Conservation Services Programme
Observer Report: 1 July 2009 to 30 June 2010

Final Report

Kris Ramm
Marine Conservation Services
Department of Conservation
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Abstract

The Department of Conservation (DOC), through the Conservation Services Programme (CSP), has a statutory role to monitor and collect data on the interactions between commercial fisheries and protected species. In order to fulfil this role, Government observers are placed on commercial fishing vessels operating in New Zealand's Exclusive Economic Zone (EEZ). Protected species known to interact with commercial fishing operations include seabirds, marine mammals, marine turtles and protected fish species. Protected corals are landed in some fisheries. The information collected by observers can identify where the most significant interactions are occurring and can inform development and application of strategies to minimise adverse impacts.

This report summarises the observed interactions (mortalities and specimens released alive) between protected species and commercial fishing vessels for the period 1 July 2009 to 30 June 2010. In total, 783 protected seabirds, mammals and fish of approximately 54 taxa were observed interacting with the commercial fishing fleet. Approximately 12 tonnes of coral was also observed bycaught. Interactions are grouped by fishery, fishing method and area. Information is presented at a coarse level to inform where fishing effort, observer coverage and captures occur so that potential gaps in monitoring can be identified along with high risk areas and time periods in various fisheries.

Keywords: commercial fishing, fisheries observers, seabirds, marine mammals, turtles, coral, incidental catch, bycatch, New Zealand EEZ.

1. Introduction

The purpose of the Conservation Services Programme (CSP) is twofold; to understand the nature and extent of interactions between commercial fisheries and protected species (as defined in the Wildlife Act 1953 and the Marine Mammals Protection Act 1978) and to work to develop effective solutions to mitigate adverse effects of commercial fishing on protected species in New Zealand fisheries' waters. The protected species most relevant to CSP are all seabirds (with the exception of the black-backed gull), all marine mammals and reptiles, the white pointer shark and spotted black grouper and certain corals. In July 2010 a number of additions were made to the schedule of protected species including whale shark, manta ray, spine tail devil ray and the giant grouper. In addition, protected corals were redefined to also include all corals in the orders Gorgonacea and Scleractinia, and hydrocorals of the family Stylasteridae[1]. Later, in December of 2010 basking sharks were also added to the schedule of protected species[2]. This report does not include capture details of the new protected fish species, as their protection status occurred after completion of the observer year. However, for completeness, all coral bycatch (including those taxa which only received protected status in July 2010) has been included in this report as observers were already specifically tasked to quantify this bycatch and CSP identification project was in place at the time.

One of the tools to achieve this goal is the placement of government observers onboard commercial fishing vessels operating within the New Zealand Exclusive Economic Zone (EEZ) in order to monitor interactions with protected species[3]. The observers collect both quantitative and qualitative information on interactions, both of which can and have been used to identify key areas of importance. The observations can also help in the development and assessment of mitigation strategies aimed at reducing the impact of commercial fisheries on protected species.

The observer coverage presented in this report extends work conducted in previous years (e.g. Rowe 2009, 2010, Ramm 2011). The specific objectives of the project were to:

- Identify, describe and, where possible, quantify protected species interactions with commercial fisheries;
- Identify, describe and, where possible, quantify measures for mitigating protected species interactions;
- Collect other relevant information on protected species interactions that will assist in assessing, developing and improving mitigation measures.

Levels of observer coverage in the offshore fisheries have remained relatively stable over recent observer years, with CSP continuing to contract a portion of observer time from the Ministry of Fisheries (MFish) Observer Programme. The scale of the MFish Observer

[1] Wildlife Order 2010 (SR 2010/159) available at www.legislation.govt.nz/regulation/public/2010/0159/latest/DLM3012938.html?search=ts_act_wildlife_resel&p=1

[2] Wildlife (Basking Shark) Order 2010 (SR 2010/411) available at: http://www.legislation.govt.nz/regulation/public/2010/0411/latest/DLM3347006.html?search=ts_act_wildlife_resel&p=1

[3] INT2008/01-Monitoring protected species interactions with New Zealand Fisheries. Further details can be found in the Conservation Services Annual Plan 2009/10 www.doc.govt.nz/mcs

Programme allows observers to be placed more strategically, cost effectively and for protected species monitoring to be widely spread throughout the fishing fleet.

Coverage in the offshore fleet has remained at relatively high levels, ranging between 20-40% due to the combining of MFish and DOC research priorities. Additional to standard observations (see Section 2), specific offal management trials were conducted on a number of vessels to assess the way in which batching practices affect bird behaviour.

Legislated mitigation measures are now in place for all surface longliners, all bottom longliners over 7m in length and all trawlers over 28m. Additional to this in the deepwater fleet is the ongoing implementation and training in Vessel Management Plans (VMP)[4] and Marine Mammal Operating Procedures (MMOP)[5] by the DeepWater Group Limited. These 'best practice' guides (VMPs being vessel specific) set out procedures for mitigating against incidental captures of both seabirds and marine mammals. While adherence to these guidelines is not recorded for CSP purposes (but is via audit forms for MFish), observers do make notes on vessel practice related to these guidelines. Observer comments indicated an increasing awareness amongst crews of environmental interaction issues and techniques for avoiding such incidents.

CSP continues to investigate alternative methods of monitoring for protected species interactions, including trial of electronic monitoring via camera systems in a range of fisheries in order to increase coverage and cost effectiveness of bycatch research.

During the 2009/10 line-sinkrate trials were conducted on a series of inshore demersal longliners north of Auckland, primarily those vessels targeting snapper. These trials were conducted in conjunction with an investigation of mitigation methods currently in use in the inshore demersal longline fishery (Goad, 2010). The results of this work highlighted a number of potential methods of increasing line sink rates in order to reduce bait availability to seabirds during setting of gear. This work is being extended into a second year, expanding on the range of vessels and gear types involved.

This report details protected species interactions by fishery, method and area for the period 1 July 2009 to 30 June 2010 in relation to observer effort and commercial fishing effort. Information is presented at a coarse level to describe where fishing effort, observer coverage and captures occur. This data forms the basis of further analytical assessments of protected species interactions are undertaken through other projects[6]. It also enables potential gaps in monitoring to be identified along with high risk areas and time periods in various fisheries. This report attempts to provide ancillary information regarding the nature of interactions; however this information should be treated with care. For example, in this report interactions are broken down into broad categories such as 'net captures' and 'warp strikes'. As these

[4] Developed by the DeepWater Group Limited: Vessel Management Plan (VMP)- Deepwater Factory Trawler over 28m. Available at www.fishinfo.co.nz/Docs/VMP%20v4.0%20.pdf

[5] Developed by the DeepWater Group Limited: Marine Mammal Operating Procedures (MMOP)- Mitigating Incidental Captures of Marine Mammals. Available at www.deepwater.co.nz/f1275,60596/60596_MM_OP_2008-09_v6.pdf

[6] Projects include estimation of total protected species captures, risk assessments, species prioritisation and other modelling projects undertaken by the Department of Conservation or Ministry of Fisheries.

categories possess different characteristics such as varying levels of associated cryptic mortality caution and some knowledge must be applied when comparing them.

It should be noted that the purse seine fishery was not included in CSP observer coverage in 2009/10 and is not reported here, due to low levels of historic observed protected species interactions. With the protection of certain rays in July 2010 this will be reassessed in future years. Inshore fisheries other than by trawl, setnet or longline methods continued to have no CSP observer coverage and are not reported here.

Key data collected by observers during this project is processed and housed by the Ministry of Fisheries Research Data and Reporting group. Observer comments are summarised to provide information on mitigation, protected species behaviour and fishing practices (e.g. offal management). It is important to note that observers may not comment on all aspects of fishing operations and individual observers comment to varying extent on particular aspects of fishing. In addition, observers have varying levels of experience. As such, comments are included to provide context but are not a complete reflection of fishing operations on neither individual vessels nor the fleet.

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2. Data collection

To date, the bulk of publicly available and verified information on at-sea interactions between fishing vessels and protected species in New Zealand waters has been collected by Government observers.

The duties of an observer in respect of the Conservation Services Programme can be summarised as:

- Recording, photographing, tagging all protected species bycatch;
- Recovering and retaining dead specimens for autopsy and / or identification;
- Recording any other interactions of protected species with fishing operations;
- Reporting on the efforts made to mitigate the impacts of commercial fishing on protected species;
- Recording at least on a daily basis the numbers, and the behaviour of, marine mammal and seabird species seen around the fishing vessel;
- Carrying out other tasks (e.g. making observations on discard and offal discharge, net capture observations) as required.

It is important to note that observer programmes typically have high spatial and temporal variation, as well as multiple priorities for information collection, which can make the data challenging to interpret and extrapolate estimates of total interaction rates by fishery, location, or other desired variables (no such analyses are reported here). Data accuracy and relevance can be affected by inter-observer variability, weather conditions and access to vessels, while precision is affected by the observer sampling design. The representativeness of data may also be biased by the opportunistic allocation of observers to vessels, as it is not always possible to place observers on vessels randomly. Nevertheless, the use of independent fisheries observers is currently considered to be the most reliable and flexible means of acquiring data on protected species interactions with fisheries.

Identification of coral taxa has been confirmed on land as part of project INT 2008/02 (Identification of protected corals). Summaries of coral bycatch have been included in each relevant section. Coral identifications have been grouped to coarse taxonomic levels to allow fisheries to be compared more easily. Finer level analysis of coral bycatch is available in the report of project INT2009/03 by Tracy and Sanders (2011).

For the majority of seabird mortalities; species identification has been confirmed through examination on land as part of project INT 2007/02 (Identification of seabirds captured in New Zealand fisheries). Results from the 2008/09 fishing year are summarised in Thompson (2010) and unpublished results were used to provide confirmed species identifications for the 2009/10 fishing year. For live captures or dead seabirds that could not be recovered independent examination of any photographs has also been undertaken (as part of project INT2009/02) in order to confirm the identification or to narrow it to a lower taxonomic level, and these determinations have been used in this report where available.

3. Format

The remainder of this document follows Rowe (2010) and Ramm (2011) and is divided into separate 'fisheries' where certain target species are grouped according to fishing method. For each 'fishery' an overall summary of commercial effort, observer effort and protected species bycatch is provided by Fisheries Management Area (see Figure 1). Protected species interactions and observer effort are then broken down further for each target stock by area and month in order to view interactions and observer effort temporally and spatially. Observer comments relating to offal management and protected species behaviour are provided per observed vessel in each 'fishery'.

A summary of protected species interactions by 'fishery' and by Fisheries Management Area are provided in Appendices 1 and 2, respectively. Common names for protected species and fish species are used throughout this report. Scientific names of protected species mentioned in this report are provided in Appendix 3.

4. Definitions

MCS (Marine Conservation Services): The team within DOC which is responsible for administering the Conservation Services Programme. Further information is available at www.doc.govt.nz/mcs

Capture: An interaction where a protected species is caught by fishing gear (e.g. hooked, caught in a net, struck by trawl warps).

Interaction: All interactions with fishing activity including captures by fishing gear, impacts against the vessel and it's structures (i.e. deck strikes) and other non-fishing gear events (e.g. landing on vessel, marine mammals climbing up the stern ramp).

Deck Strike: Defined as being when an animal collides with the vessel or it's superstructure and is unable to leave the vessel of it's own accord (either through injury or disorientation). Seabirds which land on vessels and then fly away are not included in this category. Denoted in subsequent tables as 'Impact against vessel'.

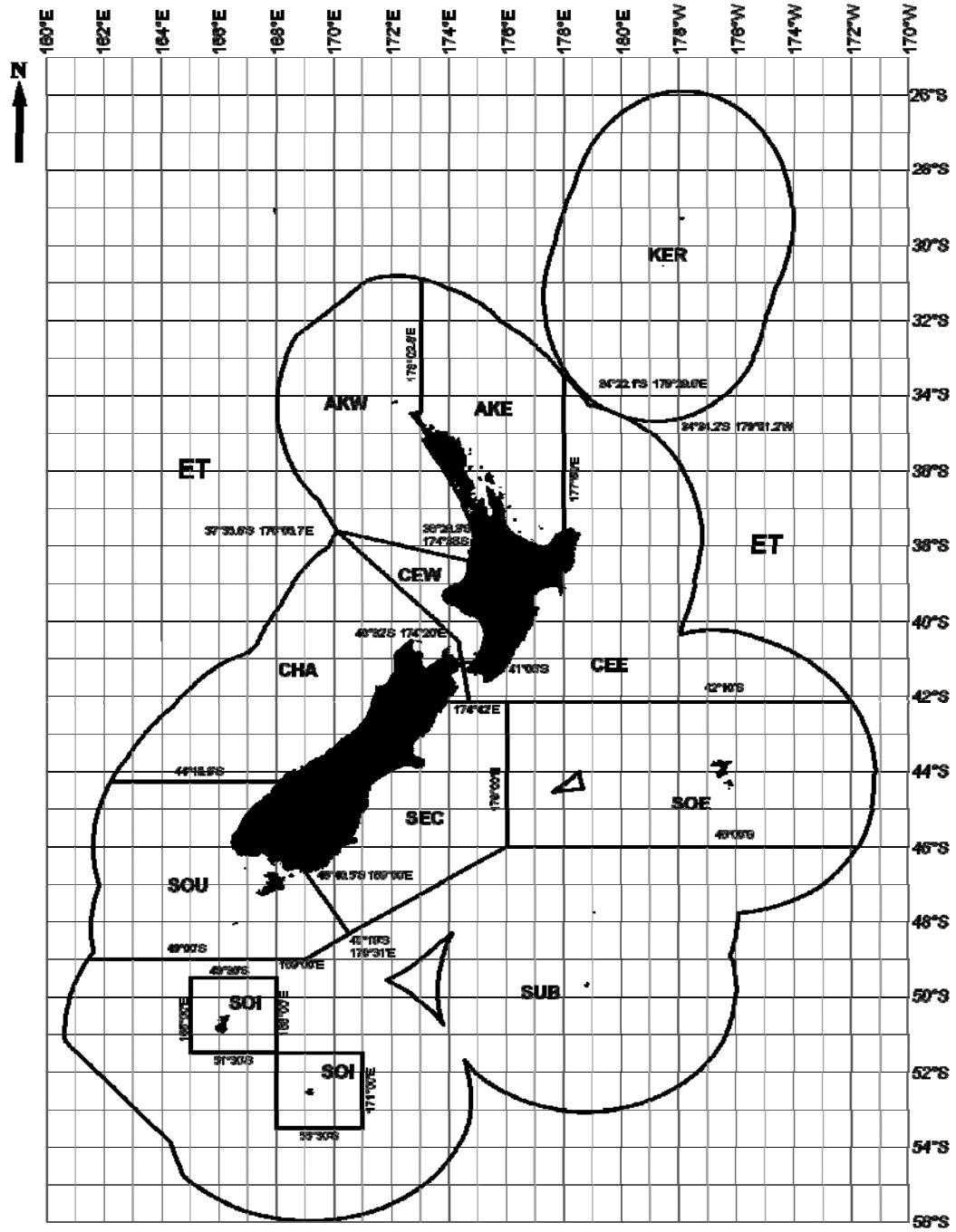
FMA (Fisheries Management Area): The entire New Zealand EEZ is divided into 10 FMA's for the purpose of administration by the MFish.

Squid 6T: The squid Quota Management Area (QMA) around Auckland and Campbell Island groups in FMA SOI (see Figure 1).

Observer Trip: A designation given by the Observer Programme, generally meaning a continuous period an observer (or pair of observers) spends with one vessel. A single observer trip can span a number of voyages undertaken by a particular vessel. There may also be more than one observed trip within the observer year for some vessels.

Observer Non-fish Bycatch Form: Filled out by the observer whenever an interaction takes place between a protected species and a fishing vessel. This is distinct form the 'Protected Species By-Catch Form' which commercial fishers are required by law to fill out upon capture of any protected species.

Figure 1: New Zealand Fisheries Management Areas (source: Ministry of Fisheries)



Key:

AKE	FMA 1	East North Island from North Cape to Bay of Plenty
CEE	FMA 2	East North Island from south of Bay of Plenty to Wellington
SEC	FMA 3	East coast South Island from Pegasus Bay to Catlins
SOE	FMA 4	Chatham Rise
SOU	FMA 5	South Island from Foveaux Strait to Fiordland
SUB	FMA 6	Subantarctic including Bounty Island and Pukaki Rise
SOI	FMA6A	Southern offshore islands – Auckland and Campbell Islands
CHA	FMA 7	West Coast South Island to Fiordland including Kaikoura
CEW	FMA 8	West North Island from South Taranaki Bight to Wellington
AKW	FMA 9	West North Island from North Cape to North Taranaki Bight
KER	FMA 10	Kermadec
ET		Outside NZ EEZ

5. Protected species interactions

5.1 Middle Depth Trawl Fisheries

5.1.1 Hoki, hake, ling and warehou species

The observer coverage in fisheries targeting the middle depth stocks hoki, hake, ling and warehou species are discussed together here. These fisheries are subject to the greatest combined observer coverage and are comparable in terms of their fishing practices and / or areas. The fisheries discussed separately in the middle depth trawl fisheries section can be distinguished either by being spatially and temporally separate (e.g. southern blue whiting, jack mackerel and squid) or by having distinctly different practices, such as lower headline double or triple trawl nets (scampi), or different protected species interactions.

The hoki, hake, ling, warehou fishery can be broadly separated into two temporal categories; 'hoki season' and 'out of hoki season'. 'Hoki season' tends to span the months of June to September and effort can be generalised as focusing on the FMAs CHA and CEE; specifically the West Coast of the South Island around the Hokitika Canyon for the larger vessel fleet and the Cook Strait (CHA/CEE boundary) for smaller vessels (under 46m). The predominant target during this time is hoki however hake is also a significant target on the West Coast. 'Out of hoki season' spans the rest of the year with hoki, hake, ling and warehou targeted largely in SEC, SUB, SOE and to a lesser extent SOU.

Mitigation in this 'fishery' involves a combination of industry implemented as well as Government regulated measures. All trawlers over 28m are required by law to carry and deploy approved bird scaring devices[7]. Supplementary to this, industry Operational Procedures are also in place such as MMOPs and VMPs which set out guidelines in terms of best use of mandatory seabird scaring devices (paired tori lines, bird bafflers or warp scarers), offal management and guidelines for reducing mammal bycatch.

Table 1 presents a summary of commercial fishing effort, observer effort and protected species captures in this fishery. As in previous years the fishing effort was predominantly in six FMAs. Over these six FMAs, fishing effort was similar to the previous year, coverage rates however were higher. Capture rates for seabirds increased over the previous year, while capture rates for mammals reduced. As in previous years, mammal captures (NZ fur seals) predominantly resulted from the Cook Strait hoki fishery occurring at the CHA/CEE boundary. Coral bycatch were generally low as would be expected with this fishery as it has limited contact with the seabed.

[7] See Fisheries (Seabird Sustainability Measures – Trawl Vessels 28m+) Notice 2008 (F432) available at http://www.fish.govt.nz/NR/rdonlyres/2451AFE8-ED82-4920-9EC5-A0AD4F5C0DDE/0/F432new.pdf

Table 1: Summary of commercial effort, observer effort and protected species captures in the hoki, hake, ling and warehou middle depth trawl fisheries during the 2009/10 observer year.

FMA	Effort Tows	Observed Tows	Coverage (%)	Seabird Captures*	Seabirds per 100 tows	Mammal Captures	Mammals per 100 tows	Coral Catch (kg)	Coral Catch per 100 tows (kg)
1. AKE	14	3	21.43	0	0.00	0	0.00	0	0.00
2. CEE	1300	276	21.23	4	1.45	16	5.80	2	0.72
3. SEC	3747	627	16.73	58	9.25	13	2.07	33.4	5.33
4. SOE	1630	129	7.91	5	3.88	0	0.00	0	7.36
5. SOU	1521	449	29.52	13	2.90	4	0.89	9.5	1.14
6. SUB	779	498	63.93	11	2.21	7	1.41	5.1	0.26
7. CHA	3035	699	23.03	12	1.72	20	2.86	1.3	0.19
8. CEW	1	0	0.00	-	-	-	-	-	-
9. AKW	37	0	0.00	-	-	-	-	-	-
10. KER	0	0	-	-	-	-	-	-	-
Total	12,064	2,681	22.22	103	3.84	60	2.24	51.30	1.91

*Captures only, excludes deck strikes and other non-fishing interactions.

Observer Coverage

Sixty two trips were conducted on 37 different vessels in this fishery during the 2009/10 observer year. Protected species interactions were recorded from 38 trips on 22 vessels. Comments relating to offal management, mitigation device (e.g. "seabird scarers") use and other information regarding protected species captures are detailed in Table A6.1.

Table 2 describes the distribution of observer effort throughout the year. As with previous years, observer coverage was highest during the June and July period which represents the Cook Strait hoki fishery. Observer coverage occurred in all months and in all but two of the FMAs where fishing was conducted. Coverage during the January and February period was higher than the previous year (Ramm 2011) due to more observers being available at this time.

Table 2: Number of tows observed in the hoki, hake, ling and warehou middle depth trawl fishery by month during the 2009/10 observer year.

FMA	Jul-09	Aug-09	Sep-09	Oct-09	Nov-09	Dec-09	Jan-10	Feb-10	Mar-10	Apr-10	May-10	Jun-10	Total
1. AKE	0	0	0	2	1	0	0	0	0	0	0	0	3
2. CEE	97	40	0	0	0	2	33	48	22	0	0	34	276
3. SEC	0	0	43	139	37	139	90	8	50	5	94	22	627
4. SOE	0	0	0	63	11	0	0	0	1	0	52	2	129
5. SOU	26	0	33	144	48	25	21	24	21	2	63	42	449
6. SUB	0	12	44	126	12	52	54	49	74	19	17	39	498
7. CHA	427	128	118	8	0	0	2	2	1	0	0	13	699
8. CEW	0	0	0	0	0	0	0	0	0	0	0	0	0
9. AKW	0	0	0	1	0	0	0	0	0	0	0	0	1
10. KER	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	550	180	238	483	109	218	200	131	169	26	226	152	2,682

As in previous years (Ramm 2011, Rowe 2010, 2009) hoki target tows accounted for the majority of tows observed in this fishery, followed by hake target tows.

Table 3: Number of tows observed in the hake, hoki, ling, and warehou middle depth trawl fishery during the 2009/10 observer year.

Target	1. AKE	2. CEE	3. SEC	4. SOE	5. SOU	6. SUB	7. CHA	9. AKW	Total
Hake	0	0	13	0	37	152	204	0	**406**
Hoki	3	276	566	129	190	252	489	1	**1,906**
Ling	0	0	5	0	66	83	0	0	**154**
Silver Warehou	0	0	42	0	48	0	5	0	**95**
Common Warehou	0	0	1	0	2	0	1	0	**4**
White Warehou	0	0	0	0	106	11	0	0	**117**
Total	**3**	**276**	**627**	**129**	**449**	**498**	**699**	**1**	**2,682**

Protected species interactions

In line with 2008/09 (Ramm 2010), New Zealand fur seals were the most common protected species to interact with this fishery, though the number of interactions reduced to 59 from 74 during the 2008/09 observer year. As in the 2008/09 observer year the majority of NZ fur seal interactions resulted in mortalities (84%).

Of the 163 protected species interactions, 37 (34 seabirds and three NZ fur seals) occurred on one trip on one vessel. These particular interactions most frequently involved Salvin's albatross and white-capped albatross, with 13 interactions for each species being recorded during one trip. Observer comments relating to these captures point to delays in hauling the trawl headine and ground rope onto the deck resulting in birds being caught around the mouth of the net. The observer commented that around 90% of captures occurred at this time.

Table 4: Protected species interactions in the hake, hoki, ling and warehou middle depth trawl fishery during the 2009/10 observer year.

Species	Alive	Dead	Decomposing	Unknown	Total
Seabirds					
Albatross (Unidentified)	2				2
Smaller Albatross (Unidentified)		1			1
Buller's albatross		4			4
New Zealand white capped albatross	3	6			9
Northern royal albatross		1			1
Salvin's albatross	13	6			19
Petrel (Unidentified)	1				1
Cape petrels (Unidentified)	4	2			6
Storm petrels (Unidentified)	4				4
Black-bellied storm petrel	1				1
Common diving petrel	1				1
Fairy prion	1				1
Grey-backed storm petrel	2				2
Sooty shearwater	3	25			28
Southern cape petrel		2			2
Westland petrel	2				2
White-chinned petrel	7	12			19
Total seabirds	44	59	0	0	103
Mammals					
New Zealand fur seal	9	48	1	1	59
Seals		1			1
Total mammals	9	49	1	1	60
Total protected species interactions	53	108	1	1	163

The nature of protected species interaction as reported on the 'Observer Non-fish Bycatch Form' is detailed in Table 5. Net captures remain the most common form of interaction in this fishery for all interactions and resulting in both live releases and mortalities. This is in line with the previous two observer years (Ramm 2011, Rowe 2010).

Table 5: Method of interaction for a) protected species released alive and b) dead protected species observed in the hake, hoki, ling and warehou middle depth trawl fishery

a) Released alive

Species	Caught in net*	Impact against vessel	Other	Unknown	Total	Comments Relating to 'Other' capture method
Birds						
Albatross (Unidentified)	2				**2**	
New Zealand white capped albatross	2		1		**3**	No comments made
Salvin's albatross	12		1		**13**	No comments made
Petrel (Unidentified)	1				**1**	
Cape petrels (Unidentified)		3		1	**4**	
Storm petrels (Unidentified)	3	1			**4**	
Black-bellied storm petrel				1	**1**	
Common diving petrel		1			**1**	
Fairy prion		1			**1**	
Grey-backed storm petrel		2			**2**	
Sooty shearwater	3				**3**	
Westland petrel	1	1			**2**	
White-chinned petrel	7				**7**	
Total Birds	**31**	**9**	**2**	**2**	44	
Mammals						
New Zealand fur seal	8		1		**9**	No comments made
Total Mammals	**8**		**1**		**9**	
Total	**39**	**9**	**3**	**2**	**53**	

**included as captures in table 1*

b) Dead protected species

Common name	Caught in net*	Caught on warp or door*	Impact against vessel	Other	Total	Comments Relating to 'Other' capture method
Birds						
Smaller Albatross (Unidentified)		1			**1**	
Buller's albatross	2	2			**4**	
New Zealand white capped albatross	2	4			**6**	
Northern royal albatross			1		**1**	
Salvin's albatross	4	1		1	**6**	No comments made
Cape petrels (Unidentified)	1			1	**2**	No comments made
Sooty shearwater	25				**25**	
Southern cape petrel	1	1			**2**	
White-chinned petrel	12				**12**	
Total Birds	**47**	**9**	**1**	**2**	**59**	
Mammals						
New Zealand fur seal	48				**48**	
Seals	1				**1**	
Total Mammals	**49**	**0**	**0**	**0**	**49**	
Total	**95**	**9**	**1**	**2**	**107**	

**included as captures in table 1*

Interactions by target species are detailed in Table 6. The greatest number of interactions was recorded for tows targeting hoki; however this was also the most commonly observed target species. Proportionately all target species had similar numbers of interactions attributed to them.

Table 6: Protected species interactions by target species in the hake, hoki, ling and warehou middle depth trawl fishery during 2009/10.

Species	Hake	Hoki	Ling	Silver warehou	White Warehou	Total
Seabirds						
Albatross (Unidentified)		1			1	2
Smaller Albatross (Unidentified)		1				1
Buller's albatross		4				4
New Zealand white capped albatross	1	8				9
Northern royal albatross		1				1
Salvin's albatross		15		3	1	19
Petrel (Unidentified)		1				1
Cape petrels (Unidentified)		5	1			6
Storm petrels (Unidentified)		3		1		4
Black-bellied storm petrel		1				1
Common diving petrel		1				1
Fairy prion		1				1
Grey-backed storm petrel		2				2
Sooty shearwater		23	2	2	1	28
Southern cape petrel		2				2
Westland petrel	1	1				2
White-chinned petrel		8	1	10		19
Total seabirds	2	78	4	16	3	103
Mammals						
Seals (Unidentified)					1	1
New Zealand fur seal	6	49	3		1	59
Total mammals	6	49	3	0	2	60
Total protected species interactions	**8**	**127**	**7**	**16**	**5**	**163**

Table 7 shows the number of seabird interactions in the hake, hoki, ling and warehou fishery reported by FMA and by month. Seabird interactions were highest during the month of October; this can be largely attributed to the single vessel noted above.

Table 7: Seabird interactions in the hake, hoki, ling and warehou middle depth trawls fishery during the 2009/10 observer year. Note: a zero indicates that no interactions were observed, a dash indicates that there was no observer coverage during that month in that FMA.

FMA	Jul-09	Aug-09	Sep-09	Oct-09	Nov-09	Dec-09	Jan-10	Feb-10	Mar-10	Apr-10	May-10	Jun-10	Total
1. AKE	-	-	-	0	0	-	-	-	-	-	-	-	0
2. CEE	1	0	-	-	-	0	1	1	1	-	-	0	4
3. SEC	-	-	0	47	4	1	0	0	2	0	3	1	58
4. SOE	-	-	-	3	1	-	-	-	0	-	1	0	5
5. SOU	1	-	0	5	2	1	0	2	0	0	2	0	13
6. SUB	-	0	0	5	0	0	0	2	3	0	1	0	11
7. CHA	11	1	0	0	-	-	0	0	0	-	-	0	12
8. CEW	-	-	-	-	-	-	-	-	-	-	-	-	0
9. AKW	-	-	-	0	-	-	-	-	-	-	-	-	0
10. KER	-	-	-	-	-	-	-	-	-	-	-	-	0
Total	13	1	0	60	7	2	1	5	6	0	7	1	103

Table 8 describes the number of marine mammal interactions in the hake, hoki, ling and warehou fishery reported by FMA and by month. As in previous observer years (Ramm 2011, Rowe 2010, 2009) the majority of marine mammals (and in particular NZ fur seal) captures occur during the 'hoki season' and in particular in the Cook Strait hoki fishery, where a large number of tows are conducted during a temporally short and spatially distinct period.

Table 8: Mammal interactions in the hake, hoki, ling and warehou middle depth trawls fishery during the 2009/10 observer year. Note: a zero indicates that no interactions were observed, a dash indicates that there was no observer coverage during that month in that FMA.

FMA	Jul-09	Aug-09	Sep-09	Oct-09	Nov-09	Dec-09	Jan-10	Feb-10	Mar-10	Apr-10	May-10	Jun-10	Total
1. AKE	-	-	-	0	0	-	-	-	-	-	-	-	0
2. CEE	8	6	-	-	-	0	0	0	0	-	-	2	16
3. SEC	-	-	2	5	1	2	0	0	0	0	3	0	13
4. SOE	-	-	-	0	0	-	-	-	0	-	0	0	0
5. SOU	1	-	1	2	0	0	0	0	0	0	0	0	4
6. SUB	-	0	1	3	0	0	1	1	0	0	0	1	7
7. CHA	12	6	1	0	-	-	0	0	0	-	-	1	20
8. CEW	-	-	-	-	-	-	-	-	-	-	-	-	0
9. AKW	-	-	-	0	-	-	-	-	-	-	-	-	0
10. KER	-	-	-	-	-	-	-	-	-	-	-	-	0
Total	21	12	5	10	1	2	1	1	0	0	3	4	60

Table 9 gives a breakdown of coral catch by broad taxonomic grouping and area in the hake, hoki, ling and warehou fishery. Stony cup corals were the most commonly caught in this fishery. Most coral bycatch occurred in SEC however this catch was not limited to an individual vessel or trip.

Table 9: Coral bycatch in kilograms per FMA in the hake, hoki, ling warehou fishery during the 2009/10 observer year. Note: a zero indicates that no bycatch was observed, a dash indicates that there was no observer coverage in that FMA.

Protected Corals	1.AKE	2.CEE	3.SEC	4.SOE	5.SOU	6.SUB	7.CHA	8.CEW	9.AKW	Total (kg)
Coral (Unidentified)	0	0	1.1	0	0.5	2.2	0	-	-	3.8
Scleractinia (Stony corals)	0	0	1.2	0	0	0	0	-	-	1.2
Stony corals-Cup	0	0	25	0	6	0.5	1.1	-	-	32.6
Stony corals-Branching	0	2	1	0	2.6	0	0	-	-	5.6
Black corals	0	0	0	0	0.1	0	0	-	-	0.1
Gorgonian coral	0	0	0.1	0	0.1	2.2	0	-	-	2.4
Bamboo Corals	0	0	0	0	0	0	0.2	-	-	0.2
Golden corals	0	0	0	0	0.1	0	0	-	-	0.1
Sea fans	0	0	0	0	0.1	0.1	0	-	-	0.2
Hydrocorals	0	0	0	0	0	0.1	0	-	-	0.1
Feathery hydroids	0	0	5	0	0	0	0	-	-	5
Total	0	2	33.4	0	9.5	5.1	1.3	0	0	51.3

5.1.2 Southern Blue Whiting

The southern blue whiting fishery tends to operate both temporally and spatially discretely from other trawl fisheries, occurring mostly in the months of August and September in area SUB. Being over 28m in length, all vessels in this fishery are mandatorily required to use seabird mitigation devices and also to adhere to industry Operational Procedures.

Table 10 outlines commercial fishing effort, observer effort and protected species captures. More tows were conducted than in previous years while less observer coverage was achieved resulting in the lowest rate of coverage in recent years (Ramm 2010, Rowe 2010, 2009).

As reported in previous years, low levels of seabird bycatch were reported by observers in this fishery with only one seabird being reported captured. Mammal captures were lower than the previous year (Ramm 2011) however the capture rate is still higher than the other middle depth fisheries.

Due to the nature of this fishery and the gear having limited contact with the seabed, observed coral bycatch tends to be negligible. A single piece of gorgonian coral was reported by observers to be caught during 2009/10.

Table 10: Summary of commercial effort, observer effort and protected species captures in the southern blue whiting fishery during the 2007/08 observer year.

FMA	Effort Tows	Observed Tows	Coverage (%)	Seabird Captures*	Seabirds per 100 tows	Mammal Captures	Mammals per 100 tows	Coral Catch (kg)	Coral Catch per 100 tows (kg)
1. AKE	0	0	-	-	-	-	-	-	-
2. CEE	0	0	-	-	-	-	-	-	-
3. SEC	0	0	-	-	-	-	-	-	-
4. SOE	4	1	25.00	0	0.00	0	0.00	0	0.00
5. SOU	0	0	-	-	-	-	-	-	-
6. SUB	1,195	290	24.27	1	0.34	17	5.86	1	0.34
7. CHA	0	0	-	-	-	-	-	-	-
8. CEW	2	0	0.00	-	-	-	-	-	-
9. AKW	0	0	-	-	-	-	-	-	-
10. KER	0	0	-	-	-	-	-	-	-
Total	**1,201**	**291**	**24.23**	**1**	**0.34**	**17**	**5.84**	**1.00**	**0.34**

*Captures only, excludes deck strikes and other non-fishing interactions

Observer coverage

A total of six trips on five vessels were observed during 2009/10 in the southern blue whiting fishery. Protected species captures were reported on three vessels. Comments relating to offal management, mitigation use and other information surrounding protected species captures are detailed in Table A6.2. As with previous years, this fishery is spatially and temporally distinct with all observed tows being conducted during a two month period (Table 11).

Table 11: Number of Observed tows in the southern blue whiting fishery by area and month during 2009/10.

FMA	Jul-09	Aug-09	Sep-09	Oct-09	Nov-09	Dec-09	Jan-10	Feb-10	Mar-10	Apr-10	May-10	Jun-10	Total
1. AKE	0	0	0	0	0	0	0	0	0	0	0	0	0
2. CEE	0	0	0	0	0	0	0	0	0	0	0	0	0
3. SEC	0	0	0	0	0	0	0	0	0	0	0	0	0
4. SOE	0	1	0	0	0	0	0	0	0	0	0	0	1
5. SOU	0	0	0	0	0	0	0	0	0	0	0	0	0
6. SUB	0	159	131	0	0	0	0	0	0	0	0	0	290
7. CHA	0	0	0	0	0	0	0	0	0	0	0	0	0
8. CEW	0	0	0	0	0	0	0	0	0	0	0	0	0
9. AKW	0	0	0	0	0	0	0	0	0	0	0	0	0
10. KER	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	160	131	0	0	0	0	0	0	0	0	0	291

Protected species interactions

A breakdown of the protected species involved in interactions in this fishery is given in Table 11.

Over all the number of interactions with protected species reduced compared to previous years, with no NZ sea lions captures observed, compared to two in the previous year.

However, of the 18 protected species interactions which were reported in the southern blue whiting fishery, 13 where from one vessel, and 12 of the 17 fur seal captures occurred on this vessel. Observer comments from this trip indicate that offal was regularly discharged whenever the meal-plant became overwhelmed; the observer also commented that while NZ fur seals were present, it generally was only in modest numbers.

Table 12: Protected species interactions in the southern blue whiting fishery during the 2009/10 observer year.

Species	Alive	Dead	Total
Seabirds			
Salvin's albatross	1		1
Total seabirds	1	0	1
Mammals			
New Zealand fur seal		17	17
Total mammals	0	17	17
Total protected species interactions	1	17	18

Net captures formed the majority of interactions with protected species in the southern blue whiting fishery (Table 13). The single seabird interaction had no observer comments associated with it.

Table 13: Method of capture for protected species interactions in the southern blue whiting fishery during the 2009/10 observer year

Species	Caught in net*	Other	Total
Seabirds			
Salvin's albatross		1	1
Total seabirds	0	1	1
Mammals			
New Zealand fur seal	17		17
Total mammals	17	0	17
Total protected species interactions	17	1	18

*Included as 'capture' in Table 10

Table 14 details the protected species interactions broken down by month. Fourteen of the NZ fur seal interactions took place during a single five day period in August 2009.

Table 14: Protected species interactions in the southern blue whiting fishery by species and month during the 2009/10 observer year.

Species	Aug-09	Sep-09	Total
Seabirds			
Salvin's albatross	1	0	1
Total seabirds	1	0	1
Mammals			
New Zealand fur seal	17	0	17
Total mammals	17	0	17
Total	18	0	18

Table 15 shows the observer determined sex of the fur seals captured. The majority of the animals captured were determined to be male; this is in line with previous observer years (Ramm 2011).

Table 15: Observer determined sex of captured pinnipeds in the southern blue whiting fishery during the 2009/10 observer year.

Sex	New Zealand fur seal	Total
Male	12	12
Female	5	5
Total	17	17

5.1.3 Scampi

Observations in the scampi fishery are undertaken to monitor interactions with seabirds and New Zealand sea lions. Historically, captures of seabirds have been recorded in this fishery in most areas, along with captures of New Zealand sea lions in SUB. Observer coverage in the scampi fishery increased from six percent in 2008/09 to nine percent in 2009/10. While commercial fishing effort remained at similar levels observer coverage increased (Ramm 2011).

Table 16 outlines commercial fishing effort, observer effort and protected species captures. In 2009/10 there were no observed marine mammal captures; this is the first time since observing began in this fishery. However, seabird interactions were higher than previous years, with a capture rate that was more than double that of the previous year. The majority of seabird interactions were recorded in the SOE area. SOE was also the only area where coral was observed to have been caught.

Table: 16: Summary of commercial effort, observer effort and protected species captures in the scampi middle depth trawl fishery during the 2009/10 observer year.

FMA	Effort Tows	Observed Tows	Coverage (%)	Seabird Captures*	Seabirds per 100 tows	Mammal Captures	Mammals per 100 tows	Coral Catch (kg)	Coral Catch per 100 tows (kg)
1. AKE	899	123	13.68	3	2.44	0	0.00	0	0.00
2. CEE	717	1	0.14	0	0.00	0	0.00	0	0.00
3. SEC	3	0	0.00	-	-	-	-	-	-
4. SOE	1224	160	13.07	15	9.38	0	0.00	56.9	35.56
5. SOU	0	0	-	-	-	-	-	-	-
6. SUB	1182	92	7.78	2	2.17	0	0.00	0	0.00
7. CHA	0	0	-	-	-	-	-	-	-
8. CEW	0	0	-	-	-	-	-	-	-
9. AKW	0	0	-	-	-	-	-	-	-
10. KER	0	0	-	-	-	-	-	-	-
Total	4,025	376	9.34	20	5.32	0	0.00	56.90	15.13

*Captures only, excludes deck strikes and other non-fishing interactions

Observer Coverage

During the 2009/10 observer year six observer trips were conducted on five vessels. Protected species captures were recorded from three of these vessels. Comments relating to offal management, mitigation use and other information surrounding protected species captures are detailed in Table A6.3. All observed vessels employed tori lines as mitigation devices, only one of these vessels was above the 32 meter limit requiring the use of seabird scaring devices.

Seabird abundance was observed to peak during periods of hauling, offal discharge and discarding of fish bycatch. This is particularly apparent in the scampi fishery due to the relatively large proportion of bycatch per tow.

Observer coverage of the scampi fishery coverage peaked at two separate times during the 2009/10 observer year (Table 17). Observer coverage was more spatially representative than in

the previous year (Ramm 2011), with the largest increase in coverage being in SOE which is also the area of the greatest fishing effort.

Table 17: Number of tows observed in the scampi trawl fishery by area and month during the 2009/10 observer year

FMA	Jul-09	Aug-09	Sep-09	Oct-09	Nov-09	Dec-09	Jan-10	Feb-10	Mar-10	Apr-10	May-10	Jun-10	Total
1. AKE	0	0	0	0	0	35	0	0	0	21	56	11	**123**
2. CEE	0	0	0	0	0	0	0	0	0	1	0	0	**1**
3. SEC	0	0	0	0	0	0	0	0	0	0	0	0	**0**
4. SOE	0	65	95	0	0	0	0	0	0	0	0	0	**160**
5. SOU	0	0	0	0	0	0	0	0	0	0	0	0	**0**
6. SUB	0	0	0	0	0	0	0	0	0	0	47	45	**92**
7. CHA	0	0	0	0	0	0	0	0	0	0	0	0	**0**
8. CEW	0	0	0	0	0	0	0	0	0	0	0	0	**0**
9. AKW	0	0	0	0	0	0	0	0	0	0	0	0	**0**
10. KER	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Total	**0**	**65**	**95**	**0**	**0**	**35**	**0**	**0**	**0**	**22**	**103**	**56**	**376**

Protected species interactions

Most notable of the captures in the scampi fishery is that of the 20 seabird captures during the 2009/10 observer year, 15 were reported from one vessel. The observer made a number of comments about factors contributing to these captures. It was noted that this vessel employed a triple net and as such, when the net was hauled to the surface the mouth to the centre net could not be closed. This meant that, compared to other trawl fisheries, seabirds were able to enter the net over an extended period, and thus risk becoming captured within the trawl and being drowned. The observer also commented that only the codend is hauled aboard, while the rest of the net remains in the water which allowed a number of 'stickers' to build up in the net. On two occasions the skipper of the vessel also released bins of offal while the net was at the surface; this occurred at the same time as four captures of Salvin's albatross.

Table 18 shows that albatross species made up the majority of interactions, which is in contrast to the other middle depth fisheries where petrels and shearwaters form the greatest number of interactions. Salvin's albatross were the most commonly interacting protected species. Overall 90% of interactions resulted in mortalities.

Table 18: Protected species interactions in the scampi trawl fishery during the 2009/10 observer year

Species	Alive	Dead	Total
Seabirds			
Albatross (Unidentified)	1		**1**
Campbell albatross		1	**1**
New Zealand white capped albatross		3	**3**
Salvin's albatross		12	**12**
Cape petrels (Unidentified)		1	**1**
Flesh-footed shearwater	1		**1**
Southern cape petrel		**1**	**1**
Total seabirds	**2**	**18**	**20**
Total protected species interactions	**2**	**18**	**20**

Table 19 shows that seabird interactions were dominated by net captures, with all net captures resulting in mortalities.

Table 19: Method of protected species capture, as recorded on the observer non-fish bycatch form for the 2009/10 observer year.

Species	Caught in net*	Impact against vessel	Total
Seabirds			
Albatross (Unidentified)	1		**1**
Campbell albatross		1	**1**
New Zealand white capped albatross	2	1	**3**
Salvin's albatross	12		**12**
Cape petrels (Unidentified)	1		**1**
Flesh-footed shearwater	1		**1**
Southern cape petrel	**1**		**1**
Total seabirds	**18**	**2**	**20**
Total protected species interactions	**12**	**0**	**12**

*Included as 'capture' in table 16

Table 20 highlights the period of captures made onboard one vessel during September 09 while low levels of captures also occurred in most other months of observer coverage.

Table 20: Seabird interactions in the scampi trawl fishery by area and month during the 2009/10 observer year. A zero indicates that no interactions are observed, a dash indicates that no coverage took place.

FMA	Jul-09	Aug-09	Sep-09	Oct-09	Nov-09	Dec-09	Jan-10	Feb-10	Mar-10	Apr-10	May-10	Jun-10	Total
1. AKE	-	-	-	-	-	0	-	-	-	1	2	0	3
2. CEE	-	-	-	-	-	-	-	-	-	0	-	-	0
3. SEC	-	-	-	-	-	-	-	-	-	-	-	-	0
4. SOE	-	1	14	-	-	-	-	-	-	-	-	-	15
5. SOU	-	-	-	-	-	-	-	-	-	-	-	-	0
6. SUB	-	-	-	-	-	-	-	-	-	-	1	1	2
7. CHA	-	-	-	-	-	-	-	-	-	-	-	-	0
8. CEW	-	-	-	-	-	-	-	-	-	-	-	-	0
9. AKW	-	-	-	-	-	-	-	-	-	-	-	-	0
10. KER	-	-	-	-	-	-	-	-	-	-	-	-	0
Total	0	1	14	0	0	0	0	0	0	1	3	1	20

Table 21 shows that coral the caught belonged exclusively to the order Scleractinia or stony corals. Coral bycatch was limited to SOE. Quantities of coral from individual events were generally up to one kilogram with a maximum catch of ten kilograms.

Table 21: Coral bycatch in kilograms per FMA in the scampi fishery during the 2009/10 observer year. Note: a zero indicates that no bycatch was observed, a dash indicates that there was no observer coverage in that FMA.

Protected Corals	1.AKE	2.CEE	3.SEC	4.SOE	5.SOU	6.SUB	7.CHA	8.CEW	9.AKW	Total (kg)
Scleractinia (Stony corals)	0	0	-	26.9	0	0	-	-	-	26.9
Stony corals-Cup	0	0	-	24	0	0	-	-	-	24
Stony corals-Branching	0	0	-	6	0	0	-	-	-	6
Total	0	0	0	56.9	0	0	0	0	0	56.9

5.1.4 Squid

Observer coverage in the squid fishery, particularly in the SQU 6T area, has been higher than other trawl fisheries due to concern about captures of New Zealand sea lions while significant seabird captures have been observed then the SQU1T. The majority of seabird captures have consistently been composed of white-capped albatross, sooty shearwaters and white-chinned petrels and this trend continues in the current year (74% of observed seabird captures). Being over 28m in length, all vessels in this fishery are mandatorily required to carry and use seabird scarers of some kind (tori line, warp deflector, or bird baffler). Offal has been identified as a key issue leading to warp captures in this fishery (Middleton & Abraham 2007). Vessel Management Plans have been developed by industry for each individual vessel to manage discharge of offal during fishing activity (Deepwater Group Limited 2009). Particularly in the Squid 6T area around the Auckland Islands the observer coverage is focused on recording New Zealand sea lion captures. Sea Lion Exclusion Devices (SLEDs) were used by all vessels operating in the Squid 6T fishery. The majority of observer coverage in the squid fishery has been targeted at the Squid 6T fishery with high levels of coverage also being achieved in SOU.

For the 2009/10 observer year most fishing effort was conducted in SOU (Table 22), this contrasts the previous year where most effort was conducted in SUB (Ramm 2011). Observer coverage levels in this fishery have dropped from the previous year's 1260 tows to 1058 tows. Seabird captures dropped by over half compared to the previous year (Ramm 2011) however this fishery continues to have the highest rate of bird captures of any of the middle depth fisheries. Marine mammal captures increased to 11 from seven in the previous year which, combined with the reduction in observer coverage, resulted in an increase in the capture rate from 0.56 animals per 100 tows to 1.04 per 100 tows (Ramm 2011). Coral bycatch was higher than any other middle depth fishery.

Table 22: Summary of commercial effort, observer effort and protected species captures in the squid fishery during the 2009/10 observer year.

FMA	Effort Tows	Observed Tows	Coverage (%)	Seabird Captures*	Seabirds per 100 tows	Mammal Captures	Mammals per 100 tows	Coral Catch (kg)	Coral Catch per 100 tows (kg)
1. AKE	0	0	-	-	-	-	-	-	-
2. CEE	0	0	-	-	-	-	-	-	-
3. SEC	100	5	5.00	0	0.00	0	0.00	0	0.00
4. SOE	13	1	7.69	0	0.00	0	0.00	1	100.00
5. SOU	2223	750	33.74	73	9.73	8	1.07	241.2	32.16
6. SUB	1249	302	24.18	20	6.62	3	0.99	2	0.66
7. CHA	4	0	0.00	-	-	-	-	-	-
8. CEW	0	0	-	-	-	-	-	-	-
9. AKW	0	0	-	-	-	-	-	-	-
10. KER	0	0	-	-	-	-	-	-	-
Total	**3,589**	**1,058**	**29.48**	**93**	**8.79**	**11**	**1.04**	**244.20**	**23.08**

*Captures only, excludes deck strikes and other non-fishing interactions

Observer Coverage

During the 2009/10 observer year 25 observer trips were conducted onboard 17 vessels. Protected species interactions were recorded by observers from 17 trips on all 17 vessels. Comments relating to offal management, mitigation use and other information surrounding protected species captures are detailed in Table A6.4. All but one of the observed vessels employed tori lines as seabird mitigation devices. As in previous years all vessels employed SLEDS whilst fishing in the 'Squid 6T' area. These were not used whilst fishing outside this area.

Table 23 gives a breakdown of observer coverage by area and month; as with previous observer years, the majority of observer coverage occurred during the February to June period which corresponds to the main 'Squid 6T' season (Ramm 2011, Rowe 2010, 2009). The majority of observer effort was again focused in the SUB and SOU areas.

Table 23: Number of tows observer in the squid trawl fishery by area and month during the 2009/10 observer year.

FMA	Jul-09	Aug-09	Sep-09	Oct-09	Nov-09	Dec-09	Jan-10	Feb-10	Mar-10	Apr-10	May-10	Jun-10	Total
1. AKE	0	0	0	0	0	0	0	0	0	0	0	0	**0**
2. CEE	0	0	0	0	0	0	0	0	0	0	0	0	**0**
3. SEC	0	0	0	0	2	0	0	1	0	0	0	2	**5**
4. SOE	0	0	0	0	0	1	0	0	0	0	0	0	**1**
5. SOU	26	0	0	0	0	0	77	234	254	32	70	57	**750**
6. SUB	0	0	0	0	0	0	0	6	165	81	44	6	**302**
7. CHA	0	0	0	0	0	0	0	0	0	0	0	0	**0**
8. CEW	0	0	0	0	0	0	0	0	0	0	0	0	**0**
9. AKW	0	0	0	0	0	0	0	0	0	0	0	0	**0**
10. KER	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Total	**26**	**0**	**0**	**0**	**2**	**1**	**77**	**241**	**419**	**113**	**114**	**65**	1,058

Protected species interactions

Table 24 shows the species composition of the interactions in the squid trawl fishery. Seabird interactions during the 2009/10 observer year reduced compared to the previous year, and were also lower than the previous four years (Ramm 2011, Rowe 2010, 2009). Marine mammal interactions were higher than the 2008/09 observer year being similar to the 2007/08 year. In previous years interactions have generally resulted in mortalities however the 2009/10 observer year displayed an even division between mortalities and live releases.

White-chinned petrels were the species most often observed interacting with the squid trawl fishery, followed by white-capped albatross, this is in line with the previous year's interactions (Ramm 2011). Sooty shearwater interactions continue to reduce.

The number of New Zealand sea lion interactions in the squid trawl fishery increased from two the previous year to four (Ramm 2011). Three of the animals died as a result of these interactions. Fur seal interactions also increased compared to the previous year. The increase in the number of marine mammal interactions is also significant due to the overall reduction in observer coverage.

Table 24: Protected species interactions in the squid trawl fishery during the 2009/10 observer year.

Species	Alive	Dead	Total
Seabirds			
Albatross (Unidentified)	1		**1**
Buller's albatross	5		**5**
New Zealand white capped albatross	10	11	**21**
Petrels, Prions and Shearwaters (Unidentified)	7		**7**
Petrel (Unidentified)	8	1	**9**
Giant petrels (Unidentified)	1		**1**
Fairy prion	1		**1**
Sooty shearwater	2	5	**7**
White-chinned petrel	11	30	**41**
Total seabirds	**46**	**47**	**93**
Mammals			
New Zealand fur seal	2	6	**8**
New Zealand sea lion	1	3	**4**
Total mammals	**3**	**9**	**12**
Total protected species interactions	**49**	**56**	**105**

Table 25 shows the method of interaction for protected species in the squid fishery during 2009/10. As with the preceding two observer years, interactions have been dominated by net captures (Ramm 2011, Rowe 2010). Seabirds identified as being killed by warp strikes remain at lower levels, and continued to decline compared to the preceding years (Ramm 2011, Rowe 2010). Overall there was a reduction in seabird captures against the previous year; there were also no large scale capture events as were identified in the 2008/09 observer year (Ramm 2011).

Table 25: Method of interaction for a) protected species released alive and b) dead protected species in the squid trawl fishery during the 2009/10 observer year.

a) Released alive

Species	Caught in net*	Impact against vessel	Other	Unknown	Total
Seabirds					
Albatross (Unidentified)	1				1
Buller's albatross	5				5
New Zealand white capped albatross	4	3	3		10
Petrels, Prions and Shearwaters (Unidentified)	7				7
Petrel (Unidentified)	7			1	8
Giant petrels (Unidentified)	1				1
Fairy prion		1			1
Sooty shearwater	2				2
White-chinned petrel	11				11
Total seabirds	**38**	**4**	**3**	**1**	**46**
Mammals					
New Zealand fur seal	2				2
New Zealand sea lion	1				1
Total mammals	**3**	**0**	**0**	**0**	**3**
Total protected species interactions	**41**	**4**	**3**	**1**	**49**

*Included as a capture in Table 22

b) Dead protected species (excluding decomposing animals).

Species	Caught in net*	Caught on warp*	Total
Seabirds			
New Zealand white capped albatross	8	3	11
Petrel (Unidentified)	1		1
Sooty shearwater	5		5
White-chinned petrel	30		30
Total seabirds	**44**	**3**	**47**
Mammals			
New Zealand fur seal	6		6
New Zealand sea lion	3		3
Total mammals	**9**	**0**	**9**
Total protected species interactions	**53**	**3**	**56**

*Included as a capture in Table 22

As shown in Table 26 seabird interactions peaked during February and March, coinciding with the peak in observer coverage. Interactions were reported during all months of coverage in SOU and SUB.

Table 26: Seabird interactions in the squid trawl fishery by area and month during the 2009/10 observer year. A zero indicates that no interactions are observed, a dash indicates that no coverage took place.

FMA	Jul-09	Aug-09	Sep-09	Oct-09	Nov-09	Dec-09	Jan-10	Feb-10	Mar-10	Apr-10	May-10	Jun-10	Total
1. AKE	-	-	-	-	-	-	-	-	-	-	-	-	0
2. CEE	-	-	-	-	-	-	-	-	-	-	-	-	0
3. SEC	-	-	-	-	0	-	-	0	-	-	-	0	0
4. SOE	-	-	-	-	-	0	-	-	-	-	-	-	0
5. SOU	0	-	-	-	-	-	1	34	27	3	4	4	73
6. SUB	-	-	-	-	-	-	-	2	9	9	-	-	20
7. CHA	-	-	-	-	-	-	-	-	-	-	-	-	0
8. CEW	-	-	-	-	-	-	-	-	-	-	-	-	0
9. AKW	-	-	-	-	-	-	-	-	-	-	-	-	0
10. KER	-	-	-	-	-	-	-	-	-	-	-	-	0
Total	0	0	0	0	0	0	1	36	36	12	4	4	93

Pinniped interactions are shown in Table 27 and occurred throughout the main period of observer coverage in SOU and SUB. NZ sea lion captures occurred in March and May of 2010, with three occurring in SUB and one in SOU. The observer determined sex of sea lions indicated that the three sea lions captured in SUB were all female, while the SOU capture was sexed as male (as is usual in this area).

Table 27: Pinniped interactions in the squid trawl fishery by area and month during the 2009/10 observer year. A zero indicates that no interactions are observed, a dash indicates that no coverage took place.

FMA	Jul-09	Aug-09	Sep-09	Oct-09	Nov-09	Dec-09	Jan-10	Feb-10	Mar-10	Apr-10	May-10	Jun-10	Total
1. AKE	-	-	-	-	-	-	-	-	-	-	-	-	0
2. CEE	-	-	-	-	-	-	-	-	-	-	-	-	0
3. SEC	-	-	-	-	0	-	-	0	-	-	-	0	0
4. SOE	-	-	-	-	-	0	-	-	-	-	-	-	0
5. SOU	0	-	-	-	-	-	2	3	2	0	1	0	8
6. SUB	-	-	-	-	-	-	-	0	1	0	2	0	3
7. CHA	-	-	-	-	-	-	-	-	-	-	-	-	0
8. CEW	-	-	-	-	-	-	-	-	-	-	-	-	0
9. AKW	-	-	-	-	-	-	-	-	-	-	-	-	0
10. KER	-	-	-	-	-	-	-	-	-	-	-	-	0
Total	0	0	0	0	0	0	2	3	3	0	3	0	11

Coral bycatch in the squid fishery during the 2009/10 observer year was higher than in any other middle depth fishery. Table 28 details the groups of corals caught, which was generally limited to SOU; with the largest individual catch being 50 kilograms. One hundred and forty kilograms of bamboo coral was caught on single trip in four events over three days. This vessel accounted for 166 of the 244 kilos of coral caught in the squid fishery during the 2009/10 observer year.

Table 28: Coral bycatch in kilograms per FMA in the squid fishery during the 2009/10 observer year. Note: a zero indicates that no bycatch was observed, a dash indicates that there was no observer coverage in that FMA.

Protected Corals	1.AKE	2.CEE	3.SEC	4.SOE	5.SOU	6.SUB	7.CHA	8.CEW	9.AKW	Total (kg)
Coral (Unidentified)	-	-	0	0	70.8	1	0	-	-	**71.8**
Coral Rubble	-	-	0	0	20	0	0	-	-	**20**
Scleractinia (Stony corals)	-	-	0	0	1.3	0	0	-	-	**1.3**
Stony corals-Cup	-	-	0	0	0.3	0	0	-	-	**0.3**
Stony corals-Branching	-	-	0	0	0.9	0	0	-	-	**0.9**
Gorgonian coral	-	-	0	0	5	1	0	-	-	**6**
Bamboo Corals	-	-	0	0	140	0	0	-	-	**140**
Sea fans	-	-	0	1	0	0	0	-	-	**1**
Hydrocorals	-	-	0	0	2.1	0	0	-	-	**2.1**
Feathery hydroids	-	-	0	0	0.8	0	0	-	-	**0.8**
Total	**0**	**0**	**0**	**1**	**241.2**	**2**	**0**	**0**	**0**	**244.2**

5.2 PELAGIC TRAWL FISHERIES

5.2.1 Jack Mackerel and Barracouta

In previous years, common dolphins (*Delphinus delphis*) have been captured in these pelagic trawl fisheries and in some instances significant capture events have occurred. A Marine Mammal Operating Procedure (MMOP) has been developed to reduce the risk of common dolphin captures. These procedures include not setting or hauling at high-risk times of the night, the net headline must remain at least 50 metres below the surface, or be hauled partially on deck whilst turning and not setting while dolphins are present close to the vessel (DeepWater Group Ltd 2008). Recent analyses of common dolphin captures in this fishery suggests a key factor related to likelihood of common dolphin capture is the depth of the headline, with most captures occurring when this is less than 30m below the surface (Thompson et al 2010). As all the vessels in this fishery are larger than 28m they are mandatorily required to carry and deploy bird capture mitigation devices. The majority of observer coverage in this fishery was from October to December, with another peak in June and July, corresponding to peaks in fishing activity.

Observer coverage in this fishery peaked during 2008/09 and has reduced again to 30% in 2009/10 (Ramm 2011). Table 29 shows that this is due to a combination of increased commercial effort and decreased observer effort in this fishery. As with previous years both commercial and observer effort was highest in CEW. Highest proportional observer coverage was achieved in AKW where significant numbers of common dolphins have been caught in some years. Both seabird and mammal captures were highest in SOU where 43% observer coverage was achieved. CHA had the greatest number of mammal captures however twice as many tows were observed in this area. Coral bycatch in this fishery was low, as would be expected due to it largely being a pelagic fishery; the use of mid-water nets and fish species prone to schooling off the seabed meaning contact with the seabed is relatively undesirable for the vessel.

Table 29: Summary of commercial effort, observer effort and protected species captures in the pelagic trawl fishery during the 2009/10 observer year.

FMA	Effort Tows	Observed Tows	Coverage (%)	Seabird Captures*	Seabirds per 100 tows	Mammal Captures	Mammals per 100 tows	Coral Catch (kg)	Coral Catch per 100 tows (kg)
1. AKE	1	0	0.00	-	-	-	-	-	-
2. CEE	0	0	-	-	-	-	-	-	-
3. SEC	461	121	26.25	5	4.13	1	0.83	0.1	0.08
4. SOE	45	0	0.00	-	-	-	-	-	-
5. SOU	261	111	42.53	8	7.21	3	2.70	0.1	0.09
6. SUB	0	0	-	-	-	-	-	-	-
7. CHA	926	251	27.11	7	2.79	4	1.59	9.7	3.86
8. CEW	1493	415	27.80	0	0.00	1	0.24	5.5	1.33
9. AKW	270	132	48.89	0	0.00	1	0.76	0.5	0.38
10. KER	0	0	-	-	-	-	-	-	-
Total	**3,457**	**1,030**	**29.79**	**20**	**1.94**	**10**	**0.97**	**15.90**	**1.54**

*Captures only, excludes deck strikes and other non-fishing interactions

Observer Coverage

During the 2009/10 observer year 32 observer trips were conducted onboard 13 vessels. Interactions with protected species occurred on 10 trips onboard six vessels. Comments relating to offal management, mitigation use and other information surrounding protected species captures are detailed in Table A6.4. As in previous years seabird numbers were observed to peak during times of hauling and offal production.

Table 30 shows that observer coverage peaked in October 2009 however coverage was achieved throughout the year; this is in line with the previous observer year (Ramm 2011).

Table 30: Number of tows observed in the pelagic trawl fishery by area and month during the 2009/10 observer year

FMA	Jul-09	Aug-09	Sep-09	Oct-09	Nov-09	Dec-09	Jan-10	Feb-10	Mar-10	Apr-10	May-10	Jun-10	Total
1. AKE	0	0	0	0	0	0	0	0	0	0	0	0	**0**
2. CEE	0	0	0	0	0	0	0	0	0	0	0	0	**0**
3. SEC	0	3	3	10	1	0	0	38	59	7	0	0	**121**
4. SOE	0	0	0	0	0	0	0	0	0	0	0	0	**0**
5. SOU	0	0	0	15	28	0	7	29	25	2	4	1	**111**
6. SUB	0	0	0	0	0	0	0	0	0	0	0	0	**0**
7. CHA	33	19	3	95	2	22	39	0	12	0	1	25	**251**
8. CEW	12	17	0	162	6	98	4	0	10	0	4	102	**415**
9. AKW	5	0	0	70	13	40	0	0	0	0	0	4	**132**
10. KER	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Total	**50**	**39**	**6**	**352**	**50**	**160**	**50**	**67**	**106**	**9**	**9**	**132**	**1,030**

Table 28 shows that in line with previous years the majority of observed tows in this fishery targeted jack mackerel; accounting for 82% of tows observed (Ramm 2011, Rowe 2010). Barracouta tows were most common in SOE. Only seven tows were designated to target English mackerel.

Table 31: Number of observed tows in the pelagic trawl fishery by area and target species during the 2009/10 observer year

Target	4. SOE	5. SOU	7. CHA	8. CEW	9. AKW	Total
Barracouta	106	64	8	1		**179**
English Mackerel			1	6		**7**
Jack Mackerel	15	45	237	408	132	**837**
Total	**121**	**109**	**246**	**415**	**132**	**1,023**

Protected species interactions

Overall less protected species interactions were reported by observers than in the previous year; however as with previous years the majority of interactions resulted in mortalities (Ramm 2011). Historically there have been a number of multiple capture events of common dolphins in this fishery (Ramm 2011, Rowe 2010, 2009) with high risk times of day being highlighted and avoided according to industry management practices. The number of common dolphins

captured reduced to four from 11 the previous year however three of the four animals were captured in a single event, hauled at 0815 New Zealand daylight savings time (NZDT).

Table 32: Protected species interactions in the pelagic trawl fishery during the 2009/10 observer year

Species	Alive	Dead	Total
Seabirds			
Buller's albatross		2	**2**
New Zealand white capped albatross		2	**2**
Salvin's albatross		4	**4**
Petrel (Unidentified)	1		**1**
Prions (Unidentified)	4		**4**
Storm petrels (Unidentified)	1		**1**
Fulmar prion		1	**1**
Sooty shearwater	1	1	**2**
Westland petrel		1	**1**
White-chinned petrel		2	**2**
Total seabirds	**7**	**13**	**20**
Mammals			
Common dolphin		4	**4**
New Zealand fur seal		6	**6**
Total mammals	**0**	**10**	**10**
Total protected species interactions	**7**	**23**	**30**

While significantly more jack mackerel tows were observed during 2009/10, the total numbers of protected species interaction were similar across the two target species (Table 33). Common dolphin captures were limited to jack mackerel targeted tows. This broadly corresponds to the distribution of captures in the previous year (Ramm 2011).

Table 33: Protected species interactions in the pelagic trawl fishery during the 2009/10 observer year

Species	Barracouta	Jack mackerel	Total
Seabirds			
Buller's albatross		2	**2**
New Zealand white capped albatross	2		**2**
Salvin's albatross	4		**4**
Petrel (Unidentified)		1	**1**
Prions (Unidentified)		4	**4**
Storm petrels (Unidentified)		1	**1**
Fulmar prion		1	**1**
Sooty shearwater	2		**2**
Westland petrel		1	**1**
White-chinned petrel	2		**2**
Total seabirds	**10**	**10**	**20**
Mammals			
Common dolphin		4	**4**
New Zealand fur seal	4	2	**6**
Total mammals	**4**	**6**	**10**
Total protected species interactions	**14**	**16**	**30**

Table 34 shows the method of interaction for each protected species capture in the pelagic trawl fisheries during 2009/10. As with previous years, the majority of interactions with this fishery were net captures (Ramm 2011, Rowe 2010). All net captures in this year resulted in mortalities. Warp captures and deck strikes were at very low levels.

Table 34: Method of interaction for a) protected species released alive and b) dead protected species interactions in the pelagic trawl fishery during the 2009/10 observer year

a) Released alive

Species	Caught on warp or door*	Other	Tangled in line	Total	Comments Relating to 'Other' capture method
Seabirds					
Petrel (Unidentified)			1	1	
Prions (Unidentified)		4		4	Three were fouled with grease to varying degrees. One would definitely not have survived
Storm petrels (Unidentified)		1		1	No comments
Sooty shearwater	1			1	
Total seabirds	1	5	1	7	
Total protected species interactions	1	5	1	7	

*Included as a capture in Table 29

b) Dead protected species (excluding decomposing animals).

Species	Caught in net*	Caught on warp or door*	Impact against vessel	Other	Unknown	Total
Seabirds						
Buller's albatross		1		1		2
New Zealand white capped albatross	2					2
Salvin's albatross	4					4
Fulmar prion			1			1
Sooty shearwater					1	1
Westland petrel	1					1
White-chinned petrel	2					2
Total seabirds	9	1	1	1	1	13
Mammals						
Common dolphin	4					4
New Zealand fur seal	6					6
Total mammals	10	0	0	0	0	10
Total protected species interactions	19	1	1	1	1	23

*Included as a capture in Table 32

Half of all seabird interactions in this fishery occurred during February 2010 (Table 35) however this month received lower levels of observer coverage than other months.

Table 35: Seabird interactions in the pelagic trawl fishery by area and month during the 2009/10 observer year. A zero indicates that no interactions are observed, a dash indicates that no coverage took place.

FMA	Jul-09	Aug-09	Sep-09	Oct-09	Nov-09	Dec-09	Jan-10	Feb-10	Mar-10	Apr-10	May-10	Jun-10	Total
1. AKE	-	-	-	-	-	-	-	-	-	-	-	-	0
2. CEE	-	-	-	-	-	-	-	-	-	-	-	-	0
3. SEC	-	0	0	0	0	-	-	4	1	0	-	-	5
4. SOE	-	-	-	-	-	-	-	-	-	-	-	-	0
5. SOU	-	-	-	1	0	-	0	6	1	0	0	0	8
6. SUB	-	-	-	-	-	-	-	-	-	-	-	-	0
7. CHA	1	0	0	0	0	0	5	-	0	-	0	1	7
8. CEW	0	0	-	0	0	0	0	-	0	-	0	0	0
9. AKW	0	-	-	0	0	0	-	-	-	-	-	0	0
10. KER	-	-	-	-	-	-	-	-	-	-	-	-	0
Total	1	0	0	1	0	0	5	10	2	0	0	1	20

Table 36 shows the distribution of marine mammal interactions throughout the 2009/10 observer year. These interactions occurred at a number of points through the year with interactions not necessarily coinciding with times of peak observer coverage.

Table 36: Marine mammal interactions in the pelagic trawl fishery by area and month during the 2009/10 observer year. A zero indicates that no interactions are observed, a dash indicates that no coverage took place.

FMA	Jul-09	Aug-09	Sep-09	Oct-09	Nov-09	Dec-09	Jan-10	Feb-10	Mar-10	Apr-10	May-10	Jun-10	Total
1. AKE	-	-	-	-	-	-	-	-	-	-	-	-	0
2. CEE	-	-	-	-	-	-	-	-	-	-	-	-	0
3. SEC	-	0	0	0	0	-	-	0	1	0	-	-	1
4. SOE	-	-	-	-	-	-	-	-	-	-	-	-	0
5. SOU	-	-	-	1	2	-	0	0	0	0	0	0	3
6. SUB	-	-	-	-	-	-	-	-	-	-	-	-	0
7. CHA	1	0	0	0	0	0	0	-	0	-	3	0	4
8. CEW	0	0	-	0	0	0	0	-	0	-	0	1	1
9. AKW	0	-	-	1	0	0	-	-	-	-	-	0	1
10. KER	-	-	-	-	-	-	-	-	-	-	-	-	0
Total	1	0	0	2	2	0	0	0	1	0	3	1	10

5.3 DEEP WATER BOTTOM TRAWL FISHERIES

5.3.1 Orange Roughy, Black Cardinalfish and Oreo species

Historically, the majority of observer coverage on vessels targeting deepwater species has been in AKW, SOE and SUB. A particular focus of coverage is monitoring of the impacts of deepwater bottom trawling on protected corals, particularly on the Chatham Rise[8]. Seabird behaviour and abundance around the vessels is also monitored. Offal management practices in conjunction with the mandatory use of bird scaring devices are employed by the fleet to mitigate against seabird captures.

Coverage in 2009/10 was highest in SOE, which was also the area of most effort (Table 37). Overall the fishery received 40% observer coverage making it one of the highest observed of the commercial fisheries. While less events were observed compared to the previous year, there was also less effort (Ramm 2011). Seabird captures were almost entirely limited to SOE as was the single mammal capture. While in previous years the rate of seabird captures has been very low when compared to other fisheries the 2009/10 observer year saw an increase in seabird captures from five in 2008/09 to 30 in 2009/10 (Ramm 2011).

Coral bycatch in this fishery has historically been significantly higher than other fisheries and this remains unchanged, with the deepwater orange roughy and oreo species accounting for the majority of the coral caught during the 2009/10 observer year by all fisheries. A total mass of 12 tonnes of coral was observed caught by vessels targeting this deepwater mix or species during 2009/10, almost 10 tonnes of which was caught in AKW.

Table 37: Summary of commercial effort, observer effort and protected species captures in the deepwater trawl fishery during the 2009/10 observer year.

FMA	Effort Tows	Observed Tows	Coverage (%)	Seabird Captures*	Seabirds per 100 tows	Mammal Captures	Mammals per 100 tows	Coral Catch (kg)	Coral Catch per 100 tows (kg)
1. AKE	224	66	29.46	0	0.00	0	0.00	19.20	29.09
2. CEE	1053	66	6.27	1	1.52	0	0.00	152.00	230.30
3. SEC	695	158	22.73	0	0.00	0	0.00	38.80	24.56
4. SOE	2052	1,131	55.12	23	2.03	1	0.09	117.80	10.42
5. SOU	18	18	100.00	0	0.00	0	0.00	0.00	0.00
6. SUB	1689	755	44.70	6	0.79	0	0.00	1,744.90	231.11
7. CHA	95	92	96.84	0	0.00	0	0.00	1.00	1.09
8. CEW	0	0	-	-	-	-	-	-	-
9. AKW	145	79	54.48	0	0.00	0	0.00	9,862.50	12,484.18
10. KER	0	0	-	-	-	-	-	-	-
Total	**5,971**	**2,365**	**39.61**	**30**	**1.27**	**1**	**0.04**	**11,936.20**	**504.70**

*Captures only, excludes deck strikes and other non-fishing interactions

[8] CSP Project - INT 2008/02 Identification of protected corals: Conservation Services Annual Plan 2009/10 p43-44. http://www.doc.govt.nz/upload/documents/conservation/marine-and-coastal/fishing/csp-final-annual-plan2008-09.pdf

Observer Coverage

During 2009/10 37 observer trips were conducted onboard 12 vessels. Protected species interactions were reported from nine trips onboard three vessels. Coral bycatch was recorded on 32 observer trips onboard all 12 vessels observed. Coverage was spread throughout the year with a trough in August 2009 and a peak in October 2009 (Table 38). Comments relating to offal management, seabird mitigation device use and other information regarding protected species captures are detailed in Table A6.6.

Table 38: Number of observed tows in the deep water bottom trawl fishery by area and month during the 2009/10 observer year.

FMA	Jul-09	Aug-09	Sep-09	Oct-09	Nov-09	Dec-09	Jan-10	Feb-10	Mar-10	Apr-10	May-10	Jun-10	Total
1. AKE	27	0	7	3	5	0	0	0	0	0	0	24	**66**
2. CEE	0	0	0	18	45	0	0	2	1	0	0	0	**66**
3. SEC	0	4	41	33	7	28	27	0	18	0	0	0	**158**
4. SOE	101	25	0	169	134	148	117	168	69	0	84	116	**1,131**
5. SOU	0	0	0	0	0	2	0	10	0	0	6	0	**18**
6. SUB	0	0	73	113	76	47	54	33	17	164	178	0	**755**
7. CHA	42	0	0	0	0	0	0	0	0	0	0	50	**92**
8. CEW	0	0	0	0	0	0	0	0	0	0	0	0	**0**
9. AKW	9	0	9	34	0	0	0	0	0	0	0	27	**79**
10. KER	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Total	**179**	**29**	**130**	**370**	**267**	**225**	**198**	**213**	**105**	**164**	**268**	**217**	**2,365**

Protected species interactions

Protected species interactions (excluding coral bycatch) in this fishery have increased markedly over the previous year rising from 12 interactions in 2008/09 to 38 in 2009/10 (Ramm 2011). Salvin's albatross interactions were the most numerous with seven of the 10 resulting in mortalities (Table 39). In general, albatross species make up the majority of interactions with this fishery; this is in contrast to other trawl fishers where petrel and shearwater species are more likely to interact.

Table 39: Protected species interactions in the deepwater bottom trawl fishery during the 2009/10 observer year.

	Alive	Dead	Decomposing	Unknown	Total
Seabirds					
Albatross (Unidentified)	1	2		2	5
Buller's albatross	2	1			3
Chatham albatross		5			5
Salvin's albatross	2	7		1	10
Petrel (Unidentified)	1				1
Prions (Unidentified)	1				1
Cape petrels (Unidentified)	2				2
Storm petrels (Unidentified)	2				2
Common diving petrel	1				1
Fairy prion	1				1
Sooty shearwater	1				1
Southern cape petrel		2			2
White-chinned petrel	2	1			3
Total seabirds	16	18	0	3	37
Mammals					
New Zealand fur seal			1		1
Total mammals	0	0	1	0	1
Total protected species interactions	16	18	1	3	38

Table 40 shows the method of interaction for the deepwater trawl fishery in 2009/10. In contrast to other trawl fisheries, net captures were not the most common form of interaction. Vessel impacts or 'deck strikes' made up the majority of the interactions where the animals were released alive. 'Warp strikes' accounted for the majority of observed seabird mortalities. All warp captures were recorded on a single vessel in three events over six days. This vessel was observed to employ mitigation devices against warp strikes however a combination of weather factors and 'sprags' (or loos ends of wire protruding from joins in the warp wires) appear to have contributed to the vessel's unusually high number of warp captures. The observer noted that action was taken by the crew to remedy this situation after an initial round of captures; however the first round of repairs were not effective. After a second round of captures further repairs were made, with the sprags being more successfully covered and no further captures were observed.

Table 40: Method of interaction for a) protected species released alive and b) dead protected species, as recorded on the observer non-fish bycatch form.

a) Released alive

Species	Caught in net*	Impact against vessel*	Other	Unknown	Total
Seabirds					
Albatross (Unidentified)				1	**1**
Buller's albatross		1	1		**2**
Salvin's albatross	1	1			**2**
Petrel (Unidentified)				1	**1**
Prions (Unidentified)		1			**1**
Cape petrels (Unidentified)		1	1		**2**
Storm petrels (Unidentified)		2			**2**
Common diving petrel		1			**1**
Fairy prion		1			**1**
Sooty shearwater			1		**1**
White-chinned petrel		2			**2**
Total seabirds	**1**	**10**	**3**	**2**	**16**
Total protected species interactions	**1**	**10**	**3**	**2**	**16**

*Included as a capture in Table 37

b) Dead protected species (excluding decomposing animals).

Species	Caught in net*	Caught on warp or door*	Other	Total
Seabirds				
Albatross (Unidentified)			2	**2**
Buller's albatross			1	**1**
Chatham albatross		5		**5**
Salvin's albatross		7		**7**
Southern cape petrel			2	**2**
White-chinned petrel	1			**1**
Total seabirds	**1**	**12**	**5**	**18**
Total protected species interactions	**1**	**12**	**5**	**18**

*Included as a capture in Table 37

Table 41 shows the distribution of protected species interactions throughout the 2009/10 observer year. Interactions were observed in most months, with a peak in November to December 2009, this is a reflection of the single vessel's warp capture events reported above.

Table 41: Protected species interactions in the deepwater trawl fishery by area and month during the 2009/10 observer year. A zero indicates that no interactions are observed, a dash indicates that no coverage took place.

FMA	Jul-09	Aug-09	Sep-09	Oct-09	Nov-09	Dec-09	Jan-10	Feb-10	Mar-10	Apr-10	May-10	Jun-10	Total
1. AKE	0	-	0	0	0	-	-	-	-	-	-	0	**0**
2. CEE	-	-	-	0	0	-	-	0	0	-	-	-	**0**
3. SEC	-	0	0	0	0	0	0	-	0	-	-	-	**0**
4. SOE	2	0	-	0	1	12	1	2	1	-	3	5	**27**
5. SOU	-	-	-	-	-	0	-	0	-	-	0	-	**0**
6. SUB	-	-	1	0	5	0	0	1	0	0	0	-	**7**
7. CHA	0	-	-	-	-	-	-	-	-	-	-	0	**0**
8. CEW	-	-	-	-	-	-	-	-	-	-	-	-	**0**
9. AKW	0	-	0	0	-	-	-	-	-	-	-	0	**0**
10. KER	-	-	-	-	-	-	-	-	-	-	-	-	**0**
Total	**2**	**0**	**1**	**0**	**6**	**12**	**1**	**3**	**1**	**0**	**3**	**5**	**34**

Table 42 shows the broad categories of corals caught in the deepwater fishery during the 2009/10 observer year. The Scleractinia order accounted for 96% of the coral bycatch. Fishing events in AKW caught significantly more coral than those in other areas. A single vessel which was observed on three separate occasions caught 9,881 kilograms of coral, primarily in two events (one catching six tonnes, the other over three).

Table 42: Coral bycatch in kilogram per FMA in the deepwater trawl fishery during the 2009/10 observer year. Note: a zero indicates that no bycatch was observed, a dash indicates that there was no observer coverage in that FMA.

Protected Corals	1.AKE	2.CEE	3.SEC	4.SOE	5.SOU	6.SUB	7.CHA	8.CEW	9.AKW	Total (kg)
Coral (Unidentified)	0	0	1	5	-	4.7	0	-	0	**10.7**
Coral Rubble	0	0	0	7	-	0	0	-	0	**7**
Scleractinia (Stony corals)	0	0	0	2	-	571.9	0	-	9,636.5	**10,210.4**
Stony corals-Cup	0.2	0	0.1	10	-	0.1	0	-	0	**10.4**
Stony corals-Branching	2	150	13	19.4	-	959	0	-	117.9	**1,261.3**
Black corals	6.3	0	0	3.5	-	3.7	0	-	6.8	**20.3**
Gorgonian coral	0.6	2	15.3	0.3	-	29.8	0	-	0.4	**48.4**
Bamboo Corals	8.9	0	4.5	19	-	90.5	0	-	51.7	**174.6**
Bubblegum coral	0	0	1	50	-	83.9	0	-	48.3	**183.2**
Precious corals	0	0	3.8	0.5	-	0.4	0	-	0	**4.7**
Golden corals	0.8	0	0	0.5	-	0.4	0	-	0.8	**2.5**
Sea fans	0.3	0	0	0.5	-	0.2	1	-	0	**2**
Hydrocorals	0	0	0	0.1	-	0.3	0	-	0	**0.4**
Feathery hydroids	0.1	0	0.1	0	-	0	0	-	0.1	**0.3**
Total	**19.2**	**152**	**38.8**	**117.8**	**0**	**1,744.9**	**1**	**0**	**9,862.5**	**11,936.2**

5.4 INSHORE FISHERIES

Inshore fishing within the New Zealand EEZ (and more particularly the NZ Territorial Sea where most "inshore fisheries operate) is an immensely diverse in nature and by region, with large amounts of variation in individual practice and effort, both spatially and between differing methods. Particularly in the case of trawl and demersal (bottom) longline, it becomes difficult to separate the inshore sector from the offshore, as a number of medium sized vessels make seasonal shifts between these designated sectors. Individual vessels can range in size from just two metres in length to over 30 metres. Equally, activity can range from 20 days per year to over 300 for any particular vessel. Characterising the inshore sector is difficult and can lead to incorrect conclusions about the fisheries within it. Therefore it is critical when gathering information on the inshore fishing sector, to get as broad and representative coverage as possible.

Observing of inshore fisheries has historically been at very low levels due to the inherent difficulties of placing observers on small vessels often in remote ports with many fishers only operating part time and either seasonally or sporadically. Hence this means that a high degree of observer time is spent on shore awaiting vessel departures or travelling between ports. The 2008/09 observer year saw increased observer coverage as part of the Hector's and Maui's dolphin Threat Management Plan (TMP). This monitoring continued during the 2009/10 observer year. Efforts were made to increase the spread of coverage by, where possible, placing observers on previously unobserved vessels in order to better understand the nature of interactions across the inshore fisheries.

Inshore fishing methods (e.g. traps, potting, Danish seining) other than trawl, setnet and longline have never been observed by the CSP observer programme.

5.4.1 Inshore trawl

The extent to which inshore trawl fisheries interact with protected species is extremely poorly understood. In terms of number of tows, the effort in inshore trawl exceeds that of all the offshore fisheries combined. Inshore trawl is also one of the few remaining fisheries in New Zealand with no regulated mitigation measures to reduce risk of seabird captures. Data is not currently available to allow the accurate quantification of interactions with protected species; however the substantial amount of fishing effort and lack of mitigation means there is the possibility of significant risk. Monitoring of the inshore trawl fishery using Government observers began relatively recently in the 2006/07 observer year with a focus on monitoring seabird and dolphin interactions. Due to the high levels of effort and difficulty of placing observers on these small vessels, historic coverage levels have generally been low and therefore coverage has been limited to specific areas and times of interest.

As with the previous observer year a large portion of the observer coverage in the inshore trawl fisheries was funded by MFish as part of monitoring the Hector's and Maui's dolphin TMP. Coverage was focused on areas of particular interest with regard to Hector's dolphin interactions. Practical issues of placing observers on small vessels continued to cause difficulty in attaining representative samples of observer coverage in this fishery.

Table 43 summarises the commercial fishing effort, observer effort and protected species captures for the 2009/10 observer year. There was an increase in commercial effort compared to the previous year, with 5,000 more tows being conducted (Ramm 2011). The number of observed tows fell to just over half of that in the previous year. This resulted in the nationwide coverage level of 1.8% of fishing effort. The majority of observer coverage occurred in SEC which was also subject to the second highest commercial fishing effort. While the number of seabird captures was highest in SEC, the capture rate was highest in SOU. The rate of seabird captures also increased in SOU from 2.58 animals per 100 tows the previous year to 3.43. The only mammal captured during the inshore trawl coverage was in AKE.

Table 43: Summary of commercial effort, observer effort and protected species captures in the inshore trawl fishery during the 2009/10 observer year.

FMA	Effort Tows	Observed Tows	Coverage (%)	Seabird Captures*	Seabirds per 100 tows	Mammal Captures	Mammals per 100 tows
1. AKE	9,768	171	1.75	-	-	1	0.58
2. CEE	10,147	0	-	-	-	-	-
3. SEC	15,554	441	2.84	10	2.27	-	-
4. SOE	1,021	0	-	-	-	-	-
5. SOU	4,038	204	5.05	7	3.43	-	-
6. SUB	796	0	-	-	-	-	-
7. CHA	15,909	258	1.62	5	1.94	-	-
8. CEW	1,946	0	-	-	-	-	-
9. AKW	1,821	0	-	-	-	-	-
10. KER	0	0	-	-	-	-	-
Total	**61,000**	**1,074**	**1.76**	**22**	**2.05**	**1**	**0.09**

*Captures only, excludes deck strikes and other non-fishing interactions

Observer coverage

During the 2009/10 observer year 23 observer trips were conducted onboard 22 vessels. Protected species interactions were observed on 9 of these trips onboard 9 vessels. Table 44 shows the distribution of observer effort throughout the year. While coverage was at a lower level than the previous observer year effort was spread over a wider period (Ramm 2011). Peak observer coverage again occurred in January and February however only September, October and April received no coverage. Comments relating to offal management, mitigation use and other information surrounding protected species captures are detailed in Table A6.6.

Table 44: Number of observed tows in the inshore bottom trawl fishery by area and month during the 2009/10 observer year.

FMA	Jul-09	Aug-09	Sep-09	Oct-09	Nov-09	Dec-09	Jan-10	Feb-10	Mar-10	Apr-10	May-10	Jun-10	Total
1. AKE	54	34	0	0	0	0	0	1	34	0	15	33	**171**
2. CEE	0	0	0	0	0	0	0	0	0	0	0	0	**0**
3. SEC	0	0	0	0	82	121	107	112	19	0	0	0	**441**
4. SOE	0	0	0	0	0	0	0	0	0	0	0	0	**0**
5. SOU	0	0	0	0	0	22	97	85	0	0	0	0	**204**
6. SUB	0	0	0	0	0	0	0	0	0	0	0	0	**0**
7. CHA	0	0	0	0	64	71	73	50	0	0	0	0	**258**
8. CEW	0	0	0	0	0	0	0	0	0	0	0	0	**0**
9. AKW	0	0	0	0	0	0	0	0	0	0	0	0	**0**
10. KER	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Total	**54**	**34**	**0**	**0**	**146**	**214**	**277**	**248**	**53**	**0**	**15**	**33**	**1,074**

Protected species interactions

While the absolute number of protected species interactions was actually higher than in previous years this is heavily swayed by an event on a single vessels involving 80 petrels and shearwaters which will be discussed further below. Table 45 shows that the number of taxa observed to interact with inshore trawl fishing vessels was less than the previous year, with a particular reduction in the number of mammal interactions (Ramm 2011).

White capped albatross were subject to the greatest number of mortalities with albatross species in general making up the majority of mortalities. The fate of seven Salvin's albatross, which were either caught on the warps or tangled in lines, was unable to be assessed by the observers.

Table 45: Protected species interactions in the inshore trawl fishery during the 2009/10 observer year.

Species	Alive	Dead	Decomposing	Unknown	Total
Seabirds					
Albatross (Unidentified)		2	1		**3**
Broad-billed prion	5				**5**
Cape petrels (Unidentified)	1				**1**
Fairy prion	10				**10**
New Zealand white capped albatross	2	7			**9**
Petrels, Prions and Shearwaters (Unidentified)	40				**40**
Salvin's albatross		4	1	7	**12**
Sooty shearwater	30	1			**31**
Spotted Shag		1			**1**
Storm petrels (Unidentified)	2				**2**
Westland petrel	1				**1**
Total seabirds	**91**	**15**	**2**	**7**	**115**
Mammals					
Bottlenose dolphin		1			**1**
Total mammals	**0**	**1**	**0**	**0**	**1**
Total protected species interactions	**91**	**16**	**2**	**7**	**116**

Table 46 sets out the method of interaction for each protected species. Contrary to other trawl fisheries and also to the previous observer year net captures were a minor source of interaction when compared to vessel impacts of different varieties. The most prominent feature of the inshore trawl interactions occurred on a single evening in SOU. Observer comments indicate that a large number of fairy prions, sooty shearwaters and diving petrels landed or crashed on the deck and needed assistance in getting off. The observer commented that it was a misty night and the vessel was well lit meaning the birds were attracted to the light. While there were a number of heavy impacts with the deck and superstructures of the vessel the observer commented that the birds seemed in good condition and with no visible injuries. The skipper commented that this kind of event had not happened for 'a couple of years' he also commented that it was the second worst event he had seen.

Table 46: Method of interaction for a) protected species released alive and b) dead protected species in the inshore trawl fishery during the 2009/10 observer year.

a) Released alive

Species	Caught in net*	Impact against vessel*	Other	Total	Comments relating to 'Other' capture method
Seabirds					
Broad-billed prion			5	**5**	landed on deck, released unharmed
Cape petrels (Unidentified)			1	**1**	flew into cabin, released unharmed
Fairy prion			10	**10**	birds 'landing' on deck in mist at night
New Zealand white capped albatross	2			**2**	
Petrels, Prions and Shearwaters (Unidentified)			40	**40**	birds 'landing' on deck in mist at night
Sooty shearwater			30	**30**	birds 'landing' on deck in mist at night
Storm petrels (Unidentified)		1	1	**2**	landed on deck, released unharmed
Westland petrel			1	**1**	landed on deck, released unharmed
Total seabirds	**2**	**1**	**88**	**91**	
Total protected species interactions	**2**	**1**	**88**	**91**	

*Included as a capture in table 43

b) Dead

Species	Caught in net*	Caught on warp or door*	Total
Seabirds			
Albatross (Unidentified)		2	**2**
New Zealand white capped albatross		7	**7**
Salvin's albatross		4	**4**
Sooty shearwater	1		**1**
Spotted Shag	1		**1**
Total seabirds	**2**	**13**	**15**
Mammals			
Bottlenose dolphin	1		**1**
Total mammals	**1**	**0**	**1**
Total protected species interactions	**3**	**13**	**16**

*Included as a capture in table 43

Table 46 shows the distribution of seabird interactions over the 2009/10 observer year. This distribution is heavily influenced by the single large-scale event in January 2010. However, even if this event is discounted, the frequency of seabird interactions peaked during the January to February period of 2010. The sole marine mammal interaction occurred during June 2010 (Table 47).

Table 46: Seabird interactions in the inshore trawl fishery by area and month during the 2009/10 observer year. A zero indicates that no interactions are observed, a dash indicates that no coverage took place.

FMA	Jul-09	Aug-09	Sep-09	Oct-09	Nov-09	Dec-09	Jan-10	Feb-10	Mar-10	Apr-10	May-10	Jun-10	Total
1. AKE	0	0	-	-	-	-	-	0	0	-	0	0	0
2. CEE	-	-	-	-	-	-	-	-	-	-	-	-	0
3. SEC	-	-	-	-	4	0	4	3	0	-	-	-	11
4. SOE	-	-	-	-	-	-	-	-	-	-	-	-	0
5. SOU	-	-	-	-	-	1	83	9	-	1	-	-	94
6. SUB	-	-	-	-	-	-	-	-	-	-	-	-	0
7. CHA	-	-	-	-	0	0	5	2	-	-	-	-	7
8. CEW	-	-	-	-	-	-	-	-	-	-	-	-	0
9. AKW	-	-	-	-	-	-	-	-	-	-	-	-	0
10. KER	-	-	-	-	-	-	-	-	-	-	-	-	0
Total	0	0	0	0	4	1	92	14	0	1	0	0	112

Table 47: Mammal interactions in the inshore trawl fishery by area and month during the 2009/10 observer year. A zero indicates that no interactions are observed, a dash indicates that no coverage took place.

FMA	Jul-09	Aug-09	Sep-09	Oct-09	Nov-09	Dec-09	Jan-10	Feb-10	Mar-10	Apr-10	May-10	Jun-10	Total
1. AKE	0	0	-	-	-	-	-	0	0	-	0	1	1
2. CEE	-	-	-	-	-	-	-	-	-	-	-	-	0
3. SEC	-	-	-	-	0	0	0	0	0	-	-	-	0
4. SOE	-	-	-	-	-	-	-	-	-	-	-	-	0
5. SOU	-	-	-	-	-	0	0	0	-	0	-	-	0
6. SUB	-	-	-	-	-	-	-	-	-	-	-	-	0
7. CHA	-	-	-	-	0	0	0	0	-	-	-	-	0
8. CEW	-	-	-	-	-	-	-	-	-	-	-	-	0
9. AKW	-	-	-	-	-	-	-	-	-	-	-	-	0
10. KER	-	-	-	-	-	-	-	-	-	-	-	-	0
Total	0	0	0	0	0	0	0	0	0	0	0	1	1

Inshore bottom longline

As with other inshore fishing methods, observer coverage in the inshore bottom longline fishery has been generally limited. In the past it has aimed at focused time periods in selected ports or regions. Historically, interactions have been recorded with a number of protected species such as black petrels, flesh-footed shearwaters and white-chinned petrels. Mitigation techniques used and tested (to varying extents) in this fishery include; line weighting regimes, night setting, use of tori lines and use of fish oil to deter birds (Pierre & Norden 2006). The effectiveness of a range of mitigation practices is discussed in more detail in Rowe (2007). Since 12th April 2008 regulations on mitigation were introduced for all bottom longline vessels, covering night setting or line weighting, tori line, and offal/discard management[9].

The 2009/10 observer coverage in the inshore bottom longline fishery expanded upon the previous year's coverage and extended the range of the data collected both temporally and spatially. In planning and execution of the observer coverage, attempts were made to place observers in new ports and new vessels. Coverage was also planned for differing times of year in order to investigate some of the seasonal effects of seabird abundance and interactions with fisheries. Particular attention was paid to offal management practices and their effect on seabirds abundance and behaviour.

DOC provided turtle de-hooking devices to a wide group of inshore longline fishers. These were generally well received and allow for easy and humane de-hooking of not only turtles but also seals, sharks and a wide range of other bycatch. Educational material on how to use them was also distributed with these devices. Other mitigation work in this fishery since this reporting period includes CSP project MIT 2009/01 (Development of mitigation strategies: Inshore Fisheries), a project combining the raising of awareness among fishers and the investigation of the sink rates of line weighting currently used by inshore bottom longline vessels (Goad 2010). Other relevant previous CSP work has included 'advisory officers' learning about fishing practices and passing on knowledge regarding protected species behaviour and mitigation techniques in both the inshore ling, bluenose, häpuku, bass fishery to (Kellian 2004), and the inshore snapper fishery (Johnson 2005).

5.4.2 Inshore bottom longline - Ling, Bluenose, Häpuku and Bass

Bottom longline vessels targeting the species assemblage of ling, bluenose, häpuku and bass tend to fish wide areas , with fishing occurring in all FMAs and ranging from what is traditionally considered 'inshore' to the Chatham rise. These fishing grounds overlap with a number of protected species' ranges, including a number of petrel and albatross species. Historically coverage has focused on the areas CEE, SOE and SOU.

[9] Fisheries (Seabird Sustainability Measures- Bottom Longlines) Notice (No.2) 2008 (No. F411), New Zealand Gazette, No.69, pg1909 3 April 2008.

Commercial fishing effort, observer effort and protected species captures are summarised in Table 48. Observer coverage was spread more widely than in the previous year meaning that coverage was achieved in AKE, AKW, SEC and SOE (Ramm 2011). Nationwide three percent of inshore bottom longlining for the species assemblage of ling, bluenose, häpuku and bass was observed. This is an increase from 0.58% during the 2008/09 observer year.

Capture rate has increased from 0.022 birds per 1,000 hooks to 0.134 contributed to mainly by captures in AKE.

Table 48: Summary of commercial effort, observer effort and protected species captures in the inshore bottom longline fishery during the 2009/10 observer year.

FMA	Effort Lines	Observed Lines	Coverage (%)	Number of hooks observed	Seabird Captures*	Seabirds per 1000 hooks	Mammal Captures	Mammals per 1000 hooks
1. AKE	1477	73	4.94	56,522	29	0.513	0	0.000
2. CEE	2520	0	0.00	0	-	-	-	-
3. SEC	1126	53	4.71	49,450	3	0.061	0	0.000
4. SOE	1989	141	7.09	180,200	7	0.039	0	0.000
5. SOU	218	0	0.00	0	-	-	-	-
6. SUB	105	0	0.00	0	-	-	-	-
7. CHA	818	0	0.00	0	-	-	-	-
8. CEW	323	0	0.00	0	-	-	-	-
9. AKW	760	16	2.11	5,770	0	0.000	0	0.000
10. KER	0	0	-	-	-	-	-	-
Total	9,336	283	3.03	291,942	39	0.134	0	0.000

*Captures only, excludes deck strikes and other non-fishing interactions

Observer coverage

During the 2009/10 observer year; four observer trips were conducted onboard four vessels. Protected species captures occurred on three trips onboard three vessels. Fishing practices, mitigation use, weighting regimes and offal management was observed to vary widely between vessels. Comments relating to offal management, mitigation techniques and protected species interactions and captures (i.e. interactions with fishing gear only) for each vessel are given in Table A6.8.

Observer coverage was undertaken over a greater number of FMAs than the previous year when coverage occurred only in SEC (Ramm 2011). As with the previous year observer effort was separated into two, two month periods, winter and summer, however in contrast to the previous year effort began earlier in the summer and continues later in the autumn / winter period (Table 49).

Table 49: Number of observed lines in the inshore bottom longline fishery by area and month during the 2009/10 observer year.

FMA	Jul-09	Aug-09	Sept-09	Oct-09	Nov-09	Dec-09	Jan-10	Feb-10	Mar-10	Apr-10	May-10	Jun-10	Total
1. AKE	0	8	31	0	0	0	20	14	0	0	0	0	**73**
2. CEE	0	0	0	0	0	0	0	0	0	0	0	0	**0**
3. SEC	0	53	0	0	0	0	0	0	0	0	0	0	**53**
4. SOE	0	76	65	0	0	0	0	0	0	0	0	0	**141**
5. SOU	0	0	0	0	0	0	0	0	0	0	0	0	**0**
6. SUB	0	0	0	0	0	0	0	0	0	0	0	0	**0**
7. CHA	0	0	0	0	0	0	0	0	0	0	0	0	**0**
8. CEW	0	0	0	0	0	0	0	0	0	0	0	0	**0**
9. AKW	0	16	0	0	0	0	0	0	0	0	0	0	**16**
10. KER	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Total	**0**	**153**	**96**	**0**	**0**	**0**	**20**	**14**	**0**	**0**	**0**	**0**	**283**

Table 50 illustrates that, as with previous years, the majority of observed lines were targeting ling; however the number of bluenose and häpuku lines observed has increased compared to the previous year.

Table 50: Lines observed set in inshore fisheries bottom longline fisheries by area and target species during the 2009/10 observer year.

Target	1.AKE	3. SEC	4. SOE	9. AKW	Total
Bluenose	34	0	0	0	34
Häpuku	39	0	0	16	55
Ling	0	53	141	0	194
Total	73	53	141	16	283

Protected species interactions

Table 51 shows that interactions with black petrels were the most frequent in this fishery, however all of these interactions resulted in live release of animals. It is important to note that classifying an interaction as "released alive" is not an assessment of the long term survival of the birds nor an attempt to quantify the extent of injury, it is merely the status of the bird when it is released from the vessel. Twenty seven interactions were observed on one vessel, 26 of them black petrels. As shown in Table 52, 25 of the 27 black petrels were caught on hooks; these animals were all captured at the time of hauling pointing to a need for further mitigation at this stage of the fishing cycle. While these birds were released alive, observer comments indicate that most obtained some form of injury. This combined with the inconvenience for crew in handling these birds point to a potential area of mutual benefit by reducing captures of this nature.

Table 51: Protected species interactions with the ling, bluenose, häpuku, bass inshore bottom longline fisher during the 2009/10 observer year.

Species	Alive	Dead	Decomposing	Total
Seabirds				
Black petrel	27			**27**
Cape petrels (Unidentified)	1	1		**2**
Chatham albatross		1		**1**
Chatham Island albatross	1			**1**
Flesh-footed shearwater	1			**1**
Grey petrel		2	1	**3**
Salvin's albatross	1			**1**
Southern cape petrel		1		**1**
White-chinned petrel		1		**1**
White-faced storm petrel	1			**1**
Total seabirds	**32**	**6**	**1**	**39**
Total protected species interactions	**32**	**6**	**1**	**39**

Table 52: Method of interaction for a) protected species released alive and b) dead protected species, as recorded on the observer non-fish bycatch form.

a) Released alive

Species	Caught on hook*	Other	Tangled in line*	Total	Comments relating to 'Other' capture method
Seabirds					
Black petrel	25	1	1	**27**	bird washed onto deck through gap in stern during hauling, released by crew
Cape petrels (Unidentified)	1			**1**	
Chatham Island albatross		1		**1**	
Flesh-footed shearwater	1			**1**	
Salvin's albatross	1			**1**	
White-faced storm petrel		1		**1**	made it's way into the wheelhouse at night, released by observer
Total seabirds	**28**	**3**	**1**	**32**	
Total protected species interactions	**28**	**3**	**1**	**32**	

*Included as a capture in table 48

b) Dead

Species	Caught on hook*	Tangled in line*	Total
Seabirds			
Cape petrels		1	**1**
Chatham albatross	1		**1**
Grey petrel	1	1	**2**
Southern cape petrel	1		**1**
White-chinned petrel	1		**1**
Total seabirds	**4**	**2**	**6**
Total protected species interactions	**4**	**2**	**6**

*Included as a capture in table 48

Table 53 shows that interactions were highly clumped in their distribution with January and February 2010 accounting for all but three of the captures, this is a reflection of the capture events onboard the one vessel.

Table 53: Seabird interactions in the inshore bottom longline fishery by area and month during the 2009/10 observer year. A zero indicates that no interactions are observed, a dash indicates that no coverage took place.

FMA	Jul-09	Aug-09	Sep-09	Oct-09	Nov-09	Dec-09	Jan-10	Feb-10	Mar-10	Apr-10	May-10	Jun-10	Total
1. AKE	-	0	0	-	-	-	15	14	-	-	-	-	29
2. CEE	-	-	-	-	-	-	-	-	-	-	-	-	0
3. SEC	-	0	-	-	-	-	-	-	-	-	-	-	0
4. SOE	-	0	3	-	-	-	-	-	-	-	-	-	3
5. SOU	-	-	-	-	-	-	-	-	-	-	-	-	0
6. SUB	-	-	-	-	-	-	-	-	-	-	-	-	0
7. CHA	-	-	-	-	-	-	-	-	-	-	-	-	0
8. CEW	-	-	-	-	-	-	-	-	-	-	-	-	0
9. AKW	-	0	-	-	-	-	-	-	-	-	-	-	0
10. KER	-	-	-	-	-	-	-	-	-	-	-	-	0
Total	0	0	3	0	0	0	15	14	0	0	0	0	32

5.4.3 Inshore bottom longline - Snapper

CSP observer coverage of the bottom longline snapper fishery began in 2004/05 and continued into the 2005/06 observer year, focusing on the summer months and largely on AKE. Interactions have been recorded with black and grey-faced petrel, flesh-footed, Buller's and fluttering shearwaters, pied shag, red-billed gull, Australasian gannet and green turtle (CSP, 2011). No coverage was undertaken in this fishery in 2007/08.

Since 12th April 2008 bottom liners have been required to employ mitigation such as night setting, line weighting regimes and use of tori lines.

Turtle de-hookers and bird identification guides have been distributed to vessels in this fishery. Mitigation officers have been employed in this fishery with work undertaken to look at line-sink rates and the factors that affect them. CSP has also provided funding and technical support for the development of devices designed to set the longline at depths, steepening the angle which the line enters the waster and so reducing the availability of baits to seabirds.

Table 54 summarises the commercial effort, observer effort and protected species captures in the snapper inshore bottom longline fishery. Both commercial fishing activity and observer effort increased compared to the previous observer year (Ramm 2011). Almost 500 lines were observed in this fishery during 2009/10 equating to a coverage level of 7.98%, the highest level of coverage ever achieved.

Table 54: Summary of commercial effort, observer effort and protected species captures in the snapper inshore bottom longline fishery during the 2009/10 observer year.

FMA	Effort Lines	Observed Lines	Coverage (%)	Number of hooks observed	Seabird Captures*	Seabirds per 1000 hooks	Mammal Captures	Mammals per 1000 hooks
1. AKE	6029	494	8.19	671,645	30	0.045	0	0.000
2. CEE	0	-	-	-	-	-	-	-
3. SEC	2	0	0.00	-	-	-	-	-
4. SOE	0	-	-	-	-	-	-	-
5. SOU	0	-	-	-	-	-	-	-
6. SUB	0	-	-	-	-	-	-	-
7. CHA	8	0	0.00	-	-	-	-	-
8. CEW	15	0	0.00	-	-	-	-	-
9. AKW	137	0	0.00	-	-	-	-	-
10. KER	0	-	-	-	-	-	-	-
Total	**6,191**	**494**	**7.98**	**671,645**	**30**	**0.045**	**0**	**0.000**

*Captures only, excludes deck strikes and other non-fishing interactions

Observer coverage

During 2009/10 33 observer trips were conducted onboard 33 vessels. Protected species captures occurred onboard 12 vessels, with one vessels accounting for 18 of the 30 captures. Comments relating to offal management, mitigation techniques, protected species interactions and captures (i.e. interactions with fishing gear only) for each vessel observed are given in Table A6.9.

Table 55 shows the distribution of observer effort over the 2009/10 observer year. Effort was distributed from November through to June, which represents the widest seasonal spread of observer coverage to date. While coverage in the previous year began in March covering late summer through to winter, the 2009/10 observer coverage commenced in November 2009 and proceeded steadily until May 2010 (Ramm 2011).

Table 55: Number of observed lines in the snapper inshore bottom longline fishery by area and month during the 2009/10 observer year.

FMA	Jul-09	Aug-09	Sep-09	Oct-09	Nov-09	Dec-09	Jan-10	Feb-10	Mar-10	Apr-10	May-10	Jun-10	Total
1. AKE	0	0	0	0	33	52	79	83	110	73	58	6	494
2. CEE	0	0	0	0	0	0	0	0	0	0	0	0	0
3. SEC	0	0	0	0	0	0	0	0	0	0	0	0	0
4. SOE	0	0	0	0	0	0	0	0	0	0	0	0	0
5. SOU	0	0	0	0	0	0	0	0	0	0	0	0	0
6. SUB	0	0	0	0	0	0	0	0	0	0	0	0	0
7. CHA	0	0	0	0	0	0	0	0	0	0	0	0	0
8. CEW	0	0	0	0	0	0	0	0	0	0	0	0	0
9. AKW	0	0	0	0	0	0	0	0	0	0	0	0	0
10. KER	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	33	52	79	83	110	73	58	6	494

Protected species interactions

Table 56 indicates that as in the previous year, all protected species interactions were with seabirds. These were predominantly black petrels and flesh-footed shearwaters; the species assemblage for the 2009/10 observer year was broadly inline with previous year's coverage (Ramm 2011, Rowe 2010) however the addition of a black-browed albatross and Southern royal albatross are of note as it is the first time albatross species have been observed interacting with the snapper bottom longline fishery. The interactions were evenly spit between live releases and mortalities

Table 56: Protected species interactions with the snapper inshore bottom longline fishery during the 2009/10 observer year.

Species	Alive	Dead	Total
Seabirds			
Black petrel	4	13	**17**
Black-browed albatross (Unidentified)	1		**1**
Buller's shearwater	1		**1**
Flesh-footed shearwater	8	7	**15**
Fluttering shearwater	2		**2**
Northern giant petrel	1		**1**
Shearwaters	1		**1**
Sooty shearwater		1	**1**
Southern royal albatross	1		**1**
Storm petrels (Unidentified)	1		**1**
White-faced storm petrel	3		**3**
Total seabirds	**23**	**21**	**44**
Total protected species interactions	**22**	**22**	**44**

Table 57 shows that hook captures were the most common form of interaction leading to mortalities while forms of vessel impacts were the most common for live releases. While during the previous year almost a third of seabirds caught on hooks were released alive only one was recorded during 2009/10 (Ramm 2011). As with previous years, line entanglements were observed to result in a mixture of mortalities and live releases. Both albatross interactions were not directly linked to fishing activity and resulted in live releases.

Table 57: Method of interaction for a) protected species released alive and b) dead protected species in the snapper inshore bottom longline fishery.

a) Alive

Species	Caught on hook*	Impact against vessel	Tangled in line*	Other	Unknown	Total	Comments relating to 'Other' capture method
Seabirds							
Black petrel		2			2	**4**	
Black-browed albatross (Unidentified)				1		**1**	found at rear of vessel on large table, released unharmed
Buller's shearwater			1			**1**	
Flesh-footed shearwater	1	6		1		**8**	brought onboard by scoop/ net, released unharmed
Fluttering shearwater			1			**1**	
Northern giant petrel		1				**1**	
Shearwaters (Unidentified)					1	**1**	
Southern royal albatross				1		**1**	brought onboard by scoop / net, released unharmed
Storm petrels (Unidentified)			1			**1**	
White-faced storm petrel					3	**3**	
Total seabirds	**1**	**9**	**3**	**3**	**6**	**22**	
Total protected species interactions	**1**	**9**	**3**	**3**	**6**	**22**	

*Included as a capture in table 54

b) Dead

Species	Caught on hook*	Tangled in line*	Total
Seabirds			
Black petrel	12	1	**13**
Flesh-footed shearwater	6	1	**7**
Sooty shearwater	1		**1**
Total seabirds	**19**	**2**	**21**
Total protected species interactions	**19**	**2**	**21**

*Included as a capture in table 54

Table 57 shows that seabird interactions occurred during all months of observer coverage, also occurring roughly in proportion with observer coverage (Table 55). April 2010 showed a large peak in interaction rates, this represents the captures which occurred on a single vessel over a three week period with steady numbers of captures during the trip rather than a single large event. Observer comments indicate a number of factors which contributed to the disproportionately high number of captures on this vessel including the use of less than half the line weighting of other vessels. The skipper was also new to longlining, having come from a trawling background. The crew discarded offal during hauling and multiple problems were recorded with the tori line. The observer noted a significant increase on bird abundance with

proximity to both Great Barrier Island and Little Barrier Island. Captures were also observed to increase with proximity to Great Barrier Island.

Table 58: Seabird interactions in the snapper inshore bottom longline fishery, by area and month during the 2009/10 observer year. A zero indicates that no interactions are observed, a dash indicates that no coverage took place.

FMA	Jul-09	Aug-09	Sep-09	Oct-09	Nov-09	Dec-09	Jan-10	Feb-10	Mar-10	Apr-10	May-10	Jun-10	Total
1. AKE	-	-	-	-	2	2	5	5	6	19	3	1	43
2. CEE	-	-	-	-	-	-	-	-	-	-	-	-	0
3. SEC	-	-	-	-	-	-	-	-	-	-	-	-	0
4. SOE	-	-	-	-	-	-	-	-	-	-	-	-	0
5. SOU	-	-	-	-	-	-	-	-	-	-	-	-	0
6. SUB	-	-	-	-	-	-	-	-	-	-	-	-	0
7. CHA	-	-	-	-	-	-	-	-	-	-	-	-	0
8. CEW	-	-	-	-	-	-	-	-	-	-	-	-	0
9. AKW	-	-	-	-	-	-	-	-	-	-	-	-	0
10. KER	-	-	-	-	-	-	-	-	-	-	-	-	0
Total	0	0	0	0	2	2	5	5	6	19	3	1	43

5.4.4 Setnet

Setnet fisheries have received only sporadic observer coverage in previous years, due in part to the difficulty of placing observers onboard these generally very small vessels. Even with low levels of coverage however, captures of a number of protected species have been reported, including Hector's dolphins, white pointer sharks, yellow-eyed penguins, shags, sooty shearwaters and Westland petrels. Setnet is one of the few fisheries, like inshore trawl by vessels under 28m, which does not have any regulated mitigation requirements.

The 2008/09 observer year saw increased observer coverage as part of the Hector's and Maui's TMP. The observer coverage followed extensive area closures which resulted in commercial setnetting being prohibited within 4 nautical miles of the coastline around most of the country. This altered fishing practices significantly. Overall in 2008/09 setnetting effort reduced (Ramm 2011), but during 2009/10 commercial fishing effort increased to above pre-closure levels. For 2009/10 there was a large increase in observer effort in SOU, while effort reduced slightly in SEC, resulting in a similar number of nets being observed overall to the previous year (Table 59).

Inline with the previous observer years, the majority of observer effort occurred in SEC with 730 nets being observed; this resulted in 18% coverage. The highest level of coverage occurred in SOU where the 282 nets equated to 50% observer coverage. A limited amount of observer coverage occurred in AKE however this equated to less than one percent of commercial effort in that area.

Table 59: Summary of commercial effort, observer effort and protected species captures in the inshore setnet fishery during the 2009/10 observer year.

FMA	Effort Nets	Observed Nets	Coverage (%)	Length of nets observed (m)	Seabird Captures*	Seabirds per 1000m net	Mammal Captures	Mammals per 1000m net	Protected Fish Captures	Protected Fish per 1000m net
1. AKE	7483	8	0.11	4,828	0	0.000	0	0.000	0	0.000
2. CEE	1588	0	0.00	0	-	-	-	-	-	-
3. SEC	4025	730	18.14	339,351	4	0.012	7	0.021	0	0.000
4. SOE	13	0	0.00	0	-	-	-	-	-	-
5. SOU	564	282	50.00	315,840	4	0.013	3	0.009	1	0.003
6. SUB	3	0	0.00	0	-	-	-	-	-	-
7. CHA	710	0	0.00	0	-	-	-	-	-	-
8. CEW	1928	0	0.00	0	-	-	-	-	-	-
9. AKW	7446	0	0.00	0	-	-	-	-	-	-
10. KER	1	0	0.00	0	-	-	-	-	-	-
Total	**23,761**	**1,020**	**4.29**	**660,019**	**8**	**0.012**	**10**	**0.015**	**1**	**0.002**

*Captures only, excludes deck strikes and other non-fishing interactions

Observer coverage

During 2009/10 15 observer trips were conducted onboard 15 vessels. Protected species interactions occurred onboard 9 vessels. Offal management was observed to be practiced on one form or another onboard most vessels, however as with the previous observer year use of pingers as a form of mitigation was rare. Comments relating to offal management, mitigation techniques and protected species interactions and captures (interactions with the fishing gear only) are given in Table A6.10. Bird abundance was observed to be highest while the vessel processed their catch and discharged offal.

The spread of observer coverage during 2009/10 was greater than in previous years (Table 60) with 6 months of coverage being achieved. Coverage peaked in November 2009 and continued through the summer period. This coincided roughly with peak fishing effort.

Table 60: Number of observed nets in the inshore setnet fishery by area and month during the 2009/10 observer year.

FMA	Jul-09	Aug-09	Sep-09	Oct-09	Nov-09	Dec-09	Jan-10	Feb-10	Mar-10	Apr-10	May-10	Jun-10	Total
1. AKE	0	0	0	0	0	0	0	0	0	8	0	0	**8**
2. CEE	0	0	0	0	0	0	0	0	0	0	0	0	**0**
3. SEC	0	0	0	0	242	160	197	101	30	0	0	0	**730**
4. SOE	0	0	0	0	0	0	0	0	0	0	0	0	**0**
5. SOU	0	0	0	0	26	29	98	80	10	39	0	0	**282**
6. SUB	0	0	0	0	0	0	0	0	0				**0**
7. CHA													**0**
8. CEW													**0**
9. AKW													**0**
10. KER													**0**
Total	**0**	**0**	**0**	**0**	**268**	**189**	**295**	**181**	**40**	**47**	**0**	**0**	**1,020**

Protected species interactions

Interactions with protected species are reported in Table 61. Unlike the previous year, the majority of protected species interactions resulted in mortalities. Marine mammal captures made up a significant portion of the overall interactions. Rate of mammal captures increased over the previous year from 0.004 mammals pre 1000m of net to 0.015 (Ramm 2011). Two Hector's dolphin captures is the highest recorded in any year. As occured in the previous year, a white pointer shark was captured in SOU, however unlike the previous year this animal was able to be released alive. The Fiordland crested penguin and Stewart Island shag captures were the first recorded for these species. Westland petrels were the single most commonly interacting species, all were released alive and were reported as having impacted with the vessel (Table 62).

Net capture was the most common form of interaction leading to mortalities. Compared to the previous year very few seabirds were caught in the net on hauling (Ramm 2011). Dolphin captures occurred across the entire SEC coastline, with one Hector's and one dusky dolphin captured in the Kaiköura region, the other Hector's capture occurring North of Timaru while the second dusky dolphin capture occurred North of Dunedin.

Table 61: Protected species interactions with the inshore setnet fishery during the 2009/10 observer year.

Species	Alive	Dead	Decomposing	Total
Seabirds				
Fiordland crested penguin		1		1
Pied shag		1		1
Spotted Shag		2		2
Stewart Island shag		2		2
Westland petrel	7			7
White-chinned petrel	1			1
Yellow-eyed penguin		1		1
Total seabirds	8	7	0	15
Mammals				
Dusky dolphin		2		2
Hector's dolphin		2		2
New Zealand fur seal		5	1	6
Total mammals	0	9	1	10
Protected Fish				
White pointer shark	1			1
Total protected fish	1	0	0	1
Total protected species interactions	9	16	1	26

Table 62: Method of interaction for a) protected species released alive and b) dead protected species in the inshore setnet fishery.

a) Alive

Species	Caught in net*	Impact against vessel	Total
Seabirds			
Westland petrel		7	7
White-chinned petrel	1		1
Total seabirds	1	7	8
Fish			
White pointer shark	1		1
Total Fish	1	0	1
Total protected species interactions	1	7	8

*Included as a capture in table 59

b) Dead

Species	Caught in net*	Total
Seabirds		
Fiordland crested penguin	1	**1**
Pied shag	1	**1**
Spotted Shag	2	**2**
Stewart Island shag	2	**2**
Yellow-eyed penguin	1	**1**
Total seabirds	**7**	**7**
Mammals		
Dusky dolphin	2	**2**
Hector's dolphin	2	**2**
New Zealand fur seal	5	**5**
Total mammals	**9**	**9**
Total protected species interactions	**16**	**16**

*Included as a capture in table 59

Tables 63 and 64 show the distribution of seabird and dolphin interactions throughout the year. Interactions occurred reasonably steadily throughout the course of coverage however interactions were more common at in early November and December for seabirds and during the peak summer months for mammals.

Table 63: Seabird interactions in the inshore setnet fishery, by area and month during the 2009/10 observer year. A zero indicates that no interactions are observed, a dash indicates that no coverage took place.

FMA	Jul-09	Aug-09	Sep-09	Oct-09	Nov-09	Dec-09	Jan-10	Feb-10	Mar-10	Apr-10	May-10	Jun-10	Total
1. AKE	-	-	-	-	-	-	-	-	-	0	-	-	**0**
2. CEE	-	-	-	-	-	-	-	-	-	-	-	-	**0**
3. SEC	-	-	-	-	1	3	0	1	0	-	-	-	**5**
4. SOE	-	-	-	-	-	-	-	-	-	-	-	-	**0**
5. SOU	-	-	-	-	7	1	0	2	0	0	-	-	**10**
6. SUB	-	-	-	-	-	-	-	-	-				**0**
7. CHA													**0**
8. CEW													**0**
9. AKW													**0**
10. KER													**0**
Total	**0**	**0**	**0**	**0**	**8**	**4**	**0**	**3**	**0**	**0**	**0**	**0**	**15**

Table 64: Mammal interactions in the inshore setnet fishery, by area and month during the 2009/10 observer year. A zero indicates that no interactions are observed, a dash indicates that no coverage took place.

FMA	Jul-09	Aug-09	Sep-09	Oct-09	Nov-09	Dec-09	Jan-10	Feb-10	Mar-10	Apr-10	May-10	Jun-10	Total
1. AKE	-	-	-	-	-	-	-	-	-	0	-	-	0
2. CEE	-	-	-	-	-	-	-	-	-	-	-	-	0
3. SEC	-	-	-	-	1	3	2	1	0	-	-	-	7
4. SOE	-	-	-	-	-	-	-	-	-	-	-	-	0
5. SOU	-	-	-	-	0	0	1	2	0	0	-	-	3
6. SUB	-	-	-	-	-	-	-	-	-				0
7. CHA													0
8. CEW													0
9. AKW													0
10. KER													0
Total	0	0	0	0	1	3	3	3	0	0	0	0	10

5.5 SURFACE LONGLINE FISHERIES

5.5.1 Charter tuna

The charter tuna surface longline fishery (Southern bluefin and bigeye tuna) has historically received high levels of observer coverage; as with the previous year, the 2009/10 observer year saw all fishing trips on all tuna charter vessels observed, with at least a portion of each line set being observed. The majority of fishing effort occurs in the areas SOU and CHA. Historically this fishery has had high capture numbers though this has reduced in recent years. Protected species captures have generally been of albatross and petrel species, although small numbers of marine mammals have also been captured in this fishery.

All surface longline vessels are required to use seabird mitigation methods, with the requirement for night setting or line weighting, and the use of tori lines whilst setting. Vessels were generally observed to use up to three tori lines while setting, and some also employed 'gas cannons' which produce loud booming sound in order to scare birds away from the bait entry point. Mitigation devices were also used at the point of hauling; with brikle curtains[10] and water cannons being most common. Additionally, CSP has provided turtle dehooking equipment to all foreign charter vessels. An MFish research project was undertaken into the efficacy of various tori line designs. During the course of this research, two distinct types of tori line were trialled- these varied from the specifications laid out in the fisheries regulations, meaning that vessels were given special exemptions to fish with non-compliant tori lines. Species specific bycatch limits were set for the trial in the event that higher numbers of birds were captured. It is outside of the scope of this report to discuss these trials, as analysis has not yet been completed by MFish.

Table 65 summarises commercial fishing effort, observer effort and captures during the 2009/10 observer year. Commercial effort was down to 166 lines compared to the previous year's 199 (Ramm 2011) and observations were made on every line set. The majority of fishing effort was made in SOU; this is in contrast to the previous year where most effort was undertaken in CHA. The 2009/10 observer year had the highest number of protected species captures since 2006/07. While fishing effort reduced, the captures of seabirds and marine mammals increased. Overall seabird captures increased from 33 in 2008/09 to 65 in 2009/10 and mammals captures increased from 11 to 16 over the same period. Seabird captures were recorded in every FMA where fishing effort occurred, in contrast marine mammal captures only occurred in CHA.

[10] A brikle curtain is a frame which is set up above the point of hauling on some longline vessels it is equipped with streamers which hang down to the water level in order to work as a physical barrier, discouraging birds from feeding on the hauling line.

Table 65: Summary of commercial effort, observer effort and protected species captures in the Tuna charter surface longline fishery during the 2009/10 observer year.

FMA	Effort Sets	Observed Sets	Coverage (%)	Number of hooks observed	Seabird Captures*	Seabirds per 1000 Hooks	Mammal Captures	Mammals per 1000 Hooks
1. AKE	0	0	-	-	-	-	-	-
2. CEE	21	21	100.00	53,265	9	0.169	0	0.000
3. SEC	0	0	-	-	-	-	-	-
4. SOE	0	0	-	-	-	-	-	-
5. SOU	120	120	100.00	320,542	46	0.144	16	0.050
6. SUB	0	0	-	-	-	-	-	-
7. CHA	25	25	100.00	69,931	10	0.143	0	0.000
8. CEW	0	0	-	-	-	-	-	-
9. AKW	0	0	-	-	-	-	-	-
10. KER	0	0	-	-	-	-	-	-
Total	166	166	100.00	443,738	65	0.146	16	0.036

*Captures only, excludes deck strikes and other non-fishing interactions

Observer coverage

During the 2009/10 observer year six observer trips were undertaken onboard the four foreign charter surface longliners fishing in the New Zealand EEZ. Protected species captures occurred onboard all six observer trips and hence on all four vessels. Comments relating to offal management and mitigation are included in Table A6.11. Observer comments refer to the trailed tori lines tangling in higher wind conditions due to their light construction and lack of swivels. This meant that their aerial coverage was limited. observer comments do indicate however that the problems with the trialled tori lines were not the only factors which appeared to contribute to the high capture rates; they also point to high bird abundances, particularly Buller's albatross, and aggressive feeding behaviour by the birds in attendance.

Table 66 shows a limited amount of coverage occurred in July 2009, this was the remainder of some trips which departed in the previous observer year. The majority of observer coverage was undertaken through the three months April 10 to June 10 with some trips overlapping into the 2010/11 observer year.

Table 66: Number of observed lines in the Tuna charter surface longline fishery by area and month during the 2009/10 observer year.

FMA	Jul-09	Aug-09	Sep-09	Oct-09	Nov-09	Dec-09	Jan-10	Feb-10	Mar-10	Apr-10	May-10	Jun-10	Total
1. AKE	0	0	0	0	0	0	0	0	0	0	0	0	0
2. CEE	21	0	0	0	0	0	0	0	0	0	0	0	21
3. SEC	0	0	0	0	0	0	0	0	0	0	0	0	0
4. SOE	0	0	0	0	0	0	0	0	0	0	0	0	0
5. SOU	0	0	0	0	0	0	0	0	0	2	101	17	120
6. SUB	0	0	0	0	0	0	0	0	0	0	0	0	0
7. CHA	1	0	0	0	0	0	0	0	0	0	13	11	25
8. CEW	0	0	0	0	0	0	0	0	0	0	0	0	0
9. AKW	0	0	0	0	0	0	0	0	0	0	0	0	0
10. KER	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	22	0	0	0	0	0	0	0	0	2	114	28	166

Protected species interactions

In total there were 81 protected species interactions, an increase from 44 the previous observer year (Ramm 2011). Fifty percent of seabirds were released alive, while all fur seals were able to be released alive by cutting the snood. As in the previous observer year, interactions were dominated by Buller's albatross. Albatross species in general made up 88% of the seabird interactions. Buller's in particular were observed to feed aggressively during shooting and primarily hauling. The numbers of seabirds around the vessels were observed to change in response to vessel numbers; when vessel numbers began to reduce the abundance of seabirds in attendance of each vessel increased.

Table 67: Protected species interactions with the Tuna charter surface longline fishery during the 2009/10 observer year.

Species	Alive	Dead	Total
Seabirds			
Albatross (Unidentified)	1		**1**
Buller's albatross	30	12	**42**
Gibson's albatross		1	**1**
Grey petrel		5	**5**
New Zealand white capped albatross	2	9	**11**
Salvin's albatross		2	**2**
Westland petrel		1	**1**
White-chinned petrel		2	**2**
Total seabirds	**33**	**32**	**65**
Mammals			
New Zealand fur seal	16		**16**
Total mammals	**16**	**0**	**16**
Total protected species interactions	**49**	**32**	**81**

Table 68 shows that the majority of protected species interactions occurred in the form of hook captures including all fur seal interactions. Some albatross were observed to be tangled in the backbone.

Table 68: Method of interaction for protected species captured in the Tuna charter surface longline fishery by area and month during the 2009/10 observer year.

Species	Caught on hook*	Tangled in line*	Unknown	Total
Seabirds				
Albatross (Unidentified)		1		**1**
Buller's albatross	35	6	1	**42**
Gibson's albatross	1			**1**
Grey petrel	4		1	**5**
New Zealand white capped albatross	10	1		**11**
Salvin's albatross	2			**2**
Westland petrel	1			**1**
White-chinned petrel	2			**2**
Total seabirds	**55**	**8**	**2**	**65**
Mammals				
New Zealand fur seal	16			**16**
Total mammals	**16**	**0**	**0**	**16**
Total protected species interactions	**71**	**8**	**2**	**81**

*Included as a capture in table 65

Table 69 shows the distribution of seabird interactions throughout the 2009/10 observer year. Interactions occurred in all months where significant effort took place, this is in line with the previous observer year (Ramm 2011). Seabird interactions peaked during May 2010, fur seal interactions also peaked during this month (Table 70).

Table 69: Seabird interactions in the Tuna charter surface longline fishery by area and month during the 2009/10 observer year. A zero indicates that no interactions are observed, a dash indicates that no coverage took place.

FMA	Jul-09	Aug-09	Sep-09	Oct-09	Nov-09	Dec-09	Jan-10	Feb-10	Mar-10	Apr-10	May-10	Jun-10	Total
1. AKE	-	-	-	-	-	-	-	-	-	-	-	-	**0**
2. CEE	9	-	-	-	-	-	-	-	-	-	-	-	**9**
3. SEC	-	-	-	-	-	-	-	-	-	-	-	-	**0**
4. SOE	-	-	-	-	-	-	-	-	-	-	-	-	**0**
5. SOU	-	-	-	-	-	-	-	-	-	0	39	7	**46**
6. SUB	-	-	-	-	-	-	-	-	-	-	-	-	**0**
7. CHA	0	-	-	-	-	-	-	-	-	-	6	4	**10**
8. CEW	-	-	-	-	-	-	-	-	-	-	-	-	**0**
9. AKW	-	-	-	-	-	-	-	-	-	-	-	-	**0**
10. KER	-	-	-	-	-	-	-	-	-	-	-	-	**0**
Total	**9**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**45**	**11**	**65**

Table 70: Marine mammal interactions in the Tuna charter surface longline fishery by area and month during the 2009/10 observer year. A zero indicates that no interactions are observed, a dash indicates that no coverage took place.

FMA	Jul-09	Aug-09	Sep-09	Oct-09	Nov-09	Dec-09	Jan-10	Feb-10	Mar-10	Apr-10	May-10	Jun-10	Total
1. AKE	-	-	-	-	-	-	-	-	-	-	-	-	0
2. CEE	0	-	-	-	-	-	-	-	-	-	-	-	0
3. SEC	-	-	-	-	-	-	-	-	-	-	-	-	0
4. SOE	-	-	-	-	-	-	-	-	-	-	-	-	0
5. SOU	-	-	-	-	-	-	-	-	-	1	13	2	16
6. SUB	-	-	-	-	-	-	-	-	-	-	-	-	0
7. CHA	0	-	-	-	-	-	-	-	-	-	0	0	0
8. CEW	-	-	-	-	-	-	-	-	-	-	-	-	0
9. AKW	-	-	-	-	-	-	-	-	-	-	-	-	0
10. KER	-	-	-	-	-	-	-	-	-	-	-	-	0
Total	0	0	0	0	0	0	0	0	0	1	13	2	16

5.5.2 Domestic tuna and swordfish

The domestic tuna and swordfish fishery (targeting bigeye, Southern bluefin and swordfish) has historically had low observer coverage, due to issues similar to the inshore fishery in that there are inherent difficulties in placing observers on these small vessels which generally work irregular patterns. Consequently data on this fleet's interactions with protected species are poor. This fishery has undergone significant changes in recent years with the fleet reducing to about a third of the number of vessels over the past 5 years. Southern bluefin tuna, bigeye tuna and swordfish were introduced into the quota system in on at the start of the 2004/05 fishing year. After a large capture event during November 2006 regulations were put in place requiring departure notices and seabird mitigation use (deployment of a streamer line and either line weighting or night setting). CSP has also distributed turtle dehookers to aid in the quick and efficient release of not only turtles but also fur seals and a number of fish species.

Commercial fishing effort, observer coverage and protected species captures are summarised in Table 71. Both commercial fishing effort and observer effort increased compared to the previous observer year (Ramm 2011). Overall 7% of fishing effort was observed in the domestic surface longline fishery. Commercial fishing effort was highest in CEE and AKE, likewise observer effort was also focused on these areas. AKW received the highest levels of coverage at 17%.

Seabird captures showed a large increase over the previous year rising to 81 from 14 the previous year. This can mainly be attributed to a capture event over several sets on a single vessel operating in CHA which is described below. Marine mammal captures also increased from eight the previous year to 11.

Table 71: Summary of commercial effort, observer effort and protected species captures in the domestic tuna surface longline fishery during the 2009/10 observer year.

FMA	Effort Sets	Observed Sets	Coverage (%)	Number of hooks observed	Seabird Captures*	Seabirds per 1000 Hooks	Mammal Captures	Mammals per 1000 Hooks
1. AKE	1028	91	8.85	80,648	24	0.298	8	0.099
2. CEE	1171	50	4.27	52,006	11	0.212	0	0.000
3. SEC	0	0	-	-	-	-	-	-
4. SOE	0	0	-	-	-	-	-	-
5. SOU	0	0	-	-	-	-	-	-
6. SUB	0	0	-	-	-	-	-	-
7. CHA	186	9	4.84	11,000	43	3.909	3	0.273
8. CEW	3	0	0.00	-	-	-	-	-
9. AKW	278	48	17.27	47,695	3	0.063	0	0.000
10. KER	44	0	0.00	-	-	-	-	-
Total	**2,710**	**198**	**7.31**	**191,349**	**81**	**0.423**	**11**	**0.057**

*Captures only, excludes deck strikes and other non-fishing interactions

Observer coverage

During 2009/10 19 observer trips were undertaken onboard 16 domestic surface longline vessels. Protected species captures occurred on 10 trips onboard eight separate vessels. Comments relating to offal management, mitigation techniques and protected species interactions or captures (i.e. interactions with the fishing gear only) for each vessel observed are given in Table A6.12.

Observer coverage occurred mainly around the top of the North Island, with the highest amounts of observer effort occurring in AKE. Observer coverage was relatively evenly spread throughout the year, with a reduction between February and April 2010.

Table 72: Number of observed lines in the domestic tuna surface longline fishery by area and month during the 2009/10 observer year.

FMA	Jul-09	Aug-09	Sep-09	Oct-09	Nov-09	Dec-09	Jan-10	Feb-10	Mar-10	Apr-10	May-10	Jun-10	Total
1. AKE	21	5	7	9	11	12	18	2	6	0	0	0	**91**
2. CEE	1	0	0	0	0	0	0	0	0	3	26	20	**50**
3. SEC	0	0	0	0	0	0	0	0	0	0	0	0	**0**
4. SOE	0	0	0	0	0	0	0	0	0	0	0	0	**0**
5. SOU	0	0	0	0	0	0	0	0	0	0	0	0	**0**
6. SUB	0	0	0	0	0	0	0	0	0	0	0	0	**0**
7. CHA	0	0	0	0	0	0	0	0	0	0	0	9	**9**
8. CEW	0	0	0	0	0	0	0	0	0	0	0	0	**0**
9. AKW	5	14	12	4	4	0	9	0	0	0	0	0	**48**
10. KER	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Total	**27**	**19**	**19**	**13**	**15**	**12**	**27**	**2**	**6**	**3**	**26**	**29**	**198**

Protected species interactions

Table 73 shows that a total 93 protected species interactions were observed, an increase of 71 over the previous observer year (Ramm 2011). As with the charter tuna fishery, the majority of observed captures were albatross species. Ninety percent of seabird interactions resulted in mortalities, however all fur seal interactions resulted in live releases.

Forty two of the 93 captures occurred on one vessel over a three day period, all interactions were hook captures and all but two of these interactions resulted in mortalities which would indicate that the majority of captures occurred on setting. Observer comments from this trip point to a number of contributing factors; the vessel was under new ownership and the crew were new entrants to this fishery. The gear was relatively light, without use of weighted swivels on the snoods. Squid was used as bait and while it was thawed it was also fount to be very large (up to 20cm) which would have reduced the sink rates of the hooks. The vessel was using a well specified tori line, however this was observed to be having limited effect on seabirds as they continued to aggressively feed on the setting hooks. Two further contributing factors were that captures occurred over the period of the full moon and the vessel was very well lit, meaning that it was visible from a great distance. Following these captures the observer assisted crew with mitigation methods and advice, and the vessel returned to port. The next trip by this vessel was also observed and no more captures were observed.

Table 73: Protected species interactions with the domestic tuna surface longline fishery during the 2009/10 observer year.

Species	Alive	Dead	Total
Seabirds			
Albatross (Unidentified)		1	**1**
Antipodean albatross	2	3	**5**
Black petrel	1	5	**6**
Black-browed albatross (Unidentified)	3	9	**12**
Buller's albatross	1	20	**21**
Campbell albatross		5	**5**
Gibson's albatross		4	**4**
Great-winged petrel	1		**1**
Grey petrel		1	**1**
Grey-faced petrel		1	**1**
New Zealand white capped albatross		15	**15**
Salvin's albatross		1	**1**
Unidentified Thalassarche albatross		1	**1**
Wandering albatross		3	**3**
Westland petrel		2	**2**
White-chinned petrel		2	**2**
Total seabirds	**8**	**73**	**81**
Mammals			
New Zealand fur seal	11		**11**
Total mammals	**11**	**0**	**11**
Total protected species interactions	**19**	**73**	**92**

The majority of interactions which occurred were recorded as hook captures, with seven seabirds being observed to be tangled in the backbone of the line. All fur seal interactions were recorded as hook captures.

Table 74: Method of interaction for protected species captured in the domestic tuna surface longline fishery by area and month during the 2009/10 observer year.

Species	Caught on hook*	Impact against vessel	Tangled in line*	Unknown	Total
Seabirds					
Albatross (Unidentified)				1	1
Antipodean albatross	4		1		5
Black petrel	4		2		6
Black-browed albatross (Unidentified)	10		2		12
Buller's albatross	21				21
Campbell albatross	4		1		5
Gibson's albatross	4				4
Great-winged petrel		1			1
Grey petrel	1				1
Grey-faced petrel	1				1
New Zealand white capped albatross	14		1		14
Salvin's albatross	1				1
Unidentified Thalassarche albatross	1				1
Wandering albatross	3				3
Westland petrel	2				2
White-chinned petrel	2				2
Total seabirds	**72**	**1**	**7**	**1**	**81**
Mammals					
New Zealand fur seal	11				11
Total mammals	**11**	**0**	**0**	**0**	**11**
Total protected species interactions	**83**	**1**	**7**	**1**	**92**

Table 75 shows that seabird interactions occurred throughout the 2009/10 observer year with a notable spike in June 2010 which represents the captures aboard the single vessel operating off the West Coast of the South Island.

Table 75: Seabird interactions in the domestic tuna surface longline fishery by area and month during the 2009/10 observer year. A zero indicates that no interactions are observed, a dash indicates that no coverage took place.

FMA	Jul-09	Aug-09	Sep-09	Oct-09	Nov-09	Dec-09	Jan-10	Feb-10	Mar-10	Apr-10	May-10	Jun-10	Total
1. AKE	2	0	1	5	2	8	2	0	3	-	-	-	23
2. CEE	-	-	-	-	-	-	-	-	-	0	4	6	10
3. SEC	-	-	-	-	-	-	-	-	-	-	-	-	0
4. SOE	-	-	-	-	-	-	-	-	-	-	-	-	0
5. SOU	-	-	-	-	-	-	-	-	-	-	-	-	0
6. SUB	-	-	-	-	-	-	-	-	-	-	-	-	0
7. CHA	-	-	-	-	-	-	-	-	-	-	-	43	43
8. CEW	-	-	-	-	-	-	-	-	-	-	-	-	0
9. AKW	0	1	0	0	2	-	0	-	-	-	-	-	3
10. KER	-	-	-	-	-	-	-	-	-	-	-	-	0
Total	**2**	**1**	**1**	**5**	**4**	**8**	**2**	**0**	**3**	**0**	**4**	**49**	**79**

Table 76 shows that fur seal interactions occurred at the start and end of the observer year, with no interactions occurring between those months.

Table 76: Marine mammal interactions in the domestic tuna surface longline fishery by area and month during the 2009/10 observer year. A zero indicates that no interactions are observed, a dash indicates that no coverage took place.

FMA	Jul-09	Aug-09	Sep-09	Oct-09	Nov-09	Dec-09	Jan-10	Feb-10	Mar-10	Apr-10	May-10	Jun-10	Total
1. AKE	8	0	0	0	0	0	0	0	0	-	-	-	8
2. CEE	-	-	-	-	-	-	-	-	-	0	0	0	0
3. SEC	-	-	-	-	-	-	-	-	-	-	-	-	0
4. SOE	-	-	-	-	-	-	-	-	-	-	-	-	0
5. SOU	-	-	-	-	-	-	-	-	-	-	-	-	0
6. SUB	-	-	-	-	-	-	-	-	-	-	-	-	0
7. CHA	-	-	-	-	-	-	-	-	-	-	-	3	3
8. CEW	-	-	-	-	-	-	-	-	-	-	-	-	0
9. AKW	0	0	0	0	0	-	0	-	-	-	-	-	0
10. KER	-	-	-	-	-	-	-	-	-	-	-	-	0
Total	8	0	0	0	0	0	0	0	0	0	0	3	11

5.6 BOTTOM LONGLINE FISHERY

5.6.1 Deep-sea Ling

The deep-sea bottom longline fishery is observed to monitor seabird and marine mammal interactions. Over recent years the fleet of large deep-sea ling bottom longliners has reduced due to redirected effort in to various outside the NZ EEZ 'toothfish' fisheries, however the relatively small fleet conducts a large amount of fishing effort, mainly in the areas of SEC, SOE and SOU. Regulations on this fishery require the use of tori lines and either night-setting or line weighting. Other mitigation techniques include gas cannons, offal and bait discard management and line throwers.

Commercial fishing effort, observer effort and protected species interactions are summarised in Table 77. Commercial fishing effort was observed to have reduced compared to the previous observer year; in contrast observer effort had increased, meaning that the levels of coverage increased from 30% in 2008/09 to 49% in 2009/10 (Ramm 2011). Observer coverage was achieved in three of the four FMAs in which commercial fishing effort was conducted. Seabird captures were highest in SOU where all fishing effort was observed.

Table 77: Summary of commercial effort, observer effort and protected species captures in the deep-sea ling bottom longline fishery during the 2009/10 observer year.

FMA	Effort Lines	Observed Lines	Coverage (%)	Number of hooks observed	Seabird Captures*	Seabirds per 1000 hooks	Mammal Captures	Mammals per 1000 hooks
1. AKE	0	0	-	-	-	-	-	-
2. CEE	44	0	0.00	0	-	-	-	-
3. SEC	0	0	-	-	-	-	-	-
4. SOE	217	147	67.74	127,615	0	0.000	0	0.000
5. SOU	84	84	100.00	172,090	8	0.046	0	0.000
6. SUB	307	91	29.64	150,238	2	0.013	0	0.000
7. CHA	0	0	-	-	-	-	-	-
8. CEW	0	0	-	-	-	-	-	-
9. AKW	0	0	-	-	-	-	-	-
10. KER	0	0	-	-	-	-	-	-
Total	652	322	49.39	449,943	10	0.022	0	0.000

*Captures only, excludes deck strikes and other non-fishing interactions

Observer coverage

Observer coverage was undertaken on three observer trips onboard only one vessel during 2009/10, this was the only vessel of it's type operating within the New Zealand EEZ during that year. Comments relating to offal management, mitigation techniques and protected species interaction and captures (i.e. interactions with the fishing gear only) are given in Table A6.13. The vessel employed a tori line during all sets and was also equipped with a 'gas cannon'. During hauling crew were observed to deter birds by banging on the side of the vessel and by use of a water hose. The vessel was equipped with a meal plant and so levels of discharged offal were minimal.

Observer coverage took place in three distinct blocks, each covering two month periods these observation periods covered all but the summer period.

Table 78: Number of observed lines in deep-sea ling bottom longline fishery by area and month during the 2009/10 observer year.

FMA	Jul-09	Aug-09	Sep-09	Oct-09	Nov-09	Dec-09	Jan-10	Feb-10	Mar-10	Apr-10	May-10	Jun-10	Total
1. AKE	0	0	0	0	0	0	0	0	0	0	0	0	**0**
2. CEE	0	0	0	0	0	0	0	0	0	0	0	0	**0**
3. SEC	0	0	0	0	0	0	0	0	0	0	0	0	**0**
4. SOE	0	70	77	0	0	0	0	0	0	0	0	0	**147**
5. SOU	0	0	0	0	79	5	0	0	0	0	0	0	**84**
6. SUB	0	0	0	0	0	0	0	0	0	0	7	84	**91**
7. CHA	0	0	0	0	0	0	0	0	0	0	0	0	**0**
8. CEW	0	0	0	0	0	0	0	0	0	0	0	0	**0**
9. AKW	0	0	0	0	0	0	0	0	0	0	0	0	**0**
10. KER	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Total	**0**	**70**	**77**	**0**	**79**	**5**	**0**	**0**	**0**	**0**	**7**	**84**	**322**

Protected species interactions

Protected species interactions are listed in Table 77. In total 10 protected species interactions were observed, an increase from the two observed in 2008/09. Interactions were limited to petrel and shearwater species and all but one of these interactions resulted in mortality. Six of the sooty shearwater interactions occurred in a single event while fishing in SOU resulting in the peak of captures shown in Table 80.

Table 79: Protected species interactions with the deep-sea ling bottom longline fishery during the 2009/10 observer year.

Species	Alive	Dead	Total
Seabirds			
Cape petrels (Unidentified)	1	1	**2**
Sooty shearwater		7	**7**
White-chinned petrel		1	**1**
Total seabirds	**1**	**9**	**10**
Total protected species interactions	**1**	**9**	**10**

Table 80: Seabird interactions in the deep-sea ling bottom longline fishery by area and month during the 2009/10 observer year. A zero indicates that no interactions are observed, a dash indicates that no coverage took place.

FMA	Jul-09	Aug-09	Sep-09	Oct-09	Nov-09	Dec-09	Jan-10	Feb-10	Mar-10	Apr-10	May-10	Jun-10	Total
1. AKE	-	-	-	-	-	-	-	-	-	-	-	-	0
2. CEE	-	-	-	-	-	-	-	-	-	-	-	-	0
3. SEC	-	-	-	-	-	-	-	-	-	-	-	-	0
4. SOE	-	0	0	-	-	-	-	-	-	-	-	-	0
5. SOU	-	-	-	-	8	0	-	-	-	-	-	-	8
6. SUB	-	-	-	-	-	-	-	-	-	-	0	2	2
7. CHA	-	-	-	-	-	-	-	-	-	-	-	-	0
8. CEW	-	-	-	-	-	-	-	-	-	-	-	-	0
9. AKW	-	-	-	-	-	-	-	-	-	-	-	-	0
10. KER	-	-	-	-	-	-	-	-	-	-	-	-	0
Total	0	0	0	0	8	0	0	0	0	0	0	2	10

6. Discussion

6.1 MIDDLE DEPTH TRAWL FISHERIES

6.1.1 Hake, hoki, ling and warehou species

Coverage levels in these fisheries has remained relatively stable at around 20% in recent years; with coverage being achieved across all FMAs where significant fishing effort occurred. Protected species interactions were observed on just over half of the observed trips (38 out of 62 trips) and the majority of observed vessels (22 of the 37 vessels). Crew awareness of bycatch and mitigation issues remains at generally high levels, with an ongoing at vessel training programme being funded jointly by CSP, MFish and the fishing industry.

All trawlers over 28m practice some form of offal management documented by their VMP, however variability between vessels is evident in terms of the level of offal management in place and the stringency of its maintenance. Observer comments continue to indicate that offal is a major attractant to both seabirds and marine mammals. CSP continues to fund offal management trials, working with the fishing industry to investigate batching and mincing techniques to reduce the attraction to seabirds of commercial fishing operations.

The 2009/10 observer year saw a continuation of the trend of levels of background mortality (one to two animals per trip) with additional large capture events occurring incidentally on some vessels. Again a small subset of the fleet was responsible for a disproportionate number of interactions, in this case one vessel of the 37 of those observed was responsible for 22% of observed protected species interactions. Observer comments help to shed light on these events, showing in general that gear malfunctions and poor practices are the key causes of the larger capture events. Work by the Deepwater Group Ltd on incident managing these kinds of events is an appropriate form of action as it considers the circumstances of each event and takes appropriate action in a time critical manner and is importantly supported by feedback from the observers aboard.

6.1.2 Southern Blue Whiting

In total only 24% of fishing effort was observed in the southern blue whiting fishery, this is a significant reduction from the previous year where 40% coverage was achieved. This fishery shows a continuing trend of higher rates of captures for marine mammals than seabirds, in contrast to many other fisheries. Mammal captures during 2009/10 were significantly higher than in the previous year with capture rates being the highest of all fisheries observed at 5.84 animals per 100 tows. In 2009/10 observed mammal captures were limited to NZ fur seals with this being the first time in five years that no New Zealand sea lions were observed captured. Again certain vessels were responsible for disproportionate numbers of captures, with one vessel capturing 12 of the 17 NZ fur seals.

Observer comments indicate that offal continues to be an issue in this fishery, even vessels equipped with meal plants tend to periodically discharge offal due to high catch volumes, this combined with the fishery being both temporally and spatially concentrated result in it having significant attraction to protected species. Advances have been made in seabird warp-strike mitigation, reducing the number these interactions however more could be done to manage offal and discards to reduce the attractiveness of the fleet. Of concern is the effect of fish escaping from the windows which are installed in the lengthener of the net as a safety mechanism in the event of excessively large catches have been made. As these fish are released in an uncontrolled manner from the net during hauling and while at the surface, it coincides with the two critical times for mammal captures. This would be a key area for development of improved practices to reduce the risk of marine mammal capture.

6.1.3 Scampi

Observer coverage in the scampi fishery increased significantly when compared to previous years with coverage levels almost doubling compared to 2008/09. Spatial and temporal distribution of this coverage was also more representative than in previous years, this has historically been an issue with observing this fishery as it comprised of a small fleet of very active vessels conducting long trips, making suitable placement of observers more problematic.

The rate of seabird capture doubled compared to the 2008/09 observer year, with the majority of captures on a single trip. The observer comments from this trip point to the use of triple net rigs being a heavily contributing factor, this design means that all three codends are hauled on deck separately and so the mouth of the centre codend remains open while the net is at the surface. This is one of the highest risk times in the fishing operation as it allows birds sitting on the surface and those swimming to enter the net. As an aggravating factor the fishery has a tendency to catch and discard relatively large quantities of small fish bycatch species; providing an attractant to any birds or mammals in the vicinity. Further investigation of this type of gear configuration is important in order to better understand how to manage this risk posed to protected species by this fishery.

6.1.4 Squid

The squid trawl fishery continues to be one of the most closely monitored fisheries due largely to the 6T fishery's overlap with the foraging range of critically endangered New Zealand sea lions.

Coverage levels in the squid trawl fishery were down slightly in the 2009/10 observer year, coupled with the fishery's shift in effort from SUB to SOU. Observed capture rates for seabirds reduced for the 2009/10 observer year when compared to previous years, being the lowest rate of captures in six years. Interactions with seabirds were more evenly distributed between

vessels than in other fisheries, and also when compared to the previous year. In general offal management and mitigation practices were observed to be good, with vessels being well equipped to batch offal and crews being consistent in net cleaning and offal management practices.

Observed captures of marine mammals increased compared to the previous year, these captures were dominated by NZ fur seals in SOU, however four New Zealand sea lions were also caught, an increase from the previous year's two. A single vessel was responsible for two of the sea lion captures, one of which was released alive. Three of the four captured sea lions were female.
As with the seabird interactions, mammal captures were relatively evenly distributed throughout the fleet indicating that there is a consistency in mitigation practices among the fleet.

While warp captures have historically been an issue in this fishery the implementation of both regulated and industry implemented measures as well as broadly supported training has reduced these to very low levels. In line with the previous observer year; interactions were dominated by white-chinned petrels and white-capped albatross, while interactions with sooty shearwaters continued to decline.

6.2 PELAGIC TRAWL FISHERIES

Observer coverage in the pelagic trawl fisheries was achieved in all areas where significant amounts fishing took place, with a relatively even spread of coverage over these areas. Both fishing effort and observer coverage showed a similar spatial and temporal distribution to the previous year, while interactions reduced overall by 61%; this was largely due to the reduction in common dolphin captures.

The mackerel trawl fishery has historically had significant capture events of common dolphins, generally occurring on CEW and AKW, however only four common dolphins were observed captured in 2009/10. While this is a marked reduction in captures the issue that three of the captures occurred in a single event show that potential is still there for multiple captures events and the risk that this entails.

Crew awareness of marine mammal mitigation measures has increased over recent years, as has the stringency of their maintenance. As new work to sheds further light on the factors related to dolphin bycatch in this fishery (e.g. Thompson et al 2010), it is important that mitigation strategies are reviewed and updated to ensure maximum effectiveness. CSP, in conjunction with MFish and industry continue to fund vessel crew and operator training programmes to raise awareness in the deepwater fleet

6.3 DEEPWATER TRAWL FISHERIES

The deepwater trawl fishery targeting orange roughy and oreo species is one of the more heavily observed. Overall 40% observer coverage was achieved, ranging from 6% to 100% depending on FMA. This represents a slight general upward trend in observer coverage over the past five years. This fishery generally has a low number of seabird and marine mammal captures compared to other large vessel trawl fisheries however a number of warp capture events on a single vessel contributed to the highest level of seabird mortality in the past four years. These events can be attributed to problems with warp maintenance as well as adverse weather conditions. In general seabird abundances were observed to be lower around vessels in this fishery than many others; this is likely due to this fishery producing only small quantities of offal.

Coral bycatch in this fishery is higher than in any other observed fishery, with 12 tonnes of coral bycatch recorded by observers; of this the vast majority of coral was caught in AKW in two events and primarily comprised Scleractinia stony corals. However, some level of coral bycatch was recorded in every FMA observed. Coral bycatch continues to be the most frequent form of protected species interaction observed in the orange roughy and oreo fisheries. More work is necessary in order to accurately map and understand the spatial distribution of coral species and thereby identify areas of most importance (project MCSINT2010-03[11] has work underway to progress this). Increased investment is being put into the training of observers in coral identification to increase the quality of the data being returned.

6.4 INSHORE FISHERIES

The 2009/10 observer year again saw increased levels of observer coverage in the inshore fisheries. This was largely driven by as ongoing monitoring programme which constituted part of the Hector's and Maui's dolphin draft TMP. Effort was also increased in inshore bottom longline fisheries, with the aim to increase both the seasonal and spatial distribution of observer coverage. Inshore fisheries other than by trawl and longline methods remain unobserved.

Difficulties in placing observers onboard inshore fishing vessels continue due to a number of factors including space, safety and reluctance by fishers to allow observers onboard. These issues result in levels of coverage being lower than planned. MFish is currently developing more robust legal frameworks in order to reduce these issues and allow for more representative and informative observer coverage to be achieved.

While observer coverage in the inshore fisheries has remained limited, a number of significant bycatch events have occurred in all fisheries. This highlights the importance of better

[11] MCS Annual plan available at http://www.doc.govt.nz/upload/documents/conservation/marine-and-coastal/fishing/approved-mcs-annual-plan-2010-11.pdf

understanding of these interactions and more representative coverage to allow quantification of the extent of interactions.

6.4.1 Inshore trawl

Commercial fishing effort increased in 2009/10 after a slump the previous year, while observer coverage reduced, resulting in less than two percent coverage nationwide (1.62% to 5.05% per FMA). While this very low level of coverage does not allow for robust quantification of protected species interactions it does give indications of areas particular risk. The East Coast of the South Island was again the area of the most captures; however this area also received the highest observer coverage. The interactions in 2009/10 were heavily influenced by a single event which occurred in SOU, whereby 70 sooty shearwaters and diving petrels were observed to impact a vessel on a foggy evening.

As part of the trawl coverage, observers were specifically tasked to make notes on any mitigation used and where possible conduct warp-strike observations in order to further understand the mitigation in use in the inshore fishery. When compared to the offshore trawl fisheries, the method of seabird captures is heavily skewed towards warp strikes as opposed to net captures. For 20011/12 CSP is undertaking trials of warp strike mitigation devices onboard inshore trawlers in order to assess which are the most effective in reducing these interactions.

While the observer coverage in 2009/10 was significantly less than the previous year, it was more evenly distributed throughout the year. One key area where coverage has been lacking is the CEE trawl fishery; this has led to a lack of understanding of this subset of the inshore trawl fishery. There is significant fishing effort in this FMA combined with high overlap with the foraging ranges of a number of seabird species of varying conservation status. As part of the 2010/11 annual plan CSP has targeted observer coverage in this FMA in order to better understand any interactions between protected species and commercial fishing vessels.

6.4.2 Inshore bottom longline- Ling, Bluenose, Häpuku and Bass

While only three percent observer coverage was achieved nationwide during 2009/10 this did represent an almost four-fold increase over the previous observer year. The coverage was spread more widely than in previous years, meaning that more areas and months were observed in an attempt to gain a more representative sample. As with other inshore fisheries gaining anything other than low levels of coverage can be difficult due to the size of the vessels, their variable effort and reluctance from some operators to have observers onboard.

Seabird interactions increased compared to the previous year (in both absolute number of captures and in capture rate), this was largely driven by capture events on a single vessel operating in AKE. Insufficient line weighting appears to be the key contributing factor to these captures along with inexperienced crews and poor offal management practices. This indicates the need for further education in mitigation practices amongst the fleet; work is

underway to expand the project described by Goad (2010) to this fishery. Even amongst the vessels observed in SEC and SOE mitigation use was observed to be variable between vessels and between crews.

6.4.3 Inshore bottom longline- Snapper

Over 200 more longlines targeting snapper were observed during 2009/10 than in the previous year. Eight percent of the annual fishing effort was observed, the highest levels of coverage in this fishery to date, and, importantly, the coverage was also spread to new areas, with an effort where possible to observer new vessels in order to better characterise the interactions occurring in this fishery. A particular focus of the observers' work was to document the various offal and bait management practices and how that affected protected species abundance around the vessel, in particular seabirds.

Mitigation use and offal management were observed to vary widely between the vessels observed as was the crew knowledge of seabird species. Use of tori lines was observed to be intermittent, with a number of vessels opting to use them only at times of high bird abundance. Generally risk of tangling and safety issues were cited as reasons for not using the tori lines. Line weighting was documented informally by observers and was often found to be below the regulated levels. Reasons given by skippers for this generally related to confusion over interpretation of the regulations into actual fishing practice along with physical limitations of the fishing gear.

While coverage increased compared to previous years, the absolute number of captures remained the same; representing a 50% reduction in capture rate. Importantly again there is a high degree of variability between vessels in terms of capture numbers; a single vessel was observed to be responsible for 18 of the 30 captures. While the vessel's proximity to the breeding colonies on Great Barrier and Little barrier Islands and the accompanying high seabird abundance was a contributing factor to the captures, the vessel's fishing practices and lack of mitigation led to the events occurring.

The skipper and crew were also new entrants to the fishery a fact highlighted by a number of other fishers in the area; with the point being raised that new entrants should go through some form of induction or mentoring process to expedite the learning process and reduce risk to both the fishery and protected species.

6.4.4 Setnet

Setnet coverage for the 2009/10 observer year was again targeted at monitoring for marine mammal interactions as part of the Hector's and Maui's Dolphin TMP. Commercial fishing effort increased to above pre-closure levels, and observer effort also increased, with particular emphasis being on the areas SEC and SOU. This resulted in coverage levels of 40% and 60% respectively. While the observer coverage was highly spatially focused, as driven by the TMP,

it was more temporally spread, with significant coverage being achieved from November 2009 to April 2010.

Overall there was a reduction in observed seabird captures compared to the previous year. This reduction was most pronounced in the birds caught on hauling and released alive, as these reduced from 22 to eight birds. The number of mortalities remained at eight for both years. While the number of yellow-eyed penguins killed in the setnet fishery reduced, it remains a concern that the mortalities are still occurring due to the species' Nationally Vulnerable threat status. 2009/10 also saw the first recorded captures of both Stewart Island shags and a Fiordland crested penguin. This demonstrated that while there have been a number of years of coverage in this fishery the nature of interactions is not yet fully understood.

Two Hector's dolphin mortalities were recorded by observers during the 2009/10 observer year, this is the highest recorded in recent years. One of these captures occurred in a similar area to the capture the previous year and also a capture in 2006. This is concerning as during most years of observer coverage in this area Hector's dolphin captures has now been reported (four of the five years of observer coverage). The second capture is significant in that it occurred north of Timaru, where no observer reported captures had previously occurred. The combination of significant setnetting effort which is undertaken in this area and the lack of mitigation in this fishery as a whole points to continued risk of interaction, even after area closures.

6.5 SURFACE LONGLINE FISHERIES

6.5.1 Charter tuna

The charter surface longline fishery is one of the best observed in the country. As in the previous year, observers were onboard every vessel for the entire season, commercial effort in this fishery was slightly down compared to the previous year. During 2009/10 tori line trials were undertaken by MFish in order to test the efficacy of alternative bird scaring lines. Seabird abundance and activity around the vessels was noted by all observers to be particularly high. Birds were noted to feed aggressively on the line during both shooting and hauling.

The 2009/10 observer year recorded the highest number of seabird captures since 2006/07. As in previous years, the captures have been dominated by albatross species, primarily Buller's albatross. The vast majority of captures occurred in SOU in May 2010. Most of the captures were of live animals meaning that the captures were made on hauling. Most vessels already employed mitigation devices at the point of hauling such as brikle curtains or deck hoses. These were observed to be variable in their effectiveness, due to the highly aggressive nature of the feeding birds, particularly in SOU. Observer comments indicate that offal and bait management techniques were generally good.

As in previous years a number of fur seals were captured by this fishery, these captures occurred exclusively at hauling, with all animals hooked but able to be released alive by cutting the snoods. There are no specific mitigation devices aimed at preventing mammals captures on these longline vessels however the vessel's offal and bait management techniques should go some way to reducing the attractiveness of the vessel to mammals.

6.5.2 Domestic tuna and swordfish

While observer effort increased compared to the previous year, coverage levels nationwide were only seven percent (ranging from no coverage to 17%, by FMA). Gaining higher coverage levels has historically be problematic due to the vessels being small, conducting long fishing trips and generally operating out of smaller, less accessible ports. Mitigation use in this fishery tends to be variable, with a number of experimental methods being developed and trailed by fishers. Offal and bait management techniques were also observed to be variable between vessels; some retaining offal and baits to batch discard at the end of hauling while others continuously discarded during the courses of the haul.

The most prominent event in this fishery from the 2009/10 observer year was a large scale capture event over the course of a three day period (42 seabirds in total). A number of factors were identified by the observer as contributing to this event including a full moon, lack of weighting on the line, a well let vessel and unusually large baits being used. The vessel was operating a regulation tori line at the time of captures; however this appeared to have little effect on the birds' behaviour. The observer used their experience to offer advice on how to change some of these factors to reduce the likely hood of captures. One of the most significant factors however was that the vessel had recently changed ownership and the crew were a new

entrant to the fishery. In 2006/07 a similar situation occurred whereby a new entrant was responsible for a disproportionate number of captures. This situation has been mirrored in other fisheries, highlighting the potential benefits of in induction or mentioning program for all new entrants in order to mitigate the risks to not just seabirds but the fishery as a whole.

6.6 BOTTOM LONGLINE FISHERY

The deep-sea ling bottom longline fishery has historically received moderate levels of observer coverage. Over the past five years the fleet has reduced in size, with a number of vessels either ceasing to operate or targeting fish stocks outside the EEZ all year round. While the fleet and therefore amount of commercial effort has reduced, observer effort has remained fairly stable resulting in the 2009/10 observer year's coverage level being the highest to date at 49%. Mitigation use in this fishery is generally consistent, with vessels employing tori lines at all times, using integrated weight lines and additional weights. Offal and unused baits are also generally closely managed, with offal rendered in the meal plant and unused baits batch discarded.

Seabird captures increased when compared to the previous observer year from two to ten. These captures were dominated by sooty shearwaters, six of which were caught a single event in SOU. While higher than the previous observer year it remains lower than the preceding years and also lower than the captures rate for the inshore longline fisheries.

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Appendix 1

COMMON NAMES, SCIENTIFIC NAMES AND CODES OF SPECIES MENTIONED IN THIS REPORT

Table A1.1: Commercial Fish Species.

MFish Code	Common name	Scientific name
BAR	Barracouta	*Thyrsites atun*
BIG	Bigeye tuna	*Thunnus obesus*
BNS	Bluenose	*Hyperoglyphe antarctica*
EMA	English (blue) mackerel	*Scomber australasicus*
HAK	Hake	*Merluccius australis*
HOK	Hoki	*Macruronus novaezelandiae*
HPB	Hapuku & Bass	*Polyprion oxygeneios, P. americanus*
JMA	Jack mackerel	*Trachurus declivis, T. murphyi, T. novaezelandiae*
LIN	Ling	*Genypterus blacodes*
OEO	Oreo	*Oreosomatidae (Family)*
ORH	Orange roughy	*Hoplostethus atlanticus*
SCI	Scampi	*Metanephrops challengeri*
SNA	Snapper	*Pagrus auratus*
SQU	Arrow squid	*Nototodarus sloanii, N. gouldi*
STN	Southern bluefin tuna	*Thunnus maccoyii*
SWA	Silver warehou	*Seriolella punctata*
SWO	Swordfish	*Xiphias gladius*
WAR	Common warehou	*Seriolella brama*
WWA	White warehou	*Seriolella caerulea*

Table A1: 2 Seabirds

MFish Code	Common name	Scientific name
XAL	Albatross (unidentified)	Diomedeidae (Family)
XAN	Antipodean albatross	*Diomedea antipodensis antipodensis*
XBP	Black petrel	*Procellaria parkinsoni*
XKM	Black-browed albatross (unidentified)	*Thalassarche melanophris* or *T. impavida*
XPB	Buller's albatross	*Thalassarche bulleri*
XCM	Campbell albatross	*Thalassarche impavida*
XCP	Cape petrel	*Daption capense*
XCI	Chatham albatross	*Thalassarche eremita*
XDP	Common diving petrel	*Pelecanoides urinatrix*
XFP	Fairy prion	*Pachyptila turtur*
XFS	Flesh-footed shearwater	*Puffinus carneipes*
XTP	Giant petrel	*Macronectes* spp.
XAU	Gibson's albatross	*Diomedea antipodensis gibsoni*
XGP	Grey petrel	*Procellaria cinerea*
XGB	Grey-backed storm petrel	*Garrodia nereis*
XGF	Grey-faced petrel (Great winged)	*Pterodroma macroptera*
XIY	Indian yellow-nosed albatross	*Thalassarche carteri*
XPE	Petrel (unidentified)	*Procellariidae (Family)*
XPN	Prion (unidentified)	*Pachyptila spp.*
XSA	Salvin's albatross	*Thalassarche salvini*
XSY	Shy albatross	*Thalassarche cauta*
XSH	Sooty shearwater	*Puffinus griseus*
XSM	Southern black-browed albatross	*Thalassarche melanophris*
XRA	Southern royal albatross	*Diomedea epomophora*
XST	Storm petrel	*Hydrobatidae (Family)*
XWP	Westland petrel	*Procellaria westlandica*
XWM	New Zealand white capped albatross	*Thalassarche steadi*
XWC	White-chinned petrel	*Procellaria aequinoctialis*
XWF	White-faced storm petrel	*Pelagodroma marina*
XYP	Yellow-eyed penguin	*Megadytes antipodes*
XFL	Fluttering shearwater	*Puffinus gavia*

Table A1.3: Marine mammals

MFish Code	Common name	Scientific name
CDD	Common dolphin	*Delphinus delphis*
FUR	New Zealand fur seal	*Arctocephalus forsteri*
HDO	Hector's dolphin	*Cephalorhynchus hectori*
HSL	New Zealand sea lion	*Phocarctos hookeri*
PIW	Pilot whale	*Globicephala melas*
DDO	Dusky dolphin	*Lagenorhynchus obscurus*
SPW	Sperm whale	*Physeter macrocephalus*
ORC	Orca	*Orcinus orca*
BDO	Bottlenose dolphin	*Tursiops truncatus*

Table A1. 4: Reptiles

MFish Code	Common name	Scientific name
LBT	Leatherback turtle	*Dermochelys coriacea*
GNT	Green turtle	*Chelonia mydas*

Table A1. 5: Protected fish species

MFish Code	Common name	Scientific name
SBG	Spotted black grouper	*Epinephelus daemelii*
WPS	White pointer shark	*Carcharodon carcharias*

Appendix 2

PROTECTED SPECIES INTERACTIONS DURING THE 2009/10 OBSERVER YEAR

See Appendix 1 for scientific names of species

Species	Alive	Dead	Decomposing	Unknown	Total
Seabirds					
Albatross (Unidentified)	6	5	1	2	**14**
Smaller Albatross (Unidentified)		1			**1**
Black-browed albatross (Unidentified)	5	9			**14**
Unidentified Thalassarche albatross		1			**1**
Wandering albatross (Unidentified)	1				**1**
Antipodean albatross	2	3			**5**
Buller's albatross	38	39			**77**
Campbell albatross		6			**6**
Chatham albatross	1	6			**7**
Gibson's albatross		5			**5**
New Zealand white capped albatross	17	53			**70**
Northern royal albatross		1			**1**
Salvin's albatross	17	36	1	6	**60**
Southern royal albatross	1				**1**
Wandering albatross		3			**3**
Petrels, Prions and Shearwaters (Unidentified)	47				**47**
Petrel (Unidentified)	11	1			**12**
Prions (Unidentified)	5				**5**
Giant petrels (Unidentified)	1				**1**
Cape petrels (Unidentified)	9	4			**13**
Storm petrels (Unidentified)	10				**10**
Black petrel	32	18			**50**
Black-bellied storm petrel	1				**1**
Broad-billed prion	5				**5**
Buller's shearwater	1				**1**
Common diving petrel	2				**2**
Fairy prion	13				**13**
Flesh-footed shearwater	10	8			**18**
Fluttering shearwater	1				**1**
Fulmar prion		1			**1**
Great-winged petrel	1				**1**
Grey petrel		8	1		**9**
Grey-backed storm petrel	2				**2**
Grey-faced petrel		1			**1**
Northern giant petrel	1				**1**
Shearwaters (Unidentified)	1				**1**
Sooty shearwater	37	40			**77**
Southern cape petrel		7			**7**
Westland petrel	10	4			**14**
White-chinned petrel	21	52			**73**
White-faced storm petrel	4				**4**
Pied shag		1			**1**
Spotted Shag		3			**3**
Stewart Island shag		2			**2**
Fiordland crested penguin		1			**1**
Yellow-eyed penguin		1			**1**
Total seabirds	**313**	**320**	**3**	**8**	**644**

Mammals					
Bottlenose dolphin		1			**1**
Common dolphin		4			**4**
Dusky dolphin		2			**2**
Hector's dolphin		2			**2**
New Zealand fur seal	38	82	3	1	**124**
New Zealand sea lion	1	3			**4**
Seals (Unidentified)		1			**1**
Total mammals	**39**	**95**	**3**	**1**	**138**
Protected Fish					
White pointer shark	1				**1**
Total fish	**1**	**0**	**0**	**0**	**1**
Total protected species interactions	**353**	**415**	**6**	**9**	**783**

Appendix 3

PROTECTED SPECIES INTERACTIONS BY METHOD DURING THE 2009/10 OBSERVER YEAR

See Appendix 1 for scientific names of species

Species	Bottom longline	Setnet	Surface Longline	Trawl	Total
Seabirds					
Albatross (Unidentified)			2	12	**14**
Smaller Albatross (Unidentified)				1	**1**
Black-browed albatross (Unidentified)	1		12	1	**14**
Unidentified Thalassarche albatross			1		**1**
Wandering albatross (Unidentified)				1	**1**
Antipodean albatross			5		**5**
Buller's albatross			63	14	**77**
Campbell albatross			5	1	**6**
Chatham albatross	2			5	**7**
Gibson's albatross			5		**5**
New Zealand white capped albatross			26	44	**70**
Northern royal albatross				1	**1**
Salvin's albatross	1		3	56	**60**
Southern royal albatross	1				**1**
Wandering albatross			3		**3**
Petrels, Prions and Shearwaters (Unidentified)				47	**47**
Petrel (Unidentified)				12	**12**
Prions (Unidentified)				5	**5**
Giant petrels (Unidentified)				1	**1**
Cape petrels (Unidentified)	3			10	**13**
Storm petrels (Unidentified)	1			9	**10**
Black petrel	44		6		**50**
Black-bellied storm petrel				1	**1**
Broad-billed prion				5	**5**
Buller's shearwater	1				**1**
Common diving petrel				2	**2**
Fairy prion				13	**13**
Flesh-footed shearwater	17			1	**18**
Fluttering shearwater	1				**1**
Fulmar prion				1	**1**
Great-winged petrel			1		**1**
Grey petrel	3		6		**9**
Grey-backed storm petrel				2	**2**
Grey-faced petrel			1		**1**
Northern giant petrel	1				**1**
Shearwaters (Unidentified)	1				**1**
Sooty shearwater	8			69	**77**
Southern cape petrel	2			5	**7**
Westland petrel		7	3	4	**14**
White-chinned petrel	2	1	4	66	**73**
White-faced storm petrel	4				**4**
Pied shag		1			**1**
Spotted Shag		2		1	**3**
Stewart Island shag		2			**2**
Fiordland crested penguin		1			**1**
Yellow-eyed penguin		1			**1**
Total seabirds	**93**	**15**	**146**	**390**	**644**

Mammals					
Bottlenose dolphin				1	**1**
Common dolphin				4	**4**
Dusky dolphin		2			**2**
Hector's dolphin		2			**2**
New Zealand fur seal		6	27	91	**124**
New Zealand sea lion				4	**4**
Seals (Unidentified)				1	**1**
Total mammals	**0**	**10**	**27**	**101**	**138**
Protected Fish					
White pointer shark		1			**1**
Total fish	**0**	**1**	**0**	**0**	**1**
Total protected species interactions	**93**	**26**	**173**	**491**	**783**

Appendix 4

PROTECTED SPECIES INTERACTIONS BY MONTH DURING THE 2009/10 OBSERVER YEAR

See Appendix 1 for scientific names of species

Species	Jul-08	Aug-08	Sep-08	Oct-08	Nov-08	Dec-08	Jan-09	Feb-09	Mar-09	Apr-09	May-09	Jun-09	Total
Seabirds													
Albatross (Unidentified)	1		1		3	3	1	1	1		2	1	**14**
Smaller Albatross (Unidentified)				1									**1**
Black-browed albatross (Unidentified)									1		2	11	**14**
Unidentified Thalassarche albatross												1	**1**
Wandering albatross (Unidentified)											1		**1**
Antipodean albatross				1	1	2			1				**5**
Buller's albatross	3							3		2	38	31	**77**
Campbell albatross	2			1					1		1	1	**6**
Chatham albatross			2			5							**7**
Gibson's albatross	1			1		2			1				**5**
New Zealand white capped albatross	1			2	1		7	15	9	1	16	18	**70**
Northern royal albatross									1				**1**
Salvin's albatross	2	1	14	16	6	10	3	7	1				**60**
Southern royal albatross									1				**1**
Wandering albatross				1		1						1	**3**
Petrels, Prions and Shearwaters (Unidentified)							40	7					**47**
Petrel (Unidentified)					1			2	7	1	1		**12**
Prions (Unidentified)					1		4						**5**
Giant petrels (Unidentified)									1				**1**
Cape petrels (Unidentified)	4	1	2	1			1				1	3	**13**
Storm petrels (Unidentified)				4	2		1	2				1	**10**
Black petrel					2	3	19	14	1	10	1		**50**
Black-bellied storm petrel									1				**1**
Broad-billed prion								5					**5**
Buller's shearwater								1					**1**
Common diving petrel	1			1									**2**
Fairy prion	1	1					10		1				**13**
Flesh-footed shearwater						1	1	1	4	10		1	**18**
Fluttering shearwater					1								**1**

Fulmar prion							1						**1**
Great-winged petrel		1											**1**
Grey petrel	6	2	1										**9**
Grey-backed storm petrel	1			1									**2**
Grey-faced petrel							1						**1**
Northern giant petrel						1							**1**
Shearwaters (Unidentified)											1		**1**
Sooty shearwater				22	11		30	2	7	1	4		**77**
Southern cape petrel	2	2										3	**7**
Westland petrel	3				6	1	1					3	**14**
White-chinned petrel			2	14	3		1	26	15	9	3		**73**
White-faced storm petrel							1	3					**4**
Pied shag					1								**1**
Spotted Shag						1		2					**3**
Stewart Island shag						2							**2**
Fiordland crested penguin						1							**1**
Yellow-eyed penguin					1								**1**
Total seabirds	**28**	**8**	**22**	**66**	**40**	**33**	**122**	**91**	**54**	**34**	**71**	**75**	**644**
Mammals													
Bottlenose dolphin												1	**1**
Common dolphin				1							3		**4**
Dusky dolphin						1	1						**2**
Hector's dolphin					1		1						**2**
New Zealand fur seal	29	29	5	11	3	4	4	7	3	1	18	10	**124**
New Zealand sea lion									2		2		**4**
Seals (Unidentified)	1												**1**
Total mammals	**30**	**29**	**5**	**12**	**4**	**5**	**6**	**7**	**5**	**1**	**23**	**11**	**138**
Protected Fish													
White pointer shark								1					**1**
Total fish	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**1**
Total protected species interactions	**58**	**37**	**27**	**78**	**44**	**38**	**128**	**99**	**59**	**35**	**94**	**86**	**783**

Appendix 5

PROTECTED SPECIES INTERACTIONS BY FISHERIES MANAGEMENT AREA DURING THE 2009/10 OBSERVER YEAR

See Appendix 1 for scientific names of species

Species	1.AKE	2.CEE	3.SEC	4.SOE	5.SOU	6.SUB	7.CHA	8.CEW	9.AKW	Total
Seabirds										
Albatross (Unidentified)			2	7	3		1		1	**14**
Smaller Albatross (Unidentified)				1						**1**
Black-browed albatross (Unidentified)	1	1			1		11			**14**
Unidentified Thalassarche albatross		1								**1**
Wandering albatross (Unidentified)					1					**1**
Antipodean albatross	4								1	**5**
Buller's albatross		7		4	43	1	22			**77**
Campbell albatross	4	1					1			**6**
Chatham albatross				7						**7**
Gibson's albatross	4	1								**5**
New Zealand white capped albatross	2		4		34	7	23			**70**
Northern royal albatross		1								**1**
Salvin's albatross	1	2	30	23	1	3				**60**
Southern royal albatross	1									**1**
Wandering albatross	2	1								**3**
Petrels, Prions and Shearwaters (Unidentified)					45	2				**47**
Petrel (Unidentified)			1		9	2				**12**
Prions (Unidentified)						1	4			**5**
Giant petrels (Unidentified)					1					**1**
Cape petrels (Unidentified)			1	5	2	1	4			**13**
Storm petrels (Unidentified)	1		3	1	1	2	2			**10**
Black petrel	50									**50**
Black-bellied storm petrel						1				**1**
Broad-billed prion					5					**5**
Buller's shearwater	1									**1**
Common diving petrel				1	1					**2**
Fairy prion				1	11		1			**13**
Flesh-footed shearwater	18									**18**

Fluttering shearwater	1									**1**
Fulmar prion							1			**1**
Great-winged petrel									1	**1**
Grey petrel	1	5	2	1						**9**
Grey-backed storm petrel						1	1			**2**
Grey-faced petrel	1									**1**
Northern giant petrel	1									**1**
Shearwaters (Unidentified)	1									**1**
Sooty shearwater	1		20	1	52	3				**77**
Southern cape petrel		1	1	3		1	1			**7**
Westland petrel			1		6		7			**14**
White-chinned petrel	1	4	15	1	33	19				**73**
White-faced storm petrel	4									**4**
Pied shag					1					**1**
Spotted Shag					3					**3**
Stewart Island shag			2							**2**
Fiordland crested penguin					1					**1**
Yellow-eyed penguin			1							**1**
Total seabirds	**100**	**25**	**83**	**56**	**254**	**44**	**79**	**0**	**3**	**644**
Mammals										
Bottlenose dolphin	1									**1**
Common dolphin							3		1	**4**
Dusky dolphin			2							**2**
Hector's dolphin			2							**2**
New Zealand fur seal	8	16	17	1	33	24	24	1		**124**
New Zealand sea lion					1	3				**4**
Seals (Unidentified)					1					**1**
Total mammals	**9**	**16**	**21**	**1**	**35**	**27**	**27**	**1**	**1**	**138**
Protected Fish										
White pointer shark					1					**1**
Total fish	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**1**
Total protected species interactions	**109**	**41**	**104**	**57**	**290**	**71**	**106**	**1**	**4**	**783**

Appendix 6

OBSERVER COMMENTS FROM OBSERVED VESSELS AND TRIPS IN EACH FISHERY DURING THE 2009/10 OBSERVER YEAR

See Appendix 1 for scientific names of species

AC= acoustic cannon, BB= bird baffler, DB= dyed bait, DH= deck hose, IWL= integrated weight line, LW= line weighting, NS= night setting, PI= pinger, SL= Sea Lion Exclusion Device, TL= tori line, WS= warp scarer

Table A6.1 Hake, Hoki, Ling and Warehou species middle depth trawl Fishery

Vessel No.	No. Times Observed	FMA's Fished	Offal Management	Mitigation used	Seabird interactions	Seabird Capture?	Marine mammal interactions	Marine mammal capture?
1	3	1. CHA 2. CHA, CEW, SUB 3. SOU, CHA, CEW, AKW	Crew cleaned the net meticulously; offal was discharged from a chute on the starboard side, continuous discharge though less during shooting and hauling. On some trips vessel practiced batch discarding.	TL, WD, BB	Large numbers of birds around the vessel at all times. Abundances peaked during processing. Generally observed to feed around the vessel	Y N Y	FUR sighted regularly, mostly at night which was when most captures occurred. WHT (pod of 50 unidentified dolphins) also sighted.	Y N Y
2	2	1. CHA 2. SOU, CHA, CEW, AKW	Net cleaned prior to reshooting. All offal mealed. Only large sharks discarded whole.	BB, (TL and WS available for use if trigger points were reached.)	Low numbers of birds around the vessel and rarely feeding on the net.	Y N	FUR regularly observed around the vessel, feeding on fish in trawlnet during hauling. Mammals only sighted on 2 occasions (FUR and Sperm whale)	N N
3	1	SOE	Vessel did not discharge during shooting or hauling.	BB, TL	Bird abundance increased as the net reached the surface. Birds actively feeding on the codend.	N	No marine mammals were sighted during the trip.	N
4	2	1. SOU, SUB 2. SEC, SOU, SUB	Majority of offal went to meal. Any offal that was discharged was not done during shooting or hauling.	BB, Twin TL	Bird numbers were noted to increase dramatically during hauling and less so during shooting.	Y Y	16 PIW sighted in total, FUR sighted on a number of occasions. CDD and SPW also sighted.	Y N
5	2	1. SEC, SOE 2. SEC, SOU, SUB	Meal plant onboard.	BB	Seabirds abundant at all times, aggressive feeding during hauling with birds feeding on stickers.	Y Y	Infrequent sightings of FUR.	N N
6	2	1. SOU 2. CHA, SOU, SUB	Meal plant generally operated full time however broke toward end of trip and offal was discharged. No discharge occurred during setting or hauling.	BB	Bird numbers were generally low around the vessel.	Y N	FUR and CDD sighted (pod of approximately 20).	Y Y
7	1	CHA, CEE	No specific comments	BB around the discard	Moderate to high numbers of birds around the vessel at all	N	FUR constantly present during fishing.	Y

				chute	times. Birds were closest to the vessel when LIN was processed.			
8	1	CHA, CEE	All bycatch and offal was held until vessel was steaming.		Stabilizer arms were observed to deter birds from coming too close to the sides of the vessel	N	No specific comments	Y
9	1	SOU	No specific comments	BB, TL	During trawling bird numbers were around 20, this increased to 200 during hauling. XWM were the most common species.	N	FUR observed around the net following during hauling on four occasions.	N
10	1	SEC, CHA	No meal plant or mincers onboard.	Twin TL	No specific comments	N	HSL frequently Observed following the vessel.	N
11	2	1. SEC, SOE 2. SOU, SUB	Net cleaned, offal held during shooting and hauling.	Twin TL	Birds were observed to feed on floaters and stickers during hauling.	Y N	No large congregations of mammals.	Y N
12	1	CHA, CEE	No specific comments		Large bird numbers around the vessel, peaking once the net surfaced; aggressive feeding behaviour.	N	FUR sighted every day: In the morning they did not appear to be actively feeding from the net; however in the evening they would move in and feed. DDO and BDO also sighted.	Y
13	2	1. CEE, CHA 2. CEE, CHA	All offal directed to the meal plant, however when meal plant reached capacity offal was discharged through hashers. No offal was discharged during shooting or hauling.	BB	Large numbers of birds were also present around the vessel.	Y Y	FUR commonly observed during hauling.	Y Y
14	1	1. CHA 2. SOU, SEC, CHA, CEW	Vessel generally mealed or batch discarded offal, however on one occasion continuous discharge took place.	Twin TL	Large numbers of birds present, birds generally fed actively on the lengthener of the net.	N Y	Marine mammals were seldom sighted.	N Y
15	1	CHA, CEW	Factory wash drained out from the port side meaning regular aggregations of birds.	TL, WS	Bird captures were during heavy swells.	Y	5 CCD sighted once and 1 FUR sighted for the whole trip.	N
16	3	1. CHA, SUB 2. CHA, SUB 3. SOU, SUB	Offal was regularly discarded whenever the meal plant was overwhelmed.	Twin TL	Bird activity peaked during hauling with birds feeding on net scraps.	N N	FUR were the only mammals seen and generally in modest numbers.	N N
17	1	CEE	Offal only discarded once fishing was complete.	Nil	No specific comments	N	Marine mammal sightings peaked during hauling (FUR feeding on fish at the	N

							lengthener).	
18	4	1. CHA, SEC 2. SEC, SOU 3. SOU, SEC CEW 4. SOU, SUB	Vessel discarded during shooting and hauling but did not run the discard conveyor until the doors were in the water during shooting or when the gear was at the surface during hauling. Net cleaned of stickers	Twin TL	Extensive bird activity during hauling and net surfacing. Bird numbers peaked at 500.	Y Y Y N	No specific comments	Y Y Y N
19	2	1. SEC, SOU 2. SEC, SOU, SUB	Vessel generally processed at separate times to fishing. Vessel generally batch discarded	BB, TL	Bird abundances stayed similar although activity and proximity to the vessel increased with hauling.	Y Y	Mammals rarely sighted though FUR were observed feeding on the codend.	Y N
20	1	CHA	Meal plant was operated, measures in place to reduce the inadvertent discharge of waste from the factory. Net was cleaned after every haul.	BB	High numbers of seabirds around the vessel at all times.	N	FUR sighted occasionally	Y
21	1	CHA, CEE	Offal and whole fish discards would occur outside of shooting and hauling	BB	Bird numbers were low around the vessel until the codend hit the surface when numbers would increase rapidly and aggressive feeding would occur.	N	1 SRW sighted Dead. Between 1 and 15 FUR were sighted daily.	Y
22	2	1. CHA, SOU 2. SOU	Vessel continuously discharged offal from the factory, no sump pumps or cutters- this was noted to attract birds.	Twin TL	No specific comments	N N	No marine mammals sighted	N N
23	2	1. CHA 2. CHA	Offal discharge was halted prior to setting. Offal was batched.	Twin TL	Low numbers of birds in attendance of vessel (40-80) until hauling and processing of offal when it would increase to 300-500. Delay in hauling the headline and groundline on deck. 90% of bird captures were around this are of the net	N Y	FUR occasionally sighted around the vessel- sighted actively feeding from the net on hauling.	N Y
24	1	CHA	All offal was minced. Some offal discharges were made during shooting	Twin TL	Seabirds were observed on all daylight hauls in moderate to high numbers. Seabirds noted to feed actively on the net	N	FUR sighted on most hauls swimming alongside the codend feeding on fish stuck in the meshes	Y
25	1	CHA	Meal plant generally in operation, however one		Large numbers of birds around the vessel at all times.	Y	Few mammal sightings were made- CCD and FUR. FUR	Y

			breakdown was noted.				observed on one occasion when the meal plant was not functioning and so offal was being discarded. They dispersed once the discards stopped (one captured after this event).	
26	1	SEC, SOU, SUB	Minimal offal was discarded and this was not done during shooting or hauling.	BB, Twin TL	Birds present in large numbers during hauling for most of the trip. In SOU and SUB the birds were note to be feeding very aggressively from the net.	Y	FUR regularly seen, most common in SEC. FUR were noted to feed most aggressively at night. Due to high numbers of FUR the vessel avoided making doors-up turns in SEC. One female HSL sighed in SUB. Doors up turns were made in SOU and SUB, however this was not deemed to be a factor in the captures of FUR.	Y
27	1	CHA, CEE	Discards were held until fishing was completed.	NIL	No specific comments	N	No specific comments	Y
28	2	1. SEC 2. SEC, SOE	Net was cleaned between tows and no offal was discharged during setting or hauling.	BB, TL	Seabirds present at all times with numbers increasing at hauling and also in rougher weather. No warp strikes observed.	Y Y	FUR sighted occasionally. Large pod of dolphins also observed close to the vessel.	Y Y
29	1	SOU	Meal plant operating, all offal and whole fish was put to meal. Sump pumps fitted with cutters.	BB, TL	No specific comments	N	One FUR and one HSL sighted during trip. FUR was observed to be following the codend bird numbers around 30 on average however this increased fivefold during hauling	N
30	1	SEC, SOU SUB	Offal only discharged on 3 occasions	BB	No specific comments	N	No marine mammals were sighted during the trip	N
31	1	AKE	No offal or whole fish discards were made	BB	Seabirds only sighted in small numbers (up to 50)	N	No marine mammals were sighted during the trip	N
32	2	1. SUB, CHA 2. SOU	Offal was batch discarded and minced before passing through	Twin TL, BB	Bird numbers peaked during hauling and processing.	N N	FUR sighted on occasion	N N

			the sump pumps. No discharging occurred during shooting or hauling.					
33	1	CHA	All offal minced before discharge. No offal discharged during hauling or shooting.	Twin TL	Birds seemed disinterested in feeding from the net, instead congregating around the mincer.	N	Mammals rarely sighted.	Y
34	1	CHA, SEC	No specific comments.		White capped albatross were the most prevalent around the vessel	Y	FUR present around the vessel at most times (1-3).	N
35	1	CEE, CHA	All fish was packed green, any whole fish discards were passed through a mincer before discharge. No discharging occurred during setting or hauling.	BB	Large numbers of birds present at all times, this would increase dramatically at hauling with up to 1000 birds in attendance.	Y	Marine mammals were commonly sighted around the vessel, particularity at hauling with up to 10 animals swimming around the stern. A large pod of common dolphins was also observed on one occasion.	Y
36	2	1. CEE, CHA, SEC 2. SEC, CEE, CHA	Offal was not discharged during shooting or hauling. Offal discharge trials were conducted on these trips.	Twin TL, BB	Birds present at all times. Large amounts of interaction during shooting and hauling.	Y	Unidentified whales occasionally sighted.	N
37	6	1. SOU 2. SOU, SUB, SEC 3. SOU, SUB 4. SOU, SUB 5. SOU 6. SOU SUB	Sump pumps and cutters used and offal was discharged more or less continuously, though not during hauling or shooting, this which was observed to attract birds to the starboard side, however this did not draw birds around to the stern. Net was cleaned between tows.	BB	Birds were noted to be more plentiful at Snares than at Puysyger.	Y Y Y Y N Y	FUR only sighted during hauling but not seen to be feeding.	N Y Y Y N Y

Table A6.2 Southern blue whiting trawl Fishery

Vessel No.	No. Times Observed	FMA's Fished	Offal Management	Mitigation used	Seabird interactions	Seabird Capture?	Marine mammal interactions	Marine mammal capture?
1	1	SUB	Offal discharged on 10 occasions during trawling but never during setting or hauling.	Twin TL	No specific comments	N	FUR sighted on a number of occasions	N
2	1	SUB	Meal plant onboard, however during time at Bounty Island s it was regularly overloaded and offal flowed out of the discard chute (sometimes during shooting and hauling. At Pukaki and Campbell the vessel would halt processing if the meal plant was overloaded	Twin TL	No specific comments	N	Small numbers of FUR sighted around Bounties. Groups of 5 to 15 HSL sighted around Campbell Island.	Y
3	2	1. SUB 2. SUB	Offal was regularly discarded whenever the meal plant was overwhelmed.	Twin TL	Bird activity peaked during hauling with birds feeding on net scraps.	Y N	FUR were generally sighted in modest numbers. Larger numbers of HSL (up to 30) in SUB. HSL particularly active, feeding on the net.	Y N
4	1	SUB	All discards and offal was minced and this was held during shooting and hauling	Twin TL, BB	Bird numbers peaked during hauling and processing.	N	No specific comments	N
5	1	SUB	The vessels discarded offal while during setting, hauling and towing. This was discharged through a cutter and sump pump.	BB	Bird sightings peaked during daylight processing.	N	Small number of FUR and HSL sightings.	Y

Table A16.3 Scampi trawl Fishery

Vessel No.	No. Times Observed	FMA's Fished	Offal Management	Mitigation used	Seabird interactions	Seabird Capture?	Marine mammal interactions	Marine mammal capture?
1	1	SOE	Offal was batch discarded during the tows.	TL	Moderate numbers of birds around the vessel at all times, peaking during hauling.	N	FUR were in regular attendance of the vessel	N
2	2	1. CEE, AKE 2. AKE	Offal was batched, however it was also discarded fairly frequently, which appeared it limit its effectiveness. Vessel also discarded during shooting. Warp-strikes were observed to be frequent during discarding.	TL	Birds sighted in high numbers, interacted with the discard chute as whole fish was discarded during processing. Observer believed there to be a high degree of cryptic mortality due to the high number of warp strikes.	Y N	No marine mammals sighted.	N N
3	1	SOE	Vessel only discarded offal at end of processing. Due to the vessel's method of hauling stickers were allowed to build un in the net. On two occasions the skipper released the offal bin when the net was at the surface, accounting for 4 XSA captures.	Twin TL	Seabirds tended to be caught in the centre codend. Bird numbers increased during the trip, as did their feeding aggression.	Y	FUR seen regularly during the first half of the trip.	N
4	1	SUB	Offal held until complete deployment of the net	TL	High number of seabirds present, this peaked at hauling. Birds actively fed on stickers.	Y	FUR sighted on 5 occasions following the codend. Pod of 50 CDD sighted but not interacting. HSL sighted on 7 occasions, generally lone individuals.	N
5	1	AKE	Offal was held and discarded once net was at depth.	Twin TL	No specific comments.	N	No marine mammal sightings throughout the trip.	N

Table A6.4 Squid trawl Fishery

Vessel No.	No. Times Observed	FMA's Fished	Offal Management	Mitigation used	Seabird interactions	Seabird Capture?	Marine mammal interactions	Marine mammal capture?
1	1	SOU, SUB	Vessel practiced batch discarding with the exception of small quantities of non-quota bycatch	Twin TL, BB, SLED	Birds were ever present. A number of the bird captures were in the meshes of the net on hauling, with the animals able to be released alive.	Y	FUR sighted on one occasion.	Y
2	2	1. SOU, SUB 2. SUB	Offal was held, stickers were removed from the net and shooting and hauling procedures were undertaken as quickly as practicable, however it was noted that the vessel occasionally discharged offal during shooting and hauling.	BB, SLED	Birds were observed in moderate to large numbers and were observed feeding close to the stern and directly from the codend.	Y N	HDO sighted in SOU briefly.	N N
3	1	SUB	No offal management for the first week of the trip. After three bird captures the vessel began holding offal while the gear was in the water. There were still however some occasions where the vessels discharged offal during shooting and hauling.	Twin TL, SLED, BB	Seabirds always in attendance, most active during the day and while the vessels targeted SQU, feeding on the codend and lengthener.	Y	HSL frequently sighted when targeting SQU. Sighted for short periods however did not stay long. HSL also observed feeding on SQU from the codend. FUR also sighted on occasion.	Y
4	1	SOU, SUB	No specific comments	BB, TL, SLED	During trawling bird numbers were around 20, this increased to 200 during hauling. XWM were the most common species.	Y	FUR observed around the net following during hauling on four occasions. No HSL sighted other than those captured.	Y
5	1	SOU, SUB	Very few discards were produced as vessel was not processing SQU.	Twin TL, SLED	Seabirds present at all times and fed aggressively on the net.	Y	Marine mammals sighted on two occasions.	N
6	2	1. SOU, SUB 2. SOU, SUB	Stickers removed from net. Offal was batch discarded and was not discharged during shooting or hauling. Factory sumps fitted with screens.	Twin TL, SLED	Seabirds in constant attendance, numbers increasing rapidly as codend surfaced. Birds fed aggressively off the net. Fewer birds attended the vessel if	Y Y	Pod of DDO sighted on one occasion, not interacting. Solitary FUR occasionally sighted.	N N

					other vessels were in the vicinity.			
7	1	SOU, SUB	Vessel generally mealed or batch discarded offal, however on one occasion continuous discharge took place.	Twin TL, SLED	Large numbers of birds present, birds generally fed actively on the lengthener of the net.	Y	Marine mammals were seldom sighted throughout the trip. HSL were sighted twice taking fish from the codend.	Y
8	1	SOU, SUB	Meal plant operated. All offal mealed.	Twin TL, SLED	Seabirds were in constant attendance of the vessel. Numbers began to increase as winched came on; this would then peak once the codend hit the surface. XAL fed actively on SQU caught in the wings and lengthener of the net.	Y	FUR sighed around the vessel during a number of hauls. HSL also sighted on one occasion. Mammals were observed to feed on SQU which escaped from the codend.	Y
9	3	1. SOU 2. SOU 3. SOU, SUB	Vessel discarded during shooting and hauling but did not run the discard conveyor until the doors were in the water during shooting or when the gear was at the surface during hauling. Stickers removed from net.	Twin TL, SLED	High numbers of birds around the vessel, peaking as codend surfaces. Bird numbers peaked at 500.	N Y N	No marine mammals observed during the trips.	N Y N
10	1	SOU, SUB	No offal discharge during shooting or hauling. Tori lines used while vessel was discharging offal.	SLED, BB (Tangled), TL	High numbers of birds attending vessel, increased during hauling.	Y	FUR sighted twice.	Y
11	1	SOU, SUB	Offal was batch discarded at the end of processing. Factory sumps were also screened to reduce accidental discharge.	TL, SLED	Seabirds were observed in moderate numbers, with XSH and XBM being the most common species. Seabirds were observed to actively feed on the codend during hauling as well as any lost fish.	Y	FUR observed around the vessel at hauling, actively feeding from the net.	Y
12	1	SOU, SUB	Stickers removed from net. Factory sumps screened. Vessel discharged offal during shooting on two occasions. Offal discharge was constant during processing; however this	Twin TL, SLED	Moderate numbers of seabirds which were noted to feed aggressively on the codend	Y	FUR and HSL sighted on one occasion during hauling however these animals were not feeding.	N

			was not generally during fishing.					
13	1	SOU, SUB	Meal plant operating, all offal and whole fish was put to meal. Sump pumps fitted with cutters.	BB, TL, SLED	Bird numbers around 30 on average however this increased fivefold during hauling.	Y	One FUR and one HSL sighted during trip. FUR was observed to be following the codend.	Y
14	1	SOU, SUB	Offal was batch discarded and minced before passing through the sump pumps. No discharging occurred during shooting or hauling.	BB, Twin TL, SLED	Seabirds present at all times and observed to be feeding aggressively.	Y	FUR and HSL sighted during a number of hauls, following the codend in. HSL was observed to be female.	N
15	1	SOU	Offal batching was practiced sump pumps were fitted with mincers no discharge occurred during shooting or hauling.	BB, Twin TL, SLED	Bird abundance was dependant on whether the vessel was hauling, if other vessels in the area were hauling then birds would move off to those vessels.	Y	FUR observed on three occasions.	Y
16	1	SOU, SUB	Offal was minced and none was discharged during shooting or hauling.	BB, Twin TL, SLED	Birds attended the vessel at all times, most abundant during offal discharge.	Y	FUR sighted on two occasions at stern during hauling. Pod of dolphins sighed on one occasion.	Y
17	5	1. SOU 2. SOU, SUB 3. SOU, SUB 4. SOU 5. SOU, SUB	Sump pumps and cutters used and offal was discharged more or less continuously, though not during hauling or shooting, this which was observed to attract birds to the starboard side, however this did not draw birds around to the stern. Net was cleaned between tows.	Twin TL, BB, SLED	Moderate numbers of seabirds around the vessel. Bird numbers were noted to increase at hauling. Birds actively fed on the codend.	Y N N N N	FUR only sighted during hauling but not seen to be feeding.	Y N N N N

Table A6.5 Jack mackerel and barracouta pelagic trawl Fishery

Vessel No.	No. Times Observed	FMA's Fished	Offal Management	Mitigation used	Seabird interactions	Seabird Capture?	Marine mammal interactions	Marine mammal capture?
1	5	1. CHA 2. CHA, CEW 3. AKW, CEW, CHA 4. SOU 5. CHA, CEW, AKW	Crew cleaned the net meticulously. Offal discharged from a chute on the starboard side, continuous discharge though less during hauling and shooting.	BB, TL	Large numbers of birds around the vessel at all times. Abundances peaked during processing.	N N N Y Y	FUR sighted regularly, mostly at night. Sightings of CCD and BDO. Bridge crew also kept a watch for marine mammals.	N N N N N
2	4	1. AKW, CEW 2. CHA 3. SOU, CHA, CEW, AKW	All offal mealed. Only large sharks discarded whole.	BB	Low numbers of birds around the vessel and rarely feeding on the net.	N N N	FUR regularly observed around the vessel, feeding on net during hauling	N N N
3	1	SEC, CHA	No meal plant or mincers onboard.	Twin TL	No specific comments.	N	HSL frequently Observed following the vessel.	N
4	3	1. CHA 2. SEC 3. CEW, SOU CHA, SEC	Nets cleaned between trawls. Offal plant onboard. Vessel generally mealed or batch discarded offal.	Twin TL	Large numbers of birds present, birds generally fed actively on the lengthener of the net.	N N Y	Marine mammals were seldom sighted throughout the trip.	N N Y
5	2	1. CHA, CEW 2. AKW, CEW, CHA	Factory wash drained out from the port side meaning regular aggregations of birds.	TL, WS	Bird captures were during heavy swells	Y N	CDD and FUR sighted.	N Y
6	2	1. CHA 2. SOU	Offal was regularly discarded whenever the meal plant was overwhelmed.	Twin TL	Seabirds were in constant attendance of the vessel. Numbers began to increase as winched came on; this would then peak once the codend hit the surface with birds feeding on net scraps.	N N	FUR were the only mammals seen and generally in modest numbers.	N N
7	3	1. CHA 2. SEC, SOU 3. SOU, SEC CEW	Vessel discarded during shooting and hauling but did not run the discard conveyor until the doors were in the water during shooting or when the gear was at the surface during hauling	Twin TL	Bird numbers peaked at 500.	N N N	No specific comments.	N Y N
8	2	1. SEC, SOU	Vessel generally processed at	BB	Bird numbers observed to be	Y	Mammals rarely sighted	Y

		2. CEW, CHA	separate times to fishing. Vessel generally batch discarded		low, even during hauling and processing, it was noted however that birds were still displaying aggressive feeding behaviour. Bird abundances stayed stable at all times although activity and proximity to the vessel increased with hauling.	Y	though FUR were observed feeding on the codend. Pod of BDO sighted on one occasion	Y
9	3	1. CHA 2. SEC, CHA, CEW AKW 3. AKW, CEW, CHA	Meal plant operated; measures were in place to reduce the inadvertent discharge of waste from the factory. Net was cleaned after every haul. Offal was only discharged when the meal plant became swamped.	BB	High numbers of seabirds around the vessel at all times. No warp-strikes observed	N N N	Vessel turned with doors up on a number of occasions (Headline at surface). FUR sighted occasionally. Number of whale sightings throughout the trip.	N N N
10	1	CHA, SOU	Vessel continuously discharged offal from the factory, no sump pumps or cutters	Twin TL	Continuous discharge of offal was observed to attract birds.	N	No marine mammals sighted.	N
11	2	1. CHA 2. SEC	Offal discharge was halted prior to setting. Offal was batched.	Twin TL	Low numbers of birds in attendance of vessel (40-80) until hauling and processing of offal when it would increase to 300-500.	N Y	FUR occasionally sighted around the vessel- sighted actively feeding from the net on hauling.	N Y
12	3	1. CHA 2. SEC, CHA, CEW, AKW 3. CHA, CEW	Meal plant generally in operation, however breakdowns did occur which resulted in the discharge of offal.	BB	Birds were present around the vessel in low to moderate numbers. Aggressive feeding behaviour was noted at times.	N N N	Hauled doors to surface on occasion to make turns. Few mammal sightings were made- CCD and FUR. FUR observed on one occasion when the meal plant was not functioning and so offal was being discarded. They dispersed once the discards stopped (one captured after this event).	Y N Y

Table A6.6 Orange Roughy and Cardinal and Oreo species deepwater trawl Fishery

Vessel No.	No. Times Observed	FMA's Fished	Offal Management	Mitigation used	Seabird interactions	Seabird Capture?	Marine mammal interactions	Marine mammal capture?
1	1	SOE	Vessel did not discharge during shooting or hauling. Stickers were removed from the net. Factory sumps were screened.	BB, TL	Bird abundance increased as the net reached the surface. Birds actively feeding on the codend. Large birds were observed feeding on floaters.	N	No marine mammals were sighted during the trip.	N
2	1	SUB	All offal was retained and mealed by the vessel. Very few whole fish discards were made and these were not discharged during setting or hauling.	BB, TL	Seabirds in constant attendance of the vessel, abundance peaked during hauling. Birds tended to congregate around the sump discharge point.	N	FUR sighted regularly around the vessel, at times actively feeding from the net. Vessel observed to steam away from heavy aggregations of FUR before setting. 40 PIW also sighted.	N
3	4	1. SUB 2. SEC, SOE, SUB 3. SUB, SOU 4. SOU, SUB	Offal discards occurred whenever the factory was in operation, during hauling, shooting and towing. Factory sumps were screened to reduce accidental offal discharge.	BB	Up to 500 Salvin's observed at any one time feeding aggressively from the discard chute.	N Y Y N	FUR sighted occasionally. SRW pod sighed on one occasion.	N N N N
4	1	SEC, SOE, CEE	Only very small amounts of offal discharged.	BB	Bird numbers 80-300 and would feed aggressively from the codend.	N	No specific comments	N
5	8	1. SOE 2. SEC, SOE 3. SEC, SOE 4. SOE, SEC 5. SEC, SOU, SUB 6. SOE, SEC 7. SOE 8. SOE	Offal was generally sent to the meal plant, except for occasions when it was not functioning, at these time offal was generally held until gear was out of the water.	BB	Birds were in regular attendance of the vessel. Birds were observed to crowd around the sump outlet where meal liquid was discharged. Calm days showed a marked decrease in bird activity.	N Y N Y Y Y Y N	Pilot whales (adults and calves), sperm whales and common dolphins sighted during the trips.	N N N N Y Y N N
6	4	1. AKE, AKW 2. AKE, AKW, CEE 3. AKE, AKW	All fish stored green so no offal discharge	BB	Small numbers of birds in attendance.	N N N	No specific comments	N N N

		4. AKE, AKW				N		N
7	1	CEE	No specific comments	Twin TL, BB	No specific comments	N	No marine mammals sighted	N
8	4	1. CHA 2. SOE 3. SEC, CEE CHA 4. CHA	Offal batching trials conducted. No offal or whole fish discharge during shooting and hauling.	Twin TL, BB	Bird numbers increased with offal production. A number of captures occurred while the vessel was repairing it's net in the water. Birds caught on the warp were all caught on the same Starboard warp on an exposed sprag. Vessel repaired this after each event and finally to good effect	N Y Y N	Whales occasionally sighted. Crew members kept watch for marine mammals.	N N N N

Table A6.7 Inshore trawl Fishery

Vessel No.	No. Times Observed	FMA's Fished	Offal Management	Mitigation used	Seabird interactions	Seabird Capture?	Marine mammal interactions	Marine mammal capture?
1	1	SEC	No specific comments	Nil	Bird abundance increased with hauling and processing of offal.	N	HDO regularly observed, though often simply passing by the vessel.	N
2	1	SEC	Vessel discharged offal intermittently during tows, however not during shooting or hauling.	WS	XSA noted to be the species most likely to interact with the trawl warps.	N	HDO regularly sighted around Akaroa and Lyttleton Harbour, behaviour generally limited to bow riding. However on some occasions dolphins were sighted swimming above the location of the hauling net.	N
3	1	SEC	Offal was batched into holding pounds which were discharged once full.	WD	Birds observed to be most abundant during discharge of offal. Vessel was observed to reduce deck lighting at night to limit deck strikes.	N	HDO sightings made during steaming in Lyttelton Harbour and Akaroa.	N
4	1	SEC	Mitigation device deployed for all tow during offal production.	WD	Seabird abundance was noted to be highest during hauling and offal production, reducing rapidly after these times.	N	HDO regularly observed during the trip, they were observed to follow the vessel approximately above the net during tows and hauls. Sightings increased with proximity to the shore. Sightings were also generally only made in turbid waters.	N
5	1	CHA	Road cone style warp deflector was used at times of offal discharge.	WD	Birds observed to be attracted by offal and whole fish discharges.	N	HDO, CDD and unidentified whales were observed.	N
6	1	AKE	Offal was only discharged once hauling was complete.	Nil	Seabirds, in particular XFS and XBP were observed to actively feed on offal and whole fish discards.	N	CDD sighted on one occasion.	N
7	1	SEC	Offal batching was practiced on	WS	Seabird numbers peaked during	N	HDO regularly sighted.	N

			occasion. Mitigation device was deployed during offal production.		processing of fish.			
8	1	SEC	Offal discharged through a specific discharge chute, offal discharge was continuous though no offal was produced during hauling. Some whole fish discharge occurred during setting.	WD	XSA observed to be the most abundant and aggressive feeders.	Y	HDO sighted frequently while steaming to and from Lyttleton harbour. DDO and FUR also sighted.	N
9	1	CHA	No offal was produced during hauling or setting	Nil	Seabird abundance was observed to increase during hauling and offal production	N	No specific comments.	N
10	1	SEC	No specific comments	Nil	Bird numbers peaked during hauls and drastically reduced during steaming between tows	N	HDO observed on one occasion. One CDD also observed.	N
11	1	CHA	No specific comments	Nil	Birds observed to actively feed of offal discharges. Very few warp strikes were noted.	N	CDD, HDO and FUR observed.	N
12	1	CHA	Offal discharge did not occur during setting of hauling.	Nil	Bird observed feeding on whole fish and offal discharge	N	CDD, HDO, FUR observed during the trip, mammals did not show direct interest in fishing activity.	N
13	1	SEC	Vessel generally retained offal and discharged it while the codend was on deck.	WS	XSA were the most abundant albatross species around the vessel, they were also observed to be the most aggressive feeders. Bird numbers were observed to increase during hauling and offal production.	N	HDO sighted frequently while steaming to and from Lyttleton harbour. DDO and FUR also sighted.	N
14	1	SOU	Offal was batch discharged (at the end of processing) in to the propeller wash to disperse it.	OB	Seabird activity and abundance highest during processing. Activity was also noted to increase wit winch noise.	N	Very few mammals sighted, FUR, PIW and unidentified dolphins.	N
15	1	SOU	Offal discharge generally occurring during towing.	TL	Birds were observed to be more abundant and active during times of offal production.	Y	One observation of a HDO, pod of common dolphins also observed on a separate occasion.	N
16	1	SOU	Majority of discharge occurred over the port side, this side was	WD	Seabirds observed actively feeding on the net while at the	N	Sightings of BDO during steaming, FUR sighted	N

			equipped with a warp deflector.		surface. Not warp strikes were observed. Bird abundance was observed to be highly dependant on offal production.		occasionally.	
17	2	1. AKE 2. AKE	Offal management and discard practices varied throughout coverage. Discards were intermittent and generally while the vessel was steaming.	BB	Prior to setting or hauling, the attachment or detachment of the trawl doors to or from the warps and the noise produced by the winches would persistently deter all birds away from the stern. This disturbance promoted bird abundance away from the vessel, concentrating activity around the net and the cod end.	N N	CDD, BDO and an unidentified whale were observed during coverage	N Y
18	1	SEC	Vessel only discharged offal at the end of the day's fishing when not gear was in the water.	Nil	Birds were in attendance at all times however were attracted to the vessel the most while hauling	N	HDO observed, in groups ranging from 1-10, all. On two occasions HDO were observed around fishing gear.	N
19	1	CHA	Offal was not discharged during shooting or hauling.	Nil	Seabirds were noted to only interact with the vessel while offal was being discarded. Bird numbers increased notable during hauling	N	HDO regularly sighted throughout the trip, often appearing to feed from the net during hauling.	N
20	1	SEC	Discard of offal and unwanted bycatch occurred continuously as the vessel was steaming. Offal and fish bycatch were either thrown directly overboard of washed off the deck into the sea using a hose.	Nil	Abundances and species assemblages were not observed to change significantly during the observation period.	N	HDO observed on regular occasions, however each sighting was only brief.	N
21	1	CHA	Offal was discharged during tows however not during setting or hauling. Offal was batch discharged.	WS	Species assemblages were observed to change with area. Behavioural changes were brought about by fishing activity; with discards	N	No marine mammals were sighted.	N

increasing feeding aggression.

Table A6.8 Inshore Bottom longline- Ling, Bluenose, Häpuku and Bass Fishery

Vessel No.	No. Times Observed	FMA's Fished	Offal Management	Mitigation used	Seabird interactions	Seabird Capture?	Marine mammal interactions	Marine mammal capture?
1	1	AKE	No specific comments.	NS, TL carried but not used	Bird numbers were low around vessel during hauling and none during setting.	N	No mammals observed.	N
2	1	SEC, SOE	No specific comments.	Twin TL	Seabirds in constant attendance of the vessel. The observer noted that the tori line was more effective for larger birds such as Albatross and giant petrels.	Y	FUR sighted around the vessel, occasionally trying to feed off the line.	N
3	1	SOE	No specific comments.	NS	Seabirds in regular attendance and observed to actively feed on offal and lost fish	Y	FUR sighted around the vessel on five occasions feeding on lost fish.	N
4	1	AKE	Unused baits were discarded continuously during hauling in the hopes that the birds would 'have their fill' and stop diving on the line, this was found to be ineffective. Any offal was discharged outside of fishing times.	TL, DH (found to be ineffective)	Bird activity and abundance varied considerable during the trip, with abundance being lowest during setting and highest during hauling. Black petrels were observed to be dominant during hauling, actively diving on the returned baits, this was particularly apparent during the early and middle parts of hauling.	Y	CDD sighted occasionally but not in close proximity to the vessel.	N

Table A6.9 Inshore Bottom longline- Snapper Fishery

Vessel No.	No. Times Observed	FMA's Fished	Offal Management	Mitigation used	Seabird interactions	Seabird Capture?	Marine mammal interactions	Marine mammal capture?
1	1	AKE	Bait discharge during hauling was minimal and batched.	NS, TL	Seabird abundance increased during hauling.	Y	CDD sighted on three occasions and one Bryde's whale also sighted	N
2	1	AKE	Offal was only discarded during the steam back to port when sharks were processed. During hauling, all unused bait was retained onboard. The bait would normally be discarded during steaming.		During setting, birds were either not present at all or were present in very low numbers. Bird activity was significantly higher during hauling. XFS were most regularly seen and were the most numerous	N	There were no marine mammal sightings.	N
3	1	AKE	Returned baits were continuously discarded during hauling. Offal from shark production was observed to increase seabird abundance.	TL	Seabird abundance increased dramatically with proximity to Great barrier and little barrier Islands. Very aggressive feeding behaviour displayed by both XFS and XBP	Y	No specific comments.	N
4	1	AKE	Unused baits were discarded close to the hauling line which was observed to draw birds in closer.	TL	XFS were the most abundance seabird sighted. Bird abundance and activity increased during processing of sharks and discarding of offal.	N	BDO and CDD sighted on occasion.	N
5	1	AKE	Very little bait was returned on the hauling line.	TL (streamers)	Seabirds only observed in small numbers.	N	CDD and Bryde's whales sighted. CDD sighted feeding on small fish escaping from the meshes of the codend of a nearby trawl vessel on one occasion.	N
6	1	AKE	Offal and baits were discarded continuously during hauling.	TL	No specific comments	N	CDD and BDO were sighted on occasion.	N
7	1	AKE	Unused bait continuously discarded during hauling.	TL used for initial part of trip but was damaged and not replaced.	Birds were observed to congregate around the line during hauling. Bird numbers highest during hauling, with discard of unused baits drawing birds in closer to the vessel.	Y	BDO and CDD observed on occasion.	N

8	1	AKE	Soy bean oil was applied to the baits in an attempt to make them less attractive to birds. Offal was not produced until after fishing was completed.	TL was onboard but not used.	Seabirds actively fed on discarded baits, in some cases birds would remove baits from the hauling line. Campbell albatross were observed to attempt to feed on the setting line.	N	No specific comments.	N
9	1	AKE	No specific comments.	TL used only during daylight hours	Birds observed to congregate around the hauling line, attempting to feed on returned baits. Birds captured at night	Y	CDD and Bryde's whales sighted during trip.	N
10	1	AKE	All baits were held during hauling.	Skipper commented that he used mitigation devices as and when bird activity warranted it.	Bird activity increased with fishing.	N	No marine mammals sighted	N
11	1	AKE	No specific comments	TL	Very few birds observed around the vessel	N	No marine mammals observed.	N
12	1	AKE	No specific comments	TL	Seabird numbers were observed to peak during hauling and discharge of unused baits.	Y	Occasional sightings of BDO.	N
13	1	AKE	Offal and unused baits were batched and discharged during steaming.	Nil	Very few birds sighted during setting, increased numbers during hauling.	N	CDD sighed on one occasion.	N
14	1	AKE	Offal and unused baits were discarded during hauling but not during shooting.	Nil	One XBP and one XFS observed showing an interest in gear during hauling, feeding on discarded baits.	N	BDO sighted infrequently at a distance, showed no interest in fishing activities.	N
15	1	AKE	No specific comments	TL,	Birds were observed in small numbers.	N	No marine mammals were sighted.	N
16	1	AKE	During times of highest bird abundance the vessel refrained from discarding offal and unused baits.	TL, NS	Birds present in low numbers. XFS were the most abundance bird species.	N	No marine mammals were sighted.	N
17	1	AKE	Vessel retained all retuned baits and discharged at the end of hauling. Any fish processing was conducted after hauling.	TL	Seabirds observed during hauling attempting to take returned baits on the hauling line. Black Petrels and	N	CDD observed nearby in a pod of around 150 in general dolphins showed no interest in fishing activities.	N

					Campbell's albatross observed to 'dive' on the baits during setting.			
18	1	AKE	No specific comments	Nil	Bird behaviour was observed to be influenced by fishing activity. Birds were observed to feed on discarded baits, also on occasion attempting to remove baits from the hauling line.	N	One pod of 12 BDO observed on four occasions, showed no interest in the fishing gear.	N
19	1	AKE	Offal was not discharged during hauling and shooting	TL	Bird abundance and activity was observed to change dramatically on a daily basis	N	CCD were sighted around the vessel on 2 separate occasions	N
20	1	AKE	Bait was occasionally held during hauling.	TL	Low abundances of seabirds in general.	N	No specific comments	N
21	1	AKE	Discard of unused bait was only conducted at the end of hauling.	TL	While seabird species assemblage did not change with location abundance did.	Y	CDD and BDO sighted, Marine mammals sighted showed no interest in fishing gear.	N
22	1	AKE	Unused bait continuously discarded during hauling	Nil	Birds observed to congregate around the vessel during hauling, with bird actively feeding on discarded bait.	Y	No marine mammals were observed.	N
23	1	AKE	Bait was continuously discarded during hauling.	TL (only used during daylight sets).	XFS and XBP observed most frequently. In constant attendance during hauling. Discarded bait was observed to be a strong attractant. All captures occurred in dark or at first light and within the first quarter of the line.	Y	CDD observed occasionally, PIW observed once.	N
24	1	AKE	Fish was not processed onboard so no offal was produced. Unused baits were discarded on occasion however this was very uncommon.	TL	XFS and XBS were the most frequently observed seabirds. Bird abundance increased dramatically during fishing activity.	N	Two sightings of CDD	N
25	1	AKE	No specific comments.	TL	Seabird abundance was generally low.	N	CDD sighted occasionally in variable numbers.	N
26	1	AKE	No specific comments	Nil	Birds observed to feed actively on discarded offal and baits. Birds observed to dive on the	Y	CDD and one Bryde's whale observed.	N

					line during both setting and hauling. Petrel and shearwater species were observed to come closer into the vessel than albatross species.			
27	1	AKE	Fish was not processed and offal not discarded until after fishing was completed.	TL	Very low bird abundance.	N	No marine mammal sightings	N
29	1	AKE	Unused baits were continuously discharged.	TL	In general very few birds were present around the vessel.	N	CDD sighted on one occasion.	N
30	1	AKE	Offal and unused baits were retained until the end of hauling.	TL (only occasionally used)	Bird abundance was generally low during the trip. XBP and XFS were observed to be the most aggressive feeders.	N	Marine mammals observed on three occasions (CDD and BDO).	N
31	1	AKE	Only small quantities of offal were produced by the vessel as most fish was packed green. Offal generally discharged while the vessel was steaming. Unused bait however was continuously discarded during hauling.	TL (Onboard but not used)	XFS and XBP were the most abundant species in attendance of the vessel. XFS and XBP were also observed to be the most aggressive during hauling.	Y	CDD sighted on three occasions, bow riding.	N
32	1	AKE	Most fish was packed green and so very little offal was produced, what was produced was discharged during steaming. Returned baits were continuously discharged on the opposite side to hauling.	TL	Seabird abundance around the vessel was generally low, vessel fished very close to the coast. XRB and XBG were the most abundant and aggressive of the birds present.	N	BDO were sighted on two separate occasions, showing no interest in fishing activity.	N

Table A6.10 Inshore Setnet Fishery

Vessel No.	No. Times Observed	FMA's Fished	Offal Management	Mitigation used	Seabird interactions	Seabird Capture?	Marine mammal interactions	Marine mammal capture?
1	1	SEC	Offal was held onboard for discharge away from the fishing grounds.	OM	In general birds stayed away from the vessel during times of fishing as no offal was discharged.	Y	Marine mammals were not observed in large numbers, FUR and DDO observed.	Y
2	1	SEC	Offal was only produced and discharged when steaming between nets. Net was cleaned before resetting.	OM	No specific comments.	N	DDO numbering in the hundreds were observed around the vessel.	N
3	1	SEC	Vessel cleaned nets after each fishing event.	OM	No specific comments.	N	Vessel did not shoot while marine mammals were around.	N
4	1	SEC	Net cleaning and not shooting in the presence of large numbers of birds and mammals was used as forms of mitigation.	OM	Bird activity did not appear to be directly linked to offal production. Time of day was noted to have an effect on the abundance and species composition of seabirds	N	No specific comments.	N
5	1	AKE	No offal produced during fishing activities or on the fishing grounds.	Nil	Birds observed around vessel however shoed little interest in fishing activities.	N	One FUR sighted briefly at a distance.	N
6	1	SEC	Offal management and discard practices were different for each crew member. Sometimes offal batched, other times discharged continuously	P (not used on all nets)	Discarded fish and offal was observed to draw birds in closer and increase aggression.	Y	HDO regularly sighed around the vessel, FUR also observed.	N
7	1	SOU	Offal was only produced at the end of hauling.	Nil	Birds were present around the vessel in large numbers at all times. Bird activity was lowest at dawn and dusk but peaked during the day. Bird numbers were noted to increase with the discharge of offal.	N	FUR and PIW sighted (pod of 8-10).	Y
8	1	SEC	Offal was only discarded after	Nil	The only change in bird	N	Only HDO were observed.	N

			hauling of the net was complete.		behaviour occurred during processing times the birds became more aggressive their feeding behaviour. Generally this was either the XSA or the XGP.		The numbers ranged from one to 12 animals in a pod. HDO were sighted on 90% of voyages throughout the observer period.	
9	1	SEC	Vessel processed between hauling and resetting the net	Nil	No specific comments	N	FUR and DDO sighted around the vessel, FUR were observed actively feeding on the net.	N
10	1	SOU	Offal discharged while the vessel was steaming between nets.	Nil	Fiordland crested penguins sighted regularly in small groups.	Y	FUR and HSL observed, HSL were observed to feed on the offal discharged by the vessel.	N
11	1	SOU	Offal production and discharge generally took place during hauling. No offal was discharged during setting.	Nil	Offal production was noted to increase abundance and aggression of seabirds. Due to setting occurring rapidly after the previous haul bird numbers were typically still high around the vessel.	Y	FUR, HSL, CDD, DDO sighted. HSL feeding on offal discharge. DDO were the most commonly sighted marine mammals.	Y

Table A6.11 Surface Longline – Charter tuna Fishery

Vessel No.	No. Times Observed	FMA's Fished	Offal Management	Mitigation used	Seabird interactions	Seabird Capture?	Marine mammal interactions	Marine mammal capture?
1	2	1. SEC, CEE 2. SOU, CHA	No specific comments	TL	Seabird abundance was observed to increase at hauling. Abundance also increased as other vessels left the fishing grounds.	Y Y	FUR sighted on regular occasions in SOU and CHA	N Y
2	1	CHA, SOU	Unused bait was batch discharged on the opposite side to hauling.	Twin TL	XBM was the most abundant species around the vessel, bird numbers highest during hauling with aggressive feeding behaviour displayed.	Y	FUR only marine mammals observed.	Y
3	2	1. CEE, CHA, SEC 2. SOU, CHA	Offal and bait was batch discharged on the opposite side of the vessels to hauling, this was closely monitored by crew.	Triple TL, GC, BC	XTP and XWC were the most commonly observed seabirds. XBM observed to display the most dominant behaviour at hauling.	Y Y	FUR sighted intermittently; on two occasions in large numbers (20+). On e large pod of PIW also sighted.	N Y
4	1	SOU, CHA	Offal and returned baits were batched and discarded on the opposite side to hauling.	Triple TL	Seabird abundance tended to vary with weather conditions, XBM observed to be the most abundant and aggressive.	Y	No specific comments.	Y

Table A6.12 Surface Longline – Domestic tuna and swordfish Fishery

Vessel No.	No. Times Observed	FMA's Fished	Offal Management	Mitigation used	Seabird interactions	Seabird Capture?	Marine mammal interactions	Marine mammal capture?
1	1	AKE, CEE	Baits and offal were continually discarded during hauling but not during setting.	TL	No specific comments	N	No marine mammals sighted during the trip	N
2	1	AKE	Vessel ensured that on setting, baits were dropped directly behind the stern of the vessel, rather than away from the prop wash, this keeps the bait entry point within the area of the TL. All returned baits were binned and discarded after hauling.	TL, BC	Lost baits and deck wash after processing seemed to be the major attractants for birds. No attempts by bids to feed on the line.	Y	No marine mammals observed interacting with gear.	N
3	1	CEE	Baits were discarded constantly during hauling.	TL	Birds present in small numbers which increased as the haul progressed.	Y	No marine mammals sighted	N
4	1	AKE	Unused baits are batch discarded during hauling and offal discarded as and when it was produced. Observer noted that if single baits were discarded it would elicit a feeding frenzy, however when a 10l bucket of SQU was thrown over there was no response form the birds.	TL	Low numbers of birds present during hauling; observed to attack hooks with unused bait and feed on offal.	N	CDD sighted outside of fishing activity.	N
5	1	CEE	All offal and unused baits were retained until the end of hauling.	TL (carried but not used)	Low numbers of birds observed around the vessel. Birds would actively feed on the hauling line.	N	FUR sighted on one occasion, followed the vessel during hauling.	N
6	1	AKW, AKE	Unused baits were generally discarded during hauling.	TL, DB (used on two occasions).	Bird numbers low around the vessel during hauling. No birds in attendance during setting.	N	No marine mammals sighted throughout the trip.	N
7	2	1. AKE 2. AKE	Unused bait was discarded away from the point of hauling.	TL, NS	Birds observed constantly - feeding on discarder SQU bait during hauling thought this	N N	No marine mammals observed.	N N

					occurred primarily behind the vessels rather then around the line. Bird umber increased once hauling commenced.			
8	1	AKE	Unused baits were retained then discharged in bulk at the end of hauling.	TL, DB, SL, LS	Moderate numbers of bird around the vessel which would stay in attendance for the duration of the trip. Birds were observed to feed on the discharged offal and attack baited hooks during hauling.	Y	Three PIW sighted also a possible Fin whale. PIW observed swimming along the line during hauling.	Y
9	2	1. AKW 2. CHA, CEE	Vessel discharged offal and unused baits continuously.	TL	Seabirds numerous and very active, tori line seemed to have little effect on bird activity.	Y Y	One FUR sighted, one hooked.	N Y
10	1	CEE, CHA	Offal and unused baits discharged during hauling.	TL	Birds a continuous presence around the vessel, building early in the haul, feeding on discarded bait and offal.	Y	FUR sighted occasionally around vessel.	Y
11	1	AKW, AKE	Baits continuously discarded during hauling, as was offal. No offal discharged during setting.	TL (not used).	Birds observed to follow vessel feeding on discarded baits.	Y	CDD and Sperm whales sighted.	N
12	1	AKE	No specific comments.	TL	Birds constantly in attendance, however not in large numbers. Observed to feed on unused bait and offal.	N	No marine mammals sighted.	N
13	1	AKE	Bait was always retained.	TL, NS	Vessel altered it's time and speed of shooting to avoid birds. Birds were in attendance of the vessel at all times.	Y	No marine mammals were encountered.	N
14	2	1. AKW, AKE 2. CEE	No specific comments	TL	Birds constantly in attendance, however not in large numbers.	Y Y	No marine mammals sighted	Y N
15	1	CEE	No specific comments	TL	Birds observe to actively feed on discarded baits and offal.	N	No marine mammals observed during the trip.	N

Table A6.13 Bottom longline- Deepsea Ling Fishery

Vessel No.	No. Times Observed	FMA's Fished	Offal Management	Mitigation used	Seabird interactions	Seabird Capture?	Marine mammal interactions	Marine mammal capture?
1	3	1. SOE 2. SOU 3. SUB	Vessel operated a meal plant. No whole fish or offal discards during hauling.	TL, GC	XGP generally seen around the bilge pumps.	N Y Y	FUR present for most hauls, Feeding on HCO and RCO 'lost' form the line, FUR did not appear interested in the LIN.	N N N