Conservation Services Programme
Observer Report: 1 July 2010 to 30 June 2011

FINAL REPORT

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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 any adverse impacts.

This report summarises the observed interactions (mortalities and animals released alive) between protected species and commercial fishing vessels for the period 1 July 2010 to 30 June 2011, covering 576 animals of approximately 40 taxa. 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. The 2010/11 observer year saw increased coordination of observer coverage of the inshore fisheries between government agencies and industry. For completeness all observer coverage is reported here regardless of whether it was funded by the DOC or the Ministry for Primary Industries (MPI)

Keywords: commercial fishing, fisheries observers, seabirds, marine mammals, turtles, 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.

During 2010 two amendments were made to Schedule 7A of the Wildlife Act 1953, extending absolute protection to a number of addition fish species and coral taxa[1]. This report, for the first time, includes information on captures of these species so no historic comparisons with previous CSP Observer Reports are possible. Marine protected species relevant to CSP are all seabirds (with the exception of the black-backed gull), all marine mammals and reptiles, seven species of fish (white pointer, basking, whale and deepwater nurse sharks, giant and spotted black grouper, manta and spine tail devil rays) and the majority of hard corals.

One of the tools to gain a better understanding of the nature and extent of interactions between commercial fisheries and protected species 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[2]. 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, 2012). 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.

In relation to these specific objectives, it should be noted that the Ministry for Primary Industries (MPI) currently commissions statistical extrapolation of observed bycatch of seabirds, marine mammals and turtles to estimate total fishery captures (e.g. see Abraham & Thompson 2011).

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

[1] See Wildlife Order 2010 (SR 2010/159)
http://www.legislation.govt.nz/regulation/public/2010/0159/latest/dlm3012938.html
and Wildlife (Basking Shark) Order 2010 (SR 2010/411)
http://www.legislation.govt.nz/regulation/public/2010/0411/latest/DLM3347006.html

[2] INT2011/01-Monitoring protected species interactions with New Zealand Fisheries. Further details can be found in the Conservation Services Annual Plan 2010/11 www.doc.govt.nz/csp

Ministry for Primary Industries (MPI, formerly Ministry of Fisheries) Observer Programme. The scale of the MPI Observer 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 MPI and DOC research priorities. Additional to standard observations (see Section 2), fisheries specific information is also collected, such as data on experimental mitigation practices or execution of experimental protocols such as line weighting or offal management trials.

Observer coverage in inshore fisheries has continued, with focus moving to different inshore sectors as informed both by previous observer coverage and risk assessment modelling. The process for planning this coverage was detailed in the Conservation Services Annual Plan 2010/11. Overall observer coverage in inshore fisheries reduced during this year and was targeted specifically at areas of key interest or limited historic observation.

2. Data collection

To date, the bulk of publicly available 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 specimens for autopsy and / or identification;
- Recording any other interactions of protected species with fishing operations;
- Reporting on the efforts made to mitigate the risk of or actual adverse 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; but see for example Abraham & Thompson 2011). 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.

3. Format

The remainder of this document follows Rowe (2010) 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'. Identification of coral taxa has been confirmed on land when at-sea identification was not possible. 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. Where possible, for seabird mortalities; species identification has been confirmed through examination on land as part of project INT 2010/02 (Identification of seabirds captured in New Zealand fisheries) the report summarising this work is published by Bell (2011). For live captures or dead seabirds that could not be recovered independent examination of any photographs has also been undertaken (as part of project INT2010/02).

4. Definitions

CSP (Conservation Services Programme): The Conservation Services Programme (CSP) is a programme of research, administered by DOC, focused on understanding and mitigating the adverse effects of commercial fishing on protected species in New Zealand fisheries waters.

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 impacts 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.

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

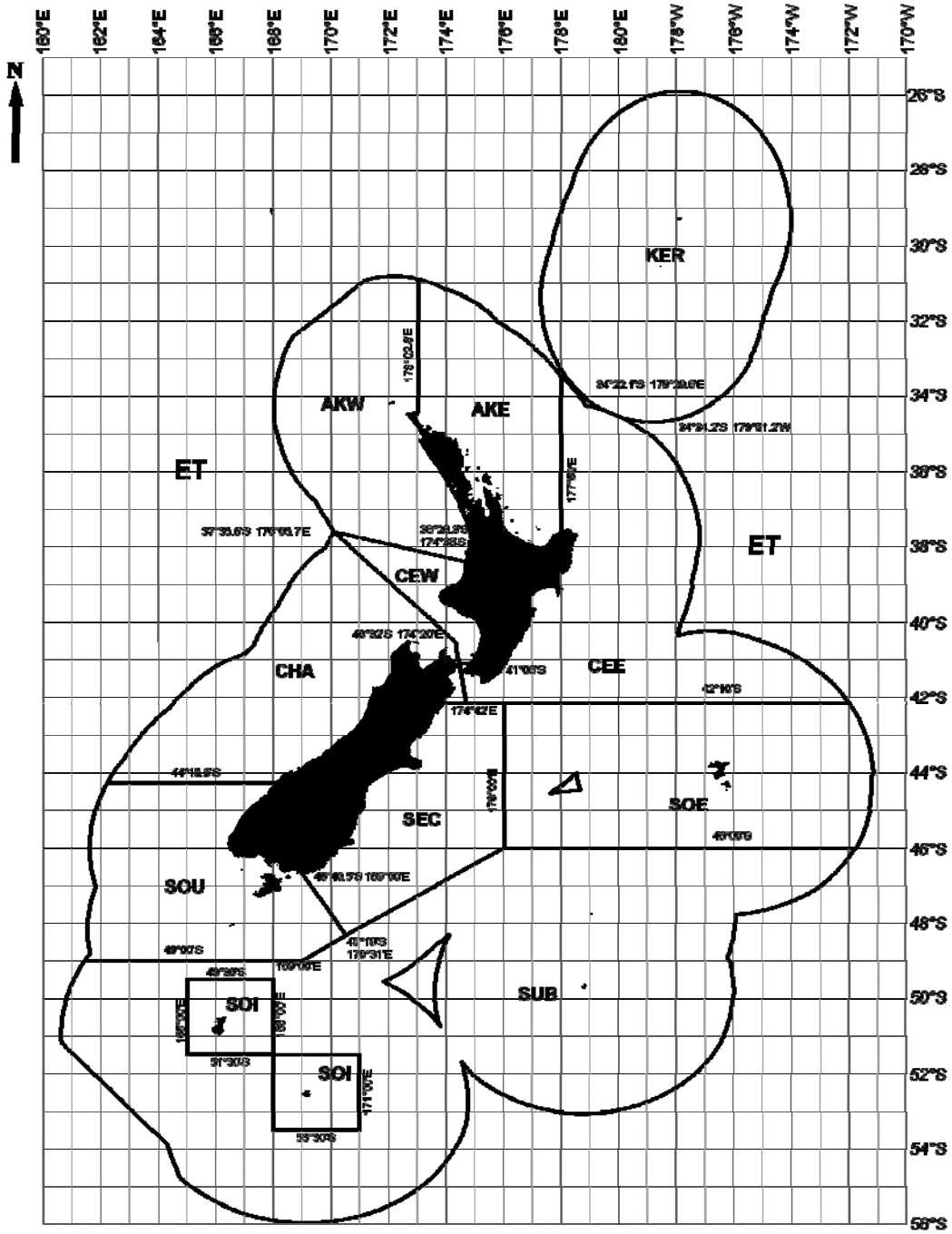
Squid 6T fishery: The squid Quota Management Area (QMA) that operates around Auckland and Campbell Island groups in FMA SOI (see Figure 1).

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 from the 'Non-Fish and Protected Species Catch Return' 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, in terms of number of events, 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 and squid) or by having distinctly different practices, such as lower headline double or triple codend nets (scampi), or different protected species interactions.

The hoki, hake, ling, warehou fishery can be broadly separated into two categories; 'hoki season' and 'out of season hoki'. 'Hoki season' spans 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 season hoki' spans the rest of the year with hoki, hake, ling and warehou targeted largely in SEC, SUB, SOE and to a lesser extent SOU.

All vessels over 28m in this fishery are required to use one of the three permissible forms of regulated bird scaring equipment. Additional to this a number of the smaller vessels operate either comparable equipment or bespoke designs. Vessels also conduct activities against a Vessel Management Plan (VMP) and Marine Mammal Operating Procedure (MMOP) which give guidelines on operational ways of reducing risk of protected species interaction.

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. Levels of both fishing effort and observer coverage were similar to the previous year. Capture rates for seabirds were similar to the previous year however captures rate of mammals reduced again with approximately half the captures of the previous year (Ramm 2012). Four protected fish captures occurred; all these were basking sharks, this species was added to Schedule 7A of the Wildlife Act 1953 in 2010. Protected coral bycatch rate was 10.62kg per 100 tows, which represents a 5 fold increase over the previous year; however was highly variable between FMAs.

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 2010/11 observer year.

FMA	Effort Tows	Observed Tows	Coverage (%)	Seabird Captures*	Seabirds per 100 tows	Mammal Captures	Mammals per 100 tows	Protected Fish Captures	Fish per 100 tows	Coral Catch (kg)	Coral Catch per 100 tows (kg)
1. AKE	11	3	27.27	0	0.00	0	0.00	0	0.00	5.3	176.67
2. CEE	1206	141	11.69	6	4.26	0	0.00	0	0.00	0	0.00
3. SEC	3598	686	19.07	30	4.37	9	1.31	1	0.15	256	37.32
4. SOE	1715	288	16.79	11	3.82	3	1.04	0	0.00	26.1	0.94
5. SOU	1386	346	24.96	34	9.83	0	0.00	3	0.87	2.7	0.72
6. SUB	792	262	33.08	12	4.58	0	0.00	0	0.00	2.5	0.92
7. CHA	3471	1,053	30.34	7	0.66	13	1.23	0	0.00	2.4	0.23
8. CEW	19	0	0.00	0	-	-	-	-	-		-
9. AKW	19	0	0.00	0	-	-	-	-	-		-
10. KER	0	-	-	-	-	-	-	-	-		-
Total	**12,217**	**2,779**	**22.75**	**100**	**3.60**	**25**	**0.90**	**3**	**0.17**	**295.00**	**10.62**

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

Observer Coverage

Sixty three trips occurred onboard 33 vessels. Protected species captures occurred on 33 trips onboard 19 vessels. Comments relating to offal management, mitigation use and other information surrounding protected species captures are detailed in Table A6.1.

Table 2 describes the distribution of observer effort throughout the year. Coverage occurred throughout the year, however it peaked in July during the Cook Strait hoki fishery, with highest coverage occurring in CHA in July. CHA received high coverage during the June to September period however no coverage was achieved in the intervening months.

Table 2: Number of tows observed in the hoki, hake, ling and warehou middle depth trawl fishery by month during the 2010/11 observer year.

FMA	Jul-10	Aug-10	Sep-10	Oct-10	Nov-10	Dec-10	Jan-11	Feb-11	Mar-11	Apr-11	May-11	Jun-11	Total
1. AKE							3						**3**
2. CEE	76	41	23					1					**141**
3. SEC		4	20	42	25	143	6	180	132	13	74	47	**686**
4. SOE		22	35	32	38	26		42		83	7	3	**288**
5. SOU	32	11		121	28	14	18	20	14	65	3	20	**346**
6. SUB	6			57	34	22	39	12	4	58	25	5	**262**
7. CHA	568	252	45									188	**1,053**
8. CEW													**0**
9. AKW													**0**
10. KER													**0**
Total	**682**	**330**	**123**	**252**	**125**	**205**	**66**	**255**	**150**	**219**	**109**	**263**	**2,779**

Table 3 details the number of tows observed for each of the main target species in this fishery. As in previous years hoki tows make up the majority of observed tows, both in individual FMAs and over the entire EEZ.

Table 3: Number of tows observed in the hake, hoki, ling, and warehou middle depth trawl fishery during the 2010/11 observer year.

Target species	AKE	CEE	SEC	SOE	SOU	SUB	CHA	CEW	AKW	Grand Total
Hake	0	0	6	0	12	82	177	0	0	**277**
Hoki	3	141	553	234	134	137	861	0	0	**2,063**
Ling	0	0	15	19	55	39	3	0	0	**131**
Silver Warehou	0	0	112	34	74	1	11	0	0	**232**
White Warehou	0	0	0	0	71	3	0	0	0	**74**
Grand Total	**3**	**141**	**686**	**287**	**346**	**262**	**1,052**	**0**	**0**	**2,777**

Protected species interactions

Protected species interactions were numerically dominated by sooty shearwaters (*Puffinus griseus*). This is in contrast with previous years where captures have been dominated by New Zealand (NZ) fur seals (*Arctocephalus forsteri*). Overall the number of NZ fur seal interactions halved compared to the previous year, this represents the second consecutive year of decreasing NZ fur seal captures in this fishery.

Of the 40 sooty shearwater interactions 14 occurred during a single trip. Observer comments on this trip indicate the bird abundance was high with aggressive feeding occurring. This vessel was also observed to maintain good offal management practise with only deck wash being discharged.

Table 4: Protected species interactions in the hake, hoki, ling and warehou middle depth trawl fishery during the 2010/11 observer year.

Species	Alive	Dead	Decomposing	Grand Total
Birds				
Buller's albatross	1	4		5
Buller's and Pacific albatross			1	1
Campbell albatross		1		1
Cape petrels	2	2		4
Common diving petrel	9			9
Fairy prion	2			2
Greater albatross	1			1
Grey-backed storm petrel	1			1
New Zealand white capped albatross	3	1		4
Petrel (Unidentified)	6	1		7
Prions (Unidentified)	1			1
Salvin's albatross	7	6		13
Short-tailed shearwater		1		1
Smaller albatross	3			3
Sooty shearwater	15	25		40
Southern cape petrel		3		3
Storm petrels	3			3
Westland petrel	2	2		4
White-chinned petrel	1	11		12
Birds Total	**57**	**57**	**1**	**115**
Marine Mammals				
New Zealand fur seal	5	20		25
Marine Mammals Total	**5**	**20**		**25**
Fish				
Basking shark		4		4
Fish Total		**4**		**1**
Grand Total	**62**	**81**	**1**	**144**

The method of protected species interaction as reported on the 'Observer Non-fish Bycatch Form' is detailed in Table 5. As in the previous year net captures made up the majority of interactions in this fishery for both live releases and mortalities (Ramm 2011, 2012). Only three warp capture mortalities were reported by observers, however there remains uncertainty over the level of cryptic mortality from warp strikes.

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 Name	Impact against vessel	Net capture*	Other	Unknown	Grand Total	Comments Relating to 'Other' capture method
Birds						
Buller's albatross		1			1	
Cape petrels	1	1			2	
Common diving petrel	7		2		9	
Fairy prion	1	1			2	
Greater albatross			1		1	
Grey-backed storm petrel			1		1	
New Zealand white capped albatross	2	1			3	
Petrel (Unidentified)		5	1		6	
Prions (Unidentified)				1	1	
Salvin's albatross		7			7	
Smaller albatross	1	1	1		3	
Sooty shearwater	7	7	0	1	15	
Storm petrels	1		1	1	3	
Westland petrel		2			2	
White-chinned petrel		1			1	
Birds Total	**20**	**27**	**12**	**3**	**57**	
Marine Mammals						
New Zealand fur seal		4		1	5	
Marine Mammals Total		**4**		**1**	**5**	
Grand Total	**20**	**31**	**12**	**4**	**62**	

**included as captures in table 1*

b) Dead protected species

Species Name	Caught on warp or door*	Net capture*	Other	Unknown	Grand Total	Comments Relating to 'Other' capture method
Birds						
Buller's albatross	1	3			4	
Campbell albatross	1				1	
Cape petrels			2		2	Caught on paravane
New Zealand white capped albatross		1			1	
Petrel (Unidentified)		1			1	
Salvin's albatross	1	4		1	6	
Short-tailed shearwater		1			1	
Sooty shearwater		25			25	
Southern cape petrel		3			3	
Westland petrel		2			2	
White-chinned petrel		9		2	11	
Birds Total	**3**	**49**	**2**	**3**	**57**	
Marine Mammals						
New Zealand fur seal		20			20	
Marine Mammals Total		**20**			**20**	
Fish						
Basking shark		4			1	
Fish Total		**4**			**1**	
Grand Total	**3**	**73**	**2**	**3**	**81**	

**included as captures in table 1*

Interactions by target species are detailed in Table 6. As in the previous year the majority of captures occurred in tows targeting hoki, however this is in line with there being more observed hoki tows (Ramm 2012). Proportionally all target species had similar rates of capture.

Table 6: Protected species interactions by target species in the hake, hoki, ling and warehou middle depth trawl fishery during 2010/11.

Species Name	Hake	Hoki	Ling	Silver Warehou	White Warehou	Grand Total
Birds						
Buller's albatross		2	1	2		5
Buller's and Pacific albatross	1					1
Campbell albatross		1				1
Cape petrels	2	2				4
Common diving petrel		9				9
Fairy prion			1	1		2
Greater albatross		1				1
Grey-backed storm petrel				1		1
New Zealand white capped albatross			1	3		4
Petrel (Unidentified)		2		5		7
Prions (Unidentified)		1				1
Salvin's albatross		10	1	2		13
Short-tailed shearwater					1	1
Smaller albatross		2		1		3
Sooty shearwater		29	2	5	4	40
Southern cape petrel		3				3
Storm petrels		3				3
Westland petrel		3		1		4
White-chinned petrel	1	8	1	2		12
Birds Total	**4**	**76**	**7**	**23**	**5**	**115**
Marine Mammals						
New Zealand fur seal	5	20				25
Marine Mammals Total	**5**	**20**				**25**
Fish						
Basking shark				4		4
Fish Total				**4**		**4**
Grand Total	**9**	**96**	**7**	**27**	**5**	**144**

Table 7 shows the number of seabird interactions in the hoki hake ling and warehou middle depth fishery reported by area and month. As in the previous year, interactions were highest in October, though were more evenly distributed than in the previous year (Ramm 2012).

Table 7: Seabird interactions in the hake, hoki, ling and warehou middle depth trawls fishery during the 2010/11 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-10	Aug-10	Sep-10	Oct-10	Nov-10	Dec-10	Jan-11	Feb-11	Mar-11	Apr-11	May-11	Jun-11	Total
1. AKE	-	-	-	-	-	-	0	-	-	-	-	-	**0**
2. CEE	6	0	1	-	-	-	-	0	-	-	-	-	**7**
3. SEC	-	0	0	4	5	2	0	4	4	0	12	0	**31**
4. SOE	-	0	0	0	7	1	-	-	-	3	0	0	**11**
5. SOU	0	0	-	22	1	1	0	8	1	9	0	5	**47**
6. SUB	1	-	-	1	3	0	0	1	0	4	2	0	**12**
7. CHA	1	3	0	-	-	-	-	-	-	-	-	3	**7**
8. CEW	-	-	-	-	-	-	-	-	-	-	-	-	**0**
9. AKW	-	-	-	-	-	-	-	-	-	-	-	-	**0**
Total	**8**	**3**	**1**	**27**	**16**	**4**	**0**	**13**	**5**	**16**	**14**	**8**	**115**

Table 8 describes the distribution of marine mammal captures, as with previous years most captures occurred in the July to September period of the 'hoki season' (Ramm 2012, 2011, Rowe 2010, 2009). These captures occurring in both the Cook Strait and West Coast spawn fisheries, although were numerically dominated by the Cook Strait fishery.

Table 8: Mammal interactions in the hake, hoki, ling and warehou middle depth trawls fishery during the 2010/11 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-10	Aug-10	Sep-10	Oct-10	Nov-10	Dec-10	Jan-11	Feb-11	Mar-11	Apr-11	May-11	Jun-11	Total
1. AKE	-	-	-	-	-	-	-	-	-	-	-	-	**0**
2. CEE	5	2	2	-	-	-	-	0	-	-	-	-	**9**
3. SEC	-	0	0	1	0	0	0	0	0	0	2	0	**3**
4. SOE	-	0	0	0	0	0	-	0	-	0	0	0	**0**
5. SOU	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**
7. CHA	1	6	6	-	-	-	-	-	-	-	-	0	**13**
8. CEW	-	-	-	-	-	-	-	-	-	-	-	-	**0**
9. AKW	-	-	-	-	-	-	-	-	-	-	-	-	**0**
Total	**6**	**8**	**8**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**25**

Protected coral interactions are detailed in Table 9, captures were heavily dominated by a capture event of over 100kgs in a single tow, with most capture events being less than 1kg at time.

Table 9: Protected coral bycatch in kg per FMA in the hake, hoki, ling, warehou fishery during the 2010/11 observer year. Note a zero indicates no bycatch was observed, a dash indicates that there was not 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	Grand Total
Scleractinia	0	0	0	0.1	0	0	0	-	-	**0.1**
Stony corals-Branching	5	0	0	0	0	0	0	-	-	**5**
Stony corals-Cup	0	0	248.5	0	0	1	2.2	-	-	**251.7**
Black corals	0.1	0	0.1	0	0	0	0	-	-	**0.2**
Gorgonian coral	0	0	0	0	0	0	0.2	-	-	**0.2**
Bamboo coral	0	0	0.2	5	0	1	0	-	-	**6.2**
Bottlebrush coral	0	0	0	0	2.1	0	0	-	-	**2.1**
Golden corals	0.2	0	0	0	0	0	0	-	-	**0.2**
Red coral	0	0	0	1	0	0	0	-	-	**1**
Coral (Unspecified)	0	0	7.2	20	0.6	0.5	0	-	-	**28.3**
Total	**5.3**	**0**	**256**	**26.1**	**2.7**	**2.5**	**2.4**	**0**	**0**	**295**

5.1.2 Southern Blue Whiting

The southern blue whiting fishery tends to operate both temporally and spatially discretely from other trawl fisheries, focussed during the months of August and September in SUB. Being over 28m in length all vessels in this fishery are required by law to use seabird mitigation devices and also to adhere to industry Operating Procedures in regards managing risk of environmental interactions.

Table 10 outlines commercial fishing effort, observer effort and protected species captures. Fishing effort was similar to the previous year, however significantly more tows were observed meaning that observer coverage increased over the previous year and was more in line with 2008/09 (Ramm 2012, 2011).

Seabird captures were higher both in terms of number and rate than in previous years; most of these captures occurred on a single vessel.

Marine mammal captures also increased over recent years giving southern blue whiting one of the highest observed capture rates of NZ fur seals for any observed fishery. The fishery also had the highest rate of observed sea lion (*Phocarctos hookeri*) captures in 2010/11.

Protected coral bycatch was again negligible as the gear has very little contact with the seabed.

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	0	0	-	-	-	-	-		-
5. SOU	0	0	-	-	-	-	-		-
6. SUB	1,112	405	36.42	11	2.72	27	6.67	0	0.00
7. CHA	2	0	0.00	-	-	-	-		-
8. CEW	0	0	-	-	-	-	-		-
9. AKW	0	0	-	-	-	-	-		-
10. KER	0	0	-	-	-	-	-		-
Total	**1,114**	**405**	**36.36**	**11**	**2.72**	**27**	**6.67**	**0.00**	**0.00**

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

Observer coverage

In total 10 trips onboard 10 vessels were observed during the 2010/11 southern blue whiting fishery. Protected species captures occurred on eight of these trips. All but two vessels captured marine mammals (NZ fur seals or NZ seal lions) during coverage. One vessel accounted for a third of all mammal interactions however once corrected for observer effort four vessels had capture rates of more than ten animals per hundred tows. Comments relating

to offal management, mitigation device 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 tows being observed around a 2 month period (Table 11). Within the fishery the vessels tend to operate in two locations during the course of the season, depending upon both quota availability and catches.

Table 11: Number of Observed tows in the southern blue whiting fishery by area and month during 2010/11.

FMA	Jul-10	Aug-10	Sep-10	Oct-10	Nov-10	Dec-10	Jan-11	Feb-11	Mar-11	Apr-11	May-11	Jun-11	Total
1. AKE													**0**
2. CEE													**0**
3. SEC													**0**
4. SOE													**0**
5. SOU													**0**
6. SUB		136	260	9									**405**
7. CHA													**0**
8. CEW													**0**
9. AKW													**0**
10. KER													**0**
Total	**0**	**136**	**260**	**9**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**405**

Protected species interactions

A breakdown of the protected species involved in interactions in this fishery is given in Table 12. The number of protected species interactions in this fishery increased over the previous year and was the highest since the 2006/07 year. The captures of sea lions was also the highest since observer coverage began.

The majority of mammal captures in this year's southern blue whiting trawl fishery led to mortality with all NZ fur seals and all but two sea lions captured being dead. A reason for the increase in capture of marine mammals over previous years may be related to the temporal and spatial shift in observed fishing effort due East. This may have resulted in increased overlap with the foraging grounds of the NZ sea lions, indicated by increased abundances around the vessels. Higher observer coverage was achieved in the area towards the east of Campbell Island with captures aggregated around the 500m depth contour. There was also a large storm event around the time of the captures; these environmental factors may also have contributed to the higher than normal rate of interactions.

Table 12: Protected species interactions in the southern blue whiting fishery during the 2010/11 observer year.

Species Name	Alive	Dead	Grand Total
Birds			
Grey petrel	13	6	19
Prions (Unidentified)	3		3
Smaller albatross	1		1
Storm petrels	7		7
Birds Total	**24**	**6**	**30**
Marine Mammals			
New Zealand fur seal		16	16
New Zealand sea lion	2	9	11
Marine Mammals Total	**2**	**25**	**27**
Grand Total	**26**	**31**	**57**

Table 13 describes the nature of the protected species interactions in the southern blue whiting fishery. Vessel impacts were the predominant form of interaction for animals released alive, however two sea lions were caught in the net during hauling and released alive by crew.

Net captures accounted for all protected species mortalities; this is in line with previous years' observations (Ramm 2012, 2011).

Table 13: Method of capture for a) protected species released alive and b) dead protected species observed in the southern blue whiting fishery during the 2010/11 observer year

a) Released alive

Species Name	Impact against vessel	Net capture*	Unknown	Grand Total
Birds				
Grey petrel	10	3		13
Prions (Unidentified)	3			3
Smaller albatross		1		1
Storm petrels	6		1	7
Birds Total	**19**	**4**	**1**	**24**
Marine Mammals				
New Zealand sea lion		2		2
Marine Mammals Total		**2**		**2**
Grand Total	**19**	**6**	**1**	**26**

*Included as 'capture' in Table 11

b) Dead protected species

Species Name	Net capture*	Grand Total
Birds		
Grey petrel	6	6
Birds Total	**6**	**6**
Marine Mammals		
New Zealand fur seal	16	16
New Zealand sea lion	9	9
Marine Mammals Total	**25**	**25**
Grand Total	**31**	**31**

*Included as 'capture' in Table 11

More male than female pinnipeds were captured in the southern blue whiting fishery (Table 14), this is particularly pronounced in sea lions where ten males were capture and only one female. This sex ratio is broadly in line with previous years (Ramm 2011, 2012).

Table 14: Sex of pinnipeds observed captured in the southern blue whiting fishery by species and month during the 2010/11 observer year.

Sex	New Zealand fur seal	New Zealand sea lion	Total
Male	10	10	20
Female	6	1	7
Total	**16**	11	**27**

All seabird interactions occurred in September of 2010, the peak month of the fishing activity (Table 15). During the previous year all captures occurred in August (Ramm 2011).

Table 15: Seabird interactions in the southern blue whiting fishery by species and month during the 2010/11 observer year.

FMA	Jul-10	Aug-10	Sep-10	Oct-10	Nov-10	Dec-10	Jan-11	Feb-11	Mar-11	Apr-11	May-11	Jun-11	Total
1. AKE													0
2. CEE													0
3. SEC													0
4. SOE													0
5. SOU													0
6. SUB			30										30
7. CHA													0
8. CEW													0
9. AKW													0
10. KER													0
Total	0	0	30	0	0	0	0	0	0	0	0	0	30

Marine mammal interactions were relatively evenly distributed between August and September, despite twice as many observed tows occurring in September (Table 16). All sea lion captures occurred in September, by contrast all but four fur seal captures occurred in August. This is reflective of the spatial movements of the fishing fleet, with fishing effort primarily centred close to the Bounty Islands in August, and close to Campbell Island in September.

Table 16: Marine mammal interactions in the southern blue whiting fishery by species and month during the 2010/11 observer year.

FMA	Jul-10	Aug-10	Sep-10	Oct-10	Nov-10	Dec-10	Jan-11	Feb-11	Mar-11	Apr-11	May-11	Jun-11	Total
1. AKE													0
2. CEE													0
3. SEC													0
4. SOE													0
5. SOU													0
6. SUB		12	15										27
7. CHA													0
8. CEW													0
9. AKW													0
10. KER													0
Total	0	12	15	0	0	0	0	0	0	0	0	0	27

5.1.3 Scampi

Observations in the scampi fishery are undertaken primarily 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. Continuing the trend of recent years observer coverage in this fishery has increased, doubling from the 2008/09 levels of six percent to over 12% in 2010/11. Commercial fishing effort has increased by approximately 20% over the previous year (Ramm 2012).

Table 17 outlines commercial fishing effort, observer effort and protected species captures. Two marine mammal captures occurred during 2010/11, increasing over the previous year (Ramm 2012). Seabird captures also increased over the previous year, in terms of both absolute number and rate of capture. For 2010/11 the scampi fishery had the highest rate of observed seabird captures of any fishery observed. The large majority of seabird captures occurred in SUB.

Coral catch was observed to be highest in CEE and SOE. Scampi had the second highest observed protected coral catch rate in the middle depth fisheries.

Table: 17: *Summary of commercial effort, observer effort and protected species captures in the scampi middle depth trawl fishery during the 2010/11 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	780	140	17.95	18	12.86		0.00	5	3.57
2. CEE	912	71	7.79	1	1.41		0.00	51	71.83
3. SEC	2	1	50.00		-		-		-
4. SOE	1982	221	11.15	4	1.81	1	0.45	57.7	26.11
5. SOU		0	-		-		-		-
6. SUB	1078	157	14.56	64	40.76	1	0.64	0	0.00
7. CHA		0	-		-		-		-
8. CEW		0	-		-		-		-
9. AKW		0	-		-		-		-
10. KER		0	-		-		-		-
Total	**4,754**	**590**	**12.41**	**87**	**14.75**	**2**	**0.34**	**113.70**	**19.27**

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

Observer Coverage

During 2010/11 eight trips were conducted onboard six vessels. Protected species interactions occurred on all but one of these trips. Two vessels were responsible for 75% of the seabird captures, showing both the highest numbers of captures and the highest rate of capture. A number of these captures were associated with triple net rigs used on these particular vessels.

Comments relating to offal management, mitigation device use and other information surrounding protected species interactions are detailed in Table A6.3. All observed vessels deployed tori lines as mitigation devices in either single, paired or triple format.

Seabird abundance was observed to peak during periods of hauling and offal/fish discharge some vessels practiced batch discarding however the extent of application of this technique was variable over the fleet as well as both between and within trips.

Table 18 describes the distribution of observer coverage over 2010/11. Observer coverage was more spatially and temporally representative than it has been previously, though peaked in November and June. SOE received the highest levels of observer coverage.

Table 18: Number of tows observed in the scampi trawl fishery by area and month during the 2010/11 observer year

FMA	Jul-10	Aug-10	Sep-10	Oct-10	Nov-10	Dec-10	Jan-11	Feb-11	Mar-11	Apr-11	May-11	Jun-11	Total
1. AKE				40	38							62	**140**
2. CEE			26	45									**71**
3. SEC								1					**1**
4. SOE		65	41		69	18			28				**221**
5. SOU													**0**
6. SUB								45	18	44	20	30	**157**
7. CHA													**0**
8. CEW													**0**
9. AKW													**0**
10. KER													**0**
Total	**0**	**65**	**67**	**85**	**107**	**18**	**0**	**46**	**46**	**44**	**20**	**92**	**590**

Protected species interactions

Protected species interactions in this fishery were aggregated both spatially and temporally with some vessels capturing inordinately large numbers of seabirds. A number of large multiple capture events also occurred on three of the vessels where up to 15 seabirds interaction occurred in the same tow. A number of risk factors have been highlighted with scampi fishing operations; these include offal and discard management, the centre net of the triple net rig remaining open during hauling and the difficulty in cleaning the net of stickers due to the net remaining in the water as the codend is emptied on deck. To this end a specific project has been commissioned to develop methods for mitigating seabird bycatch in the scampi fishery with at sea testing being undertake during the 2011/12 and 2012/13 observer years[5].

Table 19 details the species interactions during the 2010/11 observer year. The majority of interactions involved petrel and shearwater species, in contrast to the previous year when albatross species made up the majority of the interactions (Ramm 2012). A larger portion of animals were also released alive than in previous years. White-chinned petrels made up half of the interactions overall and almost all of the live releases.

[5] Project MIT2011-02 Scampi trawl – mitigate seabird captures. See the Marine Conservation Services Annual Plan 2011/12 for further details.

Table 19: Protected species interactions in the scampi trawl fishery during the 2010/11 observer year

Species Name	Alive	Dead	Decomposing	Grand Total
Birds				
Flesh-footed shearwater		15		15
New Zealand white capped albatross		2		2
Salvin's albatross	1	3		4
Seabird (unspecified)			1	1
Sooty shearwater	2	17		19
White-chinned petrel	19	27		46
Birds Total	**22**	**64**	**1**	**87**
Marine Mammals				
New Zealand fur seal	1		1	2
Marine Mammals Total	**1**		**1**	**2**
Grand Total	**23**	**64**	**2**	**89**

Table 20 describes the nature of the protected species interactions in the scampi fishery. All but three interactions were net captures. One seabird was caught up on the terminal buoy of the tori line, another on the trawl warp and a third on the codend lazy line.

The large number of live released net captures indicates that interactions are occurring on hauling, as the net mouth remains open in the water.

Table 20: Method of protected species capture for a) protected species released alive and b) dead protected species observed in the scampi fishery during the 2010/11 observer year.

a) Released alive

Species Name	Net capture*	Other	Grand Total	Comments
Birds				
Salvin's albatross		1	1	Caught on tori line buoy. Tori line had to be retrieved to release the animal. Could fly free after release.
Sooty shearwater	2		2	
White-chinned petrel	19		19	
Birds Total	**21**	**1**	**22**	
Marine Mammals				
New Zealand fur seal	1		1	
Marine Mammals Total	**1**		**1**	
Grand Total	**22**	**1**	**23**	

*Included as 'capture' in table 17

b) Dead protected species

Species Name	Caught on warp or door*	Net capture*	Other	Grand Total	Comments
Birds					
Flesh-footed shearwater		15		15	
New Zealand white capped albatross		2		2	
Salvin's albatross	1	1	1	3	Caught on lazy line. Observer not allowed to retain
Sooty shearwater		17		17	
White-chinned petrel		27		27	
Birds Total	**1**	**62**	**1**	**64**	
Grand Total	**1**	**62**	**1**	**64**	

*Included as 'capture' in table 17

Table 21 details the distribution of seabird captures over the 2010/11 observer year. Most captures occurred in the February to March period in SUB. This pattern is not mirrored by observer coverage as this period did not experience more than a moderate level of observer coverage. The pattern is better explained by overlap between the scampi vessels and the distributions of sooty shearwater and white chinned petrels at that time of year. Peak captures at this time of year are mirrored in the squid trawl fishery in this region.

Table 21: Seabird interactions in the scampi trawl fishery by area and month during the 2010/11 observer year. A zero indicates that no interactions are observed, a dash indicates that no coverage took place.

FMA	Jul-10	Aug-10	Sep-10	Oct-10	Nov-10	Dec-10	Jan-11	Feb-11	Mar-11	Apr-11	May-11	Jun-11	Total
1. AKE	-	-	-	18	0	-	-	-	-	-	-	0	**18**
2. CEE	-	-	0	1	-	-	-	-	-	-	-	-	**1**
3. SEC	-	-	-	-	-	-	-	0	-	-	-	-	**0**
4. SOE	-	0	0	-	2	0	-	-	2	-	-	-	**4**
5. SOU	-	-	-	-	-	-	-	-	-	-	-	-	**0**
6. SUB	-	-	-	-	-	-	-	33	21	10	0	0	**64**
7. CHA	-	-	-	-	-	-	-	-	-	-	-	-	**0**
8. CEW	-	-	-	-	-	-	-	-	-	-	-	-	**0**
9. AKW	-	-	-	-	-	-	-	-	-	-	-	-	**0**
Total	**0**	**0**	**0**	**19**	**2**	**0**	**0**	**33**	**23**	**10**	**0**	**0**	**87**

Table 22 describes the protected coral catch in the scampi fishery. Catch was limited almost exclusively to Scleractinian corals, with stony cup corals comprising the majority of catch weight.

Table 22: Protected coral bycatch in kg per FMA in the scampi fishery during the 2010/11 observer year. Note a zero indicates no bycatch was observed, a dash indicates that there was not observer coverage in that fishery.

Protected Corals	1.AKE	2.CEE	3.SEC	4.SOE	5.SOU	6.SUB	7.CHA	8.CEW	9.AKW	Total
Stony corals-Branching	2	26	0	0	-	0	-	-	-	**28**
Stony corals-Cup	0	25	0	54.7	-	0	-	-	-	**79.7**
Black corals	1	0	0	0	-	0	-	-	-	**1**
Bamboo coral	1	0	0	0	-	0	-	-	-	**1**
Bottlebrush coral	1	0	0	0	-	0	-	-	-	**1**
Coral (Unspecified)	0	0	0	3	-	0	-	-	-	**3**
Total	**5**	**51**	**0**	**57.7**	**0**	**0**	**0**	**0**	**0**	**113.7**

5.1.4 Squid

Observer coverage in the squid fishery has been higher than other trawl fisheries due to significant catches of New Zealand sea lions and seabirds observed in the past. The bulk of these seabird captures have consistently been made up of white-capped albatross, sooty shearwaters and white-chinned petrels and this trend continues into the current year. Being over 28m in length, all vessels in this fishery are required by law to deploy seabird mitigation devices one of the three permitted types (tori line, warp scarer, 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 to ensure each vessel has a specific plan to manage discharge of offal during fishing activity (Deep Water Group Limited 2009). Particularly in the SQU6T area around the Auckland Islands the observer coverage is focused on recording New Zealand sea lion captures. Sea Lion Exclusion Devices (SLEDs) are used by all vessels operating in the SQU6T fishery. The majority of observer coverage in the squid fishery has been targeted at the SQU6T fishery with high levels of coverage also being achieved in SOU as the vessels trawl enroute to and from SQU6T.

For 2010/11 both commercial fishing effort and observer coverage increased over the previous year (Ramm 2012). Highest levels of observer effort occurred in SOU, as did the highest level of fishing effort (Table 23). Seabird captures were highest in SOU however when corrected for observer effort the capture rate was only marginally higher than SUB and SEC respectively. Seabird captures were marginally higher than in 2009/10 while the observed marine mammal capture rate was approximately half that of the previous year and no NZ sea lions were observed caught (Ramm 2012). Three protected fish species were also captured in this fishery.

The squid trawl fishery recorded both the largest total weight of protected coral catch and the highest catch rate of any middle depth trawl fishery, with observed coral captures coming almost exclusively from SOU. This is in line with the previous year (Ramm 2012)

Table 23 Summary of commercial effort, observer effort and protected species captures in the squid fishery during the 2010/11 observer year.

FMA	Effort Tows	Observed Tows	Coverage (%)	Seabird Captures*	Seabirds per 100 tows	Mammal Captures	Mammals per 100 tows	Protected Fish Captures	Fish per 100 tows	Coral Catch (kg)	Coral Catch per 100 tows (kg)
1. AKE	0	0	-	-	-	-	-	-	-		-
2. CEE	0	0	-	-	-	-	-	-	-		-
3. SEC	385	66	17.14	6	9.09	2	3.03	-	0.00	1.3	0.00
4. SOE	91	6	6.59	0	0.00	0	0.00	-	0.00	5.3	88.33
5. SOU	1997	648	32.45	74	11.42	4	0.62	3	0.46	1746.5	269.52
6. SUB	1600	548	34.25	55	10.04	0	0.00	-	0.00	1.1	0.20
7. CHA	0	0	-	-	-	-	-	-	-		-
8. CEW	0	0	-	-	-	-	-	-	-		-
9. AKW	0	0	-	-	-	-	-	-	-		-
10. KER	0	0	-	-	-	-	-	-	-		-
Total	**4,073**	**1,268**	**31.13**	**135**	**10.65**	**6**	**0.47**	**3**	**0.24**	**1754.20**	**138.34**

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

Observer Coverage

During 2010/11 37 observer trips were conducted onboard 20 vessels. Protected species interactions were recorded on 28 of those trips. Interactions occurred on all but one of the 20 vessels observed. Capture rates of seabirds were highly variable between vessels. Comments relating to offal management, mitigation device use and other information surrounding protected species interactions are detailed in Table A6.4. Observed vessels deployed a mixture of tori lines and bird bafflers as mitigation devices. As in previous years all vessels employed SLEDs whilst fishing in the 'Squid 6T' area. These were not used outside this area.

Table 24 gives a breakdown of observer coverage by area and month. Observer coverage was highest during the January to June period and in the areas SOU and SUB. This follows the patterns in previous years (Ramm 2011, 2012). Observer coverage was more evenly distributed between SOU and SUB during 2010/11 and more fishing effort was observed in SEC than during the previous year (Ramm 2012). Coverage also continued more intensely into April than it had in the previous year.

Table 24: Number of tows observed in the squid trawl fishery by area and month during the 2010/11 observer year.

FMA	Jul-10	Aug-10	Sep-10	Oct-10	Nov-10	Dec-10	Jan-11	Feb-11	Mar-11	Apr-11	May-11	Jun-11	Total
1. AKE													**0**
2. CEE													**0**
3. SEC			1			1	3	44	7		7	3	**66**
4. SOE								6					**6**
5. SOU	23					7	121	195	156	76	18	52	**648**
6. SUB								7	242	227	33	39	**548**
7. CHA													**0**
8. CEW													**0**
9. AKW													**0**
10. KER													**0**
Total	**23**	**0**	**1**	**0**	**0**	**8**	**124**	**252**	**405**	**303**	**58**	**94**	**1,268**

Protected species interactions

Table 25 show the species composition of the interactions in the squid trawl fishery. The number of seabird interactions increased over the 2009/10 observer year, with the largest increase being in mortalities of sooty shearwaters, followed by white-capped albatross (Ramm 2012). Marine mammal interactions reduced from the previous year and were limited to NZ fur seals, all resulting in mortalities. Three basking sharks were also caught in the fishery, this being the first year that they were protected under the Wildlife Act 1953 and therefore documented here.

White chinned petrel captures reduced compared to the previous year, with the main decrease being in mortalities rather than live releases. Observer comments indicate that sooty shearwaters were very abundant and aggressive around the vessels. Tracking studies have supported at-sea observation of high levels of overlap between white-capped albatross and the squid trawl fishery (Thompson et. al 2011).

Since protection has been afforded to the basking shark under the Wildlife Act 1953, documentation of their capture has become more standardised and is now reported in the same manner as any seabird or marine mammal. Mitigating against captures of basking sharks is problematic due to their wide depth range and difficulty to detect early on in fishing. This problem is confounded by the lack of knowledge about the behaviour and life history of this species. Work is currently underway to better understanding the nature of interactions with these animals and which factors may contribute to captures[6].

Table 25: Protected species interactions in the squid trawl fishery during the 2010/11 observer year.

Species Name	Alive	Dead	Decomposing	Grand Total
Birds				
Albatross (Unidentified)	5			5
Antarctic prion	3			3
Black-browed albatross (Unidentified)	2			2
Buller's albatross	3	7		10
Common diving petrel	1	1		2
Giant petrels (Unidentified)	2			2
Grey-backed storm petrel	2			2
New Zealand white capped albatross	5	23		28
Petrel (Unidentified)	6	1		7
Prions (Unidentified)	4			4
Procillaria petrels	1			1
Smaller albatross	2	1		3
Sooty shearwater	8	40		48
White-chinned petrel	10	23		33
Birds Total	**54**	**96**		**150**
Marine Mammals				
New Zealand fur seal		5	1	6
Marine Mammals Total		**5**	**1**	**6**
Fish				
Basking Shark		3		3
Fish Total		**3**		**3**
Grand Total	**54**	**104**	**1**	**159**

The method of interaction is described in Table 26. As with the previous three years, net captures have dominated interactions (Ramm 2012, 2011, Rowe 2010). Though increased against the previous year, warp strikes remain at comparatively low levels, with observer records indicating high levels of adherence to offal management protocols and high levels of mitigation use. Large scale capture events were less common during this observer year, with a net capture of six sooty shearwaters being the largest single capture event.

Vessel impacts for Antarctic prions and grey-backed storm petrels were unusual events and haven't been observed in previous years.

[6] Project POP2011-04 Basking shark bycatch review. See the Marine Conservation Services Annual Plan 2011/12 for further details

Table 26: Method of interaction for a) protected species released alive and b) dead protected species in the squid trawl fishery during the 2010/11 observer year.

a) Released alive

Species Name	Impact against vessel	Net capture	Unknown	Grand Total
Birds				
Albatross (Unidentified)	1	4		5
Antarctic prion	3			3
Black-browed albatross (Unidentified)	2			2
Buller's albatross		3		3
Common diving petrel	1			1
Giant petrels (Unidentified)	2			2
Grey-backed storm petrel	2			2
New Zealand white capped albatross		5		5
Petrel (Unidentified)		5	1	6
Prions (Unidentified)	3	1		4
Procillaria petrels		1		1
Smaller albatross		2		2
Sooty shearwater		8		8
White-chinned petrel		10		10
Birds Total	**14**	**39**	**1**	**54**
Grand Total	**14**	**39**	**1**	**54**

*Included as a capture in Table 26

b) Dead protected species (excluding decomposing animals).

Species Name	Caught on warp or door	Impact against vessel	Net capture	Other	Unknown	Grand Total
Birds						
Buller's albatross	2		5			7
Common diving petrel		1				1
New Zealand white capped albatross	9		12	2		23
Petrel (Unidentified)			1			1
Smaller albatross			1			1
Sooty shearwater	1		39			40
White-chinned petrel			22		1	23
Birds Total	**12**	**1**	**80**	**2**	**1**	**96**
Marine Mammals						
New Zealand fur seal			5			5
Marine Mammals Total			**5**			**5**
Fish						
Basking Shark			3			3
Fish Total			**3**			**3**
Grand Total	**12**	**1**	**85**	**2**	**1**	**104**

*Included as a capture in Table 23

Table 27 shows the distribution of seabird interactions during 2010/11, with interactions steadily increasing throughout the 'squid season' with a peak in April despite a reduction of observed tows at that time. Interactions occurred in all FMAs observed.

Table 27: Seabird interactions in the squid trawl fishery by area and month during the 2010/11 observer year. A zero indicates that no interactions are observed, a dash indicates that no coverage took place.

FMA	Jul-10	Aug-10	Sep-10	Oct-10	Nov-10	Dec-10	Jan-11	Feb-11	Mar-11	Apr-11	May-11	Jun-11	Total
1. AKE	-	-	-	-	-	-	-	-	-	-	-	-	**0**
2. CEE	-	-	-	-	-	-	-	-	-	-	-	-	**0**
3. SEC	-	-	0	-	-	0	0	1	2	-	3	0	**6**
4. SOE	-	-	-	-	-	-	-	0	-	-	-	-	**0**
5. SOU	0	-	-	-	-	0	2	29	16	21	3	5	**76**
6. SUB	-	-	-	-	-	-	-	0	31	30	6	1	**68**
7. CHA	-	-	-	-	-	-	-	-	-	-	-	-	**0**
8. CEW	-	-	-	-	-	-	-	-	-	-	-	-	**0**
9. AKW	-	-	-	-	-	-	-	-	-	-	-	-	**0**
Total	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**30**	**49**	**51**	**12**	**6**	**150**

Table 28 shows that pinniped, in this year all were NZ fur seals, interactions showed an even temporal spread across the observed effort. Three of the NZ fur seals were identified as male while one was female. The sex for the other two animals was now able to be determined.

Table 28: Pinniped interactions in the squid trawl fishery by area and month during the 2010/11 observer year. A zero indicates that no interactions are observed, a dash indicates that no coverage took place.

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

Table 29 gives the breakdown of protected coral catch in the squid trawl fishery. Coral catch came almost exclusively from SOU. Scleractinian corals dominated the overall weight of catch. As with the previous year catch figures were driven largely by a small number of events in which a relatively large amount of coral was caught (Ramm 2012). In 2010/11 observed captures by weight was dominated by a single trawl which caught 1500kg of coral rubble.

Table 29: Protected coral bycatch in kg per FMA in the squid trawl fishery during the 2010/11 observer year. Note a zero indicates no bycatch was observed, a dash indicates that there was not observer coverage in that fishery.

Protected Corals	1.AKE	2.CEE	3.SEC	4.SOE	5.SOU	6.SUB	7.CHA	8.CEW	9.AKW	Total
Scleractinia	-	-	0	0	21	0	-	-	-	**21**
Stony corals-Branching	-	-	0	5	5	0	-	-	-	**10**
Stony corals-Cup	-	-	0.1	0.2	0	0	-	-	-	**0.3**
Coral Rubble	-	-	0	0	1700	0	-	-	-	**1700**
Gorgonian coral	-	-	0	0	3	1.1	-	-	-	**4.1**
Bottlebrush coral	-	-	0.2	0	0	0	-	-	-	**0.2**
Golden corals	-	-	0	0.1	0.1	0	-	-	-	**0.2**
Coral (Unspecified)	-	-	1	0	17.4	0	-	-	-	**18.4**
Total	**0**	**0**	**1.3**	**5.3**	**1746.5**	**1.1**	**0**	**0**	**0**	**1754.2**

5.2 PELAGIC TRAWL FISHERIES

5.2.1 Jack Mackerel and Barracouta

In previous years, common dolphins (*Delphinus delphis*) have been captured in the pelagic trawl fishery and in some instances multiple (more than on amimal) capture events have occurred. A Marine Mammal Operating Procedure (MMOP) has been developed by industry to reduce dolphin captures. These practices include not setting or hauling at certain times of day in certain areas, a watch being kept for dolphins in the vicinity of fishing operations, trawl doors being hauled partially on deck whilst turning and not setting while dolphins are present close to the vessel (DeepWater Group 2008). As all the vessels in this fishery are larger than 28m they are required by law to deploy bird capture mitigation devices. The majority of observer coverage in this fishery is from October to December, with another peak in June and July, corresponding to peaks in fishing activity.

Observer coverage in this fishery peaked in 2008/09 and has reduced over the past two years to around 30% (Ramm 2011, 2012). Commercial effort reduced by 1000 tows compared to the previous year and observer effort reduced proportionally (Ramm 2012). This fishery occurs most intensely in CEW, off the coast of Cape Egmont. Accordingly observer effort is focused there. Proportionally, however, AKW received highest observer coverage (Table 30), and this has been the site of larger numbers of dolphin captures in the past.

Mammal captures were the same as the previous year while seabird captures halved. As with the previous year seabird captures were highest in SOU. Marine mammals captures were highest, both in absolute number and in capture rate, in AKW and CEW.

Two protected fish captures occurred during this observer year, both being basking sharks captured in SOU. Being a midwater trawl fishery protected coral bycatch is low as contact with the seabed is avoided in this fishing operation, though some catch was still observed.

Table 30: Summary of commercial effort, observer effort and protected species captures in the pelagic trawl fishery during the 2010/11 observer year.

FMA	Effort Tows	Observed Tows	Coverage (%)	Seabird Captures*	Seabirds per 100 tows	Mammal Captures	Mammals per 100 tows	Protected Fish Captures	Fish per 100 tows	Coral Catch (kg)	Coral Catch per 100 tows (kg)
1. AKE	1	0	0.00	-	-	-	-	-	-		-
2. CEE	0	0	-	-	-	-	-	-	-		-
3. SEC	394	86	21.83	3	3.49	1	1.16	0	0.00	1.1	1.28
4. SOE	44	33	75.00	0	0.00	0	0.00	0	0.00	0	0.00
5. SOU	283	91	32.16	7	7.69	1	1.10	2	2.20	10.1	11.10
6. SUB	2	0	-	-	-	-	-	-	-		-
7. CHA	537	189	35.20	0	0.00	1	0.53	0	0.00	0.7	0.37
8. CEW	940	240	25.53	0	0.00	3	1.25	0	0.00	8.2	3.42
9. AKW	253	119	47.04	0	0.00	4	3.36	0	0.00	0	0.00
10. KER	0	0	-	-	-	-	-	-	-		-
Total	**2,454**	**758**	**30.89**	**10**	**1.32**	**10**	**1.32**	2	0.26	**20.10**	**2.65**

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

Observer Coverage

During the 2010/11 observer year 28 observer trips were conducted onboard 14 vessels„ however seventy percent of the observed tows in this fishery were on just three vessels Protected species interactions occurred on nine trips onboard six vessels. A single vessel accounted for seven of the ten observed seabird interactions. The same vessel also had the highest observed capture rate for marine mammals. Mammal captures were observed on four of the 14 vessels. Comments relating to offal management, mitigation use and other information surrounding protected species interactions are detailed in Table A6.5.

Peaks in observer coverage occurred during the November to December period as well as in June (Table 31). Observer coverage in this fishery occurred in every month. Coverage was more evenly distributed during the course of the year than in the previous observer year (Ramm 2012).

Table 31: Number of tows observed in the pelagic trawl fishery by area and month during the 2010/11 observer year

FMA	Jul-10	Aug-10	Sep-10	Oct-10	Nov-10	Dec-10	Jan-11	Feb-11	Mar-11	Apr-11	May-11	Jun-11	Total
1. AKE													**0**
2. CEE													**0**
3. SEC				8	5			56		17			**86**
4. SOE			30			3							**33**
5. SOU						9	11	12	46	13			**91**
6. SUB													**0**
7. CHA	19	20		49	1	6	16			14	4	60	**189**
8. CEW	13		5	23	46	33	18			15	23	64	**240**
9. AKW					46	59						14	**119**
10. KER													**0**
Total	**32**	**20**	**35**	**80**	**98**	**110**	**45**	**68**	**46**	**59**	**27**	**138**	**758**

Table 32 shows the distribution of observer effort between the three target species of this fishery. As with previous years the majority of effort was for jack mackerel with 80% of observed tows being targeted at this species. The number of barracouta tows was similar to the previous year (Ramm 2012).

Table 32: Number of observed tows in the pelagic trawl fishery by area and target species during the 2010/11 observer year

Target	3.SEC	4. SOE	5. SOU	7. CHA	8. CEW	9. AKW	Total
Barracouta	63	33	28	22	0	0	**146**
English Makerel	0	0	0	1	0	0	**1**
Jack Makerel	23	0	63	166	240	119	**611**
Total	**86**	**33**	**91**	**189**	**240**	**119**	**758**

Protected species interactions

Protected species interactions are described in Table 33. Over the previous three observer years the number of protected species interaction has decreased with 2010/11 having the lowest number of captures to date (Ramm 2012, 2011, Rowe 2010). As with previous years, interactions have generally resulted in mortalities.

Common dolphin captures increased over the previous year, two vessels accounted for six of the interactions with two animals being caught in a single tow. However there were no large scale capture events as have previously occurred (Rowe 2010). All but one of the captures occurred in tows hauled between 0400 and 0700 NZ Standard time. In general captures have been observed to be highest in tows hauled around the hours preceding sunrise, though this may not accurately reflect the time when animals are actually captured, as the operating procedure used by the fleet stipulates that nets may not be hauled between 0230 and 0430 hours. Recent modelling work has shown the most important explanatory variable to dolphin capture in this fleet is headline depth (Thompson et al 2010). Implementing additional operational procedures around this variable thus appears the most promising way to reduce captures in future.

Two basking shark captures occurred with one able to be released alive by the crew (Table 35). Observer comments are limited on the injuries or condition of this animal and information on post release survival is not available without further research such as satellite tagging studies.

Table 33: Protected species interactions in the pelagic trawl fishery during the 2010/11 observer year

Species Name	Alive	Dead	Grand Total
Birds			
New Zealand white capped albatross		1	1
Sooty shearwater	1	1	2
White-chinned petrel	2	5	7
Birds Total	**3**	**7**	**10**
Marine Mammals			
Common dolphin		7	7
Dolphins and Toothed whales		1	1
New Zealand fur seal		2	2
Marine Mammals Total		**10**	**10**
Fish			
Basking shark	1	1	2
Fish Total	**1**	**1**	**2**
Grand Total	**4**	**18**	**22**

Table 34 shows that the majority of interactions occurred whilst targeting jack mackerel, however there were far fewer barracouta tows observed, and it was barracouta tows which had the highest capture rate for all protected species except common dolphin. Both basking shark captures occurred on tows targeting barracouta.

Table 34: Protected species interactions in the pelagic trawl fishery during the 2010/11 observer year

Species Name	Barracouta	Jack Mackerel	Grand Total
Birds			
New Zealand white capped albatross		1	1
Sooty shearwater	1	1	2
White-chinned petrel	2	5	7
Birds Total	3	7	10
Marine Mammals			
Common dolphin	1	6	7
Dolphins and Toothed whales		1	1
New Zealand fur seal	1	1	2
Marine Mammals Total	**2**	**8**	**10**
Fish			
Basking shark	2		2
Fish Total	**2**		**2**
Grand Total	**7**	**15**	**22**

Table 35 describes the method of interaction for each species during 2010/11. For the first time in this fishery all observed interactions with protected species were net captures (Ramm 2012, 2011, Rowe 2010).

Table 35: Method of interaction for a) protected species released alive and b) dead protected species in the pelagic trawl fishery during the 2010/11 observer year.

a) Released alive

Species Name	Net capture*	Grand Total
Birds		
Sooty shearwater	1	1
White-chinned petrel	2	2
Birds Total	**3**	**3**
Fish		
Basking shark	2	2
Fish Total	**2**	**2**
Grand Total	**5**	**5**

*Included as a capture in Table 34

b) Dead protected species (excluding decomposing animals).

Species Name	Net capture*	Grand Total
Birds		
New Zealand white capped albatross	1	1
Sooty shearwater	1	1
White-chinned petrel	5	5
Birds Total	**7**	**7**
Marine Mammals		
Common dolphin	7	7
Dolphins and Toothed whales	1	1
New Zealand fur seal	2	2
Marine Mammals Total	**10**	**10**
Grand Total	**17**	**17**

*Included as a capture in Table 34

Table 36 describes the distribution of seabird captures both spatially and temporally in the pelagic trawl fishery. Most captures occurred during the February to April period which was outside the peak periods for observer coverage.

Table 36: Seabird interactions in the pelagic trawl fishery by area and month during the 2010/11 observer year. A zero indicates that no interactions are observed, a dash indicates that no coverage took place.

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

Table 37 shows that marine mammal captures peaked during December and April, both peaks being driven by common dolphin captures (three captures in each month). Other captures were spread throughout the observer year.

Table 37: Marine mammal interactions in the pelagic trawl fishery by area and month during the 2010/11 observer year. A zero indicates that no interactions are observed, a dash indicates that no coverage took place.

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

Table 38 gives the breakdown of protected coral catch. Most of the coral was only identified to a generic group by observers in this fishery.

Table 38: Protected coral bycatch in kg per FMA in the pelagic trawl fishery during the 2010/11 observer year. Note a zero indicates no bycatch was observed, a dash indicates that there was not observer coverage in that fishery.

Protected Corals	1.AKE	2.CEE	3.SEC	4.SOE	5.SOU	6.SUB	7.CHA	8.CEW	9.AKW	Total
Gorgonian coral			0.1							**0.1**
Golden corals			1							**1**
Encrusting polyps							0.7	8.2		**8.9**
Coral (Unspecified)					10.1					**10.1**
Total	**0**	**0**	**1.1**	**0**	**10.1**	**0**	**0.7**	**8.2**	**0**	**20.1**

5.3 DEEP WATER BOTTOM TRAWL FISHERIES

5.3.1 Orange Roughy Cardinal 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 the monitoring of the impacts of deepwater bottom trawling on protected corals, particularly on the Chatham rise. Seabird behaviour and abundance is also monitored around the vessels. Discard and offal and management, as well as the mandatory use of bird scaring devices are employed by the fleet to mitigate against seabird captures.

Observer effort in 2010/11 was highest in SUB, while commercial fishing effort was highest in SOE (Table 39). Commercial fishing effort decreased compared to the previous year (Ramm 2012), but observer effort decreased even more resulting in a reduced overall coverage rate of 25% compared to the previous year's 40% (Ramm 2012).

Seabird and marine mammal captures reduced to negligible levels with only two seabirds being observed caught during the entire observer year.

As with the previous year the deepwater bottom trawl fisheries caught significantly more protected corals than other trawl fisheries. Coral catch was highest in AKW, both in terms of rate and overall weight of coral, this was followed by area SUB. Coral was caught in all areas observed except for SOU, however only two tows were observed in this area.

Table 39: Summary of commercial effort, observer effort and protected species captures in the deepwater trawl fishery during the 2010/11 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	419	129	30.79	0	0.00	0	0.00	48.60	37.67
2. CEE	1167	312	26.74	0	0.00	0	0.00	91.95	29.47
3. SEC	730	133	18.22	1	0.75	0	0.00	59.00	44.36
4. SOE	1542	257	16.67	0	0.00	0	0.00	125.50	48.83
5. SOU	23	2	8.70	1	50.00	0	0.00	0.00	0.00
6. SUB	1394	402	28.84	0	0.00	0	0.00	1,057.20	262.99
7. CHA	64	61	95.31	0	0.00	0	0.00	0.30	0.49
8. CEW	0	0	-		-	-	-		-
9. AKW	202	82	40.59	0	0.00	0	0.00	2,625.68	3,202.05
10. KER	0	0	-	-	-	-	-		-
Total	**5,541**	**1,378**	**24.87**	**2**	**0.15**	**0**	**0.00**	**4008.23**	**290.87**

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

Observer Coverage

During 2010/11 19 observer trips occurred onboard eight vessels, with four vessels accounting for 80% of observer coverage. Seabird interactions only occurred on two of the eight vessels, though these were the two most observed vessels. Protected species interactions, other than protected coral catch, occurred on three trips onboard two vessels. Protected corals were caught on every trip and by every vessel in this fishery. Comments relating to offal management, mitigation device use and other information surrounding protected species captures are detailed in Table A6.7.

Table 40: Number of observed tows in the deep water bottom trawl fishery by area and month during the 2010/11 observer year.

FMA	Jul-10	Aug-10	Sep-10	Oct-10	Nov-10	Dec-10	Jan-11	Feb-11	Mar-11	Apr-11	May-11	Jun-11	Total
1. AKE	18						20	39				52	**129**
2. CEE				26	131	4	15	9		102	25		**312**
3. SEC				8	68	17	10			21		9	**133**
4. SOE	31				33	44			77		51	21	**257**
5. SOU							2						**2**
6. SUB							62	104			164	72	**402**
7. CHA	30									1		30	**61**
8. CEW													**0**
9. AKW	33			14		6	5					24	**82**
10. KER													**0**
Total	**112**	**0**	**0**	**48**	**232**	**71**	**114**	**152**	**77**	**124**	**240**	**208**	**1,378**

Protected species interactions

Protected species interactions (except for protected coral catch) in this fishery have fluctuated over recent years though have generally been at low rates compared to other fisheries (Ramm 2011, 2012). During 2010/11 seven interactions occurred, all with seabirds (Table 41). Only two of these interactions were of dead birds, though notably one of the mortalities was of a Southern royal albatross, a species particularly susceptible to fisheries bycatch at a population level (e.g. Richard et al 2011).

Table 41: Protected species interactions in the deepwater bottom trawl fishery during the 2010/11 observer year.

Species Name	Alive	Dead	Grand Total
Birds			
New Zealand white capped albatross	1		1
Petrel (Unidentified)	2	1	3
Sooty shearwater	1		1
Southern royal albatross		1	1
Storm petrels	1		1
Birds Total	**5**	**2**	**7**
Grand Total	**5**	**2**	**7**

Table 42 describes the method of interaction with protected species. All but one of the interactions in this fishery were impacts against the vessel. The Southern royal albatross was observed to impact the vessel's superstructure and be killed instantly. A single petrel was captured in the net.

Table 42: Method of interaction for a) protected species released alive and b) dead protected species in the deepwater trawl fishery during the 2010/11 observer year.

a) Released alive

Species Name	Impact against vessel	Grand Total
Birds		
New Zealand white capped albatross	1	1
Petrel (Unidentified)	2	2
Sooty shearwater	1	1
Storm petrels	1	1
Birds Total	**4**	**5**
Grand Total	**4**	**5**

*Included as a capture in Table 39

b) Dead protected species.

Species Name	Impact against vessel	Net capture*	Grand Total
Birds			
Petrel (Unidentified)		1	1
Southern royal albatross	1		1
Birds Total	**1**	**1**	**2**
Grand Total	**1**	**1**	**2**

*Included as a capture in Table 39

Table 43 shows that observed interactions were relatively evenly distributed throughout the observer year, showing no real seasonal or spatial patterns.

Table 43: Protected species interactions in the deepwater trawl fishery by area and month during the 2010/11 observer year. A zero indicates that no interactions are observed, a dash indicates that no coverage took place.

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

Table 44 describes the protected coral catch in the deepwater bottom trawl fisheries. Stony branching corals made up the majority of observed bycatch in terms of weight; however gorgonians, black and bamboo corals were also relatively regularly observed in the catch. Catches of up to 1500kgs were recorded and several tows caught over 100kgs.

Table 44: Protected coral bycatch in kg per FMA in the deepwater bottom trawl fishery during the 2010/11 observer year. Note a zero indicates no bycatch was observed, a dash indicates that there was not observer coverage in that fishery.

Protected Corals	1.AKE	2.CEE	3.SEC	4.SOE	5.SOU	6.SUB	7.CHA	8.CEW	9.AKW	Total
Scleractinia	0	0	0	3	0	100	0	-	2.63	**105.63**
Stony corals-Branching	4.6	60.3	2	7.3	0	763.5	0	-	2592.88	**3430.58**
Stony corals-Cup	0.5	0.2	0	0	0	0	0	-	0.41	**1.11**
Coral Rubble	0	2	50	0	0	84	0	-	0	**136**
Black corals	4.21	9.1	0	0	0	4.3	0	-	0.6	**18.21**
Gorgonian coral	15.9	0	6	0.5	0	20.5	0	-	18.01	**60.91**
Bamboo coral	5.07	4.6	1	1	0	19.8	0.3	-	2.71	**34.48**
Bottlebrush coral	2.6	0.15	0	0	0	1	0	-	0.4	**4.15**
Bubblegum coral	0	0	0	112	0	11	0	-	0	**123**
Golden corals	2.62	0.2	0	0	0	0	0	-	2.04	**4.86**
Precious corals	0	0	0	0	0	0	0	-	6	**6**
Hydrocorals	0.2	0	0	0.2	0	50.1	0	-	0	**50.5**
Coral (Unspecified)	12.9	15.4	0	1.5	0	3	0	-	0	**32.8**
Total	**48.6**	**91.95**	**59**	**125.5**	**0**	**1057.2**	**0.3**	**0**	**2625.68**	**4008.23**

5.4 INSHORE FISHERIES

Inshore fishing within the New Zealand EEZ is an immensely diverse activity, with large amounts of variation in individual practice and effort, both spatially and between differing methods. Particularly in the case of trawl and bottom longline, it becomes difficult to separate the inshore sector from the offshore, as a number of vessels make seasonal shifts across this artificial boundary. 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 each vessel. Characterising the inshore sector is difficult and may lead to false conclusions about the fishery. Therefore it is critical when gathering information on the inshore fishing sector, to get as broad and representative coverage as possible.

Observer coverage 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. Combined, this means that observers often spend a lot of time on shore or travelling between ports. Since 2008/09 inshore there has been an increased focus on inshore fisheries and more call to increase monitoring in these relatively poorly understood fisheries. Observer priorities for these fisheries focus on protected species interactions, however sampling work for fish catch has also increased due to greater coordination in research prioritisation and planning of observer coverage between DOC and MPI.

As the levels of observer coverage in the inshore are so low and heavily limited by factors such as cost, observer availability, vessel capacity and weather, a prioritisation process was set up to identify the key fisheries, areas and interactions to undertake research on. This prioritisation process and the coverage objectives are spelled out in detail in the Conservation Services Programme Annual Plan 2010/11[7]. Following the planning process delivery was divided up, by method, between DOC and MPI for administrative purposes. For completeness all inshore observer coverage is reported here.

5.4.1 Inshore trawl

The extent to which inshore trawl fisheries interact with protected species is extremely poorly known. In terms of number of tows, the effort in inshore trawl exceeds that in all of the offshore fisheries combined. Though the trawl nets used are considerably smaller it still demonstrates that inshore trawl is a significant fishery in New Zealand. Inshore trawl (vessels under 28m) is also one of the few remaining fisheries in New Zealand with no regulated mitigation measures. Due to the generally low and patchily distributed levels of observer coverage the quantification of interactions with protected species has been difficult and results in high levels of uncertainty. 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

[7] Available for download from http://www.doc.govt.nz/publications/conservation/marine-and-coastal/conservation-services-programme/csp-plans/csp-annual-plan-2010-11/

these small vessels, historic coverage levels have generally been low and so coverage has been limited to specific areas and times of interest.

As levels have increased clearer patterns have begun to emerge, with both bycatch rates and species being highly spatially variable. Proportionally, interactions between protected species and trawl warps are higher in the inshore than in offshore trawl fisheries. In the offshore fisheries, observed captures from warp interactions are less common than they once were before the regulated use of mitigation measures (down to a fraction of the number of net capture interactions). In inshore fisheries however they still remain a significant proportion of total captures. A variety of warp strike mitigation is in use voluntarily in the inshore trawl fishery and it is a CSP priority to investigate, develop, and where proven effective promote the use of any such mitigation devices or techniques.

Priorities for inshore trawl coverage was two fold, to investigate the poorly observed fishery on the East Coast North Island and to undertake further coverage of the Tasman / Golden Bay area to identify whether previously observed high capture rates of common dolphins were a regular issue. Due to the highly spatially focused coverage any comparison of captures or coverage levels to previous years must be treated with caution.

Table 45 summarises the commercial fishing effort, observer effort and protected species captures for the 2010/11 observer year. Commercial fishing effort is highest on East Coast of the South Island, closely followed by the West Coast of the South Island. Overall commercial fishing effort was slightly reduced compared to the previous year (Ramm 2012). The highest level of observer coverage were achieved in CEE at 3.57%, with the capture of a single mammal and a single seabird. Observer effort and coverage rate were similar in CHA to the previous year, however coverage did change over a finer spatial scale within that FMA. As with the previous year only one marine mammal was captured during 2010/11 (Ramm 2012)

Table 45: Summary of commercial effort, observer effort and protected species captures in the inshore trawl fishery during the 2010/11 observer year.

FMA	Effort Tows	Observed Tows	Coverage (%)	Seabird Captures*	Seabirds per 100 tows	Mammal Captures	Mammals per 100 tows
1. AKE	8601	115	1.34	0	0.00	0	0.00
2. CEE	11154	398	3.57	1	0.25	1	0.25
3. SEC	15072	0	-	-	-	-	-
4. SOE	242	0	-	-	-	-	-
5. SOU	4405	7	0.16	0	0.00	0	0.00
6. SUB	41	0	-	-	-	-	-
7. CHA	13727	235	1.71	1	0.43	0	0.00
8. CEW	2242	14	0.62	0	0.00	0	0.00
9. AKW	2756	0	-	-	-	-	-
10. KER	0	0	-	-	-	-	-
Total	**58,240**	**769**	**1.32**	**2**	**0.26**	**1**	**0.13**

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

Observer coverage

Table 46 shows the distribution of observer coverage throughout the year. As in previous years observer effort focussed on the summer months, however during 2010/11 coverage also extended further into the April, May and June. In total 23 vessels were observed, with the number of events on each vessel varying between seven and 77 tows. Comments relating to offal management, mitigation use and other information surrounding protected species interactions are detailed in Table A6.7.

Table 46: Number of observed tows in the inshore bottom trawl fishery by area and month during the 2010/11 observer year.

FMA	Jul-10	Aug-10	Sep-10	Oct-10	Nov-10	Dec-10	Jan-11	Feb-11	Mar-11	Apr-11	May-11	Jun-11	Total
1. AKE						8	8		43	26	30		**115**
2. CEE							36	100	102	71	55	34	**398**
3. SEC													**0**
4. SOE													**0**
5. SOU						7							**7**
6. SUB													**0**
7. CHA				80	138	17							**235**
8. CEW				5	9								**14**
9. AKW													**0**
10. KER													**0**
Total	**0**	**0**	**0**	**85**	**147**	**32**	**44**	**100**	**145**	**97**	**85**	**34**	**769**

Protected species interactions

Protected species interactions during 2010/11 are detailed in Table 47 and were limited to one white-capped albatross and a common dolphin, both mortalities. A black backed gull was also captured however this species is not protected under the Wildlife Act 1953. These captures cannot be directly compared to the previous years capture levels as coverage was intentionally undertaken in different areas and largely on different vessels. It does however show that there are potentially only very low levels of interactions between trawl vessels in the East Coast North Island and protected species. This finding warrants further investigation to identify whether the low capture rates observed are being driven by saptio-temporal species composition and overlap with fishing effort, or by fishing practices employed by these vessels.

Table 47: Protected species interactions in the inshore trawl fishery during the 2010/11 observer year.

Species Name	Dead	Grand Total
Birds		
Black-backed gull*	1	1
New Zealand white capped albatross	1	1
Birds Total	**2**	**2**
Marine Mammals		
Common dolphin	1	1
Marine Mammals Total	**1**	**1**
Grand Total	**3**	**3**

*black backed gulls are not protected under the Wildlife Act, however the capture has been recorded here for completeness

Table 48 shows that both seabird interactions were the result of warp strikes. The vessels did not employ any mitigation devices; however they did practice varying levels of offal management.

Table 48: Method of interaction for protected species captured in the inshore trawl fishery during the 2010/11 observer year.

Species Name	Caught on warp or door*	Net capture*	Grand Total
Birds			
Black-backed gull	1		1
New Zealand white capped albatross	1		1
Birds Total	**2**		**2**
Marine Mammals			
Common dolphin		1	1
Marine Mammals Total		**1**	**1**
Grand Total	**2**	**1**	**3**

*Included as a capture in table 45

Table 49 shows the spatial and temporal distribution of seabird captures. The white-capped albatross capture occurred in CHA, while the black backed gull was caught in CEE. Table 50 shows that the common dolphin was captured in June in CEE.

Table 49: Seabird interactions in the inshore trawl fishery by area and month during the 2010/11 observer year. A zero indicates that no interactions are observed, a dash indicates that no coverage took place.

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

Table 50: Mammal interactions in the inshore trawl fishery by area and month during the 2010/11 observer year. A zero indicates that no interactions are observed, a dash indicates that no coverage took place.

FMA	Jul-10	Aug-10	Sep-10	Oct-10	Nov-10	Dec-10	Jan-11	Feb-11	Mar-11	Apr-11	May-11	Jun-11	Total
1. AKE	-	-	-	-	-	0	0	-	0	0	0	-	**0**
2. CEE	-	-	-	-	-	-	0	0	0	0	0	1	**1**
3. SEC	-	-	-	-	-	-	-	-	-	-	-	-	**0**
4. SOE	-	-	-	-	-	-	-	-	-	-	-	-	**0**
5. SOU	-	-	-	-	-	0	-	-	-	-	-	-	**0**
6. SUB	-	-	-	-	-	-	-	-	-	-	-	-	**0**
7. CHA	-	-	-	0	0	0	-	-	-	-	-	-	**0**
8. CEW	-	-	-	0	0	-	-	-	-	-	-	-	**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 coverage has been focused at certain 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 (e.g. CSP 2010). Mitigation techniques used and tested (to varying extents) in this fishery include; 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 Bull (2009) and Rowe (2007). In April 2008 regulations on mitigation were introduced for all bottom longline vessels, covering night setting or line weighting, tori line, and offal/discard management[8].

Coverage in 2010/11 focused on some of the less observed ling and bluenose bottom longline vessels. These vessels can each fish a large spatial scale, operating out of several ports and ranging from the areas more traditionally considered 'inshore' out into far deeper waters. These vessels also set a significant number of hooks and have highly variable line weighting and float regimes in order to fish over rough ground or cover greater portions of the water column. The nature of fishing practice, and an investigation of mitigation in this fishery has been described by Goad et al (2010). CSP has in place further projects investigating methods of mitigating interactions in this fishery (projects MIT2011-03 and MIT2012-01).

DOC has 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. Along with these devices educational material on how to use them was also distributed. Other relevant previous CSP work has included an 'advisory officer' was placed in the inshore ling, bluenose, häpuku, bass fishery to learn about fishing practices and pass on knowledge regarding protected species behaviour and mitigation techniques (Kellian 2004), and an 'advisory officer' was placed in the inshore snapper fishery between 2003 and 2005 to liaise with fishers and advise on mitigation techniques (Johnson 2005). CSP currently has a project underway to develop an underwater line setting mitigation device invented by a commercial fisherman through processes such as flume tank testing (MIT2011-04).

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

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

Bottom longline vessels targeting the species assemblage of ling, bluenose, häpuku and bass tend to fish over wide areas, with fishing occurring in all FMAs and ranging from '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.

Commercial fishing effort, observer effort and protected species captures are summarised in Table 51. Commercial fishing effort was highest in CEE, historically this has been an area which has received low levels of observer coverage therefore one of the objectives of the inshore observer programme was to better understand the general nature, and if possible, extent of interactions in this area. Observer effort was highest in CEE though due to the relatively lower levels of commercial fishing effort, coverage was highest in SEC where 15% was achieved. Coverage in SEC largely focused on the 'mid-sized' fleet. These vessels are smaller than the classic deepwater auto liner fleet but tend to be larger and fish spatially distinct areas to the smaller, more coastal bottom longliners.

While a similar number of lines to the previous year were observed overall, only half the number of hooks were observed, a reflection on the differing fishing practiced of the vessels observed in 2010/11 (Ramm 2012). As in previous years capture rate was highest in AKE.

Table 51: Summary of commercial effort, observer effort and protected species captures in the inshore bottom longline fishery during the 2010/11 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	1675	12	0.72	10,290	2	0.194	0	0.000
2. CEE	3526	125	3.55	102,450	1	0.010	0	0.000
3. SEC	506	77	15.22	41,851	0	0.000	0	0.000
4. SOE	397	0	0.00	-	-	-	-	-
5. SOU	523	0	0.00	-	-	-	-	-
6. SUB	36	0	0.00	-	-	-	-	-
7. CHA	1348	12	0.89	9,500	0	0.000	0	0.000
8. CEW	544	0	0.00	-	-	-	-	-
9. AKW	952	0	0.00	-	-	-	-	-
10. KER	1	0	0.00	-	-	-	-	-
Total	**9,508**	**226**	**2.38**	**164,091**	**3**	**0.018**	**0**	**0.000**

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

Observer coverage

Eight observer trips occurred onboard eight separate vessels, though an observer trip was generally made up of a number of individual voyages. Of the eight vessels observed the number of hooks observed varied widely from 12,000 to 90,000 hooks, this was more an artefact of vessel operations than time spent on individual vessels. Fishing practices, mitigation use, and line weighting were observed to be highly variable between individual vessels as they specialised their operations to their individual fishing grounds. 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.

Table 52 describes the temporal and spatial distribution of observer coverage. Observer coverage focused on the summer months, largely mirroring commercial fishing effort, though compared to the previous year observer effort began much earlier and was extended further into the late summer and autumn months. This was to gain more temporally representative coverage than has been achieved in the past (Ramm 2012).

Table 52: Number of observed lines in the inshore bottom longline fishery by area and month during the 2010/11 observer year.

FMA	Jul-10	Aug-10	Sep-10	Oct-10	Nov-10	Dec-10	Jan-11	Feb-11	Mar-11	Apr-11	May-11	Jun-11	Total
1. AKE								9	3				**12**
2. CEE							48	9	56		6	6	**125**
3. SEC					24	53							**77**
4. SOE													**0**
5. SOU													**0**
6. SUB													**0**
7. CHA						12							**12**
8. CEW													**0**
9. AKW													**0**
10. KER													**0**
Total	**0**	**0**	**0**	**0**	**24**	**65**	**48**	**18**	**59**	**0**	**6**	**6**	**226**

Protected species interactions

Table 53 shows the protected species interactions which occurred during 2010/11. Unlike previous years the number of interactions is lower however coverage occurred outside of the areas where highest captures have occurred historically (Table 53). Black petrels were however still the most frequently caught animals. Table 54 shows the method of interaction, showing that all events were hook captures. Both black petrels were caught on hauling and were able to be released alive. While this is positive it highlights the importance of information on safe handling and release of seabirds to increase the chances of post release survival.

Table 53: Protected species interactions with the ling, bluenose, häpuku, bass inshore bottom longline fisher during the 2010/11 observer year.

Species Name	Alive	Decomposing	Grand Total
Birds			
Black petrel	2		2
Seabird – Small		1	1
White-chinned petrel	1		1
Birds Total	**3**	**1**	**4**
Grand Total	**3**	**1**	**4**

Table 54: Method of interaction for all protected species, as recorded on the observer non-fish bycatch form.

Species Name	Hook capture*	Impact against vessel	Grand Total
Birds			
Black petrel	2		2
White-chinned petrel		1	1
Birds Total	**2**	**1**	**3**
Birds Total	**2**	**1**	**3**

*Included as a capture in table 51

Despite the coverage spreading throughout the year captures occurred around the January to March period (Table 55), coinciding with peak abundances of some seabird species such as black petrels which breed at this time of year and have foraging ranges centred in New Zealand fisheries waters (Bell et al 2011). This is similar to what has been observed in previous years (Ramm 2012, 2011).

Table 55: Seabird interactions in the inshore bottom longline fishery by area and month during the 2010/11 observer year. A zero indicates that no interactions are observed, a dash indicates that no coverage took place.

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

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, 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.

Since 2008/09 observer coverage in the setnet fishery has increased, largely due to monitoring requirements around Hector's dolphins. However, even with increased levels of observer coverage gaining sufficient spatial and temporal representativeness is difficult. Therefore, coverage has still been aimed at key areas and times of interest for particular protected species interactions.

Overall commercial fishing effort increased slightly compared to the previous year (Table 56), though due to difficultly in placing observers coverage decreased markedly compared to the previous year (Ramm 2012). Observer effort was focused on SEC where 10% of commercial effort was observed.

Unlike the previous year no seabirds were captured. Four marine mammals were captured with capture rate doubling over the previous year to 0.023 animals per 1000m of net. Capture rate was highest in CEE where only eight nets were observed and a fur seal was caught in the first event.

Table 56: Summary of commercial effort, observer effort and protected species captures in the inshore setnet fishery during the 2010/11 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
1. AKE	7630	0	0.00	0	-	-	-	-
2. CEE	1384	8	0.58	7,000	0	0	1	0.143
3. SEC	4744	467	9.84	166,700	0	0	3	0.018
4. SOE	8	0	0.00	0	-	-	-	-
5. SOU	583	0	0.00	0	-	-	-	-
6. SUB	1	0	0.00	0	-	-	-	-
7. CHA	771	0	0.00	0	-	-	-	-
8. CEW	1637	0	0.00	0	-	-	-	-
9. AKW	7348	0	0.00	0	-	-	-	-
10. KER	0	0	-	-	-	-	-	-
Total	**24,106**	**475**	**1.97**	**173,700**	**0**	**0**	**4**	**0.023**

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

Observer coverage

Fishing activity and offal management was observed to be highly variable between the vessels with the number of nets observed on the six vessels covered varying widely from eight nets to 155. 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. Seabird abundance was observed to increase greatly during hauling and processing of fish / offal discard.

Table 57 describes the spread of observer coverage throughout the year. Compared to the previous year observer coverage began and ended a month earlier, though still ran over the summer months of peak fishing activity (Ramm 2012).

Table 57: Number of observed nets in the inshore setnet fishery by area and month during the 2010/11 observer year.

FMA	Jul-10	Aug-10	Sep-10	Oct-10	Nov-10	Dec-10	Jan-11	Feb-11	Mar-11	Apr-11	May-11	Jun-11	Total
1. AKE													**0**
2. CEE											8		**8**
3. SEC				81	218	78	59	31					**467**
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**	**81**	**218**	**78**	**59**	**31**	**0**	**0**	**8**	**0**	**475**

Protected species interactions

Interactions with protected species are reported in Table 58. All protected species interactions were mortalities. Interactions were split evenly between fur seals and dusky dolphins. Observers reported dusky dolphins to be in the vicinity of the net during setting of the capture events, however in the area of observer coverage dusky dolphins were often in attendance of the vessel,

Table 58: Protected species interactions with the inshore setnet fishery during the 2010/11 observer year.

Species Name	Dead	Grand Total
Marine Mammals		
New Zealand fur seal	2	2
Dusky dolphin	2	2
New Zealand fur seal	**2**	**2**
Marine Mammals Total	**4**	**4**

All marine mammal captures in this fishery were net captures which occurred either during setting or while the net was at depth and fishing.

Marine mammal captures in SEC occurred at the beginning of observer coverage and then tailed off (Table 59). This is unlike the previous year when captures occurred throughout the coverage period (Ramm 2012).

Table 59: Marine mammal interactions in the inshore setnet fishery, by area and month during the 2010/11 observer year. A zero indicates that no interactions are observed, a dash indicates that no coverage took place.

FMA	Jul-10	Aug-10	Sep-10	Oct-10	Nov-10	Dec-10	Jan-11	Feb-11	Mar-11	Apr-11	May-11	Jun-11	Total
1. AKE	-	-	-	-	-	-	-	-	-	-	-	-	**0**
2. CEE	-	-	-	-	-	-	-	-	-	-	1	-	**1**
3. SEC	-	-	-	2	1	0	0	0	-	-	-	-	**3**
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**	**2**	**1**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**4**

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 years, the 2010/11 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, mainly fur seals, have also been captured in this fishery

All surface longline vessels are required to use seabird mitigation methods, with the requirement for the use of tori lines whilst setting and either night setting or line weighting, . Some vessels also employ mitigation devices during hauling with brikle curtains[9] and water cannons being most common. Additionally CSP has provided turtle dehooking equipment to all foreign charter vessels.

Table 60 summarises commercial fishing effort, observer effort and captures during the 2010/11 observer year. Commercial fishing effort reduced again compared to the previous year, showing a steady downward trend over the past three years (Ramm 2011, 2012). The majority of fishing effort was made in SOU though effort in CHA doubled compared to the previous year. Effort was largely being limited to the boundary between areas SOU and CHA. Both seabird and marine mammal capture rates were highest in SOU.

Overall capture rates reduced compared to the previous year by almost half for seabirds but by a lesser degree for marine mammals..

Table 60: *Summary of commercial effort, observer effort and protected species captures in the Tuna charter surface longline fishery during the 2010/11 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	2	2	100.00	4,763	0	0.000	0	0.000
2. CEE	0	0	-	-	-	-	-	-
3. SEC	0	0	-	-	-	-	-	-
4. SOE	0	0	-	-	-	-	-	-
5. SOU	89	89	100.00	215,609	24	0.111	10	0.046
6. SUB	0	0	-	-	-	-	-	-
7. CHA	60	60	100.00	149,700	5	0.033	1	0.007
8. CEW	0	0	-	-	-	-	-	-
9. AKW	0	0	-	-	-	-	-	-
10. KER	0	0	-	-	-	-	-	-
Total	**151**	**151**	**100.00**	**370,072**	**29**	**0.078**	**11**	**0.030**

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

[9] 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.

Observer coverage

Of the four vessels covered by observers protected species interactions occurred on all vessels. At least part of each line set this fleet was observed. Capture rates for seabirds were similar on three of the vessels, however the second most heavily observed vessel caught only one seabird during the coverage giving a capture rate an order of magnitude lower. The same vessel also only caught one marine mammal. Observer comments do not point to any large differences in fishing practices between the vessels however there did appear to be a lower overall seabird abundance around this vessel..

Comments relating to offal management and mitigation are included in Table A6.12.

Observer coverage was undertaken through the three months April to June with some trips overlapping into the 2011/12 observer year by extending into July 2011. Fishing activity and protected species captures occurring during the 2010/11 observer year are reported here (Table 61).

Table 61: Number of observed lines in the Tuna charter surface longline fishery by area and month during the 2010/11 observer year.

FMA	Jul-10	Aug-10	Sep-10	Oct-10	Nov-10	Dec-10	Jan-11	Feb-11	Mar-11	Apr-11	May-11	Jun-11	Total
1. AKE												2	**2**
2. CEE													**0**
3. SEC													**0**
4. SOE													**0**
5. SOU										4	74	11	**89**
6. SUB													**0**
7. CHA										1	42	17	**60**
8. CEW													**0**
9. AKW													**0**
10. KER													**0**
Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**5**	**116**	**30**	**151**

Protected species interactions

Forty one protected species interactions occurred during 2010/11, a reduction on the previous year though more in line with 2008/09 (Ramm 2012, 2011). About half of seabird interactions resulted in mortalities, similar to the previous year. All but one of the marine mammals caught were released alive. As with previous year captures in this fishery are numerically dominated by Buller's albatross. This is due to the high degree of spatial and temporal overlap between the fishery and seabirds during breeding season.

All but two of the captures were from the animals being hooked (Table 63). The two line captures were the result of snoods wrapping around the birds' legs.

Table 62: Protected species interactions with the Tuna charter surface longline fishery during the 2010/11 observer year.

Species Name	Alive	Dead	Grand Total
Birds			
Buller's albatross	15	9	24
New Zealand white capped albatross	1	2	3
White-chinned petrel		2	2
Birds Total	**16**	**13**	**29**
Marine Mammals			
New Zealand fur seal	10	1	11
Marine Mammals Total	**10**	**1**	**11**
Grand Total	**27**	**14**	**41**

Table 63: Method of interaction for a) protected species released alive and b) dead protected species in the Tuna charter surface longline fishery during the 2010/11 observer year.
a) Released alive

Species Name	Hook capture	Tangled in line	Grand Total
Birds			
Buller's albatross	14	1	15
New Zealand white capped albatross		1	1
Birds Total	**14**	**2**	**16**
Marine Mammals			
New Zealand fur seal	10		10
Marine Mammals Total	**10**		**10**
Grand Total	**25**	**2**	**27**

b) Dead protected species.

Species Name	Hook capture	Grand Total
Birds		
Buller's albatross	9	9
New Zealand white capped albatross	2	2
White-chinned petrel	2	2
Birds Total	**13**	**13**
Marine Mammals		
New Zealand fur seal	1	1
Marine Mammals Total	**1**	**1**
Grand Total	**14**	**14**

Table 64 show that all captures of seabirds occurred in May and June, the peak months of observer coverage. Marine mammal captures also occurred in these peak months of coverage (Table 65)

Table 64: Seabird interactions in the Tuna charter surface longline fishery by area and month during the 2010/11 observer year. A zero indicates that no interactions are observed, a dash indicates that no coverage took place.

FMA	Jul-10	Aug-10	Sep-10	Oct-10	Nov-10	Dec-10	Jan-11	Feb-11	Mar-11	Apr-11	May-11	Jun-11	Total
1. AKE	-	-	-	-	-	-	-	-	-	-	-	0	**0**
2. CEE	-	-	-	-	-	-	-	-	-	-	-	-	**0**
3. SEC	-	-	-	-	-	-	-	-	-	-	-	-	**0**
4. SOE	-	-	-	-	-	-	-	-	-	-	-	-	**0**
5. SOU	-	-	-	-	-	-	-	-	-	0	21	3	**24**
6. SUB	-	-	-	-	-	-	-	-	-	-	-	-	**0**
7. CHA	-	-	-	-	-	-	-	-	-	0	0	5	**5**
8. CEW	-	-	-	-	-	-	-	-	-	-	-	-	**0**
9. AKW	-	-	-	-	-	-	-	-	-	-	-	-	**0**
10. KER	-	-	-	-	-	-	-	-	-	-	-	-	**0**
Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**21**	**8**	**29**

Table 65: Marine mammal interactions in the Tuna charter surface longline fishery by area and month during the 2010/11 observer year. A zero indicates that no interactions are observed, a dash indicates that no coverage took place.

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

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 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 shark species.

Commercial fishing effort, observer coverage and protected species captures are summarised in Table 66. Commercial fishing effort was similar to that of the previous year though effort shifted slightly from AKW to AKE (Ramm 2012). Observer effort was slightly reduced on the previous year reducing to around 6% or 20,000 less hooks observed. Observer effort was highest in AKE though percentage fishing observed was highest in AKW.

Seabird captures reduced in both absolute number and in capture rate compared to the previous year, being almost a quarter of the rate of the previous year (Ramm 2012). No large scale capture events occurred as in the previous year.

Table 66: Summary of commercial effort, observer effort and protected species captures in the domestic tuna surface longline fishery during the 2010/11 observer year.

FMA	Effort Sets	Observed Sets	Coverage (%)	Number of hooks observed	Seabird Captures*	Seabirds per 1000 Hooks	Mammal Captures	Mammals per 1000 Hooks	Reptile Captures	Reptile per 1000 Hooks
1. AKE	1368	64	4.68	64,926	6	0.092	0	0.000	1	0.015
2. CEE	954	69	7.23	69,037	6	0.087	1	0.014	2	0.029
3. SEC	0	0	-	-	-	-	-	-	-	-
4. SOE	0	0	-	-	-	-	-	-	-	-
5. SOU	0	0	-	-	-	-	-	-	-	-
6. SUB	0	0	-	-	-	-	-	-	-	-
7. CHA	255	13	5.10	14,380	0	0.000	0	0.000	0	0.000
8. CEW	3	0	0.00	-	-	-	-	-	-	-
9. AKW	150	23	15.33	24,527	7	0.285	0	0.000	0	0.000
10. KER	26	0	0.00	-	-	-	-	-	-	-
Total	**2,756**	**169**	**6.13**	**172,870**	**19**	**0.110**	**1**	**0.006**	**2**	**0.017**

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

Observer coverage

During 2010/11 17 observer trips occurred onboard 12 vessels. Protected species captures occurred on eight of these trips. Of the 19 seabirds caught, 11 were on a single vessel. Observations on vessels varied widely between 1,000 hooks and 33,000 hooks. The vessel subject to the most captures was observed to hold discard of offal and baits during setting however not during hauling. Seabird abundance was also observed to increase markedly during the trip. Vessel practices, in terms of mitigation use, offal management and seabird knowledge was observed to vary widely between vessels. Comments relating to offal management, mitigation techniques and protected species interactions and captures (i.e. interactions with the fishing gear only) for each vessel observed are given in Table A6.13.

As with previous years observer coverage occurred mainly around the top and east coast of the North Island. Coverage was spread relatively evenly through the year though none occurred in January and February.

Table 67: Number of observed lines in the domestic tuna surface longline fishery by area and month during the 2010/11 observer year.

FMA	Jul-10	Aug-10	Sep-10	Oct-10	Nov-10	Dec-10	Jan-11	Feb-11	Mar-11	Apr-11	May-11	Jun-11	Total
1. AKE	9	18	6		6	14			8			3	**64**
2. CEE	11									8	24	26	**69**
3. SEC													**0**
4. SOE													**0**
5. SOU													**0**
6. SUB													**0**
7. CHA	8								3	2			**13**
8. CEW													**0**
9. AKW		6		4	4				9				**23**
10. KER													**0**
Total	**28**	**24**	**6**	**4**	**10**	**14**	**0**	**0**	**20**	**10**	**24**	**29**	**169**

Protected species interactions

Table 68 gives a breakdown of the protected species captures in the domestic surface longline fishery. As with the charter tuna fishery, captures are dominated by albatross species. The majority of interactions were motilities. Gibson's and Antipodean albatross continue to feature as bycatch, making this fishery the primary cause of fishing related impact to the species. One black petrel was also observed killed in the fishery, down from five the previous year (Ramm 2012)

Two leather back turtles were observed captured in the fishery, and while both were released alive hooks and snoods were not totally removed from the animals. The vessels were equipped with turtle dehooking gear.

Whilst a large scale capture event such as that observed in the previous year was not repeated, captures were still heavily skewed towards a single vessel. This highlights the possible need for further work on vessel specific management plans to be developed which could address specific risks relevant to individual fishing operations.

Table 68: Protected species interactions with the domestic tuna surface longline fishery during the 2010/11 observer year.

Species Name	Alive	Dead	Grand Total
Birds			
Antipodean albatross		1	1
Black petrel		1	1
Black-browed albatross (Unidentified)	1	2	3
Buller's albatross	1	1	2
Cape petrels	1		1
Flesh-footed shearwater	2		2
Gibson's albatross		2	2
Grey petrel		1	1
White-chinned petrel		6	6
Birds Total	**5**	**14**	**19**
Marine Mammals			
New Zealand fur seal	1		1
Marine Mammals Total	**1**		**1**
Reptiles			
Leatherback turtle	2		2
Reptiles Total	**2**		**2**
Grand Total	**8**	**14**	**22**

All but three of the interactions involved animals being hooked at various stages of the fishing process (Table 69). Three animals tangled in the snood at hauling were able to be released alive.

Table 69: Method of interaction for a) protected species released alive and b) dead protected species in the domestic tuna surface longline fishery during the 2010/11 observer year.

a) Released alive

Species Name	Hook capture	Tangled in line	Grand Total
Birds			
Black-browed albatross (Unidentified)	1		1
Buller's albatross	1		1
Cape petrels		1	1
Flesh-footed shearwater		2	2
Birds Total	**2**	**3**	**5**
Marine Mammals			
New Zealand fur seal	1		1
Marine Mammals Total	**1**		**1**
Reptiles			
Leatherback turtle	2		2
Reptiles Total	**2**		**2**
Grand Total	**5**	**3**	**8**

b) Dead protected species.

Species Name	Hook capture	Grand Total
Birds		
Antipodean albatross	1	1
Black petrel	1	1
Black-browed albatross (Unidentified)	2	2
Buller's albatross	1	1
Gibson's albatross	2	2
Grey petrel	1	1
White-chinned petrel	6	6
Birds Total	**14**	**14**
Grand Total	**14**	**14**

Seabird interactions occurred in most months of observer coverage, however the majority of captures occurred in November, with six of them occurring in a three day period onboard a single vessel (Table 70). The single marine mammal interaction occurred in June.

Table 70: Seabird interactions in the domestic tuna surface longline fishery by area and month during the 2010/11 observer year. A zero indicates that no interactions are observed, a dash indicates that no coverage took place.

FMA	Jul-10	Aug-10	Sep-10	Oct-10	Nov-10	Dec-10	Jan-11	Feb-11	Mar-11	Apr-11	May-11	Jun-11	Total
1. AKE	0	0	0	-	4	2	-	-	0	-	-	0	**6**
2. CEE	3	-	-	-	-	-	-	-	-	0	1	2	**6**
3. SEC	-	-	-	-	-	-	-	-	-	-	-	-	**0**
4. SOE	-	-	-	-	-	-	-	-	-	-	-	-	**0**
5. SOU	-	-	-	-	-	-	-	-	-	-	-	-	**0**
6. SUB	-	-	-	-	-	-	-	-	-	-	-	-	**0**
7. CHA	0	-	-	-	-	-	-	-	0	0	-	-	**0**
8. CEW	-	-	-	-	-	-	-	-	-	-	-	-	**0**
9. AKW	-	0	-	1	6	-	-	-	0	-	-	-	**7**
10. KER	-	-	-	-	-	-	-	-	-	-	-	-	**0**
Total	**3**	**0**	**0**	**1**	**10**	**2**	**0**	**0**	**0**	**0**	**1**	**2**	**19**

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. A relatively small fleet conducts a large amount of fishing effort in terms of hook set, 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 industry applied mitigation techniques include, gas cannons and offal and bait discard management.

Commercial fishing effort, observer effort and protected species interactions are summarised in Table 71. Observer effort in this fishery reduced slightly over the previous year, while peak observer effort continued to be in SOE and SUB. The number of hooks observed in this fishery increased by 59% however the number of seabird captures tripled, leading to an overall increase in the captures rate compared to the previous year (Ramm 2012).

Table 71: Summary of commercial effort, observer effort and protected species captures in the deep-sea ling bottom longline fishery during the 2010/11 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	68	0	0.00	-	-	-	-	-
3. SEC	858	40	4.66	81,648	5	0.061	0	0.000
4. SOE	1839	109	5.93	223,778	11	0.049	0	0.000
5. SOU	104	0	0.00	-	-	-	-	-
6. SUB	334	124	37.13	411,269	11	0.027	0	0.000
7. CHA	0	0	-	-	-	-	-	-
8. CEW	0	0	-	-	-	-	-	-
9. AKW	0	0	-	-	-	-	-	-
10. KER	0	0	-	-	-	-	-	-
Total	**3,203**	**273**	**8.52**	**716,695**	**27**	**0.038**	**0**	**0.000**

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

Observer coverage

Two observer trips were conducted onboard two vessels in this fishery. The vessels were observed to be very different in their fishing operations, including number of hooks set, offal management and mitigation use. One vessel was equipped with a meal plant and operated integrated weight line. 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 A6.14.

Observer coverage showed a greater seasonal spread than in previous years (Table 72). Seabird captures were split almost evenly between the two vessels.

Table 72: Number of observed lines in deep-sea ling bottom longline fishery by area and month during the 2010/11 observer year.

FMA	Jul-10	Aug-10	Sep-10	Oct-10	Nov-10	Dec-10	Jan-11	Feb-11	Mar-11	Apr-11	May-11	Jun-11	Total
1. AKE													**0**
2. CEE													**0**
3. SEC				15	25								**40**
4. SOE					80	29							**109**
5. SOU													**0**
6. SUB	22							70	32				**124**
7. CHA													**0**
8. CEW													**0**
9. AKW													**0**
10. KER													**0**
Total	**22**	**0**	**0**	**15**	**105**	**29**	**0**	**70**	**32**	**0**	**0**	**0**	**273**

Protected species interactions

Protected species interactions are listed in Table 73. Similar to previous years white-chinned petrels have dominated captures largely due to their aggressive feeding behaviour and strong diving ability. Observer comments indicated that abundance of white-chinned petrels was particularly high in close proximity to the vessels. Less common are the interactions with Campbell and royal albatross. The interaction with the southern royal albatross was observed to be a crew member accidentally gaffing the bird while attempting to retrieve a fish (Table 84). Of those seabirds released alive half were hook captures, indicating high levels of feeding activity at hauling even though both vessels practiced offal and bait management during hauling.

Table 73: Protected species interactions with the deep-sea ling bottom longline fishery during the 2010/11 observer year.

Species Name	Alive	Dead	Decomposing	Grand Total
Birds				
Campbell albatross	1			1
Common diving petrel	2			2
New Zealand white capped albatross	1			1
Salvin's albatross	1			1
Southern royal albatross	1			1
White-chinned petrel	6	11	9	26
Birds Total	**12**	**11**	**9**	**32**
Grand Total	**12**	**11**	**9**	**32**

Table 74: Method of interaction for a) protected species released alive and b) dead protected species in the deep-sea ling bottom longline fishery during the 2010/11 observer year.
a) Released alive

Species Name	Hook capture	Impact against vessel	Other	Grand Total	Comments relating to 'Other' code
Birds					
Campbell albatross	1			1	
Common diving petrel		2		2	
New Zealand white capped albatross		1		1	
Salvin's albatross	1			1	
Southern royal albatross			1	1	Gaffed through wing by crew while retrieving fish
White-chinned petrel	4	2		6	
Birds Total	**6**	**5**	**1**	**12**	
Grand Total	**6**	**5**	**1**	**12**	

b) Dead protected species.

Species Name	Hook capture	Grand Total
Birds		
White-chinned petrel	20	20
Birds Total	**20**	**20**
Grand Total	**20**	**20**

Interactions with protected species took place in all but one month of observer coverage (Table 75), thou interactions peaked in both November (SEC and SOE) and March (SUB).

Table 75: Seabird interactions in the deep-sea ling bottom longline fishery by area and month during the 2010/11 observer year. A zero indicates that no interactions are observed, a dash indicates that no coverage took place.

FMA	Jul-10	Aug-10	Sep-10	Oct-10	Nov-10	Dec-10	Jan-11	Feb-11	Mar-11	Apr-11	May-11	Jun-11	Total
1. AKE	-	-	-	-	-	-	-	-	-	-	-	-	**0**
2. CEE	-	-	-	-	-	-	-	-	-	-	-	-	**0**
3. SEC	-	-	-	1	4	-	-	-	-	-	-	-	**5**
4. SOE	-	-	-	-	9	2	-	-	-	-	-	-	**11**
5. SOU	-	-	-	-	-	-	-	-	-	-	-	-	**0**
6. SUB	0	-	-	-	-	-	-	5	11	-	-	-	**16**
7. CHA	-	-	-	-	-	-	-	-	-	-	-	-	**0**
8. CEW	-	-	-	-	-	-	-	-	-	-	-	-	**0**
9. AKW	-	-	-	-	-	-	-	-	-	-	-	-	**0**
10. KER	-	-	-	-	-	-	-	-	-	-	-	-	**0**
Total	**0**	**0**	**0**	**1**	**13**	**2**	**0**	**5**	**11**	**0**	**0**	**0**	**32**

6. Discussion

6.1 MIDDLE DEPTH TRAWL FISHERIES

6.1.1 Hake, hoki, ling and warehou species

The ongoing observer coverage of around 20% has remained stable, so too has the capture rate for seabirds while the capture rate for marine mammals dropped. Protected species interactions occurred on the majority of vessels observed, while interaction rates were found to vary greatly between vessels. Crew awareness of bycatch and mitigation issues continues to improve due in a large part to ongoing education programmes funded jointly by CSP, MPI and the fishing industry.

The Cook Strait spawn fishery continues to have the highest catch rate of fur seals over all fisheries. Genetic analysis of these bycaught animals would provide useful insight into their provenance and therefore help quantify whether the fishery is having disproportionate impact on any local populations.

With the protection of the basking shark under the Wildlife Act 1953, better reporting of these captures and the circumstances surrounding them should lead to development of methods to reduce captures. The hoki and squid trawl fisheries have the highest incidence of observed basking shark bycatch.

Ongoing efforts by industry and government have lead to an overall reduction in captures over recent years though the high degree of variability in catch rate between vessels points to a continuing need for vessel specific operational strategies and a ongoing development and refinement in mitigation devices such as tori lines and bird bafflers. Observer comments indicate that compliance with regulations is high amongst this fleet though efficacy of mitigation is variable. Therefore increased tailoring of strategies to suit individual vessels and operations as well as dealing with the temporal and spatial variation in seabird behaviour can go a long way to further reducing captures.

6.1.2 Southern Blue Whiting

The southern blue whiting fishery continued to receive a relatively high level of observer coverage. During 2010/11 the highest rate of observed marine mammal captures was recorded, with crews and observers reporting that both NZ sea lions and NZ fur seals were in attendance of the vessels in moderate to high numbers at most times. The fishery also had higher observed rates of seabird captures than the previous year, though these captures were largely limited to a single vessel and species of seabird.

Observations indicate that capture events were associated with larger numbers of pinnipeds around the vessel and also with particularly aggressive feeding activity. These factors can be used inform vessel activities by guiding changes to fishing activity to avoid captures.

The timing of the fishery and it's relatively short and intense season mean that when risk factors to captures are highlighted, such as adverse weather conditions or high mammal abundance, there is very little time for the fleet to act to mitigate against further captures. Thus it is even more important to have in place open communication between vessels and strong management plans which can be implemented quickly 'in-season' to reduce the risk of captures or further captures. This is a process is being led by the DeepWater Group (DWG) to apply fleet wide mitigation and capture avoidance strategies.

6.1.3 Scampi

Observer coverage in the scampi fishery has scaled up markedly, almost doubling over the past three years. Commercial fishing effort has also increased, though not to the same extent. With increased observer coverage a number of protected species bycatch issues have been identified for both seabirds and pinnipeds. In 2010/11 the scampi fishery had the highest observed catch rate of seabirds of any fishery considered in this report.

The high levels of fish bycatch and offal discarded can significantly increase the attractiveness of vessels to protected species. Observer comments point to both variability in offal management regime and variability in their application. Therefore comprehensive and consistent offal management protocols are critical to reducing the risk of captures. Investment has gone into installation of offal holding tanks in some vessels to facilitate this.

The use of triple net rigs appears to increase the risk of seabird capture as the centre net remains open at the surface as the catch is tipped from the codend. Work is underway as part of a project commissioned by CSP, in collaboration with the fishing industry and MPI, to develop ways of restricting the size of the net mouth at the surface and therefore reduce risk of net captures at the surface. More specific observer protocols have been developed to document the conditions around capture events and better inform the development of mitigation techniques.

Observer comments also point variability in tori line design and use. Ongoing refinement of seabird scaring devices can increase their efficacy as well as making them more 'user-friendly'. Work is underway in other offshore fisheries to investigate and trial improvements to regulated mitigation devices.

6.1.4 Squid

Squid received marginally higher observer coverage in 2010/11. The capture rate of seabirds was similar to the previous year while the marine mammal capture rate was approximately half that of 2009/10. No NZ sea lions were observed caught. Interactions occurred throughout the

fleet though at widely variable levels. Some observer comments identified poor or variable offal management practices on some vessels. Ongoing monitoring of VMPs and MMOPs by both government and industry will help highlight these issues or particular vessels of interest and bring about remedial work to be targeted, bringing all vessels to the same standard.

Sooty shearwater, white-chinned petrel and white-capped albatross captures again make up the bulk of observed interactions in this fishery. Observations pointed to high abundances of seabirds and aggressive feeding activity. This further highlights the need for carefully considered offal management plans which are consistently applied.

The squid trawl fishery has one of the highest bycatch rates of basking sharks. With their recent protection under the Wildlife Act 1953 there is an increased focus on collection of high quality data on interaction and methods to mitigate against this. Work is underway to identify factors both environmental and operational which effect bycatch rates and therefore help inform mitigation strategies.

6.2 PELAGIC TRAWL FISHERIES

Observation remains at around 30% of effort in this fishery. Marine mammal captures remained at a similar level to the previous year while the seabird interactions halved. Common dolphin captures continue to feature prominently in this fishery with it being the leading source of observed fishing mortality for this species. As with previous year most captures occur in events hauled in the early hours preceding sunrise.

Observer comments indicate that vessels generally managed offal very well and consistently, seabird abundances around the vessels were not as high as in other fisheries, with seabirds being less aggressive when offal discharge was absent.

Crew awareness of marine mammal interaction issues remains high, however continuing captures point to the importance of maintaining this education, particularly translated and delivered to the crews of foreign charter vessels which make up the majority of this fishery.

6.3 DEEPWATER TRAWL FISHERIES

Observer coverage in this fishery reduced compared to the previous year due to a combination of reduced observer effort (days) and increased commercial fishing effort. In 2010/11 this fishery was one of the least observed of the offshore fisheries. Observed seabird and mammal interactions reduced to negligible levels with the leading sources of interaction coming from deck strikes caused in part by birds being attracted to deck lighting. Mitigation against this effect is complicated by the need for lighting to ensure crew and vessel safety.

While it generally has a low interaction rate with seabirds and marine mammals, the deepwater bottom trawl fishery continues to have the greatest impact of any fishery on protected coral

species. The majority of catch, by weight, was made up of Scleractinian corals, in particular various taxa of stony branching corals. However a number of other taxa are also caught including gorgonian, golden and black. Catches are reported here only to a coarse taxonomic level. Protected coral taxa are identified to a finer scale and impacts are further discussed in Tracey et. al (2011).

Given the slow rate of regeneration of corals, the continuing catch of a variety of protected coral taxa indicate that while the overall trawl footprint may be shrinking there is an ongoing and fine scale spreading impact of commercial fishing on the benthos. The effect of this on the wider ecosystem is still poorly understood though work is ongoing to identify and where possible predict areas of most importance to coral communities and therefore help inform management of fishing activities.

6.4 INSHORE FISHERIES

The 2010/11 observer year saw increased planning and coordination between DOC and MPI (then Ministry of Forestry and Agriculture) in order to prioritise monitoring and research in the inshore fisheries. As a result of the prioritisation observer coverage was particularly focused in some areas meaning that bycatch rates are not directly comparable to previous years.

6.4.1 Inshore trawl

The majority of observer coverage in inshore trawl was focused on the previously unobserved areas around the East Coast of the North Island. This area has distinct assemblages of seabirds and differing environmental conditions. Therefore an understanding of the operation of the fishery and indication of bycatch rates was important to understanding any potential risk. Seabird abundance around the vessels was generally observed to be low, and interactions were observed to be very low during the coverage.

Observers noted that use of mitigation devices was rare though a number of vessels practiced offal management, either as a way to reduce risk of seabird interactions or for operational reasons due to low crew numbers meaning that fish could not be processed during shooting or hauling.

Coverage was also focused in the Tasman and Golden Bay areas in order to investigate whether some previously high rates of common bycatch were characteristic of the fishery. The high capture rates observed in the 2008/09 observer year were not observed in 2010/11.

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

As with observer coverage in the inshore trawl fisheries, priority was placed on observing in the poorly understood fisheries off the east coast of the North Island. Coverage was achieved onboard a large number of vessel which had never previously been observed. Fishing

practices, mitigation use, offal management and line weighting regimes were observed to vary widely between vessels.

Bycatch rates were observed to be low and all animals were caught at hauling and released alive. Offal was generally observed to be batched in some form; however used bait were generally discarded continuously, and seabird abundance and aggression was observed to increase during offal or bait discard. Management and batch discarding of these unused baits would reduce abundance of seabirds around the vessel at hauling and reduce risk of capture. This would have the additional benefit for crew of not having to handle the seabirds hooked at hauling, risking injury to themselves and the birds.

Catch rates of seabirds was observed to be higher in the Northern areas of coverage as vessels fished closer to the breeding area of black petrels, the main observed species of seabird bycatch. While the absolute number of captures was low, black petrels are at extreme risk from fisheries bycatch (Richard et al 2011) and observer coverage was low. This points to the need for further development of mitigation techniques applied onboard inshore longline vessels.

6.4.3 Setnet

Setnet coverage during 2010/11 was spatially focused on the northern portion of East Coast South Island, meaning it is not directly comparable with recent years coverage which had broader spatial extent. Overall less fishing effort was observed than in the previous year. The difficulties in obtaining spatially and temporally representative coverage continues due to difficulties in placing observers on vessels because of issues related space, and safety onboard vessels as well as a reluctance by some parties to take observers. Recent increased cooperation between government and the fishing industry has increased buy-in to observer coverage and facilitated placement in some areas, and this collaboration is continuing.

Offal management was generally observed to be good with no fish being processed or offal discarded during setting of hauling. This was observed to be due to operational reasons including limited crew numbers (no crew were available to process during setting or hauling) and a desire to reduce spiny dog and sea lice occurrence on the fishing grounds.

While, unlike recent years, no Hector's dolphin captures were observed, two dusky dolphin and two fur seal captures were observed. Capture rates of marine mammals in SEC were similar to the previous year. A lack of proven mitigation techniques in setnet fisheries, for both seabirds and marine mammals, remains a concern and an area for investigation. CSP project MIT2012-03[10] is underway, and aims to investigate international advances in mitigation techniques and examine their applicability to New Zealand fisheries.

[10] CSP Annual plan 2012/13. Available at: http://www.doc.govt.nz/documents/conservation/marine-and-coastal/marine-conservation-services/csp-approved-annual-plan-2012-13.pdf

6.5 SURFACE LONGLINE FISHERIES

6.5.1 Charter tuna

As with previous years all foreign charter tuna vessels were observed in 2010/11 with at least a portion of all lines set and hauled being observed. There has been a downward trend in the number of lines set by these foreign charter vessels, with the 'season' now covering a much shorter period. Fishing effort was focused off the West Coast of the South Island, at the boundary between CHA and SOU.

Protected species capture rates reduced markedly compared to the previous year however during 2009/10 a number of mortalities were associated with a mitigation trial, bringing up capture numbers. The 2010/11 rate was much more in line with other recent years.

Buller's albatross continue to have the highest interaction rate with this fishery, largely driven by the spatial and seasonal overlap between breeding birds and the fishery. The large proportion of birds caught at hauling points to a need to further develop or implementation of hauling mitigation such as offal and bait management, brickle curtains and water cannons. While birds caught at hauling are generally released alive they do sustain a wide range of injuries and post release survival rate is unclear. Reducing incidences of captures at hauling also frees crew up from having to de-hook or untangle the bird and reduces the risk of injury to crew.

Work is ongoing in mitigating captures of seabird in surface longline fisheries with CSP project MIT2012-04[11] underway, which aims to test methods of reducing hook captures during the 2012/13 observer year.

6.5.2 Domestic tuna and swordfish

Less observer coverage than the previous year was achieved in the domestic surface longline fishery. This was largely driven by a lack of observer resource at certain times of year.

The overall seabird capture rate reduced considerably compared to the previous year, though the previous year's rate was driven by the a series of captures on a single vessel. The large fluctuations in capture rate make any estimations of total bycatch or 'risk' highly uncertain. As with a number of fisheries there was a large variation in capture rate between vessels. There was also wide variation in mitigation practices and offal management. A fleet wide education programme, similar to that in operation in the deepwater fisheries would have the potential to bring vessels up to the same standards of current best practice and therefore work to consistently minimise bycatch rates.

[11] CSP Annual plan 2012/13. Available at: http://www.doc.govt.nz/documents/conservation/marine-and-coastal/marine-conservation-services/csp-approved-annual-plan-2012-13.pdf

Unusually, three leatherback turtles were captured during the 2010/11 observer year. This is the highest number observed to be caught in a single year. All animals were released alive, however not all were successfully de-hooked and some had snoods still trailing.

6.6 BOTTOM LONGLINE FISHERY

The deepwater bottom longline fishery comprises a small fleet of larger active vessels, with large numbers of hooks being set during individual trips due to the use of automatic line setting equipment. An effort was made to spread observer coverage in this fleet over more vessels in order to gain more representative data across the fishery.

White-chinned petrel captures continue to feature heavily in the deepwater bottom longline fishery. The diving ability and aggressive feeding behaviour of this species increase the risk factor where there is an overlap between the bottom longline fishery and white-chinned petrel foraging areas. This risk is amplified by the extremely large number of hooks set by any individual vessel in this fishery, up to 1,000,000 hooks per trip. Therefore if environmental or operational factors occur causing an increase in capture rates there is the potential for large numbers of animals to get caught very quickly.

Observer comments on vessel operations pointed to variability between management practices onboard the vessels. Given the nature of the fishery and the species it interacts with, it is very important that diligence is maintained in this fishery to prevent large capture events.

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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	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*
GGP	Giant grouper	*Epinephelus lanceolatus*
WPS	White pointer shark	*Carcharodon carcharias*
WSH	Whale shark	*Rhincodon typus*
BSK	Basking shark	*Cetorhinus maximus*
RMB	Manta ray	*Manta birostris*
MJA	Spine-tailed devil ray	*Mobula japanica*
ODO	Deepwater nurse shark	*Odontapsis ferox*
OWS	Oceanic whitetip shark	*Carcharhinus longimanus*

Appendix 2

PROTECTED SPECIES INTERACTIONS DURING THE 2010/11 OBSERVER YEAR

See Appendix 1 for scientific names of species

Species Name	Alive	Dead	Decomposing	Grand Total
Birds				
Albatross (Unidentified)	5			5
Antarctic prion	3			3
Antipodean albatross		1		1
Black petrel	2	1		3
Black-backed gull		1		1
Black-browed albatross (Unidentified)	3	2		5
Buller's albatross	20	21		41
Buller's and Pacific albatross			1	1
Campbell albatross	1	1		2
Cape petrels	3	2		5
Common diving petrel	12	1		13
Fairy prion	2			2
Flesh-footed shearwater	2	15		17
Giant petrels (Unidentified)	2			2
Gibson's albatross		2		2
Greater albatross	1			1
Grey petrel	13	7		20
Grey-backed storm petrel	3			3
New Zealand white capped albatross	11	30		41
Petrel (Unidentified)	14	3		17
Prions (Unidentified)	8			8
Procillaria petrels	1			1
Salvin's albatross	9	9		18
Seabird - Small			1	1
Seabird (unspecified)			1	1
Short-tailed shearwater		1		1
Smaller albatross	6	1		7
Sooty shearwater	27	83		110
Southern cape petrel		3		3
Southern royal albatross	1	1		2
Storm petrels	11			11
Westland petrel	2	2		4
White-chinned petrel	39	85	9	133
Birds Total	**201**	**272**	**12**	**485**

Species Name	Alive	Dead	Decomposing	Grand Total
Marine Mammals				
Common dolphin		8		8
Dolphins and Toothed whales		1		1
Dusky dolphin		2		2
New Zealand fur seal	17	45	2	64
New Zealand sea lion	2	9		11
Marine Mammals Total	**19**	**65**	**2**	**86**
Fish				
Basking shark	1	8		9
Fish Total	**1**	**8**		**9**
Reptiles				
Leatherback turtle	3			3
Reptiles Total	**3**			**3**
Grand Total	**224**	**342**	**14**	**583**

Appendix 3

PROTECTED SPECIES INTERACTIONS BY METHOD DURING THE 2010/11 OBSERVER YEAR

See Appendix 1 for scientific names of species

Species Name	Bottom longline	Surface longline	Setnet	Trawl	Grand Total
Birds					
Albatross (Unidentified)				5	5
Antarctic prion				3	3
Antipodean albatross		1			1
Black petrel	2	1			3
Black-backed gull				1	1
Black-browed albatross (Unidentified)		3		2	5
Buller's albatross		26		15	41
Buller's and Pacific albatross				1	1
Campbell albatross	1			1	2
Cape petrels		1		4	5
Common diving petrel	2			11	13
Fairy prion				2	2
Flesh-footed shearwater		2		15	17
Giant petrels (Unidentified)				2	2
Gibson's albatross		2			2
Greater albatross				1	1
Grey petrel		1		19	20
Grey-backed storm petrel				3	3
New Zealand white capped albatross	1	3		37	41
Petrel (Unidentified)				17	17
Prions (Unidentified)				8	8
Procillaria petrels				1	1
Salvin's albatross	1			17	18
Seabird - Small	1				1
Seabird (unspecified)				1	1
Short-tailed shearwater				1	1
Smaller albatross				7	7
Sooty shearwater				110	110
Southern cape petrel				3	3
Southern royal albatross	1			1	2
Storm petrels				11	11
Westland petrel				4	4
White-chinned petrel	27	8		98	133
Birds Total	**36**	**48**		**401**	**485**

Species Name	Bottom longline	Surface longline	Setnet	Trawl	Grand Total
Marine Mammals					
Common dolphin				8	8
Dolphins and Toothed whales				1	1
Dusky dolphin			2		2
New Zealand fur seal		12	1	51	64
New Zealand sea lion				11	11
Marine Mammals Total		**12**	**3**	**71**	**86**
Fish					
Basking shark				9	9
Fish Total				**9**	**9**
Reptiles					
Leatherback turtle		3			3
Reptiles Total		**3**			**3**
Grand Total	**36**	**63**	**3**	**478**	**583**

Appendix 4

PROTECTED SPECIES INTERACTIONS BY MONTH DURING THE 2010/11 OBSERVER YEAR

See Appendix 1 for scientific names of species

Species Name	Jul-10	Aug-10	Sept-10	Oct-10	Nov-10	Dec-10	Jan-11	Feb-11	Mar-11	Apr-11	May-11	Jun-11	Grand Total
Birds													
Albatross (Unidentified)								1		3	1		5
Antarctic prion									3				3
Antipodean albatross	1												1
Black petrel					1			2					3
Black-backed gull				1									1
Black-browed albatross (Unidentified)	1				2			1		1			5
Buller's albatross	1				1					5	20	14	41
Buller's and Pacific albatross												1	1
Campbell albatross		1				1							2
Cape petrels	1	2	1									1	5
Common diving petrel				7				2	2		2		13
Fairy prion				1					1				2
Flesh-footed shearwater				15	2								17
Giant petrels (Unidentified)										1		1	2
Gibson's albatross					1							1	2
Greater albatross										1			1
Grey petrel	1		19										20
Grey-backed storm petrel									2			1	3
New Zealand white capped albatross				2			1	6	9	9	9	5	41
Petrel (Unidentified)					2		1	3	3	8			17
Prions (Unidentified)			3		1				4				8
Procillaria petrels									1				1
Salvin's albatross				6	9	2		1					18
Seabird - Small									1				1
Seabird (unspecified)									1				1
Short-tailed shearwater				1									1
Smaller albatross			1				1			5			7
Sooty shearwater	1			13	2			25	21	35	12	1	110
Southern cape petrel	3												3

Species Name	Jul-10	Aug-10	Sept-10	Oct-10	Nov-10	Dec-10	Jan-11	Feb-11	Mar-11	Apr-11	May-11	Jun-11	Grand Total
Southern royal albatross							1		1				2
Storm petrels			7	1	1						1	1	11
Westland petrel	2				2								4
White-chinned petrel				3	19	5	1	44	44	13	4		133
Birds Total	**11**	**3**	**31**	**50**	**43**	**8**	**5**	**85**	**93**	**81**	**49**	**26**	**485**
Marine Mammals													
Common dolphin						3		1		3		1	8
Dolphins and Toothed whales					1								1
Dusky dolphin				1	1								2
New Zealand fur seal	7	21	12	2		1	1	2	1	1	11	5	64
New Zealand sea lion			11										11
Marine Mammals Total	**7**	**21**	**23**	**3**	**2**	**4**	**1**	**3**	**1**	**4**	**11**	**6**	**86**
Fish													
Basking shark				2		1	5		1				9
Fish Total				**2**		**1**	**5**		**1**				**9**
Reptiles													
Leatherback turtle										1	1	1	3
Reptiles Total										**1**	**1**	**1**	**3**
Grand Total	**18**	**24**	**54**	**55**	**45**	**13**	**11**	**88**	**95**	**86**	**61**	**33**	**583**

Appendix 5

PROTECTED SPECIES INTERACTIONS BY FISHERIES MANAGEMENT AREA DURING THE 2010/11 OBSERVER YEAR

See Appendix 1 for scientific names of species

Species Name	AKE	CEE	SEC	SOE	SOU	SUB	CHA	CEW	AKW	Grand Total
Birds										
Albatross (Unidentified)					5					5
Antarctic prion						3				3
Antipodean albatross		1								1
Black petrel	3									3
Black-backed gull							1			1
Black-browed albatross (Unidentified)	1	1			1	1			1	5
Buller's albatross	1	1	1		29	2	7			41
Buller's and Pacific albatross							1			1
Campbell albatross				1			1			2
Cape petrels		3					2			5
Common diving petrel					7	6				13
Fairy prion			1		1					2
Flesh-footed shearwater	15								2	17
Giant petrels (Unidentified)						2				2
Gibson's albatross		1							1	2
Greater albatross				1						1
Grey petrel		1				19				20
Grey-backed storm petrel					1	2				3
New Zealand white capped albatross		1		1	18	13				33
New Zealand white-capped albatross	1		2		3	2				8
Petrel (Unidentified)			2		10	5				17
Prions (Unidentified)						8				8
Procillaria petrels					1					1
Salvin's albatross	1	1	8	6	1	1				18
Seabird - Small		1								1
Seabird (unspecified)						1				1
Short-tailed shearwater					1					1

Smaller albatross					4	3				7
Sooty shearwater	1	1	21	3	50	34				110
Southern cape petrel		3								3
Southern royal albatross						2				2
Storm petrels			1		1	9				11
Westland petrel		1	1	1			1			4
White-chinned petrel	3	1	10	15	21	80			3	133
Birds Total	**26**	**17**	**47**	**28**	**154**	**193**	**13**		**7**	**485**
Marine Mammals										
Common dolphin		1	1					3	3	8
Dolphins and Toothed whales									1	1
Dusky dolphin			2							2
New Zealand fur seal		10	6	1	15	17	15			64
New Zealand sea lion						11				11
Marine Mammals Total		**11**	**9**	**1**	**15**	**28**	**15**	**3**	**4**	**86**
Fish										
Basking shark			1		8					9
Fish Total			**1**		**8**					**9**
Reptiles										
Leatherback turtle	1	2								3
Reptiles Total	**1**	**2**								**3**
Grand Total	**27**	**30**	**57**	**29**	**177**	**221**	**28**	**3**	**11**	**583**

Appendix 6

OBSERVER COMMENTS FROM OBSERVED VESSELS AND TRIPS IN EACH FISHERY DURING THE 2010/11 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	Mitigation used	FMA's Fished	Offal Management	Seabird Capture?	Seabird interactions	Marine mammal capture?	Marine mammal interactions
1	1	BB	CHA	Meal plant was operated and generally all offal and whole fish was put to meal. Vessel also equipped with buffer tanks to batch discard in the case of meal plant failure.	N	Seabird abundance was observed to vary significantly depending on both fishing area and the number of vessels in the vicinity. Albatross were observed to feed aggressively on fish in the codend.	N	No marine mammals were observed
	2		CHA		N		N	
2	1	BB, TL	CHA	All offal and whole fish discards mealed, with only factory floor wash being discharged.	N	Seabirds constantly attending the vessel, numerically dominated by XCP, XWM and XBM also present in large numbers. Abundance peaked at hauling when birds would feed on stickers in the codend as well as congregating around the sumps, feeding on factory wash.	Y	FUR sighted occasionally, actively feeding from the net during hauling
	2		SEC, SOE		Y		Y	
3	1	BB	CHA	All offal and whole fish discard was mealed. Factory sumps were screened.	N	Seabirds present in moderate numbers (up to 400). And were observed to be highly dependant upon weather conditions, with fewer birds observed on calm days.	N	CDD observed on four occasions. FUR occasionally sighted during hauling. FUR observed to interact with the trawl gear.
4	1	BB	SOU, SUB, CHA	Meal plant was operated on the vessel and generally all offal and whole fish was mealed. However on occasion build up of SPD caused the meal plant to fail. At these times batch discarding was practiced. Not offal was discharged during setting or hauling.	N	XCP (up to 200) and XBM (up to 50) were the numerically dominant species. Seabird abundance was observed to peak during mid morning hauls and then tail off. Birds observed to actively feed on the codend at hauling, including as the codend was hauled up the stern ramp.	Y	FUR and CDD sighted on occasion. FUR were observed to actively feed on the codend during hauling, while CDD interactions were limited to bow riding.
	2		COU, SUB		N		N	
	3		SEC, SOU, SUB		N		N	

5	1	NIL	CEE, CHA	No offal or whole fish was discarded at any point.	N	Seabirds constantly attending the vessel, with abundance peaking at hauling when birds would feed on stickers in the codend.	N	No marine mammals were observed
6	1	NIL	CEE, CHA	Vessel did not produce any offal or whole fish discards.	N	Seabirds present in large numbers around the vessel (around 750). Observed to actively feed on the codend and on lost fish at hauling.	Y	FUR constantly present around the vessel during both fishing and steaming. Observed to actively feed form the net as well as feeding on lost fish.
7	1	BB, TL	SEC, CHA	No offal or whole fish was discarded during shooting or hauling.	N	High seabird abundances were observed (up to 3000 individuals). Production of offal caused seabirds to get closer to the vessel.	N	CDD sighted on one occasion. FUR sighted on other occasions, actively feeding on the codend during hauling.
8	1	TL	CHA	No Comments made	Y	Seabirds were a constant presence around the vessel. On occasion showed especially high abundance with approximately 1500 albatross in the vicinity of the vessel.	N	CDD observed on one occasion, interaction limited to bow riding. FUR were observed approaching the vessel during one haul
9	1	TL	SEC, SOE, CHA	Vessel only discharged offal between fishing events. Net was cleaned between each event.	N	Seabird abundances up to 300, though only reached this level during hauling.	N	No marine mammals observed on this trip.
10	1 2 3 4	BB, TL	SOE, CHA SEC, SOE SEC, SOU SOU	Offal and whole fish was not discharged during setting or hauling. Vessel had a single discharge point.	N Y Y Y	Seabird present in high abundance (up to 1300 birds), at times feeding aggressively. Seabird captures coincided with delays in hauling.	Y N N N	FUR regularly present around the vessel, only ever individually.
11	1	BB	CEE, CHA	Vessel was equipped with a meal plant however the buffer tanks to this were not adequate to hold all offal during times of heavy processing. During these times offal was minced and discharged. Vessel was observed to hold all offal and discards during hauling and setting.	Y	Seabird abundances were generally very high and measures in the thousands for XCP and up to 200 for albatross species.	Y	FUR were commonly observed around the vessel in abundances of up to 8. All FUR were observed to follow the codend up to the vessel during hauling, actively feeding on lost fish and directly from the net.

12	1	TL	SOU	Factory wash was minimised by placing screens over the scuppers. All offal and whole fish was mealed, with no discharges at any stage	Y	Seabirds constantly present around the vessel, abundance of up to 500 individuals	N	No specific comments
13	1 2 3		CHA CHA CHA	Vessel generally mealed all offal, however on occasion the meal plant capacity was reached and offal was directed overboard. No offal was discharged during setting or hauling.	Y N Y	Seabirds were constantly present, abundances peaking at 1500. XBM and XWM were the most abundant albatross species. Abundance and activity significantly increased during periods of offal discharge.	N N N	FUR often observed around the vessel, following the codend and feeding off it during hauling.
14	1	NIL	CEE, CHA	Vessel did not discharge offal or whole fish during setting or hauling.	N	Seabirds constantly present, with abundance peaking during hauling. XRA, XWM, XKM, XBM, XSA were always in attendance of the vessel. Abundance was highly variable (40 to 1200 birds).	N	FUR were a constant presence in low numbers around the vessel at the haul. FUR were observed to actively feed from the codend and from floating fish.
15	1 2 3 4 5	BB, TL	SEC, SOE SEC, SOE, SOU SEC, SOU SEC, SOU SEC	No offal or whole fish discards during setting or hauling	Y N N N N	Seabirds constantly present around the vessel. Abundance peaked during hauling and discarding. Numerically dominated by XSA and XBM.	N N N N N	No marine mammals were sighted.
16	1 2 3 4		SOE SEC, SOE SEC, SOU SEC	No offal was observed to be discharged during shooting or hauling.	N N Y N	Seabirds constantly present in lover abundances (<150). Birds observed to occasionally feed from the codend.	N N N N	5 FUR sighted on one occasion. Not observed to be actively feeding or interacting with the gear at the time. CDD and PIW also sighted on occasion.
17	1 2	BB	CEE, CHA CEE, CHA	Vessel practiced batch discarding. No offal or whole fish discards occurred during setting or hauling.	N N	High seabird abundances (up to 800) were observed around the vessel as the codend hit the surface and until it was hauled aboard. At other times bird abundance was low (up to 80).	N N	Up to 15 FUR sighted day. Swimming around the vessel and actively feeding on the codend at hauling.

18	1	TL, BB	SEC, SOE, SOU, CHA	Offal was continuously discharged during shooting. Mincer attached to the discard buffer hoper was never used.	Y	XCP and XBM were the numerically dominant bird species around the vessel. Seabirds observed to interact with the vessel during shooting, hauling and continuous discharge.	Y	CDD, FUR and HSL observed around the vessel on occasion.
19	1	TL	SEC, SOE, SOU, SUB	Vessel was observed to discard offal and whole fish during shooting and hauling. No meal plant was operated and sumps had no mincers.	N	Large abundances of seabirds in the vicinity of the vessel. Abundances peaked during hauls and during u turns in trawls (when the winches were operated to bring the trawl doors up from depth).	N	FUR observed during hauling, following codend and feeding on stickers in the net.
20	1	TL	SEC, SOU, SOE	Offal and whole fish discarded retained during shooting and hauling. Net was also cleaned between tows.	Y	Seabirds generally Abundant around the vessel with numbers peaking at hauling. XSA were the numerically dominant seabird species around the vessel. Seabirds observed to congregate around the stern and actively feed on the net at hauling.	N	Individual FUR were sighted on occasion during the trip.
21	1	BB	CHA	All offal and whole fish mealed. No discharges were made during setting or hauling. Net was also cleaned between tows.	N	Large abundances of seabirds were observed around the vessel. Up to 200 XWM in attendance. At times birds were observed to feed aggressively from the codend and factory sumps.	N	FUR and CDD observer during fishing. FUR observed to feed on the net
22	1		SEC		Y		N	
23	1		CEE, CHA	The vessel did not discard any offal or whole fish during shooting or hauling.	N	No specific comments	Y	FUR constantly present around the vessel- feeding aggressively at hauling
24	1	NIL	CEE	Offal was only discarded during the steam back to port, outside of fishing activities.	N	Seabird observed to actively feed on the codend and lost fish at hauling. Numerically dominated by XSA, XWM and XKM.	N	FUR occasionally present around the vessel at hauling.

25	1	CHA	Vessel did not discharge offal or whole fish during setting or hauling.	N	Moderate numbers of seabirds were observed around the vessel, dominated numerically by XWM, XKM, and XCP. Seabird tended to flow the net during hauling and feed on detritus from it	N	FUR observed around the vessel, following codend during hauling
	BB, TL						
	2	SEC, SOE, SOU, SUB		Y		Y	
	3	SEC, SOE		Y		N	
26	1	CHA	All offal and whole fish was mealed. No discharge occurred during setting or hauling.	Y	Large numbers of birds present at all times, also high diversities of albatross and petrel species. XWM numerically dominant albatross species (up to 50). Birds were observed to actively feed on factory wash.	Y	Small numbers of FUR were observed on occasion. Actively feeding on the codend at hauling. FUR caught on a tow in which two turns were conducted- presumed during one of these tows.
	2	SEC, CHA		N		N	
	BB, TL						
27	1	SOU	No Specific Comments made	N	Seabird species numerically dominated by XWM and XWC. Seabirds of all species were observed to feed actively on stickers in the net.	N	HSL observed on one occasion. DDO observed on two occasions.
	BB, TL						
28	1	AKE, CEE		N		N	
29	1	SEC, CHA	No offal was discharged during shooting or hauling. Offal and whole fish was minced before discharge.	N	On the west coast the numerically dominant albatross species was XWM, whereas on the east coast XSA dominated.	Y	Small numbers of FUR were sighted around the vessel, observed to follow the codend during hauling and feed from it. 3 HDO sighted off coast while dodging weather.
	2	SEC, SOU, SUB		Y		N	
	3	CHA		Y		N	
30	1	SOU	All offal and whole fish were minced prior to discarding. Discharges did not occur during shooting or hauling. Net was cleaned of stickers between shots.	N	Seabirds present around the vessel in moderate numbers (up to 300). Seabirds were observed to actively feed on SQU protruding from the net and on lost fish.	N	Marine mammals were rarely observed. HSL occasionally observed feeding on the codend at hauling.
	2	CHA		N		N	
31	1	CEE, CHA	No offal or whole fish was discarded during the trips	N	Large numbers of seabirds present at all times. Numerically dominated by XBM	N	DDO observed on a number of occasions during both shooting and hauling. DDO were not observed to actively feed around the vessel.
	2	CEE, CHA		N		N	
	NIL						

32	1	BB, TL	CEE, CHA	All offal was minced and batch discarded by the vessel. Net was cleaned of stickers between tows	Y	Seabirds were observed around the vessel in high abundances, actively feeding on the codend at hauling.	N	FUR observed regularly around the vessel during hauling
33	1		SOU, SUB		Y		N	
	2	BB	SOU	Offal and whole fish did not occur during times of hauling due to vessel processes. Offal was minced before discharge. Where possible, offal was batch discarded.	Y	Seabirds observed in abundances of up to 1500. numerically dominated by XBM.	N	FUR observed around the vessel (up to 3) generally following the codend during hauling. On two occasions HSL were sighted swimming along with the vessel during towing.
	3		SOU, SUB		N		N	
	4		SOU, SUB		Y		N	
	5		SOU, SUB		N		N	
	6		SOU		Y		N	
	7		SOU		N		N	

Table A6.2 Southern blue whiting trawl Fishery

Vessel No.	No. Times Observed	Mitigation used	FMA's Fished	Offal Management	Seabird Capture?	Seabird interactions	Marine mammal capture?	Marine mammal interactions
1	1	BB, TL	SUB	All offal and whole fish discards were mealed by the vessel.	N	Seabirds were constantly present around the vessel high numbers. Abundance peaked during hauling.	Y	FUR and HSL were present around the vessel, sometimes in high numbers. Capture events were associated with high abundances of mammals.
2	1	BB	SUB	Vessel batch discarded twice a day, though some livers of fish washed out through scuppers from factory.	Y	No specific comments	Y	HSL observed in relatively high numbers and also displayed aggressive feeding behaviour at hauling. Offal production by the vessel did not tend to alter behaviour.
3	1	TL	SUB	Factory wash was minimised by placing screens over the scuppers. All offal and whole fish was mealed, with no discharges at any stage	N	Seabirds constantly present around the vessel, abundance of up to 500 individuals	Y	HSL present around the vessel in small groups. Animals were observed to actively feed on the codend.
4	1		SUB		N		Y	
5	1	BB, TL	SUB	No offal was observed to be discharged during shooting or hauling.	N	Seabirds constantly present in lover abundances (<150). Birds observed to occasionally feed from the codend.	Y	5 FUR sighted on one occasion. Not observed to be actively feeding or interacting with the gear at the time.
6	1	BB	SUB	Vessel did not discharge offal or whole fish during setting or hauling	Y	Up to 500 seabirds present around the vessel at any time actively scavenging on lost fish.	Y	FUR regularly observed around the vessel during fishing activity.
7	1		SUB		N		N	
8	1	BB	SUB	Vessel was equipped with a meal plant and no discharged of offal or whole fish were made save for factory floor wash.	Y	Seabird abundance was observed to be constantly high, numerically dominated by XCP and XWM.	Y	FUR and HSL sighted during the trip. Both species were observed to actively feed on the net and lost fish during hauling.

9	1	SUB	Vessel did not discharge offal or whole fish during setting or hauling.	N	XKM and XGA were the numerically dominant species around the vessel, numbering up to 200. Seabirds were observed to congregate around the stern during hauling and actively feed on the codend.	N	FUR constantly present around the vessel.
	BB, TL						
10	1	SUB	Offal was minced at all times however discharge was not stopped for either shooting or hauling. Whole damaged fish was held in bins during shooting and hauling.	N	Seabirds attended the vessel in high numbers (up to 700).	Y	FUR and HSL were commonly sighted around the vessel during shooting and hauling, although did not appear to be actively feeding. A turn was made by the vessel during the tow which captured one HSL.
	BB						
11	1	SOU, SUB	Vessel did not discharge offal or whole fish during setting or hauling	Y	Seabirds constantly present around the vessel, abundance peaking during hauling. On two nights while close to the Auckland Islands a number of petrel and prion deck strikes occurred. Birds were disoriented however all were released alive.	N	FUR sighted on one occasion, not interacting.
	BB, TL						
12	1	SOU, SUB	Offal and whole fish discard was mealed. Meal plant often reached capacity and in those cases offal was batch discarded.	Y	Seabirds were present around the vessel in low numbers.	N	No sightings of marine mammals on this trip
	BB						
13	1 2	SOU SOU, SUB	Vessel discharged during processing however held offal during shooting and hauling.	N Y	Seabirds were observed in constant attendance of the vessel in numbers of up to 1000. Feeding aggressively on the codend on occasion.	N Y	CDD, FUR and SRW observed during steaming. Animals were not observed to interact other than bow riding.
	BB						
14	1	SOU, SUB	Vessel did not discharge offal or whole fish during hauling. All offal was batch discarded however this was conducted any time the discard hopper was full, regardless of whether the	N	XWM and XWC were the numerically dominant seabird species around the vessel. Abundance rapidly increased as hauling began with birds feeding actively on the codend as it surfaced.	N	No marine mammals were observed for the duration of the trip.
	TL						

				vessel was shooting.				
15	1	TL	SOU, SUB, SEC	Offal was batch discarded by the vessel and all offal was held during shooting and hauling. Net was cleaned of stickers between tows.	Y	Seabird abundance peaked during hauling. Generally low abundances before hauling. Numerically dominated by XWC and XWM. Birds were observed to actively feed on the net at the surface.	Y	No marine mammals were observed in the water around the vessel during the trip.
16	1	TL	SEC, SOE, SOU, SUB	Offal was batch discarded by the vessel and all offal was held during shooting and hauling.	Y	Seabirds regularly observed around the vessel in numbers up to 1000 with birds interacting during processing and hauling.	N	FUR occasionally sighted around the vessel.
	2		SEC, SOU, SUB		N		N	
17	1	TL	SEC, SOU	Offal was generally held during shooting and hauling. However on 4 occasions offal was discharged during shooting. Offal was generally batch discarded.	Y	Birds observed to congregate around the stern during hauling, actively feeding on stickers and lost fish.	Y	FUR occasionally sighted around the vessel.
	2		SOU, SUB		Y		N	
18	1	BB	SOU, SUB	Net cleaned between tows	Y	Numerically dominated by XWM Actively feeding on the Net during hauling.	N	No marine mammals observed on this trip.
19	1	TL	SEC	No offal or whole fish discards during	N	Seabirds constantly present around the vessel. Abundance peaked during hauling and discarding. Numerically dominated by XSA and XBM. Seabirds were observed to actively feed on the net during hauling. A number of birds were caught in the meshes of the net during this time	N	FUR sighted occasionally, however only during steaming.
	2		SOU		Y		N	
	3		SEC, SOU, SUB		N		N	
	4		SEC, SOU, SOE		N		N	
	5		SOU, SUB		Y		N	
20	1	BB, TL	SEC, SOU	Offal was generally held during shooting and hauling. However it was discharged	Y	Seabirds constantly present around the vessel. Numerically dominated by XWM and XSA. Birds were	Y	Occasional sightings of FUR, CDD and PIW. HSL sighted feeding on squid escaping from codend
	2		SEC, SOE, SOU, SUB		Y		Y	

	3		SEC, SOU, SUB	continuously during processing. Net was	Y	observed to feed aggressively at hauling.	N	
	4		SUB	normally cleaned between tows.	Y		N	
21	1	BB	SOU, SUB	Net was cleaned between tows; factory was reduced by screens covering scuppers. Offal and whole fish discards were mealed, holding tanks were present on the vessel to buffer processing when meal plant became swamped.	Y	Seabirds were present around the vessel in moderate numbers (up to 200). Numerically dominated by XSH. Seabird numbers peaked during hauling and were observed to actively feed on the codend and lost fish.	N	Sightings of CDD, HSL and FUR. Mammals were observed to follow the codend during hauling.
22	1		SEC, SOU, SUB		Y		N	
23	1		SEC		N	Seabirds were constantly present.	N	
	2	BB	SOU, SUB	All offal and whole fish discards were held during shooting and hauling. Net was cleaned between tows.	Y	Numerically dominated by XWM and XWC. Birds were observed to feed very aggressively on the net at hauling, with a number of birds being caught in the meshes while feeding.	N	No marine mammals were observed during the trip
24	1	TL	SOU, SUB	Vessel did not discharge offal or whole fish during setting or hauling. All discards were minced before discharge.	Y	seabirds were constantly present, numerically dominated by XMA.	N	SRW sighted on two occasions, 6 unidentified whales were also sighted at a distance.
25	1		SOU, SUB		Y		N	
26	1		SEC, SOU, SUB	All offal and whole fish discard was mealed. On	Y		N	
	2	TL	SOU, SUB	two occasion meal plant reached capacity, and so offal and whole fish discard was minced and batch discharged. Stickers removed from the net between tows.	Y	Seabird species numerically dominated by XWM and XWC. Seabirds of all species were observed to feed actively on stickers in the net.	N	HSL observed on one occasion. DDO observed on two occasions.
27	1		SUB		Y		N	
28	1	BB, TL	SOU	Vessel did not discharge	N	Seabirds present around the vessel in very high numbers (up to 2000).	N	DDO and HSL sighted on occasion. Never observed to interact with vessel.
	2		SOU, SUB	offal or whole fish during setting or hauling	Y		N	

29	1	BB, TL, SLED	SEC, SOU, SUB	No specific comments made	Y	Seabirds numerically dominated by XKM. Seabird activity increased significantly during hauling	N	One FUR observed over the course of the trip. Observed interacting with the net.
30	1	BB, TL	SOU	Offal and whole fish did not occur during times of hauling due to vessel processes. Offal was minced before discharge. Where possible, offal was batch discarded.	N	Seabirds observed in abundances of up to 1500. numerically dominated by XBM. Seabird feeding was observed to be more active on days of calm weather.	N	FUR observed around the vessel (up to 3) generally following the codend during hauling. On two occasions HSL were sighted swimming along with the vessel during towing.
	2		SEC, SOU		Y		N	
	3		SOU		Y		Y	
	4		SOU		Y		N	
	5		SOU		Y		N	

Table A6.3 Scampi trawl Fishery

Vessel No.	No. Times Observed	Mitigation used	FMA's Fished	Offal Management	Seabird Capture?	Seabird interactions	Marine mammal capture?	Marine mammal interactions
1	1	Twin TL	CEE, SOE	All offal and whole fish discards were batch discarded.	Y	Seabird abundance and species composition varied between FMAs. Seabird behaviour was observed to vary between tows, at times birds actively fed on the codend, displaying aggression between individuals. On other occasions very little feeding behaviour was observed.	N	CDD and FUR sighted throughout the trip. Mammals were not observed to actively feed from the net or offal
2	1	TL	SUB	All offal and whole fish discards were held until after shooting. During processing offal and whole fish was continually discarded	Y	Seabirds present around the vessels in moderate numbers (up to 300). These numbers peaked at sorting and grading of the catch.	N	HSL sighted around the vessel during daylight hauling.
3	1 2	TL	AKE AKE	All offal and whole fish discarded were held until after shooting when it was batch discarded.	Y N	XAL species were observed actively feeding on floaters and lost fish around the net during hauling. Seabirds were in constant attendance of the vessel, at times in high numbers (up to 3000)	N N	No specific comments
4	1 2	Twin TL	SOE SOE, SUB	Offal and whole fish was batch discarded. Nothing was discarded during shooting or hauling	N Y	Seabirds constantly present around the vessel. XSA was the numerically dominant seabird species. Abundances exceeded 700 birds at times of captures.	Y N	FUR were present around the vessel for the majority of tows and were observed to actively feed on the codend at hauling.
5	1	TL	SEC, SOE, SUB	Vessel batch discarded offal and whole fish discards and was equipped with a holding tank to facilitate this.	Y	Seabirds present in high numbers around the vessel, feeding aggressively during hauling. Birds observed on occasion to swim into the mouth of the net during hauling.	N	HSL observed on five occasions.

6	1	SOE	No specific comments made	Y	Seabirds constantly present around the vessel (numbers up to 700). XSA were the numerically dominant species. Seabirds were observed to actively and aggressively feed on the net.	N	No sightings of marine mammals

Table A6.4 Squid trawl Fishery

Vessel No.	No. Times Observed	Mitigation used	FMA's Fished	Offal Management	Seabird Capture?	Seabird interactions	Marine mammal capture?	Marine mammal interactions
1	1	BB, TL	SOU, SUB	Vessel did not discharge offal or whole fish during setting or hauling	Y	Seabirds constantly present around the vessel, abundance peaking during hauling. On two nights while close to the Auckland Islands a number of petrel and prion deck strikes occurred. Birds were disoriented however all were released alive.	N	FUR sighted on one occasion, not interacting.
2	1	BB	SOU, SUB	Offal and whole fish discard was mealed. Meal plant often reached capacity and in those cases offal was batch discarded.	Y	Seabirds were present around the vessel in low numbers.	N	No sightings of marine mammals on this trip
3	1 2	BB	SOU SOU, SUB	Vessel discharged during processing however held offal during shooting and hauling.	N Y	Seabirds were observed in constant attendance of the vessel in numbers of up to 1000. Feeding aggressively on the codend on occasion.	N Y	CDD, FUR and SRW observed during steaming. Animals were not observed to interact other than bow riding.
4	1	TL	SOU, SUB	Vessel did not discharge offal or whole fish during hauling. All offal was batch discarded however this was conducted any time the discard hopper was full, regardless of whether the vessel was shooting.	N	XWM and XWC were the numerically dominant seabird species around the vessel. Abundance rapidly increased as hauling began with birds feeding actively on the codend as it surfaced.	N	No marine mammals were observed for the duration of the trip.
5	1	TL	SOU, SUB, SEC	Offal was batch discarded by the vessel and all offal was held during shooting and hauling. Net was cleaned of stickers between tows.	Y	Seabird abundance peaked during hauling. Generally low abundances before hauling. Numerically dominated by XWC and XWM. Birds were observed to actively feed on the net at the surface.	Y	No marine mammals were observed in the water around the vessel during the trip.
6	1 2	TL	SEC, SOE, SOU, SUB SEC, SOU,	Offal was batch discarded by the vessel and all offal was held during shooting and hauling.	Y N	Seabirds regularly observed around the vessel in numbers up to 1000 with birds interacting	N N	FUR occasionally sighted around the vessel.

			SUB			during processing and hauling.		
7	1 2	TL	SEC, SOU SOU, SUB	Offal was generally held during shooting and hauling. However on 4 occasions offal was discharged during shooting. Offal was generally batch discarded.	Y Y	Birds observed to congregate around the stern during hauling, actively feeding on stickers and lost fish.	N N	FUR occasionally sighted around the vessel.
8	1	BB	SOU, SUB	Net cleaned between tows	Y	Numerically dominated by XWM Actively feeding on the Net during hauling.	N	No marine mammals observed on this trip.
9	1 2 3 4 5	TL	SEC SOU SEC, SOU, SUB SEC, SOU, SOE SOU, SUB	No offal or whole fish discards during	N Y N N Y	Seabirds constantly present around the vessel. Abundance peaked during hauling and discarding. Numerically dominated by XSA and XBM. Seabirds were observed to actively feed on the net during hauling. A number of birds were caught in the meshes of the net during this time	N N N N N	FUR sighted occasionally, however only during steaming.
10	1 2 3 4	BB, TL	SEC, SOU SEC, SOE, SOU, SUB SEC, SOU, SUB SUB	Offal was generally held during shooting and hauling. However it was discharged continuously during processing. Net was normally cleaned between tows.	Y Y Y Y	Seabirds constantly present around the vessel. Numerically dominated by XWM and XSA. Birds were observed to feed aggressively at hauling.	Y Y N N	Occasional sightings of FUR, CDD and PIW. HSL sighted feeding on squid escaping from codend
11	1	BB	SOU, SUB	Net was cleaned between tows, factory waste was reduced by screens covering scuppers. Offal and whole fish discards were mealed, holding tanks were present on the vessel to buffer processing when meal plant became swamped.	Y	Seabirds were present around the vessel in moderate numbers (up to 200). Numerically dominated by XSH. Seabird numbers peaked during hauling and were observed to actively feed on the codend and lost fish.	N	Sightings of CDD, HSL and FUR. Mammals were observed to follow the codend during hauling.
12	1		SEC, SOU, SUB		Y		N	
13	1 2	BB	SEC SOU, SUB	All offal and whole fish discards were held during shooting and hauling. Net was cleaned	N Y	Seabirds were constantly present. Numerically dominated by XWM and XWC. Birds were observed to	N N	No marine mammals were observed during the trip

				between tows.		feed very aggressively on the net at hauling, with a number of birds being caught in the meshes while feeding.		
14	1	TL	SOU, SUB	Vessel did not discharge offal or whole fish during setting or hauling. All discards were minced before discharge.	Y	Seabirds were constantly present, numerically dominated by XMA.	N	SRW sighted on two occasions, 6 unidentified whales were also sighted at a distance.
15	1		SOU, SUB		Y		N	
16	1 2	TL	SEC, SOU, SUB SOU, SUB	All offal and whole fish discard was mealed. On two occasions the meal plant reached capacity, and so offal and whole fish discard was minced and batch discharged. Stickers removed from the net between tows.	Y Y	Seabird species numerically dominated by XWM and XWC. Seabirds of all species were observed to feed actively on stickers in the net.	N N	HSL observed on one occasion. DDO observed on two occasions.
17	1		SUB		Y		N	
18	1 2	BB, TL	SOU SOU, SUB	Vessel did not discharge offal or whole fish during setting or hauling	N Y	Seabirds present around the vessel in very high numbers (up to 2000).	N N	DDO and HSL sighted on occasion. Never observed to interact with vessel.
19	1	BB, TL, SLED	SEC, SOU, SUB	No specific comments made	Y	Seabirds numerically dominated by XKM. Seabird activity increased significantly during hauling	N	One FUR observed over the course of the trip. Observed interacting with the net.
20	1 2 3 4 5	BB, TL	SOU SEC, SOU SOU SOU SOU	Offal and whole fish did not occur during times of hauling due to vessel processes. Offal was minced before discharge. Where possible, offal was batch discarded.	N Y Y Y Y	Seabirds observed in abundances of up to 1500, numerically dominated by XBM. Seabird feeding was observed to be more active on days of calm weather.	N N Y N N	FUR observed around the vessel (up to 3) generally following the codend during hauling. On two occasions HSL were sighted swimming along with the vessel during towing.

Table A6.5 Jack mackerel and barracouta pelagic trawl Fishery

Vessel No.	No. Times Observed	Mitigation used	FMA's Fished	Offal Management	Seabird Capture?	Seabird interactions	Marine mammal capture?	Marine mammal interactions
1	1	BB	CHA, CEW	All whole fish discards and offal were mealed by the vessel. Net was cleaned between tows.	N	Seabirds present in moderate numbers (up to 200).	N	No marine mammals were observed
	2		SEC, SOU		Y		N	
	3		CHA,CEW		N		N	
2	1	BB	CHA, CEW	Meal plant was operated and generally all offal and whole fish was put to meal. Vessel also equipped with buffer tanks to batch discard in the case of meal plant failure.	N	Seabird abundances were observed to vary significantly depending on both fishing area and the number of vessels in the vicinity. Albatross were observed to feed aggressively on fish in the codend.	N	No marine mammals were observed
	2		SEC, SOU		N		N	
	3		CHA		N		N	
3	1	BB, TL	CHA	No offal or whole fish was discarded during shooting or hauling.	N	High seabird abundances were observed (up to 3000 individuals). Production of offal caused seabirds to get closer to the vessel.	N	CDD sighted on one occasion. FUR sighted on other occasions, actively feeding on the codend during hauling.
4	1		CHA		N		N	
5	1	TL	SOE	Vessel only discharged offal between fishing events. Net was cleaned between each event.	N	Seabird abundances up to 300, though only reached this level during hauling.	N	No marine mammals observed on this trip.
6	1	TL	CHA	No Specific Comments made	N	Birds observed to congregate around the stern during hauling, actively feeding on stickers and lost fish.	N	FUR occasionally sighted around the vessel.
	2		SOU		N		N	
7	1	BB	SEC, SOU, CHA, CEW	Net cleaned between tows	Y	Numerically dominated by XWM Actively feeding on the Net during hauling.	Y	CDD sighted during the trip. Both capture events occurred on tows fished through the night into the early morning.
8	1	BB	CHA, CEW, AKW	All offal and whole fish discards were mealed. However factory scuppers had no screens and meal augers had large holes in them meaning that there was a large quantity of fish waste escaping the factory as floor wash.	N	Seabirds were observed in generally low numbers, numerically dominated by XWM.	N	No marine mammals were observed during the trip

9	1 2 3	BB	SOU SEC SEC	All offal and whole fish discards were held during shooting and hauling.	N N N	Seabirds attended the vessel in high abundances. Numerically dominated by XWM and XSA. Abundance and activity increased at hauling where birds would congregate around the stern of the vessel.	N N N	No Marine mammals were sighted
10	1 2 3		SOE SOE, SOU SEC, SOU	No offal was observed to be discharged during shooting or hauling.	N N N	Seabirds constantly present in lover abundances (<150). Birds observed to occasionally feed from the codend.	N Y N	5 FUR sighted on one occasion. Not observed to be actively feeding or interacting with the gear at the time. CDD and PIW also sighted on occasion.
11	1 2	BB, TL	CHA, CEW, AKW SEC, SOU	All offal and whole fish discards were mealed, with the exception of SPD and POP which were batch discarded at the end of processing. On two occasions the meal plant was swamped and in these instances offal was batched and discarded once the net was onboard.	N Y	Seabirds attended the vessel in low numbers. XWM, XGT, XPE were the numerically dominant.	Y N	Marine mammals were only observed on one occasion.
12	1		SEC	Offal and whole fish discarded retained during shooting and hauling. Net was also cleaned between tows.	N	Seabirds generally Abundant around the vessel with numbers peaking at hauling. XSA were the numerically dominant seabird species around the vessel. Seabirds observed to congregate around the stern and actively feed on the net at hauling.	N	Individual FUR were sighted on occasion during the trip.
13	1 2 3 4	BB	CHA, CEW SEC, CHA, CEW CEW, AKW SEC, SOU	All offal and whole fish mealed. No discharges were made during setting or hauling.	N Y N N	Large abundances of seabirds were observed around the vessel. Up to 200 XWM in attendance. At times birds were observed to feed aggressively from the codend and factory sumps.	Y N N Y	FUR and CDD observer during fishing. FUR observed to feed on the net. Pod of PIW observed while steaming
14	1 2	BB	CHA SOU	Vessel did not discharge offal or whole fish during setting or hauling	N Y	Seabirds present around the vessel in very high numbers (up to 2000).	N N	DDO sighted on occasion. Never observed to interact with vessel.

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

Vessel No.	No. Times Observed	Mitigation used	FMA's Fished	Offal Management	Seabird Capture?	Seabird interactions	Marine mammal capture?	Marine mammal interactions
1	1	BB	SEC, SUB	Vessel discharged during processing however held offal during shooting and hauling.	Y	Seabirds were observed in constant attendance of the vessel in numbers of up to 1000. Feeding aggressively on the codend on occasion	N	CDD, FUR and SRW observed during steaming. Mammals were not observed to interact with the vessel other than bow riding.
	2		SUB		N		N	
2	1	BB	CEE	Very little offal was produced by the vessel. Offal was batched and discarded while the vessel was not fishing.	N	Up to 200 seabirds in attendance of the vessel. Numerically dominated by XWM. Abundance increased during hauling	N	FUR observed on one occasion.
	2		CEE		N		N	
	3		CEE, SEC, CHA		N		N	
3	1	BB	SOE	No offal or whole fish was discarded during shooting or hauling.	N	Seabird observed in low abundances (<30) numerically dominated by XWM.	N	SRW sighted on one occasion, not interacting with the vessel
4	1	BB	SOE	Offal was mealed onboard the vessel. Species which could not be mealed were batch discarded. No offal was discarded during shooting or hauling	N	Large numbers of XCP were present around the vessel. Up to 40 individual albatross were also present at times. Abundance increased at hauling and at time birds were observed to feed directly from the codend.	N	Unidentified species of whale were observed at a distance on one occasion.
	2		SEC, SOE		Y		N	
	3		SEC, SOE, SUB		Y		N	
	4		SOE		N		N	
5	1	BB	AKW	No whole fish or offal was discarded by the vessel	N	Seabirds were present for all hauls, however only in small numbers (<20)	N	No marine mammals were sighted
	2		AKE, AKW		N		N	
	3		AKE, CEE, AKW		N		N	
	4		AKW, AKE		N		N	
6	1	BB	CEE	Offal was not discharged during shooting or hauling and only rarely during towing.	N	Seabirds were observed in moderate numbers (up to 200) numerically dominated by XSA and XBM. Seabird numbers peaked during hauling when birds would congregate at the stern of the vessel and feed from the codend.	N	No marine mammals were observed for the duration of the trip.
	2		CEE, SOE		N		N	
7	1	BB	CHA	Vessel produced very little offal. No offal or whole fish was discarded during setting or	N	Seabird species were numerically dominated by XCP. However also high numbers of	N	No Marine mammal observed
	2		CHA		N		N	

			hauling		XKM and XWM		
8	1	AKW	No offal or whole fish was discharged by the vessel during shooting or hauling.	N	Seabirds attended the vessel in low numbers. Abundance peaked during processing and when the codend surfaced.	N	No Marine mammal observed

Table A6.7 Inshore trawl Fishery

Vessel No.	No. Times Observed	Mitigation used	FMA's Fished	Offal Management	Seabird Capture?	Seabird interactions	Marine mammal capture?	Marine mammal interactions
1	1		CHA	All offal was batch discarded at the end of processing. No discharges were made during shooting or hauling.	N	Seabirds in attendance of vessel. Activity increased during Shooting, hauling and processing.	N	DDO, CDD and BDO and HBW observed on occasion around the vessel
2	1		CEE	No Specific Comments made	N	Seabird constantly present around the vessel however did not interact until vessel hauled at which time abundance and activity would rapidly increase and birds would actively feed on the net at the surface.	N	CDD sighted on occasion. Regularly interacting with the vessel
3	1	NIL	CHA	No offal or whole fish was discarded during shooting or hauling.	N	Seabirds constantly present around the vessel, abundance and activity peaked during shooting, hauling and processing of catch.	N	CDD and FUR observed around the vessel. CDD observed bow riding and interacting with the net.
4	1		CEE	Fish sorting and discarding was only conducted at the end of the tow when the gear was out of the water.	N	Seabirds constantly present around the vessel. XBG and XGT were the numerically dominant species around the vessel. Nearly all seabird interaction with the vessel was at hauling or sorting of the catch.	N	CDD observed on a daily basis around the vessel. At times dolphins were observed following the vessel during towing at a position above the net.
5	1	Nil	CHA	No Specific Comments made	N	Seabirds observed to interact with the vessel during hauling and processing of the catch	N	CDD sighted on occasion not interacting with the vessel
6	1		CHA	Offal was batch discarded at the end of hauling.	N	Seabird abundance increased during hauling, though abundance remained relatively low.	N	A pod of 30 BDO were observed on one occasion, however did not interact with vessel in any way.
7	1	NIL	CHA	No Specific Comments made	N	Seabirds in regular attendance of the vessel.	N	CDD and FUR occasionally sighted around the vessel.

8	1	WS	AKE, CEE	No Specific Comments made	N	Seabirds constantly present around the vessel. Numbers increased to up to 300 at hauling and processing of fish.	N	CDD observed regularly in numbers up to 100. The dolphins often interacted with the vessel itself, however showed little interest in the fishing gear.
9	1		CEE	No Specific Comments made	N	Seabirds constantly present. Numerically dominated by XFS and XBP.	N	CDD sighted on occasion
10	1		AKE	No Specific Comments made	N	No Specific Comments made	N	No Specific Comments made
11	1	Nil	AKE	No Specific Comments made	N	Seabird abundance showed significant spatial variation. With highest abundances around offshore islands.	N	CDD sighted regularly around the vessel, both during the day and at night. Interactions were with the vessel but not the gear.
12	1	WD	AKE,CEE	No Specific Comments made	Y	Seabirds constantly present around the vessel. Abundance increased rapidly during hauling and processing	N	No marine mammals observed on this trip.
13	1	NIL	CHA, CEW	Vessel batched offal into fish bins during processing. Offal would be discarded over the stern of the vessel either during times of low bird abundance 'mid tow'. Or once hauling was completed.	N	Seabirds in attendance of the vessel in moderate numbers (up to 200). Abundance and bird activity peaked at hauling and during processing. Seabirds generally dispersed once processing was completed.	N	FUR and CDD observed on occasion around the vessel. Though at no time did the animals interact with the vessel.
14	1	NIL	CHA	Offal was discarded while the vessel towed	Y	Seabird observed actively feeding on offal and discards. The warp capture occurred while the bird was feeding on offal.	N	One pod of DDO sighted. FUR sighted on one occasion.
15	1	NIL	CEE	Vessel batched offal during processing.	N	Seabirds were constantly present around the vessel. Actively feeding at hauling and during processing and discarding of offal.	N	CDD sighted on occasion. Dolphins were observed to follow the vessel above the net during towing.
16	1	Nil	CEE	No whole fish or offal discarded during shooting or hauling. Net cleaned between tows.	N	Seabird constantly present around the vessel. Numerically dominated by XBG and XWM. Seabirds abundance and activity increased during hauling and fish processing	Y	CDD observed on a number of occasions, often bow riding however once observed interacting with the net.

17	1		CHA	Discarding of whole fish was conducted while the net was out of the water. Offal was discarded continually while the net was at fishing depth.	N	Seabird abundance increased during fishing events. Seabirds were numerically dominated by XBG and XWM.	0	CDD followed the vessel on several occasions, swimming approximately above the position of the net.
18	1		CHA	Offal was binned during processing and batch discarded.	N	Seabirds constantly in attendance of the vessel in low numbers (up to 50).	0	Two CDD observed on one occasion.
19	1	Nil	CEE	Offal was binned and batch discarded over the stern away from the path of the warps. Very little whole fish discards occurred.	N	Seabirds were observed in relatively low numbers (up to 80). Numerically dominated by XFS and XBP. Birds were present at all times however abundance and activity peaked during shooting and hauling.	0	CDD observed occasionally, interaction limited to bow-riding.
20	1	Nil	CEE	Whole fish and offal was discarded intermittently over the stern	N	Seabird activity and abundance would peak during hauling and processing of fish.	0	CDD observed interacting with the gear during trawling by swimming directly above it.
21	1	Nil	CEE	Vessel intermittently discarded whole fish and offal during fishing	N	Seabirds observed actively feeding from the codend while the net was at the surface. As well as feeding on offal and discards during sorting and processing	0	CDD observed occasionally over the position of the codend during fishing.
22	1	Nil	SOU	Vessel binned all offal and only discarded once processing was complete	N	Seabirds regularly observed around the vessel. Birds would interact with the vessel during the discarding of offal. Seabird behaviour was observed to change as the net approached the surface when bird numbers would increase.	0	No marine mammals were observed for the duration of the trip.
23	1	Nil	CEE	No Specific Comments made	N	XFS were the numerically dominant seabird species. Birds were observed to actively feed on the codend during hauling.	0	Pods of CDD observed on two occasions. Never interacting with the fishing gear

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

Vessel No.	No. Times Observed	Mitigation used	FMA's Fished	Offal Management	Seabird Capture?	Seabird interactions	Marine mammal capture?	Marine mammal interactions
1	1	NS, OM, TL	CEE	Very little offal produced. Old baits discarded during hauling	Y	Birds in constant attendance of the vessel. XBP and XFS were numerically dominant (between 10 and 50 birds) and the most aggressive feeders on discarded baits	N	FUR and CDD observed during steaming.
2	1	TL	SEC	No specific comments	N	Seabirds constantly present around the vessel. Numerically dominated by XWC	N	CDD observed on a number of occasions during hauling. FUR sighted 3 occasions though not interacting with fishing gear.
3	1	NIL	SEC	Batch discards practiced, with offal being held and discharged between events.	N	Albatross and petrels in constant attendance of the vessel	N	FUR and DDO observed on occasion. Mammals were observed to approach within 10m but never to interact with the vessel.
4	1	NS	SEC	No Comments made	N	Seabirds in constant attendance of the vessel. XSA was the numerically dominant species	N	DDO sighted at haul, however animals were not observed to be interacting with the vessel
5	1	NS, TL, WC	CEE	Minimal offal was produced by the vessel due to it's fishing practices. Old baits were continuously discarded.	Y	Seabirds in constant low abundance. Smaller petrels were observed to feed aggressively at hauling attacking lost fish and old baits. Changes in discards of old baits altered petrel behaviour.	N	CDD sighted on 3 occasions during steaming (pod of 5-10). ORC sighted once while steaming (pod of 10-14). No direct interactions occurred with the vessel during fishing.
6	1		CEE	Used baits and offal was discarded during hauling, however not during setting.	Y	Flesh-footed shearwaters and black petrels were the numerically dominant species. Bird abundance was observed to increase over the period of hauling and also with a positive correlation to offal production. Seabird abundance was observed to be lower during setting than hauling.	N	CDD observed on two occasions during steaming. Never interacting with the vessel

7	1	TL, NS	CHA, SEC	Offal was not discharged during setting. During hauling offal was discharged from the non-haul side. Whole fish discarded were occasionally discharged from the haul side.	N	Petrels and shearwaters occasionally observed diving on baits during setting and on discards and baits during hauling.	N	FUR, PIW, ORC and CDD observed close to the vessel during hauling. However mammals were not observed to interact with the fishing gear.
8	1	NS, OM	CEE	All baits and offal were held during setting and hauling.	N	Seabirds in constant attendance of the vessel.	N	No comments

Table A6.10 Inshore Setnet Fishery

Vessel No.	No. Times Observed	Mitigation used	FMA's Fished	Offal Management	Seabird Capture?	Seabird interactions	Marine mammal capture?	Marine mammal interactions
1	1	NIL	SEC	Fish processing occurred after haul and before re-setting the net therefore no offal was produced during fishing. Net was cleaned of stickers prior to resetting.	N	Seabirds constantly present around the vessel. However very few instances of seabirds actively feeding whist the vessel was fishing	N	Mammals observed in low abundance around the vessel during fishing, and did now actively feed or interact with the fishing gear.
2	1	NIL	SEC	No specific comments	N	Seabirds constantly present around the vessel. Numerically dominated by XWC	N	CDD observed on a number of occasions during hauling. FUR sighted 3 occasions though not interacting with fishing gear.
3	1	NIL	SEC	Batch discards practiced, with offal being held and discharged between events.	N	Albatross and petrels in constant attendance of the vessel	Y	FUR and DDO observed on occasion. Mammals were observed to approach within 10m but never to interact with the vessel.
4	1	NIL	SEC	Fish processing was conducted between events so no offal was produced during setting or hauling. Net was cleaned between events.	N	Seabirds were constantly present around the vessel	N	DDO, ORC, HDO and FUR observed around the vessel. Mammals were occasionally close by during setting of gear.
5	1	NIL	SEC	No specific comments made	N	No specific comments	Y	FUR observed on occasion around the vessel.
6	1	NIL	SEC	Offal was only produced and discarded by the vessel between events when no gear was in the water. Whole. Fish discards were done during hauling. Net was cleaned of stickers before re-setting	N	Seabirds present around the vessel, peaking at hauling. Birds observed to actively feed on discards during hauling as well as lost fish.	Y	DDO observed occasionally in pods of 3 to 4 but some times up to 30. FUR sighted on one occasion

Table A6.11 Surface Longline – Charter tuna Fishery

Vessel No.	No. Times Observed	Mitigation used	FMA's Fished	Offal Management	Seabird Capture?	Seabird interactions	Marine mammal capture?	Marine mammal interactions
1	1	TL, NS, BC, WC	SOU, CHA	All offal and used bait was discarded on the opposite side of the vessel to hauling.	Y	Seabirds numerically dominated by XBM and XWM.	Y	FUR observed on most days of fishing. All FUR caught on hauling.
2	1	Twin TL, NS, BC	SOU, CHA	Used baits were batch discarded on the opposite side of the vessel to hauling.	Y	Seabirds constantly present in moderate numbers (up to 200). Numerically dominated by XBM and XWM	Y	Although 4 FUR were caught on hauling, not were sighted in the vicinity of the vessel during the trip.
3	1	Triple TL, NS, GC, BC, LW	SOU, CHA	All offal and used baits were batch discarded on the opposite side of the vessel to hauling.	Y	Seabirds caught on haul were generally when the vessel slowed to haul a large tuna and so the line was dragged away from the brickle curtain.	Y	FUR observed intermittently in low numbers. PIW pod sighted on one occasion.
4	1	Twin TL, NS, BC	SOU, CHA, AKE	Offal and unused baits were batch discarded on the opposite side of the vessel to hauling.	Y	Seabirds constantly present in low numbers (up to 100). Abundance increased toward the end of the season as fewer vessels were p[resent on the fishing grounds.	Y	FUR observed intermittently during the trip. Generally only noted to be basking near the vessel.

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

Vessel No.	No. Times Observed	Mitigation used	FMA's Fished	Offal Management	Seabird Capture?	Seabird interactions	Marine mammal capture?	Marine mammal interactions
1	1 2	TL	AKE CEE	Offal and used baits discarded during hauling	N N	Seabirds were observed to actively feed on offal and discarded bait at hauling. Generally around 100 petrels and 20-30 albatross in the vicinity of the vessel.	N N	On one occasion a Sei or Fin whale was observed at distance
2	1 2	TL, NS	CHA CHA, AKW	No Specific Comments made	N N	XBM and XWM were the most frequently observed albatross species.	N N	No marine mammals were observed for the duration of the trip.
3	1		AKE, CEE	No specific comments made	Y	Seabird abundance was observed to be highest during the mid to late stages of hauling. XBM and XGF were the numerically dominant seabird species present around the vessel.	N	FUR, CDD and PIW sighted on occasion. Sightings occurring while the vessel was hauling however no indication that they were interacting with the gear. ORC sighted during one haul and sharks were observed to be missing livers when hauled aboard.
4	1	TL	CEE	Used baits were discarded continuously during hauling.	Y	Seabird abundance was observed to increase during hauling	N	No marine mammals were sighted during the trip.
5	1	NS LW, TL	CEE	Offal and used baits were discarded during hauling	Y	Seabirds observed to actively feed on offal, used baits and lost fish during hauling.	N	No marine mammals observed on this trip.
6	1 2	TL, LW	AKE, CEE CEE	No offal was discharged during setting	N N	Seabirds numerically dominated by XBP and XFS. Actively feeding on offal and used baits at hauling.	N N	Unidentified whales observed at a distance on one occasion.
7	1 2	TL, NS	CEE AKE, AKW	Offal and used baits discarded during hauling	Y N	Seabirds observed in relatively high abundances.	N N	FUR observer around the vessel on three occasions, feeding on the line during hauling.
8	1	NS, TL	AKE	Offal and used baits were discarded away from the hauling station during hauling.	N	Seabirds observed to actively feed on baits and offal during hauling.	N	No marine mammals were sighted during the trip.

9	1	NS, TL	AKE, AKW	Offal and used baits were not discarded during setting. However they were regular discards of offal and used baits during hauling.	Y	XFS were the numerically dominant seabird species. Birds observed to actively feed on offal and discarded baits during hauling. Seabird activity was observed to notably increase during the trip.	N	CDD observed bow riding during steaming.
10	1	NS, TL, LW	CEE	Used baits and offal was discarded during hauling.	N	Seabirds attended the vessel in low numbers (up to 50). XKM being numerically dominant. XKM actively fed on lost baits and offal during hauling.	N	CDD observed on occasion during steaming.
11	1	TL	AKE, CEE	Used baits were continuously discarded during hauling.	N	Seabird abundance increased rapidly during hauling. Numerically dominated by XGF.	N	CDD observed on one occasion. Pod of up to 500 individuals. Animals did not appear to interact with the vessel.
12	1 2	TL, DB	AKE CEE	Vessel retained used baits during hauling. Offal was discharged on the opposite side of the vessel to the line during hauling.	Y Y	Seabirds present around the vessel in generally low numbers (up to 60)	N Y	FUR observed on one occasion. ORC observed on one haul taking fish from the line.

Table A6.13 Bottom longline- Deepsea Ling Fishery

Vessel No.	No. Times Observed	Mitigation used	FMA's Fished	Offal Management	Seabird Capture?	Seabird interactions	Marine mammal capture?	Marine mammal interactions
1	1		SUB		N	Seabirds constantly present, though species composition varied over fishing grounds. Numerically dominated by XWC. Birds actively fed on lost bait at setting. XWC often observed to dive on the line. At hauling birds actively fed on lost baits and sump water	N	
	2	TL, GC, LW	SUB	Vessel mealed all offal except sharks	Y		N	FUR often present feeding on lost fish. Up to 6 HBW sighted on one occasion
2	1	TL	SEC, SOE	Offal discharged through chute on non haul side. Batch discarding generally practiced	Y	Seabirds constantly present, particularly around offal discharge point. XWC numerically dominant	N	1-3 FUR regularly sighted during hauls, occasionally feeding on lost fish.