

Observations of set-net and inshore trawl fishing operations in the South Canterbury Bight, 2001

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ABSTRACT

The Conservation Services Levy Programme briefed two Ministry of Fisheries observers to record interactions between protected species (Hector's dolphins (*Cephalorhynchus hectori*) and seabirds) and set-net and trawl fisheries operating in South Canterbury Bight waters of New Zealand, during the 2001 inshore fishing season. Fifty observer days for the inshore trawl fishery and 100 days for the set net fishery were provided for. Only 3 trawl days and 20 set-net days were completed. No captures of protected species were made during any of the set net or trawl trips observed. One New Zealand fur seal (*Arctocephalus forsteri*) was seen to take a hapuka (*Polyprions oxygeneios*) from a set. A small pod of Hector's dolphins was seen feeding on fish ahead of a trawl ground-line in shoal waters, single animals and small pods of up to eight dolphins were seen riding bow waves of vessels steaming to and from the fishing grounds. No Hector's dolphins were seen attending any set-net events. Generally, about 62% of all sea birds counted were seen at the haul but often few or no birds were present at the beginning of the first set of the day or trawl shot away. Waste from fish processing was discarded away from the deployed set nets or while the vessels were steaming between locations. The trawler did not discharge fish waste during shooting or hauling operations. No gear events occurred that were likely to result in the capture of protected species. Acoustic pingers were deployed on 21 of 24 sets at various spacing combinations, over four net lengths. Two Hector's dolphins were observed with body scars of unknown origin.

Keywords: Observed fishery, inshore, trawl, set-net, protected species, mitigation, seabirds, Hector's dolphin.

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1. Introduction

The Conservation Services Levy Programme (CSL), under project CSL OBS 2000/1, Department of Conservation, 2000, briefed two Ministry of Fisheries scientific observers to report on interactions by set net and trawl vessels with Hector's dolphins (*Cephalorhynchus hectori*) during the 2001 inshore fishing season. The study area was in Fisheries Statistical Areas (FSA) 20 & 22 in the South Canterbury Bight waters of New Zealand. The Conservation Services Plan 2000 provided for 50 observer days on inshore, South Island, trawl fisheries in FSAs 20 & 22 and an additional 100 observer days was provided for parallel studies in the set net fishery and also included any interactions with penguins (Sphenscidae). Only three trawl and 20 set-net days were completed at sea.

This summary report is compiled from CSL debriefing reports and is edited to remove associations between trip numbers, vessel identification and observer names.

2. Briefings

Written CSL briefings for the set net (Appendix 1) and trawl (Appendix 2) fisheries were forwarded to the observers via Ministry of Fisheries briefing officers on 9 December 2000. The observers, under the aegis of the Ministry of Fisheries, arranged the trips with the fishermen on the basis of availability, accommodation (to vessel survey classification) and weather conditions. Catch effort and environmental data were recorded (Appendix 3). Estimates of seabird abundance and species present during fishing operations were made. The attendance and behavior of marine mammals, when sighted, were recorded.

3. Results

A total of 28 observer sea-days were compiled over four, completed, Ministry of Fisheries contracted trips between 4 January and 21 March 2001. Twenty-four set and haul events were observed over a period of 20 fishing days. Seven inshore trawls were observed during three consecutive sea-days.

No protected species by-catch occurred at any observed set/haul or trawl.

One observer completed two of three arranged trip sequences. The first with a set net vessel that made seven trips, over 15 days, and completed 19 set and haul events. The second trip was cancelled because the vessel decided to fish offshore beyond the known range of Hector's dolphins. The third trip was with a trawler that made seven inshore tows over three days.

The other observer completed two trip sequences on set net vessels. The first vessel made one six-hour trip without setting and four one-day set and haul events over a period of eleven days. The second vessel was observed on one day for one set and haul event.

The difficulties of monitoring this inshore fishery for Hector's dolphin by-catch were described by Starr & Langley (2000). The Manager of the Ministry of Fisheries Observer Programme, Mr. Andrew France, provided the following comments (shown in italics below) on the observer coverage for this season which demonstrate how the full 50 trawl and 100 set-net observer days provided for were not able to be realised from the 13 vessels eventually contacted.

The set-net fishery starts in October and is generally finished by March, with the best fishing between October and January. Due to a number of reasons, the Ministry of Fisheries Observer Programme was not aware that they were providing observers for this fishery until the end of November 2000.

The CSL Programme and the Seafood Fishing Industry Council (SeaFIC) were contacted to determine the objectives for the monitoring of this fishery, although information gathered did not define all data fields very well. The Southeast Finfish Management Company was contacted and a copy of their Code of Practice was requested—several times—but not received. A copy of the acoustic Pinger specification document was also requested but was not obtained until February 2001.

The Observer Programme was able to get contact details for nine set-net fishermen from records held by the Ministry of Fisheries in Dunedin from the 1999-2000 programme. SeaFIC and the Southeast Finfish Management Company offered assistance in supplying fisher details, but it took some time to obtain this information.

Reports were requested from the Ministry of Fisheries reporting group on vessels landing fish from FSA 20 and 22 (the areas of interest to the Department of Conservation) over the last few fishing years. Seventeen vessels were identified as of possible interest. Eight of these vessels were ruled out as they were less than 7 m in length and unsuitable for carrying observers. The nine remaining fishers made up the list initially provided by the Ministry of Fisheries in Dunedin. A list of 34 names was received from SeaFIC. Of these, only the nine already known had ever fished in FSA 20 or 22.

All of these fishers were difficult to contact. Cell phone numbers for only six of the fishers were obtained, however the phones were often turned off (out of range while fishing) and had no message service.

Two vessels were no longer fishing in FSA 20 or 22 and were based in Nelson until about April. One was only surveyed to carry two people and needed both persons to operate. One was only surveyed to carry one person. These four vessels were therefore not suitable for coverage.

One fisher was very co-operative when contacted and agreed to take an observer. An observer sailed with the vessel and managed to achieve 19 sea-days. This vessel was only surveyed to carry three people and the skipper had to sail with only one crewmember in order to accommodate the observer.

Another fisher was extremely uncooperative when first approached. He was unwilling to carry an observer as his vessel was only surveyed to carry three people and he was unwilling to drop a crewmember.

After initial communication difficulties an observer eventually sailed with another vessel and managed to achieve five sea-days. During the trip the skipper took exception to the observer attempting to do a conversion factor test (to improve his catch assessment). An incident occurred where the skipper's attitude was such that the observer was worried for his own safety, and did not return to the vessel after that trip.

Another fisher was contacted and an observer joined the vessel but only achieved one sea-day. By that time, fishing was poor and the skipper was not planning on fishing every day.

The Observer Programme was still having a lot of trouble managing to contact any other fishers to arrange other vessels. Consideration was given towards having one observer change between two vessels, depending on fishing strategy, to effect wider coverage.

Another fisher was reached, but unfortunately his vessel was only surveyed to carry two people and was therefore not suitable to carry an observer.

The Observer Programme had been unsuccessful in attempting to contact one particular fisher, but in the meantime two observers were told by other skippers that the vessel of the fisher they were trying to contact would not be suitable. That vessel only had two bunks and last year the observer was told to stay on deck at all times as there was no room in the bridge. This was not considered a suitable situation for observer placement.

Contact details were then provided, by a fisher, for a vessel that was not previously known to the Observer Programme. The fisher was contacted and a trip was arranged for an observer. When the observer rang to confirm he was told that the vessel would from now on be fishing 10 n.m. offshore, and well outside the range that Hector's dolphin cover. It was subsequently found that all coverage for this programme needed to be within 4 n.m. of the shore, unfortunately no observer coverage was carried out on that vessel.

By that time the set net fishery was basically over and the vessels were changing over to trawl gear. A fisher was contacted who had not previously been prepared to take an observer. This time he agreed to take an observer. An observer sailed with the vessel and achieved three sea-days. The skipper then decided to start doing overnight trips. He told the observer that the accommodation on the vessel was not suitable for three people overnight and said that he would no longer be able to carry an observer.

A fisher was approached who had helped cover the set net fishery and agreement was obtained for him to take another observer on some trawl trips. An observer rang him to confirm details and during the conversation was told that the vessel survey could not accommodate an observer. He said that in the past he had taken one anyway but was no longer willing to do so. The Observer Programme was unaware of any survey problems when the first observer was placed on board.

This fishery is extremely dependent on the weather. The vessels do not sail if there is even a hint of a southerly in the forecast. Vessels generally leave port between 0000 and 0200 hours and arrive back around 1700-1800 hours. Observers contracted to this fishery spent a large proportion of their days on shore due to weather and vessels changing plans. Fishers are very difficult to contact and even though this is not the first year that observers have been in this fishery, there is a large proportion of vessels that are not surveyed to carry an observer.

4. Marine mammal sightings

4.1 SET NET TRIPS

New Zealand fur seal (*Arctocephalus forsteri*). On 8 February a large male fur seal took a hapuka (*Polyprions oxygeneios*) from the set net towards the end of that haul, but no other fish were seen to be taken by seals. On the following day a fur seal, noted in the observer's diary as the same animal, was seen on North Rock. On 13 February a fur seal was seen basking near the end of the set net when the vessel started to haul. The animal showed no interest in the vessel and stayed well away.

Hector's dolphin. Sightings of between two and ten animals riding vessel bow waves were recorded during seven trips between net-setting locations and Timaru between 4 January and 14 February. The animals were only seen relatively close to the harbour (3 to 4 n.m.) and only briefly stayed alongside as the vessel steamed between locations.

On 29 January 2001, a timed series of observations were made from a set-net vessel while it was returning to Timaru. Conditions (recorded at end of haul, 1210 h) were: clear sky, a rising glass at 1014 mb up from 1009 mb at start of set, 0437 h, light air 3 kn, E by ENE (100° True), Beaufort sea state 1 (probable wave height 0.1 m, maximum 0.1 m). Observer diary extracts are shown in italics:

1520 b. Three sightings of possibly the same [Hector's] dolphin heading towards (the vessel) from the landward port side. A single blue shark (Prionace glauca) was also seen swimming south on the surface. The Hector's [dolphin] came to the bow and rode the bow wave for three minutes before disappearing.

1526 b. Two Hector's dolphins were seen heading towards the bow from the port side. A check revealed one dolphin riding the bow wave.

1531 b. Five Hector's dolphins seen heading towards the boat from ahead. All rode the bow wave.

1550 b. One Hector's [dolphin] seen approaching from directly ahead. This Hector's rode the bow wave for a few seconds then disappeared.

1554 b. One Hector's [dolphin] seen portside, 200 metres off, heading north. This dolphin did [a] complete somersault then headed south at great speed, porpoising twice, before disappearing.

Near the harbour mouth: Two Hector's [dolphins] seen approaching [the vessel and later] Four Hector's [dolphins were] seen heading towards the boat.

The vessel tied up at 1728 h.

Another timed series of observations was made on 13 February, by the same observer, on a different set-net vessel. Conditions, recorded at end of haul 1216 h, were: 2/8 cloud in clearing sky, a falling glass at 1016 mb (from 1020 mb, at start of set 0405 h), light breeze of 5 kn out of the NE (050° True). A Beaufort sea state 2 (probable wave height 0.2 m, maximum 0.3 m) was reported as prevailing for all dolphin sightings. Observer diary extracts are shown in italics:

1337 b. Two Hector's dolphins were seen on the port side heading towards [the vessel] from the south. A check at the bow revealed five dolphins riding the bow wave. They remained there for about a minute and then disappeared.

1339 b. Two Hector's dolphins were seen to starboard heading towards [the vessel] from the north. They came to the bow where they were joined by another [Hector's dolphin]. All three dolphins rode the bow wave for a short time, and then disappeared.

1341 b. Two Hector's dolphins were seen to starboard, heading towards [the vessel] from the north. Both dolphins rode the bow wave for a minute or so before disappearing.

1345 b. Three Hector's dolphins were seen directly ahead, porpoising towards [the vessel] from the [west]. All three dolphins came to and rode the bow wave momentarily before disappearing.

1346 b. Six Hector's dolphins were seen directly ahead. All six dolphins came to and rode the bow wave before disappearing.

1409 b. Two Hector's dolphins were seen porpoising. Neither dolphin came to the bow of the boat.

4.2 TRAWL TRIP

During the observed trawl trip no marine mammals or seabirds were seen during the shooting of the first trawl of each day. At the haul of Tow 1, on day one, two Hector's dolphins were seen to play around the cod end and then left. At the shooting of Tows 4 and 5, the second and third tows of day two, six Hector's dolphins were seen playing at the bow and showed no interest in the net; the observer noted that they were possibly the same pod present at both shots. At the haul of Tow 6, first lift on the last day, four Hector's dolphins were playing at the bow and showed no interest in the net. All of the preceding tows were in about 24 metres and the vessel was targeting red cod (*Pseudophycis bachus*). At the shooting of Tow 7, the last tow which was targeting flatfish in about 15 metres of water, a pod of four Hector's dolphins was seen actively fishing the net as it trawled the bottom. As the tow proceeded the pod seemed

to change and six apparently different animals were counted at the haul, they were seen to feed on loose fish at the cod end as it was hauled.

Photographs were taken by the observer of two Hector's dolphins, one with scars to the head (Fig. 1) and the other with scars forward of the dorsal fin (Fig. 2) on 21 March 2001. It could not be clearly determined from the vessel if these scars were the result of interactions with fishing gear.

The observer recorded Hector's dolphin feeding behavior where animals were seen, through clear shoal waters, to feed on fish swimming ahead of those trawl groundlines using rubber disc rollers. Flat fish were seen to pass more readily over a chain groundline and then drift down into the cod end of the net.

Figure 1. Hector's dolphin with scar to the head. 21 March 2001, South Canterbury Bight, New Zealand. (Photograph courtesy Ministry of Fisheries Observer Programme)



Figure 2. Hector's dolphin with scar forward of the dorsal fin. 21 March 2001, South Canterbury Bight, New Zealand. (Photograph courtesy Ministry of Fisheries Observer Programme)



5. Observed seabird abundance at net setting, trawl shooting and gear hauling in both fishing operations

Black-backed gulls (*Larus dominicanus*) were the predominant seabirds (68%) observed where cumulative counts of 533 at sets/shots and 1108 at hauls were recorded for all trips. Over 31 set-net and trawl events the gulls were present at all 21 net hauls observed and averaged 37 birds (n = 778, range: 10 to 239) but on only 11 sets an average of 33 birds (n = 363, range: 2 to 91) was seen. Similarly, gulls were not seen at the shooting of the first trawl on each of the three days trawling; numbers seen at the subsequent four shots averaged 47 birds (n = 190, range: 20 to 80) while five of the seven hauls averaged 66 birds (n = 330, range: 40 to 80).

Cape pigeons (*Daption* spp.) were the second (16%) most abundant species observed; the cumulative counts for all net sets was 67 and over all net hauls 330 birds were seen. At 21 of 24 net hauls an average of 16 birds (n = 330, range: 2 to 30) was seen, while over ten sets Cape pigeons averaged 7 birds (n = 67, range: 2 to 12); but none were seen during the trawl trip,

New Zealand white-capped albatross (*Diomedea cauta steadi*) were the third (11%) most observed species, the cumulative counts for all sets was 36 and for net hauls was 221 birds. Only three birds were seen at the shooting of one trawl and none were observed at any trawl hauls. Over six net sets an average of six birds (n = 36, range: 1 to 9) was observed and over 12 net hauls an average of 19 birds (n = 221, range: 2 to 50) was seen.

Petrels (Procellariidae): In addition to the Cape pigeons (above, 16%), the observers provisionally identified a total of 30 **sooty shearwaters** (*Puffinus griseus*) (about 1%), over three net sets and three net hauls. A total of 17 **giant petrels** (*Macronectes* spp.) were reported, one at one net set and 16 over five net hauls. Twelve **white-chinned petrels** (*Procellaria aequinoctialis steadi*) were reported at one net haul. A total of 11 **flesh-footed shearwaters** (*Puffinus carneipes*) were reported over both sets and hauls of two net events. A further 36 birds (about 1%) were recorded, six at the set and 30 at the haul of one net event, as unspecified petrels. Collectively, petrel species represented 20% (n = 503, 98 over 10 net sets, 405 over 21 net hauls) of all birds seen.

Albatrosses (Diomedidae): In addition to white-capped albatross (above, 11%), ten **royal albatross** (*Diomedea epomophora*) were provisionally identified on two days, three at one net haul on 7 January and on 30 January four birds and three birds were counted on successive net hauls. Three **Salvin's albatross** (*Diomedea salvini*) were also seen at the same net haul event on 7 January. Collectively, the albatross species represented 11% (n = 276, 3 at one trawl set, 36 over 6 net sets, 237 over 13 net hauls) of all birds seen.

Other seabird species: Three **gannets** (*Morus serrator*) were seen at the net hauls on 9 & 10 February and two birds were seen diving at a distance from the trawler on 20 March during a haul and the following set. One **blue penguin** (*Eudyptula minor*) was seen swimming by the trawl vessel at first haul on 19 March. There was no observed interaction with the vessel.

6. Mitigation techniques

6.1 ACOUSTIC PINGERS

Acoustic pingers are small noise-emitting devices which are attached to a net with the intention of deterring dolphins from the net or alerting them to the net presence (Stone et al. 1999).

So far there have been few controlled experiments on which to base firm conclusions as to the effectiveness of the device in reducing marine mammal interactions with fisheries (Jefferson & Curry 1996).

Dawson et al. (1998) estimated that six years of total expected fishing effort would be required to determine experimentally whether acoustic pingers were able to reduce Hector's dolphin by-catch by 50%.

Acoustic pingers were used on set-nets deployed by two vessels during the observation period.

On one vessel, combinations of three or four and then three, four or five acoustic pingers were deployed at equal spacings on either 1000 m or 2000 m long (by 2 m deep, from sinkers to floats) set nets respectively where the water depth ranged from 7 to 68 m (mean 31.8 m over 19 sets). No pingers were deployed on two sets made with the 2000 m net in 32 m and 68 m of water. Nine sets were made with the 1000 m net in water depths of 7 to 40 m (mean 27.7 m) and ten sets were made with the 2000 m net in water depths of 19 to 68 m (mean 33.5 m). A shoal-water exploratory set was made in 7 m at about 300 m offshore. Only one deep-water set was made in 68 m, also in an area new to the skipper. The remaining 17 sets were in water ranging between 19 and 42 m (mean 31.2 m) on previously fished grounds. No Hector's dolphins were observed during any set or haul event, at any depth or fishing location, whether or not pingers were deployed. However, from two to ten animals were seen riding the vessel's bow wave while it was steaming to and from the fishing grounds.

The other vessel first deployed nine acoustic pingers equidistantly on the 1829 m long (by 2 m deep, from sinkers to floats) set net for two sets in 17 and 30 m of water respectively. Two further sets were made with a 2286 m long (by 2 m deep, from sinkers to floats) net, one set deploying 11 pingers on a net set in 38 m of water and the other deploying ten pingers (one was lost) on a net set in 23 m of water. The reported water depths were estimated by the skipper because the echo-sounder was not functioning. Again, no Hector's dolphins were observed during any set or haul event, at any depth or fishing location,

but, similarly to the previous vessel, from one to five animals were observed riding the vessel's bow wave while it steamed to and from the fishing grounds. The third set-net vessel deployed no acoustic pingers on a 1000 m long (by 2 m deep, from sinkers to floats) net set in 42 m of water. The reported set positions and sighting observations were charted from compass bearings taken and timed distances run at known engine revolutions. Once more, no Hector's dolphins were observed during the set or haul, but two to six animals were observed riding the vessel's bow wave as it returned from the fishing grounds.

6.2 PROCESS DISCARDS

Each set net vessel processed fish catch, mainly discarded heads, some frames, and offal, whilst at anchor between sets or during steaming and always away from the deployed nets, thereby negating any risk of 'baiting' seabirds and marine mammals within the net vicinity.

The trawler discarded fish heads and guts while processing. No discharge occurred during shooting or hauling.

6.3 GEAR EVENTS

The set nets were shot straight down, weighted by anchor, and paid overboard from a net roller or over bobbins. The nets were cleaned of fish detritus during each haul with the net worked downwind to effect a near vertical lift which presented minimal net exposure near the surface. There was little or no opportunity for diving seabirds to become entangled if foraging at the submerged net.

The trawler used one bottom trawl with a 28 m spread, 2.2 m headline height, and rubber discs on the groundline. A second bottom trawl with a spread of 35 m and a 1 m headline height had a chain groundline.

There were no gear events observed where delays in setting nets, shooting trawls or hauling from either fishing method may have contributed to the capture of protected species.

6.4 FISHING PRACTICE

Fishing practices observed on all vessels appeared to be mindful of operational risks to protected species and the efforts and attitudes towards appropriate mitigation were clearly evident. However, unsolicited opinions were freely offered to the observers by fishers about the greater risks posed to Hector's dolphins by uncontrolled recreational fishers.

7. Summary

Observer coverage realised only 20 set-net and three trawl days spent fishing over 28 observer sea-days contracted from the total 150 observer days levied for this fishery.

The difficulties were due to late organisation of the observer programme, weather conditions, vessel survey types, communications and variable co-operation from fishers.

No captures of protected species were made during any of the set net or trawl trips observed.

One New Zealand fur seal was seen to take a hapuka from a set net and only one other fur seal was seen basking nearby on a later occasion.

A small pod of Hector's dolphins was seen feeding on fish ahead of a trawl groundline in shoal waters; single animals and small pods of up to eight dolphins were seen to ride bow waves while vessels were steaming to and from the fishing grounds out of the Port of Timaru. The pods came to the vessels about 3 to 4 n.m. from the Port. No Hector's dolphins were seen attending any set-net events.

Observers identified black-backed gulls (68%) as the most abundant seabirds present throughout all trips. Albatross (11%), mostly New Zealand white-capped, included ten royal and three Salvin's. Petrels (20%) comprised Cape pigeons (16% of all seabirds), 30 sooty shearwaters, 17 giant petrels, 12 white-chinned petrels and 11 fleshfooted shearwaters. Three gannets and one blue penguin were also sighted but had no observed interaction with the fishery.

Generally, about 62% of all birds counted were seen at the haul but often few or no birds were present at the beginning of the first set of the day or trawl shot away.

Fish processing discards were made away from the deployed set nets or while those vessels were steaming. The trawler did not discharge fish waste during shooting or hauling operations.

No gear events occurred that were likely to result in the capture of protected species.

Acoustic pingers were deployed on 21 of 24 sets at various spacing combinations, over four net lengths. The fishermen were confident that acoustic pingers were effective in mitigating against the capture of Hector's dolphins.

Photographs were taken by an observer of two Hector's dolphins seen bearing body scars of unknown origin.

Observers noted that all the skippers were very aware of threatened species issues and were well versed in the mitigation techniques recorded. Commercial fishers strongly remarked to observers that greater risks were posed to Hector's dolphins by uncontrolled recreational fishers.

8. Acknowledgements

The CSL Programme acknowledges the effort and commitment shown by the Ministry of Fisheries observers in negotiating access to this fishery with the fishermen. The observers thank the fishermen for their co-operation and interest in this study. The CSL Programme again thanks the Ministry of Fisheries Briefing Officers for consistent support, at all hours; and for their customary professionalism in managing the trips. Mr. Andrew France, Manager of the Observer Programme, kindly contributed definitive comments on the observer coverage provided for this study. We also greatly appreciate the local support offered to the observers by the DOC Akaroa Field Centre staff at Duvauchelles and Mr. Alister Hutt for arranging for the effective transfer of specimens, if required, on a 24-hour basis. The author thanks Mr. Ian West, Science Manager, Marine and Freshwater Research Unit, DOC, Wellington, and Mr. Peter Dawson, CEO, South East Finfish Management Company, Lyttelton, for reviewing the text of this report.

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Appendix 1

SET NET BRIEFING

CSL Briefing: (day/date)	Vessel: (name)	(type) Set net
Trip: (number)	Working: (FMA area)	(code)
Observer: (name)	Targeting: (species)	(code)

Hi,

These notes supplement your TRIP FOLDER: Please check your MFish 'Instructions to Observers' regarding the introductory meeting with Skipper/Company to verify that your requirements relating to the recording and retention of marine mammals and seabirds are understood and passed down to the deck crew. Refer also the specimen identification, handling and carcass recovery instructions in the CSL Briefing Folio.

This briefing is focussed on recording marine mammal and seabird interactions with set net fishing events, incidental bycatch reporting, mitigation efforts and vessel attitudes towards protected species.

1. Set net fishery observations

The principal 'at risk' species in this fishery is Hector's Dolphin (*Cephalorhynchus hectori*) which are occasionally entangled in set nets in inshore waters (e.g. 8 observed captures from 5 sets between 7 and 29 metres deep, two animals entangled in 9 m water were released alive). Anecdotal reports of Yellow-eyed penguins (*Megadyptes antipodes*) and sea turtles (not specified) have not been substantiated but any observed captures are to be recorded and any dead specimens returned as per carcass recovery instructions (NB small sea turtle carcasses are to be forwarded to MoNZ, Te Papa, Wellington). Large dead Leatherback turtles should be photographed, measured (if possible), tissue sample taken (from the flipper), CSL tagged and discarded. Any live entangled specimens are to be released as carefully as possible particularly sea turtles for which handling instructions are described in the CSL Briefing Folio.

2. All CSL data recorded on Set Net CED, NFBC and DOC forms

The Set Net Catch Effort Data form covers each net set as a fishing event and is 'Page' numbered sequentially throughout the trip. Provision is made for recording protected species interactions and sightings occurring during each set. For captured specimens the routine MFish Non-Fish By-catch Form will be completed. Marine mammal observations made during steaming between sets or en route for shelter between fishing days are to be recorded on the DOC Cetacean Sighting Form.

Seabird species, abundance estimates, activity descriptions, and sightings of dyed birds during each fishing event may also be summarised on the Set net form.

NZ Fur seal foraging observations including: number of animals seen, size (L-M-S), general condition (fit/fat/thin/bony/impaired), behavior and/or interactions with set or vessel; plus any tagged fur seals or branded sea lions sighted may also be summarised on the appropriate Set net form.

3. Trip Report

The MFish Trip Report will record the Vessel Data, Fishing Itinerary, Fishing Location Diagram and any Incidents (including pertinent attitudes) relevant to protected species and this fishery.

4. Retention and forwarding of specimens

For after hours access to cold storage liaise with TranzLink Timaru local Manager, Mr Ricky Velstrom, (03) 684 1733, and DOC Area Manager, Mr George Hadler, (03) 693 9994, who will assist with the retention of protected species and transmission of biohazardous specimens to Massey, MoNZ & DOC.

Have a safe trip, Regards, Reg Blezard.

Appendix 2

TRAWL BRIEFING

CSL Briefing: (day/date)	Vessel: (name)	(type) Set net
Trip: (number)	Working: (FMA area)	(code)
Observer: (name)	Targeting: (species)	(code)

Hi,

These notes supplement your TRIP FOLDER: Please check your MFish 'Instructions to Observers' regarding the introductory meeting with Skipper/Company to verify that your requirements relating to the recording and retention of marine mammals and seabirds are understood and passed down to the deck crew. Refer also the specimen identification, handling and carcass recovery instructions in the CSL Briefing Folio.

This briefing is focussed on recording marine mammal (especially Hector's dolphin) and seabird interactions with inshore trawl fishing operations, incidental bycatch reporting, mitigation efforts and vessel attitudes towards protected species.

The priority is to watch each haul to release live animals or retain and return dead specimens for autopsy.

5. Inshore trawl fishery observations

The principal 'at risk' species in this localised fishery is Hector's Dolphin (*Cephalorhynchus hectori*) which are very occasionally taken by trawlers in inshore waters (e.g. one animal recorded dead in 188 observed days during a study in 1997/98 fishing year). Anecdotal reports of Yellow-eyed penguins (*Megadyptes antipodes*) and sea turtles (not specified) have not been substantiated but any observed captures in these waters are to be recorded and any dead specimens returned as per carcass recovery instructions (NB small sea turtle carcasses are to be forwarded to MoNZ, Te Papa, Wellington). Large dead Leatherback turtles should be photographed, measured (if possible), tissue sample taken (from the flipper), CSL tagged and discarded. Any live entangled specimens are to be released as carefully as possible particularly sea turtles for which handling instructions are described in the CSL Briefing Folio.

6. CSL data recorded in Trip Diary and on NFBC and DOC forms

For all captured specimens the routine MFish Non-Fish By-catch Form is to be completed.

Record protected species interactions and sightings in the back of your MFish Trip Diary along with any NZ Fur seal foraging observations including: number of animals seen, size (L-M-S), general condition (fit/fat/thin/bony/impaired), behavior and/or interactions with the vessel; plus any tagged fur seals. Marine mammal observations made during steaming between trawls or en route for shelter between fishing days are to be recorded on the DOC Cetacean Sighting Form. Seabird species, abundance estimates, activity descriptions, are to be recorded after the first daylight haul. Sightings of dyed birds and tagged or branded pinnipeds should include a GPS position.

7. Trip Report

The MFish Trip Report will record the Vessel Data, Fishing Itinerary, Fishing Location Diagram and any Incidents (including pertinent attitudes) relevant to protected species and this fishery.

8. Retention and forwarding of specimens

For after hours access to cold storage liaise with TranzLink Timaru local Manager, Mr Ricky Velstrom, (03) 684 1733, and DOC Area Manager, Mr George Hadler, (03) 693 9994, who will assist with the retention of protected species and transmission of biohazardous specimens to Massey, MoNZ & DOC.

Have a safe trip, Regards, Reg Blezard.

APPENDIX 3: Set Net Catch Effort Data form. (reverse)

Seabird and Marine Mammal Interactions and Abundance

Environmental Conditions

	Wind Direction	Wind Speed	Sea State	Cloud cover	Barometer (mb)	Vessel Speed
Start of set						
End of set						
Start of haul						
End of haul						

Beaufort Scale of Wind Force

Beaufort Number	Descriptive term	Mean wind speed (knots)	Probable wave height * (m)
0	Calm	<1	
1	Light air	1 - 3	0.1 (0.1)
2	Light breeze	4 - 6	0.2 (0.3)
3	Gentle breeze	7 - 10	0.6 (1.0)
4	Moderate breeze	11 - 16	1.0 (1.5)
5	Fresh breeze	17 - 21	2.0 (2.5)
6	Strong breeze	22 - 27	3.0 (4.0)
7	Near gale	28 - 33	4.0 (5.5)
8	Gale	34 - 40	5.5 (7.5)
9	Strong gale	41 - 47	7.0 (10.5)
10	Storm	48 - 55	9.0 (12.5)
11	Violent storm	56 - 63	11.5 (16.0)
12	Hurricane	64 and over	14 (-)

* This table is intended as a rough guide for the open sea. Figures in brackets indicate the probable maximum wave heights. In coastal areas greater heights will be experienced.