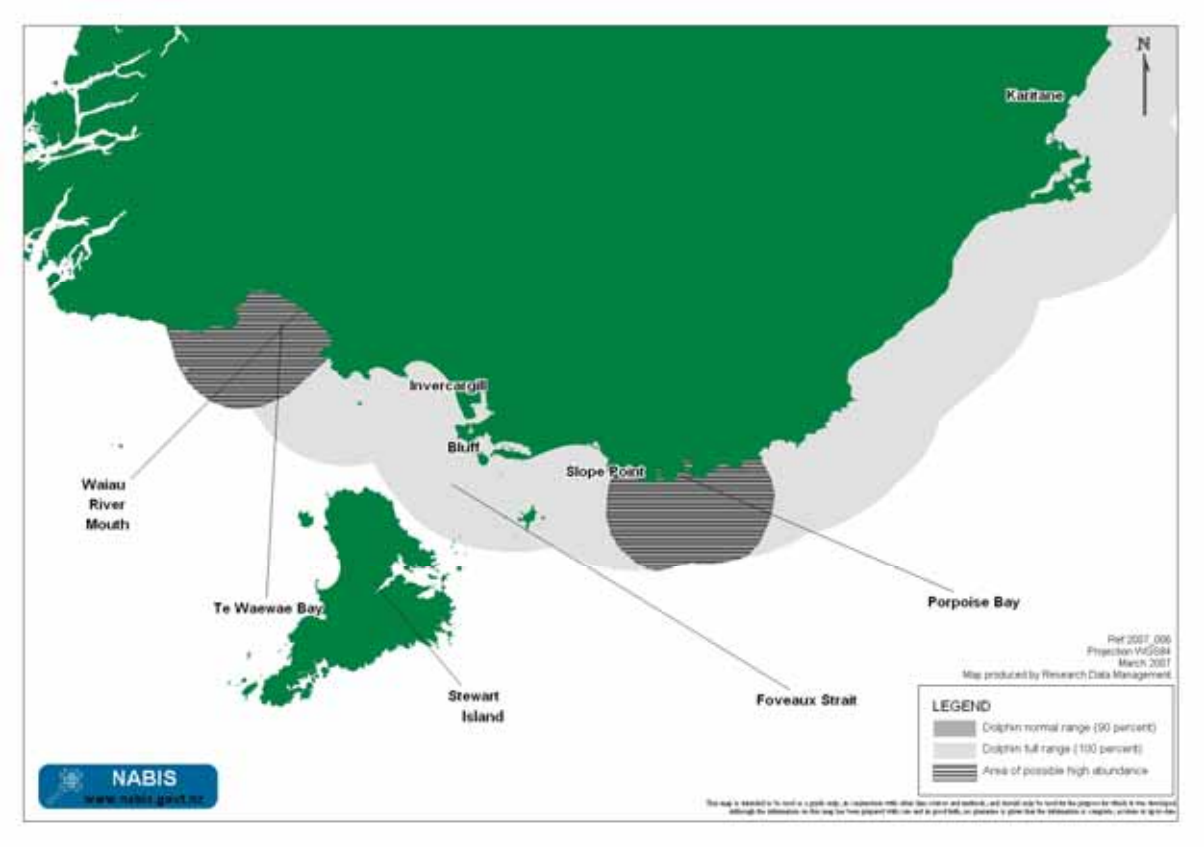
7.5. South Coast of the South Island

The south coast of the South Island (SCSI) Hector's dolphin population extends from Slope Point (south of Waikawa Harbour in the Catlins) in the east through to Sandhill Point (western point of Te Waewae Bay) in the west (Map 14). This area covers the south-eastern part of Fisheries Management Area 5 but excludes lagoons, coastal lakes, river mouths, estuaries, inlets and harbours. The SCSI population falls within the Southland region of the Department of Conservation.

All lagoons, coastal lakes, river mouths, estuaries, inlets and harbours on the SCSI are excluded from the proposals because these areas are not part of the known Hector's dolphin range on the SCSI.



Map 14 Distribution of SCSI Hector's dolphin population

7.5.1. Population characteristics

The south coast supports the smallest population of Hector's dolphins around the South Island. By far the largest numbers of the dolphins are found in Te Waewae Bay. Dolphins have also been sighted in Toetoe Bay, off Oreti Beach and on occasion in the Fiordland Sounds. Hector's dolphins on the SCSI are found close inshore, often in the breaker zone, mostly inside 3nm, and rarely beyond 5nm. It is unknown whether dolphins found in Porpoise Bay are more closely affiliated with the east or south coast populations of Hector's dolphins[114].

[114] For the purposes of the TMP, Hector's dolphins found in Porpoise Bay have been incorporated into the ECSI population. This is because the ECSI population estimate includes the extent of coastline that incorporates Porpoise Bay.

SCSI Hector's dolphins are more closely related genetically to west coast South Island Hector's dolphins than east coast South Island Hector's dolphins, suggesting there is some movement between these populations. This is supported by confirmed reports of Hector's dolphins in Shark Cove, Dusky Sound and Milford Sound and anecdotal reports in Preservation Inlet.

Hector's dolphin distribution off the south coast appears to follow a similar pattern to elsewhere (e.g. ECSI), with dolphins strongly concentrated close to shore during summer and more widely dispersed with respect to water depth in winter.

There is no abundance estimate for Hector's dolphins that reside along the extent of the SCSI (i.e. abundance estimates have been published for Hector's dolphins in Te Waewae Bay but not for the full extent of the SCSI).

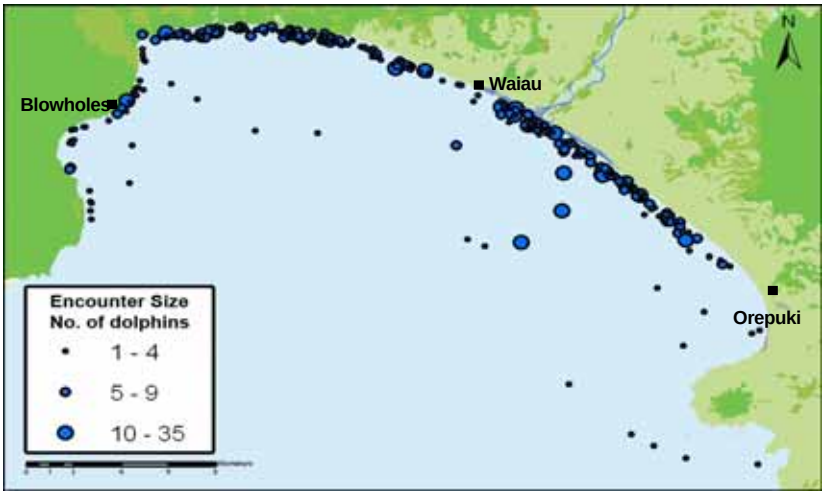
The most recent published and peer reviewed population estimate for Te Waewae Bay is 89 (95% confidence interval = 36-218). This abundance was estimated from a study conducted in 1998-99, which entailed a single boat-based line transect survey of the area[115]. There has been a more recent study undertaken on Hector's dolphins in Te Waewae Bay. This research involved boat-based surveys of the population from April-June 2004 and from December 2004-February 2005. The findings of this study are currently being peer reviewed, but preliminary results suggest that the number of dolphins that use Te Waewae Bay may substantially exceed 89 individuals. DOC has indicated that while the study's results are currently not suitable for public release (due to review status), the final results of this study should be available for final advice to the Minister of Fisheries. MFish notes that in light of this more recent study, there is uncertainty around the number of Hector's dolphins that use Te Waewae Bay; thereby adding to the uncertainty around the total size of the SCSI Hector's dolphin population.

The lack of comparative population surveys means that change in abundance over time cannot be estimated, and there is consequently a high level of uncertainty around trends in the SCSI population's abundance. Based on genetic analysis to date, there is no evidence of population decline on the SCSI. Although there was a relatively low sample size, genetic analysis has found no evidence of lower genetic diversity than expected and no evidence of inbreeding. [116]

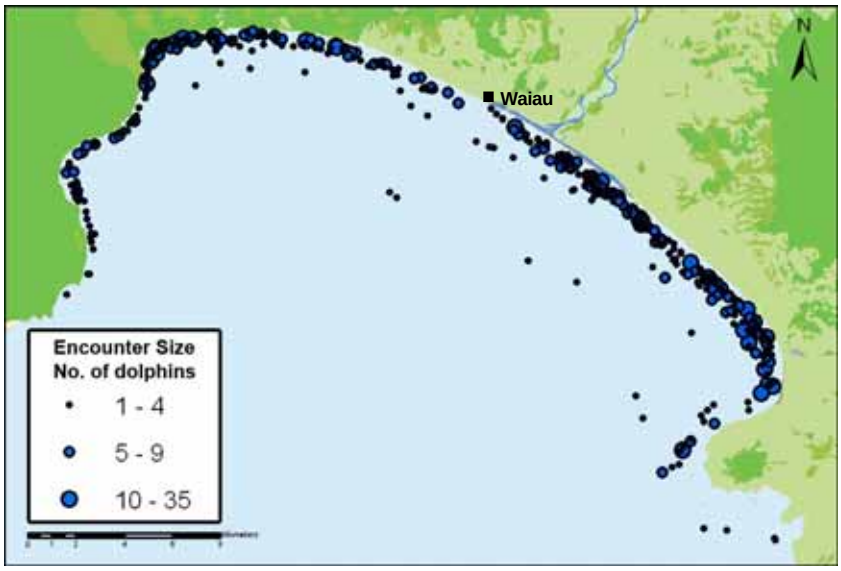
The boat-based surveys carried out by DOC between April 2004 and February 2005 found that Hector's dolphins were concentrated within 1 km of the coast, along the extent of Te Waewae Bay, with somewhat lower densities along the eastern and western edges of the bay (see Maps 15 and 16).

[115] The 1998-99 study was undertaken using a single line transect survey taken from a boat that could not get too close to shore. This figure should be considered a snapshot of the situation at the time.

[116] 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 15: Locations of Hector's dolphin sightings in Te Waewae Bay during autumn 2004



Map 16: Locations of Hector's dolphin sightings in Te Waewae Bay during summer 2004/05

7.5.2. Fishing and non-fishing threats

Life history characteristics (maturity, fecundity, and longevity) and abundance means the SCSI population is threatened by low levels of human-induced mortality. Population Biological Removal (PBR) analysis based on the published abundance estimates suggests that the population cannot sustain any human-induced mortalities each year. [117] MFish notes that while results from the more recent study may identify that more than 89 dolphins use Te Waewae Bay, the level of human-induced mortality that

[117] When applying the Recovery Rate Goals; 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.

the population can sustain probably remains low.

Fishing threats identified as facing the SCSI Hector's dolphin population are:

⇒Set netting (commercial, amateur)

⇒Commercial trawling

The DOC incident database indicates there have been nine reported Hector's dolphin mortalities associated with the SCSI population since 1988[118]. Of these, there are six mortalities where the cause of death was able to be assessed. The number of mortalities definitely attributable to a cause of death (three) is set out in Table 14. In the remaining three cases where a cause of death was able to be assessed, cause of death could not be established by the pathologist in two cases, and in one case, probable entanglement was the cause of death established.[119]

Table 14: Reported Hector's dolphin mortalities with a confirmed cause of death on the SCSI since 1988.

Cause of death	**Number**
Trauma – unknown source	1
Natural	2

7.5.2.1. Nature and extent of fishing threats

MFish notes that the level of threat to Hector's dolphins from fishing is difficult to quantify, as there is no formal monitoring of amateur set netting and there has been low levels of observer coverage of the commercial set net fishery. There has been no observer coverage of inshore trawl vessels on the SCSI. 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 one known fishing-related Hector's dolphin death on the SCSI represents a minimum level of mortality.

Further detail about fishing threats facing the SCSI population is provided below.

Set netting

Set netting is a threat to Hector's dolphins on the SCSI. Both commercial and amateur set netting is practiced; information on the nature and extent of the threat from these fisheries is set out below.

Amateur set netting

Amateur set netting occurs in Te Waewae Bay and overlaps with Hector's dolphin distribution. The rough and exposed conditions on the open coastline mean that little amateur set netting occurs outside Te Waewae Bay on the SCSI. A small amount of amateur set netting occurs in reef areas for butterfish and moki between Bluff Harbour and Te Waewae Bay.

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[118] 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.

[119] "Probable" net entanglements relate to carcasses that show evidence of entanglement (for example, some sign of net marks). An assessment of the cause of death was not undertaken in 2 cases and in one case the animal was too decomposed to allow a cause of death to be assessed.

Amateur set netting in Te Waewae Bay is confined to within 500m off the shore for small sharks (such as elephant fish and rig) during summer and reef fish (such as butterfish and trumpeter). At the eastern end from Monkey Island to Pahia Point the rocky area is fished for reef fish. At the western end near the Waikoau River mouth and back along the beach to the eastern end set netters target small sharks.

Fishing mainly takes place over summer and is primarily confined to a limited number of local people who fish on the weekends. There is a campground at Monkey Island, which is located on the eastern side of Te Waewae Bay. Visitors from outside the local area stay at the campground, particularly over the Christmas/New Year holiday, which leads to increased fishing effort (including set netting).

Amateur fishers set net and drag net for flounder in the lagoon of the Waiau River that flows into Te Waewae Bay (i.e. outside the area where Hector's dolphins are present).

Available information suggests that set netting for butterfish poses a low risk of dolphin mortalities[120]. MFish is not aware of any dolphin mortalities caused by nets set only for butterfish. Butterfish nets are confined to kelp/reef areas in the SCSI (habitat that is not favoured by Hector's dolphins).

Set netting for moki adjacent to reefs and small sharks (elephant fish, rig and school shark and spiny dogfish) is considered by MFish to have a higher risk of dolphin entanglement than netting for butterfish (in reef areas) and flatfish[121]. This is because fishing for these species involves using nets with large mesh sizes in areas where dolphins are known to frequent, and which have more than double the number of meshes used to catch flatfish. The nets are usually made of courser mesh set tightly to form a wall that acts to catch the fish by their gills.

There is uncertainty around the actual number of dolphin deaths caused by amateur set net fishing in Te Waewae Bay because the level of fisher self-reporting is unknown. Of the known deaths on the south coast South Island, there has been one dolphin death attributed to probable net entanglement (unknown sector cause). This dolphin was recovered on Orepuki Beach, on the eastern side of Te Waewae Bay.

Customary set netting

MFish does not know of any customary set net effort off the SCSI that overlaps with Hector's dolphins' range.

Customary fishing is now managed under a regulatory framework as a result of the Treaty of Waitangi (Fisheries Claims) Settlement Act 1992. Ngāi Tahu Whānui has implemented the South Island customary fishing regulations, through the appointment of Tangata Tiaki/Kaitiaki. In order to undertake customary fishing within a particular location of the Ngāi Tahu Whanui Takiwā (which includes the SCSI), prospective customary fishers must first obtain an authorisation from a Tangata Tiaki/Kaitiaki appointed for that area. Te Rūnanga o Ngāi Tahu (the Ngāi Tahu Tribal Council) manages and administers the Ngāi Tahu customary fisheries database. The nine years of customary fishing catch landing returns compiled within this database indicates that Ngāi Tahu customary fishers set net within coastal lagoons and lakes only. At this point in time Ngāi Tahu Tangata Tiaki/Kaitiaki are not authorising customary fishers to set net on the open coast of the SCSI.

As such, MFish considers there is currently no threat from customary set netting to Hector's dolphins on the SCSI. MFish welcomes stakeholder views on this.

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[120] From the DOC incident database and fisher interviews

[121] 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.

Commercial set netting

Some commercial set netting on the SCSI overlaps with Hector's dolphin distribution. 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. Fishers also catch butterfish, moki, and trumpeter with short (up to 60m) nets in kelp/reef areas close inshore (occasionally in the Pahia Point area). Some set netting for flatfish currently occurs outside the dolphins' range in the New River Estuary and Aparima Estuary at Riverton.

Approximately 11 commercial set netters (operating about 12 vessels) fish on the SCSI. Available information suggests that at least 4 or 5 operate in Te Waewae Bay. Table 15 below characterizes the main commercial set net fisheries on the SCSI using estimated catch and effort data reported from statistical reporting areas 025 and 030 over the past three fishing years. Not all the catch and effort (and value) listed in Table 14 can be attributed to the SCSI 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 SCSI 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 this section). Additional fishery characterization for selected SCSI fisheries is in Appendix 4.

Table 15 SCSI set net characterisation captured from estimated catch and effort reporting in statistical reporting areas 025 and 030. Value is estimated from the port price for the corresponding fishing year[122].

Fishery		**2003-04**	**2004-05**	**2005-06**
School shark	Catch (tonne)	280	304	316
	Fishers	11	10	8
	Vessels	11	12	9
	Value ($)	$619,122	$577,600	$725,220
Spiny dogfish	Catch (tonne)	121	126	124
	Fishers	8	10	7
	Vessels	7	12	8
	Value ($)	$60,258	$54,810	$62,000
Rig	Catch (tonne)	87	100	84
	Fishers	11	10	9
	Vessels	10	11	10
	Value ($)	$282,211	$357,000	$253,860
Elephant fish	Catch (tonne)	5	17	23
	Fishers	6	10	8
	Vessels	6	11	9
	Value ($)			$32,430
Butterfish	Catch (tonne)	30	18	15
	Fishers	3	2	1
	Vessels	5	4	2

[122] 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
	Value ($)	$87,633	$58,320	$57,600
Flatfish[123]	Catch (tonne)	0.3	6	4
	Fishers	1	3	3
	Vessels	1	3	3
	Value ($)	$980	$19,020	$11,840
Moki	Catch (tonne)	4	7	3
	Fishers	6	5	5
	Vessels	8	7	6
	Value ($)	$4,252	$7,280	$2,415
Trumpeter	Catch (tonne)	2	2	1
	Fishers	1	2	1
	Vessels	3	4	2
	Value ($)	$4,572	$3,320	$1,920
Stargazer	Catch (tonne)	3	4	2
	Fishers	7	6	7
	Vessels	6	6	7
	Value ($)	$4,138	$4,320	$8,995

There has been some limited observer coverage of the commercial set net fishery off the SCSI in recent years, with no Hector's dolphins observed caught. In 2005-06, 29 set net events were observed (17 in statistical area 025[124] and 12 in statistical area 030[125]). Seventy-one sets have been observed off the SCSI in the current fishing year (59 sets in statistical area 25[126], and 12 sets in statistical area 30[127]).

Low levels of monitoring means there is uncertainty around the actual number of dolphin deaths caused by commercial set net fishing on the SCSI. As mentioned above, necropsy results have attributed one dolphin death to probable net entanglement (unknown sector cause) in Te Waewae Bay. MFish cannot determine whether the absence of reported dolphin commercial set net entanglements on the SCSI reflects zero interactions between commercial set nets and Hector's dolphins or fisher non-reporting.

Trawling (mid-water, bottom and pair)

Trawling is a method known to occasionally interact with Hector's dolphins (records from the east and west coasts of the South Island). There has been no observer coverage of inshore trawl fisheries on the SCSI.

There are approximately 30 trawl fishers operating about 31 vessels (under 46m) on the SCSI. These fishers catch a wide range of inshore fish species. Many fishers target flatfish in water depths less than 30m using low headline nets (Foveaux Strait and Te Waewae Bay). A larger number of fishers also catch stargazer in deeper waters outside 50m (off the west coast of Stewart Island and in western Foveaux Strait). A number of trawlers also target barracouta in deeper waters outside 12nm.

Table 16 below characterizes the main commercial trawl fisheries on the SCSI (<46m) using estimated catch and effort data reported from statistical reporting areas 025 and 030 over the past three fishing years. Not all the catch and effort (and value) listed in Table 16 can be attributed to the SCSI area that overlaps with Hector's dolphins because the statistical reporting areas cover a much wider area.

[123] All flatfish codes included.
[124] Targeting rig, school shark and spiny dogfish.
[125] Targeting school shark and rig.
[126] Targeting school shark and rig.
[127] Targeting school shark.

However, the characterization illustrates the nature and extent of trawling on the SCSI 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 16 SCSI trawl characterisation captured from estimated catch and effort reporting in statistical reporting areas 025 and 030. Value is estimated from the port price for the corresponding fishing year[128]. Analysis excludes vessels >46m except for * that may include vessels greater than 46m.

Fishery		**2003-04**	**2004-05**	**2005-06**
Stargazer	Catch (tonne)	781	790	824
	Fishers	26	28	27
	Vessels	26	29	29
	Value ($)	$1,077,650	$853,257	$1,058,960
Spiny dogfish	Catch (tonne)	164	375	294
	Fishers	8	17	15
	Vessels	8	18	16
	Value ($)	$81,884	$163,042	$147,073
Red gurnard	Catch (tonne)	160	177	172
	Fishers	26	26	28
	Vessels	26	27	29
	Value ($)	$220,934	$240,872	$218,011
Flatfish[129]	Catch (tonne)	102	140	212
	Fishers	27	30	25
	Vessels	27	31	26
	Value ($)	$333,054	$444,789	$626,928
Red cod*	Catch (tonne)	118	164	134
	Fishers	32	35	28
	Vessels	40	48	41
	Value ($)	$69,360	$96,760	$72,360
Elephantfish	Catch (tonne)	82	89	100
	Fishers	25	21	21
	Vessels	25	22	23
	Value ($)	$212,543	$154,557	$149,974
Barracouta	Catch (tonne)	82	65	102
	Fishers	6	6	4
	Vessels	6	6	4
	Value ($)	$32,722	$17,420	$29,181
Tarakihi	Catch (tonne)	43	41	31
	Fishers	17	20	15
	Vessels	17	21	16
	Value ($)	$57,197	$58,495	$40,144
Leatherjacket	Catch (tonne)	14	40	44
	Fishers	5	7	10

[128] 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.

[129] Includes all flatfish species codes.

Fishery		2003-04	2004-05	2005-06
	Vessels	5	7	10
	Value ($)	$6,455	$20,000	$23,320
Warehou	Catch (tonne)	4	31	53
	Fishers	4	5	4
	Vessels	4	5	4
	Value ($)	$2,930	$26,725	$48,754
School shark	Catch (tonne)	30	14	24
	Fishers	20	18	17
	Vessels	20	19	18
	Value ($)	$65,817	$47,011	$44,986
Rig	Catch (tonne)	11	12	14
	Fishers	20	22	20
	Vessels	21	23	20
	Value ($)	$35,918	$42,040	$41,519
Blue cod	Catch (tonne)	2	6	7
	Fishers	9	10	13
	Vessels	9	10	13
	Value ($)	$7,088	$18,604	$20,526

There is no reported information confirming that trawlers have caught dolphins off the south coast. However, trawl vessels operating within the dolphins range are a potential threat to the population – although this may be low for flatfish trawling.

Fishers believe that slow trawling for flatfish using a small 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, and is therefore of low risk to Hector's dolphins. However, there has been no observer coverage on trawlers to determine interaction with Hector's dolphins in other trawl fisheries, and it is possible that mortalities may have gone unreported.

7.5.3. Existing threat management – status quo

There are a number of voluntary and regulatory measures in place on the SCSI to reduce the impacts of fishing on Hector's dolphins; these are outlined below.

7.5.3.1. Current measures for amateur set netting

A mandatory measure is currently in place to mitigate dolphin bycatch in amateur set nets in Te Waewae Bay. This measure was introduced in December 2006 to mitigate the threat of amateur set netting to Hector's dolphins in Te Waewae Bay while the TMP was under development, and requires non-commercial fishers to stay in attendance with their nets while set (see Map 17).

Similarly to elsewhere in New Zealand, MFish actively promotes a voluntary set net CoP for amateur fishers on the SCSI. Some of the provisions of this code can also help to reduce the likelihood of Hector's dolphin mortalities. This code encourages wise set netting practices (refer ECSI section for examples of measures set out in the CoP).

As outlined in the ECSI section, there are also a number of laws that apply nationally to amateur set

netting that may help to reduce the likelihood of Hector's dolphin bycatch[130].

Map 17: Current mandatory amateur set net restriction on the SCSI

[130] For example: the use of stakes to secure nets is prohibited; set nets must not exceed 60 m in length; only one set net (maximum 60 m) and one bait net (maximum 10 m with a mesh size of 50 mm or less) can be carried on a boat at any one time; nets must not be set within 60 m of another net.

7.5.3.2. Current measures for commercial set netting

No mandatory measures are in place to mitigate the impacts of commercial set netting on SCSI Hector's dolphins.

However, there are some mandatory measures that apply nationally to commercial set netting and may help reduce the chance of Hector's dolphin entanglement. These measures include:

⇒Commercial fishers cannot use more than 3000m of net per day[131]

⇒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 caught.[132]

Commercial set netters fishing in FMA 5, which encompasses the SCSI, operate under the SEFMC voluntary CoP. This includes where possible using best endeavours to avoid set netting inside the 40m depth contour in Foveaux Strait. Additionally, under SEFMC CoP, fishers are required to adopt a number of fishing practices that reduce the likelihood of dolphin incidental bycatch (refer ECSI section for examples of measures set out in the CoP).

7.5.3.3. Current measures for trawling

MFish is not aware of any specific voluntary measures and there are no specific mandatory management measures in place to mitigate the effects of trawling on Hector's dolphins off the SCSI.

7.5.4. Additional threat management

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

⇒The effectiveness of current threat management

⇒Relevant considerations for the Minister when determining whether measures are necessary to avoid, remedy or mitigate the effects of fishing on the SCSI population.

7.5.4.1. Effectiveness of current threat management

Amateur set nets

Some of the provisions of the voluntary CoP would, if applied, help to reduce Hector's dolphin bycatch on the SCSI. MFish doesn't know whether the CoP is followed by amateur fishers in this area. MFish welcomes information from stakeholders of the level of compliance with the voluntary CoP by amateur fishers. Because an unknown proportion of Hector's dolphin mortalities go unreported, the nature and extent of the current risk to the population from amateur set netting cannot be quantified. The level of amateur set netting appears to be relatively low and mainly restricted to locals. Because use is low and sporadic, MFish cannot determine whether the interim measure requiring amateur set netters to stay with their nets in Te Waewae Bay has resulted in any changes to fishing effort.

Based on available information, the degree of interaction between amateur set nets and Hector's dolphins appears to be low. There is one official report of a dolphin mortality with "probable" net entanglement as the cause (unknown sector), although it is an isolated part of the country and therefore beach cast animals may not be readily detected.

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[131] Regulation 65 (3), Fisheries (Commercial Fishing) Regulations 1986

[132] Regulation 3C, Fisheries (Southland and Sub-Antarctic Commercial Fishing) Regulations 1986

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

⇒Set netting is the most significant known threat to Hector's dolphins (and is known to cause mortalities in other parts of the dolphins' range)

⇒Amateur set netting on the SCSI occurs within Hector's dolphins range

Commercial set nets

Use and application of the SEFMC CoP on the SCSI is unknown, although MFish is aware that some commercial set net fishers in Te Waewae Bay and other areas use pingers. MFish welcomes information from stakeholders of the level of compliance with the CoP by commercial fishers. Low levels of observer coverage make it difficult for MFish to evaluate the success of industry's initiatives to mitigate Hector's dolphin mortalities. However, there has been some limited observer coverage of the commercial set net fishery off the SCSI in recent years, with no Hector's dolphins observed caught.

Although information on the actual level of dolphin deaths attributable to commercial set netting is uncertain, MFish considers the use of this method poses a risk to the south coast Hector's dolphin population for the same reasons as amateur set netting, namely:

⇒Set netting is the most significant known threat to Hector's dolphins (and is known to cause mortalities in other parts of the dolphins' range)

⇒Commercial set netting on the SCSI occurs within Hector's dolphins range

Commercial trawling

No trawl mortalities are known to have occurred in the SCSI. MFish is unable to accurately assess the effectiveness of the current management measures to address trawl interactions with Hector's dolphins because the level of fisher self-reporting is unknown. The absence of reports may signal a low risk of inshore trawl fishing on the SCSI population or a failure by fishers to report any dolphin interactions. Evidence of trawl-related mortalities off other parts of the South Island's coastline suggests that where trawling overlaps with Hector's dolphins range, a risk of interaction exists.

7.5.4.2. 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 utilisation 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 SCSI population is the smallest South Island Hector's dolphin population;

⇒PBR analysis indicates zero human-induced mortalities can occur each year (based on published abundance estimate);[133]

⇒Genetic analysis has not detected evidence of population decline; [134]

⇒There has been one known "probable" fishing-related mortality (net entanglement) on the SCSI;

⇒An unquantified number of fishing-related mortalities go unreported;

⇒The genetic continuity of the population may be susceptible to fishing impacts (through localised depletion);[135] and

⇒The effectiveness of current measures is uncertain.

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

⇒There is uncertainty around the number of dolphins that use Te Waewae Bay, as well as the total number of dolphins that make up the SCSI population;

⇒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;

⇒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 in other parts of the South Island. MFish cannot determine the extent of this practice but considers it does indicate 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. Lack of monitoring of amateur fishing on the SCSI, and limited monitoring of the commercial fishery, also increases the opportunity for non- reporting offences.

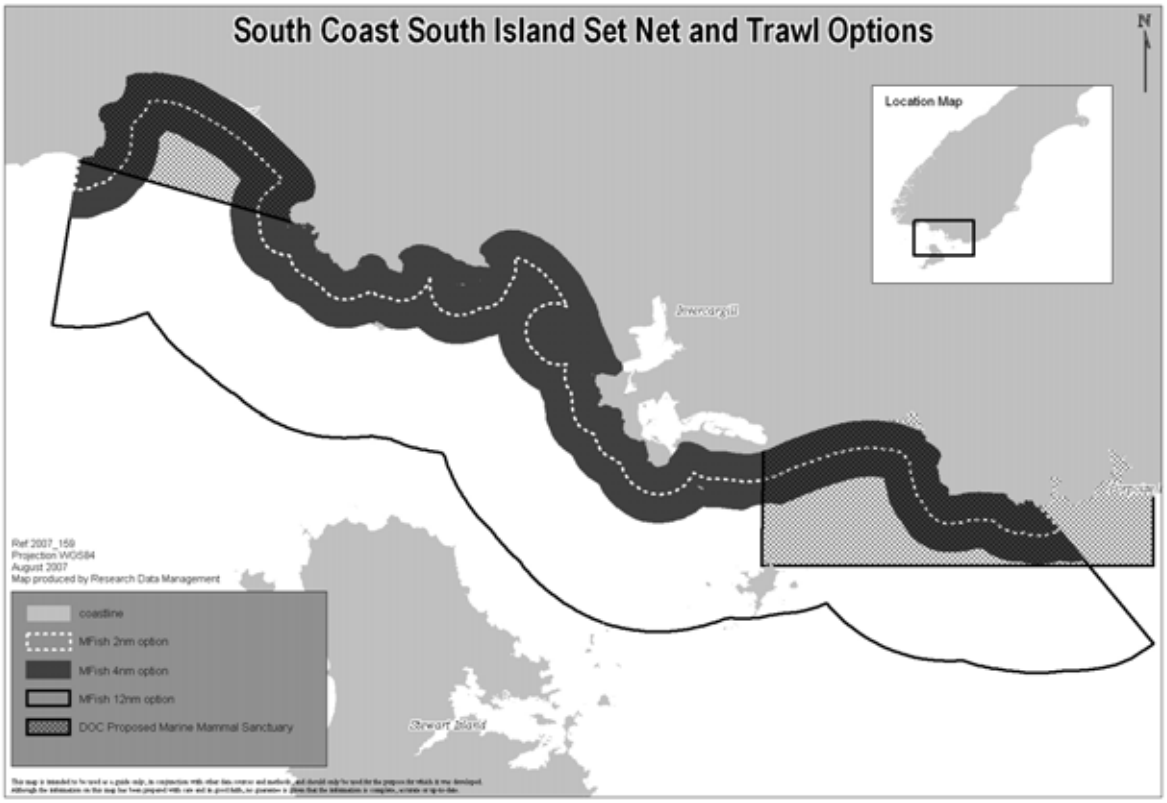
MFish notes that the Minister should take this uncertainty into account when making decisions on the need for further measures on the SCSI. The Minister should take into account best available information; be cautious when information is uncertain; and should not use absence of, or uncertainty in, any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

7.5.5. Options

MFish has prepared a range of options for managing fishing threats to the SCSI 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 and therefore the effect on the population and species 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 effect from fishing activities to Hector's dolphins on the SCSI, 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

[133] See Appendix 3 for details of the PBR analysis
[134] Although sample size was small.
[135] Hector's dolphins 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

example, different proposal boundaries) based on relevant considerations (see previous section). Map 18 illustrates the proposed boundaries of the various options set out below.



Map 18 Measures proposed for SCSI

7.5.5.1. *Status quo*

The nature and extent of fishing threats to the SCSI 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 SCSI population are not necessary. MFish notes that the *status quo* remains a valid option given uncertainty over the nature and extent of the impact of fishing-related mortality on Hector's dolphins and the impact on fisheries users. MFish notes that the previous sections have outlined information about the existing threat of fishing to Hector's dolphins on the SCSI, 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.

7.5.5.2. *Set netting*

MFish proposes the following options to manage the effects of amateur and commercial set netting on the SCSI population. The options do not apply to lagoons, coastal lakes, river mouths, estuaries, inlets and harbours on the SCSI.

Status Quo – Existing management (refer Existing Threat Management Section)		
Option 1 – Existing mandatory management measures and codes of practice inside 12nm[136] from shore (MHW) between Slope Point and Sandhill Point 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 60m 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[137]
Option 2 –Amateur and commercial set netting is banned inside 2nm or 4nm from shore (MHW) between Slope Point and Sandhill 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)*	Set net prohibition applies inside 2nm from shore – this option includes the following three alternatives: Prohibition applies all year round with set netting for butterfish allowed in designated areas for nine months of the year (1 March to 30 November) with the restrictions listed below; or Prohibition applies all year round with set netting for butterfish allowed in designated areas for six months of the year (1 April to 30 September) with the restrictions listed below; or Prohibition applies all year round

[136] MFish notes that the 12nm boundary generally incorporates the 100 m depth contour line off the SCSI. There are some places where the 100 depth contour is further offshore than 12nm. However, MFish is not aware of any Hector's dolphin sightings further offshore than 12nm in these places. MFish therefore considers that the 12nm boundary should encompass Hector's dolphins' range n the SCSI.

[137] See Part III section on monitoring.

Or	*Option 2(b)*	Set net prohibition applies inside 4nm from shore (as well as closure of Te Waewae Bay) – this option includes the following three alternatives: Prohibition applies all year round with set netting for butterfish allowed in designated areas for nine months of the year (1 March to 30 November) with the restrictions listed below; or Prohibition applies all year round with set netting for butterfish allowed in designated areas for six months of the year (1 April to 30 September) with the restrictions listed below; or Prohibition applies all year round
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 30m for butterfish[138] set nets and 60m for flatfish set nets[139]		
DESIGNATED AREAS (approximate boundaries, refer to Appendix 6 or the MFish website www.fish.govt.nz for indicative maps of the designated areas) **Designated butterfish set net areas out to 100m from MHW** **Bluff** – Stirling Point to Bombay Rock **Pahia** – 2km east of Wakaputa Point to Pahia Point		
Option 3 – All amateur and commercial set netting is prohibited inside 12nm from shore (MHW) between Slope Point and Sandhill Point		

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 SCSI 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. Refer to Part III for more information about the proposed monitoring approach.

Analysis of amateur set net options

Option 1

Option 1 applies to amateur set netting activities between Slope Point and Sandhill Point out 12nm from

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

[139] Flatfish nets must be no more than 60m in length, 9 meshes deep, and 0.35mm mesh diameter and no less than 125mm mesh size, and anchored at each end with a weight no lighter than 3kg

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shore.

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 30m (60m 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.[140]

Under this option, MFish would invite recreational fishers to hand in any unused or unwanted amateur set nets. The handing in of unused or unwanted nets would remove the potential latent effort within the amateur set net fishery. MFish will 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 it is 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.

⇒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 amateur set netting to Hector's dolphins will be reduced under this option, potential for dolphin entanglement will remain. Allowing set nets in areas and at times of the year where dolphins are present constitutes a greater, albeit un-quantified, 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.

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[140] 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 (i.e. usually 9-12) of fine mesh with a low breaking strain that hangs loosely to trap flatfish.

- *Impacts on fishers*

Option 1 will provide for greatest amateur set netting use along the SCSI 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 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 the same 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 eliminate 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, as well as likely 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 butterfish set netting in designated areas at certain times of the year outside Te Waewae Bay (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 pose the least risk of Hector's dolphin mortalities. Amateur set netting (for flatfish) that currently occurs in the lagoon of the Waiau River that flows into Te Waewae Bay would still be permitted because this is outside the proposed closure boundaries.

Amateur set netting along the coast would be restricted to the main butterfish grounds outside Te Waewae Bay for 6 or 9 months depending on whether sub-option (i) or (ii) 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 for amateur fishers (i.e. mandatory net attendance, no overnight setting, etc) would also apply 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 could choose to implement one of the designated areas, rather than the two identified (Bluff and Colac).

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.

MFish considers that a 2nm set net closure is likely to effectively prohibit all coastal amateur set netting on the SCSI. This is because most recreational 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, all amateur set netting on the SCSI 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 (or possibly eliminate, sub-option iii) risk to Hector's dolphins from amateur set netting. While the area inhabited by the SCSI Hector's dolphin population is not a popular area for set netting, some amateur set netting does take place, particularly over summer months.

Measures proposed under Option 2 will mean that amateur set netting on the south coast considered to be of highest risk to Hector's dolphins (targeting small sharks, moki adjacent to reefs, red cod and herrings) is prohibited throughout the year. Information from other parts of New Zealand's coastline suggests that set netting for butterfish in reef areas poses a lower risk of dolphin mortalities compared to set netting for these other species. 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 in designated areas outside the summer months (when dolphins are thought to be further offshore) will only constitute a marginal increase in risk to Hector's dolphins – particularly because Te Waewae Bay (where dolphins are concentrated on the SCSI) is not included as a designated area. Therefore, set netting would be prohibited out to 2nm or 4nm throughout the year in Te Waewae Bay under all sub-options (i, ii and iii). Where the designated areas apply (Bluff and Colac), the longer (6 month) closure period would afford a greater level of protection than the shorter 3 month closure to all set netting.

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), with the exception of any non-compliance. Nevertheless, Option 2b provides greater certainty that amateur fishers will not move further offshore to set their nets.

Under Option 2, amateur set netting for flounder will be able to continue in the Te Waewae Bay lagoon. MFish considers this activity is likely to not constitute a threat to Hector's dolphins because the dolphins are not known to use the lagoon; combined with the fact that set netting for flatfish has a relatively low risk of dolphin entanglement (due to low headline height and lower mesh breaking strain).

MFish considers that Option 2 will effectively reduce the likelihood of Hector's dolphin entanglement in set nets because it effectively prohibits all amateur set netting year round in Te Waewae Bay, which is where Hector's dolphins are concentrated and most amateur set netting currently occurs. Allowing set netting in the designated areas outside the summer period (sub-options i and ii) will constitute a marginally greater, albeit unquantified, threat to Hector's dolphins than if set netting was banned year round throughout the whole SCSI, as proposed under Options 2a(iii), 2b(iii) and Option 3 below.

- *Impacts on fishers*

The main utilisation impacts associated with Option 2 are that set netting for butterfish 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 along the coast. Under all sub-options of Option 2, set netting will effectively be eliminated throughout the year in Te Waewae Bay.

As mentioned above, MFish considers there is little difference in terms of effects on use between option 2a and 2b because fishers are unlikely to travel further than 2nm from shore to set a net, and therefore a 2nm offshore boundary is likely to have the same impact as a 4nm boundary (and a 12nm boundary as proposed under Option 3).

Because most amateur set netting occurs in Te Waewae Bay, MFish considers that Option 2 will largely stop all coastal amateur set netting on the SCSI, resulting in a significant impact on use. This impact will

be somewhat lessened by providing for restricted butterfish set netting in designated areas at certain times of the year, as proposed under sub-options (i) and (ii).

Set netting for butterfish is an important amateur fishery. Butterfish can only be caught in reasonable numbers using set nets – other methods such as lining and scoop nets catch few butterfish.

Option 2 will have impacts on set netting for small sharks, moki, red cod and herrings. For these species, lining may be a viable method to catch these fish, but this is likely to achieve lower catch rates of these species. As mentioned above, amateur set netting that currently occurs in the lagoon of the Waiau River would still be permitted under Option 2, and therefore set netting for flounder can continue in this area.

Sub-options (i) and (ii) provide for greater set net use than Option 3 (complete set net ban) because this option allows for butterfish set netting in designated areas at certain times of the year. Sub-option (iii) will have comparable impacts as a complete ban on amateur set nets throughout the SCSI due to the close inshore nature of amateur set netting. MFish welcomes stakeholder information on the likely utilisation impacts of Option 2.

Option 3

Option 3 constitutes a full set net ban to 12nm and is the most risk averse option.

- *Effectiveness*

Option 3 essentially eliminates residual risk of amateur set netting to the SCSI population (with the exception of any non-compliance). However, MFish considers there is unlikely to be additional benefit in terms of risk mitigation to that achieved under sub-option (iii) of Options 2a and 2b – both these options are likely to eliminate amateur set netting on the SCSI. Option 3 is appropriate if the Minister considers amateur set nets pose such great risk to the SCSI population that potential threats must be eliminated to the greatest extent possible.

- *Impacts on fishers*

There are similarly 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 SCSI, 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. A prohibition on set nets is likely to mean lower catch rates for amateur fishers of species such as moki and small sharks. Fishers will still be able to line drag and set net for flounder in the lagoon of the Waiau River. MFish welcomes stakeholder views on the likely utilisation impacts of Option 3.

Analysis of commercial set netting options

Option 1

Option 1 is the *status quo* with increased monitoring of commercial set netting. This option will require fishers to continue to apply 'safe netting' practices outlined in the SEFMC CoP. Officials will work with set netters to increase compliance with the CoP.

A comprehensive monitoring programme for commercial set netters to determine the interaction of their set netting and Hector's dolphins would be implemented by Government under this option. The monitoring programme would also be used to independently verify fisher compliance with the CoP.

- *Effectiveness*

Low levels of observer coverage of the commercial fishery make it difficult to evaluate the success of industry's initiatives to mitigate Hector's dolphin mortalities, and therefore the effectiveness of Option 1 is uncertain.

Option 1 provides the least mitigation of potential threat to Hector's dolphins from commercial set netting of the options proposed. Allowing set nets in areas and at times of the year where dolphins are usually present constitutes a greater, though unquantified, risk than excluding set nets within parts, or the whole, of the dolphins range (Options 2 and 3).

MFish notes that under the current voluntary arrangements (which apply to both the ECSI and SCSI), Hector's dolphins continue to be entangled in commercial set nets on the ECSI. Information from fishers suggests compliance with the current CoP is at least reasonable, 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 SCSI. This approach, if agreed by the Minister would, therefore accept that commercial set netting on the SCSI 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 (if any) between commercial set nets and Hector's dolphins to be observed with increased certainty.

- *Impacts on fishers*

MFish considers Option 1 would only be a reasonable course of action providing there is sufficient certainty that all fishers comply with the 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 fishers who do not comply with, or breach, specific measures. MFish considers there is also a need for independent verification that fishers comply with the CoP, and this could be simultaneously achieved through the placement of fisheries observers and/or monitoring equipment on set net vessels fishing within the dolphins' range for the purpose of monitoring dolphin-set net interactions.

The main economic impact of this option on fishers is the cost of the monitoring programme. There are approximately 10 set net vessels operating in the area covered by the SCSI 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 up to $1000 per day, and electronic monitoring equipment around $10000 to install (with ongoing operating and auditing costs) such that total monitoring costs could be expensive.

MFish welcomes stakeholder information on the likely utilisation impacts and costs of 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), with provisions for some butterfish set netting in designated areas at certain times of the year (sub options i and ii).

Commercial set netting for butterfish along the SCSI would be restricted to the main fishing grounds outside Te Waewae Bay for 6 or 9 months of the year depending on whether sub-option (i) or (ii) is chosen. 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 butterfish on the SCSI would be eliminated under sub-option (iii) because effort occurs close inshore in reef areas.

Under sub-options (i) and (ii), additional restrictions would apply to commercial set netters fishing within the designated areas (Bluff and Colac), 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 30m for butterfish nets.

MFish notes that the Minister could choose to implement one of the designated areas, rather than both of those identified.

Proposed measures for commercial fishers under Option 1 (ie, strict adherence to the existing voluntary CoP and additional monitoring) would also apply to commercial set netting activities inside 12nm but offshore from the 2nm or 4nm boundaries proposed under Option 2.

- *Effectiveness*

MFish considers that Option 2 is likely to substantially 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 (targeting small sharks, moki and red cod) is prohibited throughout the year within 2nm or 4nm from the shore (where dolphin densities are highest, particularly in summer). No set netting (including for butterfish) would be allowed within 2nm or 4nm throughout the year in Te Waewae Bay. 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, albeit unquantified risk, than prohibiting commercial set netting throughout the dolphin's range (Option 3).

The 4nm offshore boundary (Option 2b) provides greater protection to Hector's dolphins than the closer inshore boundary proposed under Option 2a, and will cover almost the full extent of Te Waewae Bay.

Available information suggests that set netting for butterfish poses the least risk of dolphin mortalities out of all set net practices. Under both Options (2a and 2b), fishing close to shore for butterfish will either be prohibited throughout the year (sub-option iii) or restricted to designated areas (outside Te Waewae Bay) for 9 or 6 months under restrictions that reduce risk to Hector's dolphins (sub-options i and ii).

While the longer (6 month) closure to all set netting, including for butterfish, affords a lower level of certainty around threat mitigation than a year round closure, MFish considers sub-option (ii) will likely still provide a substantial level of threat reduction because inshore set netting will still only be allowed in two restricted areas outside Te Waewae Bay. The shorter 3 month closure to all set netting incurs an increased risk of dolphin entanglement in the designated fishing areas over summer when Hector's dolphins are likely to be closer inshore.

MFish considers that Option 2 will more effectively mitigate risk from commercial set netting to the SCSI 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 commercial set netting in designated areas outside summer 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 that follows.

- *Impacts on fishers*

Option 2 may limit fishers operating in the target rig and elephant fish fisheries that are typically

prosecuted closer to shore than other shark fisheries. Option 2b (ie. a 4nm set net prohibition) has greater potential to limit catch than Option 2a (ie. a 2nm prohibition). Table 15 suggests that the elephant fish and rig set net fisheries on the SCSI returned about $286,000 in the last fishing year. It is likely that some of the catch was taken inside 4nm such that shark fishers will need to move offshore to maintain similar levels of catch. Analysis of the location of sets nets during the current fishing year suggests that most fishers are able to fish outside 4nm but a significant amount of set netting occurs within 4nm of the coast.

Some set netting for flatfish currently occurs in the New River Estuary and Aparima Estuary at Riverton. This will not be affected, as estuaries are excluded from the area to which the proposals apply (note that these areas are the only areas that flatfish are commercially set netted).

Catch and effort information shows that butterfish is caught year round on the SCSI (although most fishing is in summer) such that winter "open seasons" in designated areas may offer some relief (and fishing opportunities) to commercial butterfish fishers. However, the additional fishing restrictions that would also apply as part of Option 2 (set net attendance, prohibited overnight fishing, limits on net size, and one net per person per boat) would probably limit fishing activity inside designated areas, although MFish understands that most butterfish target fishing on the SCSI occurs around Stewart Island where Option 2 does not apply. Additional monitoring described in Option 1 is also part of Option 2 and would be a significant cost for fishers opting to target butterfish and flatfish in designated areas inside the set net prohibition.

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

Additional costs associated with this option are the costs of monitoring set net activity inside 12nm. 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 this option.

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 seeks stakeholder views on the likely utilisation impacts of Option 2.

Option 3

Option 3 constitutes a full set net ban to 12nm between Slope Point and Sandhill Point, and is the most risk averse option.

- *Effectiveness*

This option avoids potential interactions between Hector's dolphins and set nets to a greater extent than Options 1 and 2, and therefore provides the highest level of risk mitigation. Because Hector's dolphins on the SCSI are usually sighted within 3nm and rarely outside 5nm, Option 3 may provide only marginal benefit to SCSI Hector's dolphins compared with Option 2b. Nevertheless, Hector's dolphins are known to range further offshore (out to the 100 m depth contour) in other parts of the coastline, and therefore the 12nm offshore boundary provides greater certainty that commercial set netting activity does not overlap with Hector's dolphins' range on the south coast. MFish welcomes information from stakeholders on the offshore range of Hector's dolphins on the south coast, and notes that the Minister could choose a variation on the 12nm boundary when making his final decisions.

- *Impacts on fishers*

Option 3 (ie, 12nm set net prohibition) would close some, and limit other, set net fisheries on the SCSI. Butterfish and inshore shark fisheries (rig, elephant fish, spiny dogfish, and school shark) would be restricted to areas outside the prohibition.

Butterfish and flatfish fisheries may persist (because they are also prosecuted outside the proposed

prohibition on the SCSI) but it is possible the inshore shark fisheries would no longer be viable. Option 3 will probably eliminate set netting for rig and elephant fish. Set netting for school shark, ling, groper and other deeper water species could only occur outside the 12nm boundary unless provision is made for school shark and deepwater fishing inside 12nm in waters deeper than 100m, where Hector's dolphins are not found. MFish notes though that exemptions would be extremely difficult to enforce.

Some set netting for flatfish currently occurs in the New River Estuary and Aparima Estuary at Riverton. This will not be affected, as estuaries are excluded from the area to which the proposals apply. MFish welcomes stakeholder input on the likely cost and utilisation impacts of Option 3.

Customary set netting

Currently, Ngāi Tahu 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 SCSI. 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.

7.5.5.3. Trawling (mid-water, bottom and pair)

Proposals for managing the impacts of trawling on the SCSI Hector's dolphin population are outlined below. As previously mentioned, these options do not apply to lagoons, coastal lakes, river mouths, estuaries, inlets and harbours on the SCSI.

Status Quo – Existing management (refer Existing Threat Management Section)
Option 1 – Develop and implement a voluntary code of practice inside 12nm between Slope Point and Sandhill Point and additional trawl monitoring
Option 2 – Trawling prohibited inside 2nm between Slope Point and Sandhill Point except for vessels targeting flatfish with low headline height nets, and measures as per Option 1
Option 3 – Trawling prohibited inside 2nm between Slope Point and Sandhill 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 SCSI 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. Please refer to the monitoring section Part III for more information about the proposed monitoring approach.

Analysis of options

Option 1

Option 1 requires trawl fishers to develop and implement a CoP to mitigate the risk of trawling (mid-water, pair, and bottom trawl) on SCSI Hector's dolphins inside 12nm between Slope Point and Sandhill

Point.

A comprehensive monitoring programme (e.g. observers or video monitoring) of commercial trawl activity within 12nm 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*

A CoP that includes the following minimum requirements could help fishers avoid potential interactions with Hector's dolphins within inshore areas:

⇒Low headline gear, no wing doors and low tow speed

⇒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.

The key benefit of the monitoring programme is that is will allow the level of interaction (if any) between trawling and Hector's dolphins to be estimated with increased certainty.

- *Impacts on fishers*

CoP development and monitoring costs are the main costs associated with Option 1 – all trawling inside 12nm between Slope Point and Sandhill Point must comply with a CoP, and compliance will be independently verified.

CoP development will require cooperation between SCSI trawl fishers and validation from MFish to ensure the CoP meets minimum standards.

MFish considers Option 1 would only be a reasonable course of action providing there is sufficient certainty that all trawl fishers comply with the 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 trawl fishers who do not comply with, or breach, specific measures. MFish considers there is also a need for independent verification that fishers comply with the CoP, and this could be simultaneously achieved through the placement of fisheries observers and/or monitoring equipment on trawl vessels fishing within the dolphins' range for the purpose of monitoring dolphin-trawl interactions.

The nature of ongoing costs under this option depends on the nature and extent of monitoring the Minister deems most appropriate. Fisheries observers typically cost $800 to $1000 per day while video monitoring equipment may cost around $10000 to install.

MFish invites the industry to submit how it might monitor CoP compliance and manage non

compliance[141].

The extent of costs associated with Option 1 is difficult to quantify because of the uncertainty in information on the nature and extent of trawling on the SCSI between Slope Point and Te Waewae Bay. However, MFish notes that there are approximately 31 trawl vessels <46m that operate in the statistical reporting areas that encompass the SCSI. Not all these vessels would fish inside 2nm between Slope Point and Sandhill Point because some of the species targeted are normally caught in larger quantities in deeper water (eg, stargazer, red cod, and barracouta). Only flatfish is targeted en masse inside 2nm[142]. Trawl fisheries prosecuted inside 12nm that may require additional monitoring as part of Option 1 are characterized in Table 16.

Option 1 relies on industry agreeing, in a timely manner, to develop and adopt a CoP with the minimum requirements outlined above. MFish welcomes stakeholder information on the likely utilisation impacts and costs of Option 1.

Option 2

Option 2 proposes a trawl ban (mid-water, bottom, and pair) within 2nm from shore with the exception of vessels targeting flatfish that use low headline gear (<1m high). 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. All vessels trawling within 12nm would be required to implement measures required under Option 1 (i.e. implement CoP and additional monitoring).

- *Effectiveness*

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

⇒Despite no reported interactions between Hector's dolphins and trawlers on the SCSI, all known trawl-related interactions with Hector's dolphins in other parts of New Zealand's coast have occurred within 2nm of the shore

⇒Hector's dolphin density is probably higher within 2nm of the SCSI shore than further out

⇒Trawling in shallower 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 (there are no known trawl interactions on the SCSI).

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. 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. MFish recognizes that mandatory gear design in the target flatfish fishery operating inside 2nm will be difficult to enforce under current compliance monitoring

[141] MFish notes that Option 1 proposes no penalty for CoP breaches but, should breaches be common, MFish would advise the Minister on regulatory options to implement CoP measures.
[142] MFish is currently unable to determine the feasibility of supplying observer services to the SCSI trawl fleet.

capacity. Additional monitoring that accompanies Option 2 (assuming the Minister chooses to monitor all target flatfish vessels) will help mitigate non compliance risk. MFish also welcomes comment from fishers on their proposals to ensure compliance with mandatory gear design should the Minister allow target flatfish fishing inside 2nm.

♦ *Impacts on fishers*

Option 2 provides for some trawling within 2nm as commercial fishers will still be able to target flatfish, providing they meet gear design requirements (see above) and CoP measures discussed in Option 1[143].

The overall impact of Option 2 on commercial fishers is difficult to quantify because of the uncertainty in, and absence of, information on the nature and extent of trawling on the SCSI between Slope Point and Sandhill Point out 2nm. However, MFish considers relevant points include:

⇒Trawlers <46m catch about around 13 main fish species in the Statistical Reporting Areas that include the SCSI Hector's dolphin population. Most of these species are probably caught in bulk outside 2nm (see Table 16).

⇒Only flatfish is probably targeted en masse inside 2nm. Fishers can still target flatfish inside 2nm under Option 2 providing vessels meet gear requirements

- Tarakihi, red gurnard, and red cod are most likely the only other high volume SCSI trawl fisheries taken in large amounts inside 2nm, probably as flatfish bycatch. Providing fishers do not target these species inside 2nm there are no additional costs for catching them associated with Option 2

- Any other target trawl fisheries inside 2nm will bear costs of shifting effort outside 2nm or to the west and east of the prohibited area. MFish cannot determine the extent of these costs because, other than the flatfish fishery, MFish has no information on target trawl fisheries inside 2nm.

Additional costs associated with this option are the costs of monitoring trawl activity inside 12nm. 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 this option.

MFish welcomes stakeholder input on the likely utilisation impacts of Option 2.

Option 3

Option 3 proposes to prohibit all trawl fishing within 2nm from shore between Slope Point and Sandhill Point. Trawl vessels between 2nm and 12nm would be required to implement measures required under Option 1.

♦ *Effectiveness*

Option 3 is the most risk averse option and reduces residual risk that trawlers will catch Hector's dolphins on the SCSI by prohibiting trawling from area where dolphin densities are highest. MFish considers that risk reduction between Option 2 and 3 is marginal but notes that prohibiting all forms of trawling within 2nm will protect a significant proportion of the SCSI Hector's dolphin population from the threat of trawl gear.

[143] MFish notes that the CoP cost assessment in Option 1 is relevant to the assessment of cost in Option 2

- *Impacts on fishers*

A 2nm trawl prohibition between Slope Point and Sandhill Point will close a large, but unquantifiable, proportion of the SCSI flatfish target fishery. The SCSI flatfish fishery is a regionally large and valuable target fishery – around 26 vessels catch flatfish inside statistical reporting areas 030 and 025. Anecdotal information suggests less than a third of the catch is taken inside 2nm. MFish cannot determine losses in other fisheries because of limited information about other target trawl fisheries inside 2nm. MFish invites industry to provide additional information to assess this impact.

Option 1 measures (if applied to all trawl vessels operating out to 12nm between Slope Point and Sandhill Point) would impose significant costs. However, MFish notes that the level of monitoring required under Option 3 may be less than Options 1 and 2 due to the lower level of residual risk achieved.