

Conservation Services Programme
Observer Report: 1 July 2008 to 30 June 2009

Final Draft

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Abstract

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

This report summarises the observed interactions (mortalities and specimens released alive) between protected species and commercial fishing vessels for the period 1 July 2008 to 30 June 2009 783 animals of approximately 60 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 2008/09 observer year saw an increase in coverage of the inshore fisheries as part of the draft Hector's and Maui's dolphin Threat Management Plan, and the interactions observed during this coverage are also reported here.

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. The protected species most relevant to CSP are all seabirds (with the exception of the black-backed gull), all marine mammals and reptiles, the white pointer shark and spotted black grouper and certain corals.

One of the tools to achieve this goal is the placement of government observers onboard commercial fishing vessels operating within the New Zealand Exclusive Economic Zone (EEZ) in order to monitor interactions with protected species¹. 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). The specific objectives of the project were to:

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

Levels of observer coverage in the offshore fisheries have remained relatively stable over recent observer years, with CSP continuing to contract a portion of observer time from the Ministry of Fisheries (MFish) Observer Programme. The scale of the MFish Observer Programme allows observers to be placed more strategically, cost effectively and for protected species monitoring to be widely spread throughout the fishing fleet.

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

Legislated mitigation measures are now in place for all surface longliners, all bottom longliners over 7m in length and all trawlers over 28m. Additional to this in the deepwater fleet is the ongoing development of Vessels Management Plans (VMP)² and Marine Mammal Operating Procedures (MMOP)³ by the DeepWater Group Limited. These 'best practice' guides set out procedures for mitigating against incidental captures of both seabirds and marine mammals. While

¹ INT2008/01-Monitoring protected species interactions with New Zealand Fisheries. Further details can be found in the Conservation Services Annual Plan 2008/09 www.doc.govt.nz/mcs

² Developed by the DeepWater Group Limited: Vessel Management Plan (VMP)- Deepwater Factory Trawler over 28m. Available at www.fishinfo.co.nz/Docs/VMP%20v4.0%20.pdf

³ Developed by the DeepWater Group Limited: Marine Mammal Operating Procedures (MMOP)- Mitigating Incidental Captures of Marine Mammals. Available at www.deepwater.co.nz/f1275,60596/60596_MM_OP_2008-09_v6.pdf

adherence to these guidelines is not recorded for CSP purposes, observers do make notes on vessel practice related to these guidelines. Observer comments indicated an increasing awareness amongst crews of bycatch issues and techniques for avoiding such incidents.

The 2008/09 observer year saw a large increase in the levels of coverage of inshore fisheries, particularly inshore trawl and setnet. This was largely funded by MFish in order to monitor the new trawl and setnet exclusion areas as part of the draft Hector's and Maui's dolphin Threat Management Plan (TMP, a joint DOC and MFish plan)⁴. The observers in this project (termed the 'Hector's Dolphin Project') were specifically focused on protected species interactions with no focus on fish catch. Tasked almost exclusively to observe and document protected species interactions with fishing activity they also recorded abundances and behaviour of, primarily, cetaceans but also pinnipeds and seabirds. Although this coverage was not funded directly by CSP the observer effort and bycatch figures are included in this report for completeness. As the 'Hector's Dolphin Project' coverage focused on the South Island and the West Coast of the North Island, CSP inshore coverage focused on inshore trawl in FMA1 and in particular the areas from Auckland North aiming to investigate interactions in areas which have received little or no coverage in the past.

Mitigation (both in the form of specific devices and modifications to fishing practices) remains a priority of CSP and of observer data collection, both by the quantitative assessment of methods currently in place and more qualitative description of novel devices. This work at sea is complemented by reviews of international practice (Bull 2007, 2009; Rowe 2007) in progressing toward development of effective bycatch mitigation.

Work on alternative monitoring methods continued during the 2008/09 observer year with video monitoring trials conducted on inshore trawl vessels operating out of Auckland. These trials used a combination of video cameras, sensors and GPS to monitor trawl catches for protected species bycatch. This trial has been reported by McElderry et al (2010).

This report details protected species interactions by fishery, method and area for the period 1 July 2008 to 30 June 2009 in relation to observer effort and commercial fishing effort. Information is presented at a coarse level to describe where fishing effort, observer coverage and captures occur. This data forms the basis of further analytical assessments of protected species interactions are undertaken through other projects⁵. It also enables potential gaps in monitoring to be identified along with high risk areas and time periods in various fisheries.

Key data collected by observers during this project is processed and housed by the Ministry of Fisheries Research Data and Reporting group. Observer comments are summarised to provide information on mitigation, protected species behaviour and fishing practices (e.g. offal management). It is important to note that observers may not comment on all aspects of fishing operations and individual observers comment to varying extent on particular aspects of fishing. In addition, observers have varying levels of experience. As such, comments are included to provide context but are not a complete reflection of fishing operations on individual vessels.

⁴ Available at www.fish.govt.nz/en-nz/Consultations/Archive/2008/Hectors+dolphins/Threat+Management+Plan.html

⁵ Projects include estimation of total protected species captures, risk assessments, species prioritisation and other modelling projects undertaken by the Department of Conservation or Ministry of Fisheries.

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 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). 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 as part of project INT 2008/02 (Identification of protected corals). 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 2007/02 (Identification of seabirds captured in New Zealand fisheries) the report summarising this work is published by Thompson (2010) and Thompson (in press). For live captures or dead seabirds that could not be recovered independent examination of any photographs has also been undertaken (as part of project INT2009/02) in order to confirm the identification or to narrow it to a lower taxonomic level.

4. Definitions

MCS (Marine Conservation Services): The team within DOC which is responsible for administering the Conservation Services Programme. Funded largely by industry levies and working on an annual research planning cycle, within the framework of a 5 year Strategic Plan.

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.

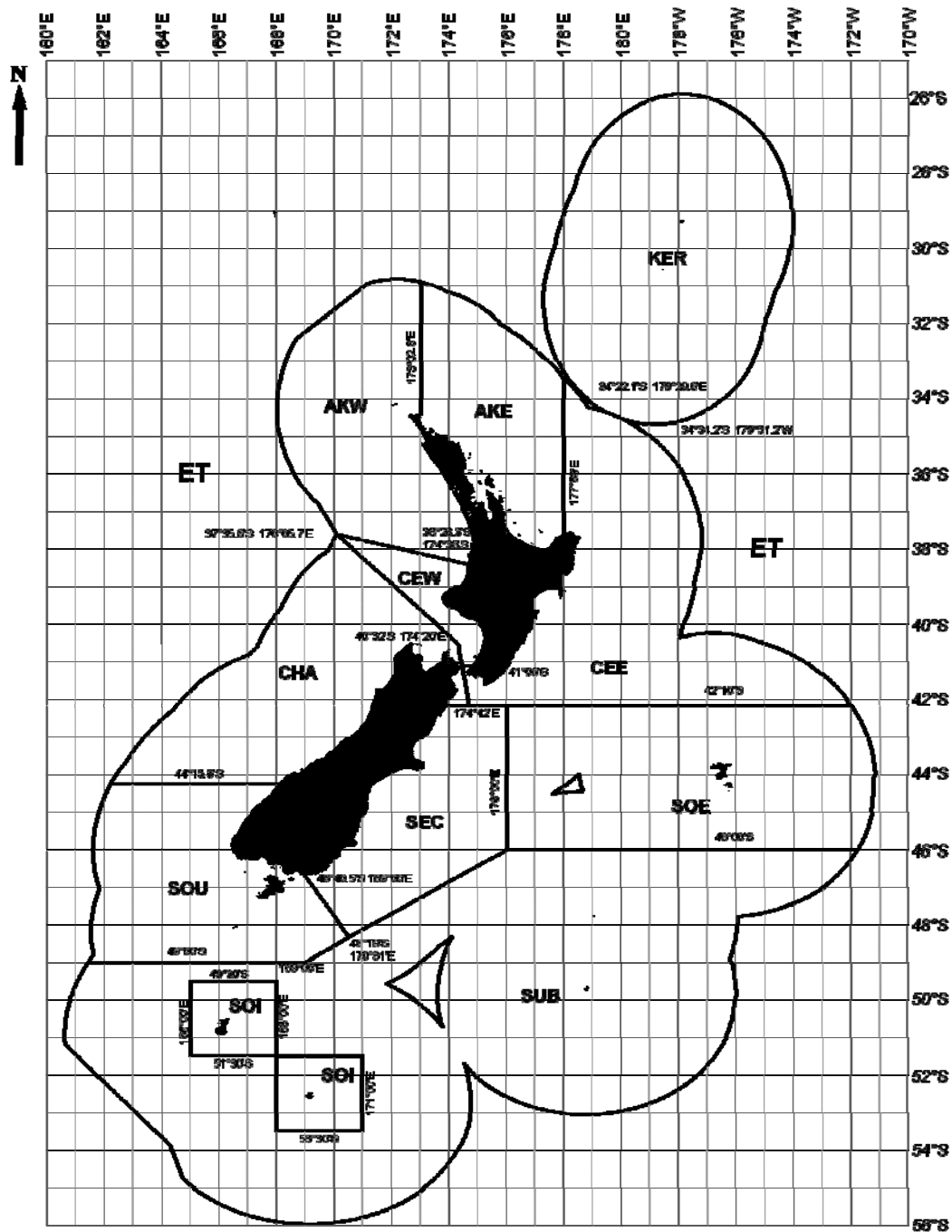
FMA (Fisheries Management Area): The entire New Zealand EEZ is divided into 10 FMA's for the purpose of administration by the MFish.

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 'Protected Species By-Catch Form' which commercial fishers are required by law to fill out upon capture of any protected species.

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



Key:

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

5. Protected species interactions

5.1 MIDDLE DEPTH TRAWL FISHERIES

5.1.1 Hoki, hake, ling and warehou species

The observer coverage in fisheries targeting the middle depth stocks hoki, hake, ling and warehou species are discussed together here. These fisheries are subject to the greatest combined observer coverage and are comparable in terms of their fishing practices and / or areas. The fisheries discussed separately in the middle depth trawl fisheries section can be distinguished either by being spatially and temporally separate (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 hoki season'. 'Hoki season' tends to span the months of June to September and effort can be generalised as focusing on the FMAs CHA and CEE; specifically the West Coast of the South Island around the Hokitika canyon for the larger vessel fleet and the Cook Strait (CHA/CEE boundary) for smaller vessels (under 46m). The predominant target during this time is hoki however hake is also a significant target on the West Coast. 'Out of hoki season' spans the rest of the year with hoki, hake, ling and warehou targeted largely in SEC, SUB, SOE and to a lesser extent SOU.

Mitigation in this 'fishery' involves a combination of voluntary and regulated measures. All trawl vessels over 28m must carry and employ approved bird scaring devices⁶. Supplementary to this, voluntary industry codes of practice are also in place such as MMOPs and VMPs which set out guidelines in terms of best use of mandatory seabird bycatch mitigation devices (paired tori lines, bird bafflers or warp scarers), offal management and guidelines for reducing mammal bycatch (e.g. not shooting or hauling between certain times, hauling the trawl doors to the surface before conducting a turn and not when large numbers of mammal are present).

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. However, fishing effort was slightly less than previous years while observer effort remained similar (Rowe 2010) and as a result observer coverage was higher (21% overall, 9% to 44% per FMA). In the 2007/08 observer year the majority of marine mammal captures came from the Cook Strait hoki fishery at the CHA / CEE boundary (Rowe, 2010). However for 2008/09 the majority of mammal captures occurred on the West Coast, 20 of which can be attributed to two observed trips onboard one vessel, this is discussed in more detail below. Seabird captures in the 2008/09 year were double the previous year, partially attributable to a large number of captures on a single trip in SEC but also a more uniform increase in the capture rate in SOU.

⁶ See Fisheries (Seabird Sustainability Measures – Trawl Vessels 28m+) Notice 2008 (F432) available at <http://www.fish.govt.nz/NR/rdonlyres/2451AFE8-ED82-4920-9EC5-A0AD4F5C0DDE/0/F432new.pdf>

Table 1: Summary of commercial effort, observer effort and protected species captures in the hoki, hake, ling and warehou middle depth trawl fisheries during the 2008/09 observer year.

FMA	Effort Tows	Observed Tows	Coverage (%)	Seabird Captures*	Seabirds per 100 Tows	Mammal Captures	Mammals per 100 tows
1. AKE							
2. CEE	1,053	146	13.87	1	0.68	18	12.33
3. SEC	4,378	705	16.10	35	4.96	10	1.42
4. SOE	1,737	158	9.10	3	1.90	0	-
5. SOU	1,612	351	21.77	34	5.70	1	0.28
6. SUB	903	401	44.41	7	1.75	1	0.25
7. CHA	2,896	887	30.63	13	1.47	45	5.07
8. CEW							
9. AKW	1	1	100.00	0	-	0	-
10. KER							
Total	12,580	2,649	21.06	93	2.98	75	2.83

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

Observer Coverage

During 2008/09 56 trips were undertaken on 30 vessels (Table A6.1). Captures of protected species were reported from 22 trips onboard 17 vessels. Comments relating to offal management, mitigation use and other information surrounding protected species captures are detailed in Table A6.1. Observers often commented the both bird abundance and aggression increased at times of hauling and offal production.

Observer coverage was undertaken throughout the year, with the greatest number of days being observed in CHA (Table 2). There was a large increase in observer coverage in SEC over the previous year (Rowe, 2010) which can be largely attributed to increased commercial effort in that fishery in that area. A drop off in observer effort is evident in the January to February period, primarily caused by redirection of observer efforts into other fisheries, particularly the inshore fisheries.

Table 2: Number of tows observed in the hoki, hake, ling and warehou middle depth trawl fishery by month during the 2008/09 observer year.

FMA	Jul 08	Aug 08	Sept 08	Oct 08	Nov 08	Dec 08	Jan 09	Feb 09	Mar 09	Apr 09	May 09	Jun 09	Total
1. AKE	0	0	0	0	0	0	0	0	0	0	0	0	0
2. CEE	21	85	40	0	0	0	0	0	0	0	0	0	146
3. SEC	0	23	70	59	72	78	0	31	184	79	41	68	705
4. SOE	5	15	43	12	6	18	0	0	0	0	28	31	158
5. SOU	3	0	7	17	45	86	0	22	34	19	77	41	351
6. SUB	7	0	58	69	83	84	4	1	7	63	10	1	401
7. CHA	286	320	201	5	0	0	0	0	1	0	0	74	887
8. CEW	0	0	0	0	0	0	0	0	0	0	0	0	0
9. AKW	0	0	0	0	1	0	0	0	0	0	0	0	1
10. KER	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	322	443	419	162	207	280	4	54	226	161	156	215	2,649

Inline with previous years the majority of observed tows in this ‘fishery’ targeted hoki, however significantly more tows were observed for hake and silver warehou and less targeted ling than in the previous year (Table 3; Rowe, 2010) with the distribution of observer effort more similar to the 2005/06 and 2006/07 years (Rowe, 2009).

Table 3: Number of tows observed in the hake, hoki, ling, and warehou middle depth trawl fishery during the 2008/09 observer year.

Target	2. CEE	3. SEC	4. SOE	5. SOU	6. SUB	7. CHA	9. AKW	Total
Hake	0	53	24	13	64	318	0	472
Hoki	146	563	79	175	264	547	1	1,775
Ling	0	18	21	21	72	0	0	132
Silver Warehou	0	71	34	59	0	22	0	186
Common Warehou	0	0	0	5	0	0	0	5
White Warehou	0	0	0	78	1	0	0	79
Total	146	705	158	351	401	887	1	2,649

Protected species interactions

As detailed in Table 4; more fur seals were reported captured in 2008/09 than the 53 during the pervious year (Rowe, 2010), being more inline with the preceding three observer years (Rowe, 2009). Of the 74 captures for 2008/09, 20 were reported from two observed trips onboard a single vessel; 13 of which resulted in mortalities. Bird interactions have also increased over the 2007/08 year (from 58 to 100 interactions) with the ratio of dead to live animals also increasing. Sooty shearwaters accounted for over one third of both the live interactions and mortalities. One vessel accounted for 14 of the 27 sooty shearwater mortalities. A separate vessel was responsible for nine of the 13 white-capped albatross mortalities, also capturing seven other albatross.

Table 4: Protected species interactions in the hake, hoki, ling and warehou middle depth trawl fishery during the 2008/09 observer year.

Species	Dead	Alive	Total
Seabirds			
Seabird - Small		1	1
Albatross (Unidentified)	1		1
Smaller albatrosses (<i>Thalassarche spp.</i>)	2		2
Salvin's albatross	4	2	6
Shy albatross		1	1
White-capped albatross	13	1	14
Buller's albatross	16	3	19
Petrels, Prions and Shearwaters	1		1
Giant petrels (Unidentified)		1	1
Petrel (Unidentified)		4	4
Prions (Unidentified)		2	2
Sooty shearwater	27	11	38
Westland petrel	1		1
White-chinned petrel	2	3	5
Salvin's prion		1	1
Black-bellied storm petrel	1		1
Cape petrels		1	1
Fairy prion		1	1
Total seabirds	68	32	100
Mammals			
New Zealand fur seal	49	25	74
New Zealand sea lion		1	1
Total mammals	49	26	75
Total protected species interactions	117	58	175

The method of protected species interaction as reported on the 'Observer Non-fish Bycatch Form' is detailed in Table 5. Around two thirds of all net captures of birds resulted in mortalities (Table 5 a & b). Only one of the eight 'vessel impacts' (recorded as deck strikes) resulted in mortality. Compared to 2007/08 the number of birds caught on the warp or trawl door increased 5 fold, from 6 in 2007/08 to 30 in 2008/09 (Rowe, 2010), however in keeping with the previous observer year the majority of interactions and mortalities were attributed to net captures (77% of interactions and 49% of mortalities). A single New Zealand sea lion was reported as a net capture in SUB and was subsequently released alive. The observer comment relating to this capture was as follows: "Codend opened and small male [New Zealand sea lion] came out and quickly ran down stern ramp. Heard hissing whilst trapped in net."

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

a) Released alive

Species	Caught in net*	Impact against vessel	Other	Total	Observer comments relating to 'Other' capture method
Birds					
Seabird – Small	1			1	
Salvin's albatross	2			2	
Shy albatross	1			1	
White-capped albatross	1			1	
Buller's albatross	2	1		3	
Giant petrels (Unidentified)		1		1	
Petrel (Unidentified)	4			4	
Prions (Unidentified)		1	1	2	Collided with another bird before contact with the rigging- found sheltering on deck
Sooty shearwater	10	1		11	
White-chinned petrel		3		3	
Salvin's prion			1	1	Collided with another bird before contact with the rigging- entangled in net
Cape petrels			1	1	Landed on vessel, unable to take off
Fairy prion	1			1	
Total Birds	22	7	3	32	
Mammals					
New Zealand fur seal	25			25	
New Zealand sea lion	1			1	
Total Mammals	26	0	0	26	
Total	48	7	3	58	

*included as captures in table 1

b) Dead protected species

Common name	Caught in net*	Caught on warp or door*	Impact against vessel	Total
Birds				
Albatross (Unidentified)		1		1
Smaller albatrosses (<i>Thalassarche spp.</i>)		2		2
Salvin's albatross	2	2		4
White-capped albatross		13		13
Buller's albatross	5	11		16
Petrels, Prions and Shearwaters	1			1
Sooty shearwater	26	1		27
Westland petrel			1	1
White-chinned petrel	2			2
Black-bellied storm petrel	1			1
Total Birds	37	30	1	68
Mammals				
New Zealand fur seal	49			49
Total Mammals	49			49
Total	86	30	1	117

*included as captures in table 1

Interactions by target species are detailed in Table 6. The greatest number of captures came from the hoki fishery, this fishery was also being subject to the highest observer coverage. There was an increase in captures for both hake and silver warehou targeted tows, when compared to the previous year (Rowe, 2010), which can largely be attributed to the increased observer coverage of those targets. Fur seal interactions (in this case net captures) were reported almost exclusively from hake and hoki tows.

Table 6: Protected species interactions by target species in the hake, hoki, ling and warehou middle depth trawl fishery during 2008/09.

Species	Hake	Hoki	Ling	Silver warehou	White Warehou	Total
<u>Seabirds</u>						
Seabird - Small		1				1
Albatross (Unidentified)		1				1
Smaller albatrosses (<i>Thalassarche spp.</i>)		1			1	2
Salvin's albatross	2	3		1		6
Shy albatross					1	1
White-capped albatross	1	4		9		14
Buller's albatross		11		7	1	19
Petrels, Prions and Shearwaters		1				1
Giant petrels (Unidentified)		1				1
Petrel (Unidentified)				4		4
Prions (Unidentified)		1	1			2
Sooty shearwater	6	18	4	5	5	38
Westland petrel		1				1
White-chinned petrel	2	1	1	1		5
Salvin's prion		1				1
Black-bellied storm petrel		1				1
Cape petrels		1				1
Fairy prion	1					1
Total seabirds	12	47	6	27	8	100
<u>Mammals</u>						
New Zealand fur seal	28	45		1		74
New Zealand sea lion		1				1
Total mammals	28	46		1		75
Total protected species interactions	40	93	6	28	8	175

Seabird interactions were reported in all months, except January, when only 4 tows targeting this fishery were undertaken in SUB (Table 7). While August and September received the highest levels of observer coverage, March proved to have the greatest number of observed bird interactions; this can largely be attributed to one observed trip resulting in 14 of the 17 bird interactions in SEC in March. Similarly, 12 of the 14 bird interactions in May in SOU were from one observed vessel.

Table 7: Seabird interactions in the hake, hoki, ling and warehou middle depth trawls fishery during the 2008/09 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-08	Aug-08	Sept-08	Oct-08	Nov-08	Dec-08	Jan-09	Feb-09	Mar-09	Apr-09	May-09	Jun-09	Total
1. AKE	-	-	-	-	-	-	-	-	-	-	-	-	0
2. CEE	0	0	2	-	-	-	-	-	-	-	-	-	2
3. SEC	-	0	0	6	8	1	-	1	17	1	1	0	35
4. SOE	0	0	0	1	0	0	-	-	-	-	3	-	4
5. SOU	0	-	0	1	0	2	-	1	13	2	14	2	35
6. SUB	0	-	0	2	2	4	0	-	0	0	0	0	8
7. CHA	8	8	0	0	-	-	-	-	0	-	-	0	16
8. CEW	-	-	-	-	-	-	-	-	-	-	-	-	0
9. AKW	-	-	-	-	0	-	-	-	-	-	-	-	0
10. KER	-	-	-	-	-	-	-	-	-	-	-	-	0
Total	8	8	2	10	10	7	0	2	30	3	18	2	100

Mammal interactions (in the form of net captures) for the 2008/9 observer year (Table 8) were most prevalent during 'hoki season' and as discussed earlier, 20 of these interactions were from one observed vessel in CHA over the August to September period. In July in CHA one trip accounted for 8 of the 18 interactions.

Table 8: Mammal interactions in the hake, hoki, ling and warehou middle depth trawls fishery during the 2008/09 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-08	Aug-08	Sept-08	Oct-08	Nov-08	Dec-08	Jan-09	Feb-09	Mar-09	Apr-09	May-09	Jun-09	Total
1. AKE	-	-	-	-	-	-	-	-	-	-	-	-	0
2. CEE	2	9	7	-	-	-	-	-	-	-	-	-	18
3. SEC	-	2	3	1	1	0	-	0	1	0	0	2	10
4. SOE	0	0	0	0	0	0	-	-	-	-	0	-	0
5. SOU	0	-	0	0	0	1	-	0	0	0	0	0	1
6. SUB	0	-	1	0	0	0	0	-	0	0	0	0	1
7. CHA	16	15	14	0	-	-	-	-	0	-	-	0	45
8. CEW	-	-	-	-	-	-	-	-	-	-	-	-	0
9. AKW	-	-	-	-	0	-	-	-	-	-	-	-	0
10. KER	-	-	-	-	-	-	-	-	-	-	-	-	0
Total	18	26	25	1	1	1	0	0	1	0	0	2	75

5.1.2 Southern Blue Whiting

The southern blue whiting fishery tends to operate both temporally and spatially discretely from other trawl fisheries, centring on the months of August and September in SUB. Being over 28m in length all vessels in this fishery are required to use seabird mitigation devices and also to adhere to codes of practice.

Table 9 outlines commercial fishing effort, observer effort and protected species captures. The coverage rate of 40% for 2008/09 was slightly higher than 2007/08, 2006/07 and 2005/06 and closer to 2004/05 (Rowe 2009, 2010), making this one of the most intensively observed fisheries.

Similar to the 2004/05 and 2005/06 observer years (Rowe 2009) lower rates of bird bycatch were observed in this fishery than in other middle depth trawl fisheries. The 2008/09 observer year, in fact, had the lowest rate of bird bycatch of the four years from 2004/05 onward. Mammal capture rates (NZ fur seals and NZ sea lions) were also lower than the preceding four observer years (Rowe 2009, 2010) though still higher than any other fishery observed.

Table 9: 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
1. AKE							
2. CEE							
3. SEC							
4. SOE							
5. SOU							
6. SUB	822	332	40.39	2	0.60	22	6.63
7. CHA							
8. CEW							
9. AKW							
10. KER							
Total	822	332	40.39	2	0.60	22	6.63

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

Observer coverage

During the 2008/09 observer year nine observer trips were conducted on nine commercial fishing vessels. Protected species captures were reported from five of these trips. Comments relating to offal management, mitigation use and other information surrounding protected species captures are detailed in Table A6.2. Both seabirds and pinnipeds were observed feeding from offal discharge from the fishing vessels. As with other fisheries and previous years seabird numbers were observed to increase during hauling and offal discharge. Vessels tended to adhere to VMPs, and the MMOP with a number of observers commenting that there was a good level of awareness by crews and interest in mitigating against incidental captures.

The majority of southern blue whiting tows were conducted during August and September (Table 10), in keeping with the previous four years (Rowe 2009, 2010). The three outlying tows were all conducted during trips which generally targeted hoki in SUB.

Table 10: Number of Observed tows in the southern blue whiting fishery by area and month during 2008/09.

FMA	Jul-08	Aug-08	Sept-08	Oct-08	Nov-08	Dec-08	Jan-09	Feb-09	Mar-09	Apr-09	May-09	Jun-09	Total
1. AKE	0	0	0	0	0	0	0	0	0	0	0	0	0
2. CEE	0	0	0	0	0	0	0	0	0	0	0	0	0
3. SEC	0	0	0	0	0	0	0	0	0	0	0	0	0
4. SOE	0	0	0	0	0	0	0	0	0	0	0	0	0
5. SOU	0	0	0	0	0	0	0	0	0	0	0	0	0
6. SUB	0	103	226	0	1	0	0	0	0	2	0	0	332
7. CHA	0	0	0	0	0	0	0	0	0	0	0	0	0
8. CEW	0	0	0	0	0	0	0	0	0	0	0	0	0
9. AKW	0	0	0	0	0	0	0	0	0	0	0	0	0
10. KER	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	103	226	0	1	0	0	0	0	2	0	0	332

Protected species interactions

A breakdown of the protected species involved in interactions in this fishery is given in Table 11. The majority of protected species interactions in this fishery involved pinnipeds. No live captures were reported in the 2008/09 year. The number of New Zealand sea lions captured in this fishery is down from six in the previous observer year (Rowe 2010).

Table 11: Protected species interactions in the southern blue whiting fishery during the 2008/09 observer year.

Species	Dead	Total
<u>Seabirds</u>		
Salvin's albatross	1	1
Grey petrel	1	1
Total seabirds	2	2
<u>Mammals</u>		
New Zealand fur seal	20	20
New Zealand sea lion	2	2
Total mammals	22	22
Total protected species interactions	24	24

As with the previous observer year (Rowe 2010) the majority protected species interactions were net captures, only one bird was caught on the trawl warp and no non-fishing related interactions were reported (Table 12).

Table 12: Method of capture for protected species interactions in the southern blue whiting fishery during the 2008/09 observer year

Species	Caught in net*	Caught on warp or door*	Total
Seabirds			
Salvin's albatross		1	1
Grey petrel	1		1
Total seabirds	1	1	2
Mammals			
New Zealand fur seal	20		20
New Zealand sea lion	2		2
Total mammals	22		22
Total protected species interactions	23	1	24

*Included as 'capture' in Table 9

As with the preceding four observer years (Rowe 2009, 2010) the highest number of protected species captures occurred in August, even though the observer coverage was half of that achieved in the following month (Table 13).

Table 13: Protected species interactions in the southern blue whiting fishery by species and month during the 2008/09 observer year.

Species	Aug-09	Sep-09	Total
Seabirds			
Salvin's albatross	1		1
Grey petrel	1		1
Total seabirds	2		2
Mammals			
New Zealand fur seal	15	5	20
New Zealand sea lion		2	2
Total mammals	15	7	22
Total	18	2	20

Observer determination of sex of the pinnipeds captured showed that over 80% of pinnipeds captured were male, and within that, all New Zealand sea lions were determined by the observers as male.

Table 14: Observer determined sex of captured pinnipeds in the southern blue whiting fishery during the 2008/09 observer year.

Sex	Species	New Zealand fur seal	New Zealand sea lion	Total
Male		16	2	18
Female		4		4
Total		20	2	22

5.1.3 Scampi

Observations in the scampi fishery are undertaken to monitor interactions with seabirds and New Zealand sea lions. Historically, captures of seabirds have been recorded in this fishery in most areas, along with captures of New Zealand sea lions in SUB. Commercial effort in the scampi fishery dropped approximately 20% compared to the previous year, while observer coverage dropped by almost half (Rowe 2010). The majority of observer coverage occurred in AKE, followed by SUB. The greatest percentage of tows observed was in CEE.

Mammal captures occurred exclusively in SUB while bird captures were more evenly spread throughout the FMAs. The number of captures is similar to previous years; however as fewer tows were observed, capture rates are higher than those reported for the previous year (Rowe 2010). As in previous years no captures were recorded in CEE.

Table: 15: *Summary of commercial effort, observer effort and protected species captures in the scampi middle depth trawl fishery during the 2008/09 observer year.*

FMA	Effort Tows	Observed Tows	Coverage (%)	Seabird Captures*	Seabirds per 100 tows	Mammal Captures	Mammals per 100 tows
1. AKE	952	91	9.56	2	2.20	0	-
2. CEE	385	39	10.13	0	-	0	-
3. SEC	3	0	-				
4. SOE	1,176	43	3.66	1	2.33	0	-
5. SOU	1						
6. SUB	1,619	72	4.45	1	2.78	2	2.78
7. CHA							
8. CEW							
9. AKW							
10. KER							
Total	4,136	245	5.92	4	2.04	2	0.82

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

Observer Coverage

During the year, four trips were observed on four separate vessels, and protected species bycatch was recorded from three of those trips. Comments relating to offal management, mitigation use and other information surrounding protected species captures are detailed in Table A6.3. Inline with previous years and other fisheries, birds were observed to be of greatest abundance when the net was at the surface and also during offal production. Some vessels were observed to hold their offal and discards and also not discard while the net was at the surface. However this process was not uniform either between trips or within trips. Three of the vessels employed twin tori line mitigation devices the fourth used a single tori line. Of the seven protected species interactions, four occurred on one vessel, which employed a twin tori line setup.

The bulk of observer coverage occurred in the November and December, with another period of higher coverage in April. The greatest single concentration of tows was in SUB in November. Observer coverage in 2008/09 was more sporadic than in the previous year (Rowe 2010).

Table 16: Number of tows observed in the scampi trawl fishery by area and month during the 2008/09 observer year

FMA	Jul-08	Aug-08	Sept-08	Oct-08	Nov-08	Dec-08	Jan-09	Feb-09	Mar-09	Apr-09	May-09	Jun-09	Total
1. AKE	0	0	0	0	44	47	0	0	0	0	0	0	91
2. CEE	0	0	0	0	0	0	0	0	9	30	0	0	39
3. SEC	0	0	0	0	0	0	0	0	0	0	0	0	0
4. SOE	0	0	0	0	0	0	0	0	0	43	0	0	43
5. SOU	0	0	0	0	0	0	0	0	0	0	0	0	0
6. SUB	11	0	0	5	56	0	0	0	0	0	0	0	72
7. CHA	0	0	0	0	0	0	0	0	0	0	0	0	0
8. CEW	0	0	0	0	0	0	0	0	0	0	0	0	0
9. AKW	0	0	0	0	0	0	0	0	0	0	0	0	0
10. KER	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	11	0	0	5	100	47	0	0	9	73	0	0	245

Protected species interactions

Contrary to the previous year (Rowe 2010), the majority of observed interactions resulted in mortalities (Table 17). In the previous year a relatively high number of vessel impacts were recorded, however this was not the case this year with only one interaction being a vessel impact (Table 18) however the possibility that inter observer variability could have contributed to this. One white-capped albatross was also caught by the tori line, resulting in mortality. Both pinniped captures were net captures.

Table 17: Protected species interactions in the scampi trawl fishery during the 2008/09 observer year

Species	Alive	Dead	Total
<u>Seabirds</u>			
White-capped albatross	1	1	2
Buller's albatross		1	1
Flesh-footed shearwater		2	2
Total seabirds	1	4	5
<u>Mammals</u>			
New Zealand fur seal	1		1
New Zealand sea lion		1	1
Total mammals	1	1	2
Total protected species interactions	2	5	7

Table 18: Method of protected species capture, as recorded on the observer non-fish bycatch form for the 2008/09 observer year.

Species	Caught in net*	Impact against vessel	Other*	Total	Observer comments relating to 'Other' capture method
Seabirds					
White-capped albatross		1	1	2	Tangled in tori line. Fell off before bits recovered
Buller's albatross	1			1	
Flesh-footed shearwater	2			2	
Total seabirds	3	1	1	5	
Mammals					
New Zealand fur seal	1			1	
New Zealand sea lion	1			1	
Total mammals	2			2	
Total protected species interactions	5	1	1	7	

*Included as 'capture' in table 15

The majority of seabird interactions were during the November to December period (Table 19). The two pinniped interactions also occurred at this time, one in November, one in December. This appears is an artefact of the areas observed at these times of year rather than a seasonal pattern.

Table 19: Seabird interactions in the scampi trawl fishery by area and month during the 2008/09 observer year. A zero indicates that no interactions are observed, a dash indicates that no coverage took place.

FMA	Jul-08	Aug-08	Sept-08	Oct-08	Nov-08	Dec-08	Jan-09	Feb-09	Mar-09	Apr-09	May-09	Jun-09	Total
1. AKE	-	-	-	-	0	2	-	-	-	-	-	-	2
2. CEE	-	-	-	-	-	-	-	-	0	0	-	-	0
3. SEC	-	-	-	-	-	-	-	-	-	-	-	-	0
4. SOE	-	-	-	-	-	-	-	-	-	1	-	-	1
5. SOU	-	-	-	-	-	-	-	-	-	-	-	-	0
6. SUB	0	-	-	0	2	-	-	-	-	-	-	-	2
7. CHA	-	-	-	-	-	-	-	-	-	-	-	-	0
8. CEW	-	-	-	-	-	-	-	-	-	-	-	-	0
9. AKW	-	-	-	-	-	-	-	-	-	-	-	-	0
10. KER	-	-	-	-	-	-	-	-	-	-	-	-	0
Total	0	0	0	0	2	2	0	0	0	1	0	0	5

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 bird 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 to carry and use seabird mitigation devices of some kind (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 manage discharge of offal during fishing activity (Deepwater Group Limited 2009). Particularly in the SQU6T area around the Auckland Islands the observer coverage is focused at 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 on route to and from SQU6T.

Most fishing effort for 2008/09 was conducted in SUB, a shift in effort compared to the previous four years where commercial effort was most intensive in SOU (Rowe 2009 2010). Observer effort was also highest in SUB with 41% of all tows being observed (Table 20). Coverage levels in the squid fishery overall were similar to the previous year (Rowe 2010). Slightly fewer mammal captures were observed in 2008/09 than the preceding four years (Rowe 2009, Rowe 2010). Bird capture rates overall were higher than in the previous year, due largely but not completely to a high rate of captures in SEC. Thirty four of the 40 captures in SEC occurred on one vessel during one trip, with 29 occurring in a single fishing event (i.e. one tow).

Table 20: Summary of commercial effort, observer effort and protected species captures in the squid fishery during the 2008/09 observer year.

FMA	Effort Tows	Observed Tows	Coverage (%)	Seabird Captures*	Seabirds per 100 tows	Mammal Captures	Mammals per 100 tows
1. AKE	5	0	-				
2. CEE							
3. SEC	181	16	8.84	40	250.00	0	-
4. SOE	6	0	-				
5. SOU	1,628	478	29.36	78	16.32	4	0.84
6. SUB	1,848	766	41.45	141	18.41	3	0.39
7. CHA	1	0	-				
8. CEW							
9. AKW							
10. KER							
Total	3,669	1,260	34.34	259	20.56	7	0.56

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

Observer Coverage

During 2008/09 25 observer trips were conducted onboard 23 vessels fishing for squid. Protected species captures were observed on 23 of these trips onboard 22 vessels. Comments relating to offal management, mitigation use and other information surrounding protected species captures are

detailed in Table A6.4. As in previous years, all vessels employed SLEDs whilst fishing in SQU6T, though these were not used whilst fishing outside of SQU6T.

Inline with the previous observer year the majority of observed tows occurred in the February to June period, corresponding with the main SQU6T season. Only 13 trips were observed outside of this timeframe. The majority of observed tows again was in the SOU and SUB FMAs.

Table 21: Number of tows observed in the squid trawl fishery by area and month during the 2008/09 observer year.

FMA	Jul-08	Aug-08	Sept-08	Oct-08	Nov-08	Dec-08	Jan-09	Feb-09	Mar-09	Apr-09	May-09	Jun-09	Total
1. AKE	0	0	0	0	0	0	0	0	0	0	0	0	0
2. CEE	0	0	0	0	0	0	0	0	0	0	0	0	0
3. SEC	0	0	0	0	0	0	0	0	12	4	0	0	16
4. SOE	0	0	0	0	0	0	0	0	0	0	0	0	0
5. SOU	0	0	0	0	0	0	18	313	48	46	41	12	478
6. SUB	0	0	1	0	0	0	0	129	371	240	25		766
7. CHA	0	0	0	0	0	0	0	0	0	0	0	0	0
8. CEW	0	0	0	0	0	0	0	0	0	0	0	0	0
9. AKW	0	0	0	0	0	0	0	0	0	0	0	0	0
10. KER	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	1	0	0	0	18	442	431	290	66	12	1,260

Protected species interactions

Two hundred and sixty four protected species interactions occurred in the squid fishery in 2008/09 (Table 22). This represents an almost two-fold increase over the previous observer year and with approximately 200 less observed tows (Rowe 2010). The largest increase in type of interaction was live captures of seabirds, over double the previous year's observed total. In terms of species, white-chinned petrel interactions have increased the most substantially, more than doubling compared to the previous year, with most interactions resulting in mortalities. White-capped albatross and sooty shearwater interactions have also increased 6 and 10% respectively. Observed marine mammal interactions have continued a downward trend over the four observer years from 2004/05, in particular New Zealand sea lion captures, corresponding to a period of high SLED usage. As in the four years from 2004/05 no New Zealand sea lions were reported as live interactions. Four decomposing cetacean's were also reported captured. These animals were found to be in an advanced state of decomposition and identification to species level by the observer was not possible.

Table 22: Protected species interactions in the squid trawl fishery during the 2008/09 observer year.

Species	Alive	Dead	Decomposing	Total
Seabirds				
Seabird - Large		1		1
Albatross (Unidentified)	3	1		4
Great albatrosses	1			1
Smaller albatrosses (Thalassarche spp.)	2	4		6
White-capped albatross	9	42		51
Buller's albatross	1	3		4
Grey-headed albatross		1		1
Petrels, Prions and Shearwaters	6	1		7
Petrel (Unidentified)	27			27
Sooty shearwater	24	49		73
White-chinned petrel	16	68		84
Antarctic prion		1		1
Black-bellied storm petrel	1			1
Total seabirds	90	171		261
Mammals				
Baleen whales			2	2
Dolphins and Toothed whales			2	2
New Zealand fur seal		1		1
New Zealand sea lion		2		2
Total mammals		3	4	7
Total protected species interactions	90	174	4	268

Seabirds were predominantly caught in the net with only seven warp or door captures being observed. This is inline with the previous years' records. The large increase in live captures over the previous years can mainly be attributed to one vessel which caught 44 birds (32 live, 12 dead) over two FMAs. Captures were mainly during hauling and at night. Observer comments indicate that contributing factors to the large number of captures on this trip were the extended time of the net being at the surface during hauling and the large amount of lighting at the stern of the vessel. The observer recorded that the vessel did not generally produce offal or discards during either the shooting or hauling. Of the captures resulting in mortality (Table 23b) 23 sooty shearwaters were captured by a separate vessel, along with two white-capped albatross and five white-chinned petrels. Observer comments indicate that the majority of captures occurred during the early part of the trip, during which time the net was not cleaned particularly well and once the crew began cleaning it more diligently the frequency of captures decreased.

Table 23: Method of interaction for a) protected species released alive and b) dead protected species in the squid trawl fishery during the 2008/09 observer year.

a) Released alive

Species	Caught in net*	Impact against vessel	Total
Seabirds			
Albatross (Unidentified)	3		3
Great albatrosses	1		1
Smaller albatrosses (Thalassarche spp.)	2		2
White-capped albatross	9		9
Buller's albatross	1		1
Petrels, Prions and Shearwaters	6		6
Petrel (Unidentified)	27		27
Sooty shearwater	23	1	24
White-chinned petrel	16		16
Black-bellied storm petrel		1	1
Total seabirds	88	2	90
<hr/>			
Total protected species interactions	88	2	90

*Included as a capture in Table 20

b) Dead protected species (excluding decomposing animals).

Species	Caught in net*	Caught on warp*	Other*	Unknown*	Total	Comments relating to 'Other' or 'Unknown' capture method
Seabirds						
Seabird - Large	1				1	NOT KEPT BY VESSEL.
Albatross (Unidentified)				1	1	
Smaller albatrosses (Thalassarche spp.)	3	1			4	
White-capped albatross	35	5	1	1	42	
Buller's albatross	2	1			3	
Grey-headed albatross	1				1	
Petrels, Prions and Shearwaters				1	1	
Sooty shearwater	49				49	
White-chinned petrel	68				68	
Antarctic prion	1				1	
Total seabirds	160	7	1	3	171	
Mammals						
New Zealand fur seal	1				1	FIRST SEEN WEDGED BETWEEN THE BARS OF THE SLED.
New Zealand sea lion	1		1		2	
Total mammals	2		1		3	
Total protected species interactions	162	7	2	3	174	

*Included as a capture in Table 20

Table 24 shows that seabird interactions were recorded in every area and in every month observer coverage took place (except for the one tow observed in September 2008). The bulk of captures occurred in March 2009 which also had one of the highest coverage levels.

Table 24: Seabird interactions in the squid trawl fishery by area and month during the 2008/09 observer year. A zero indicates that no interactions are observed, a dash indicates that no coverage took place.

FMA	Jul-08	Aug-08	Sept-08	Oct-08	Nov-08	Dec-08	Jan-09	Feb-09	Mar-09	Apr-09	May-09	Jun-09	Total
1. AKE	-	-	-	-	-	-	-	-	-	-	-	-	0
2. CEE	-	-	-	-	-	-	-	-	-	-	-	-	0
3. SEC	-	-	-	-	-	-	-	-	36	4	-	-	40
4. SOE	-	-	-	-	-	-	-	-	-	-	-	-	0
5. SOU	-	-	0	-	-	-	2	34	18	21	2	1	78
6. SUB	-	-	-	-	-	-	-	48	57	37	1	-	143
7. CHA	-	-	-	-	-	-	-	-	-	-	-	-	0
8. CEW	-	-	-	-	-	-	-	-	-	-	-	-	0
9. AKW	-	-	-	-	-	-	-	-	-	-	-	-	0
10. KER	-	-	-	-	-	-	-	-	-	-	-	-	0
Total	0	0	0	0	0	0	2	82	111	62	3	1	261

Both sea lion captures occurred in SUB, more specifically in the SQU6T fishery (Table 25)

Table 25: Pinniped interactions in the squid trawl fishery by area and month during the 2008/09 observer year. A zero indicates that no interactions are observed, a dash indicates that no coverage took place.

FMA	Jul-08	Aug-08	Sept-08	Oct-08	Nov-08	Dec-08	Jan-09	Feb-09	Mar-09	Apr-09	May-09	Jun-09	Total
1. AKE	-	-	-	-	-	-	-	-	-	-	-	-	0
2. CEE	-	-	-	-	-	-	-	-	-	-	-	-	0
3. SEC	-	-	-	-	-	-	-	-	0	0	-	-	0
4. SOE	-	-	-	-	-	-	-	-	-	-	-	-	0
5. SOU	-	-	0	-	-	-	0	1	0	0	0	0	1
6. SUB	-	-	-	-	-	-	-	1*	0	1*	0	-	2
7. CHA	-	-	-	-	-	-	-	-	-	-	-	-	0
8. CEW	-	-	-	-	-	-	-	-	-	-	-	-	0
9. AKW	-	-	-	-	-	-	-	-	-	-	-	-	0
10. KER	-	-	-	-	-	-	-	-	-	-	-	-	0
Total	0	0	0	0	0	0	0	2	0	1	0	0	3

*New Zealand sea lion captures

5.2 PELAGIC TRAWL FISHERIES

5.2.1 Jack Mackerel and Barracouta

In previous years, common dolphins have been captured in the pelagic trawl fishery and in some instances large capture events have occurred. A Marine Mammal Operating Procedure (MMOP) has been developed to reduce dolphin capture. These practices include not setting or hauling at certain times of day, the net headline must remain at least 50 metres below the surface, or be hauled partially on deck whilst turning and not setting while dolphins are present close to the vessel (DeepWater Group 2008). As all the vessels in this fishery are larger than 28m they are required to carry and use 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 has gradually increased since 2004/05 (Rowe 2009, 2010) with the 2008/09 observer year achieving the highest overall levels of coverage to date (Table 26). The highest level of commercial effort was in CEW where 34% coverage was achieved. 86% coverage was achieved in AKW where large numbers of common dolphins have been caught in the past, but fishing effort in this area was low in 2008/09. Bird capture rates were highest in SOU by a considerable margin, however no mammal captures were observed in that FMA. The highest marine mammal capture rates occurred in SEC and AKW. No captures occurred in SOE however there were also very few tows observed in this FMA.

Table 26: Summary of commercial effort, observer effort and protected species captures in the pelagic trawl fishery during the 2008/09 observer year.

FMA	Effort Tows	Observed Tows	Coverage (%)	Seabird Captures*	Seabirds per 100 tows	Mammal Captures	Mammals per 100 tows
1. AKE							
2. CEE							
3. SEC	384	104	27.08	4	3.85	6	5.77
4. SOE	156	58	37.18	0	-	0	-
5. SOU	233	94	40.34	10	10.64	0	-
6. SUB							
7. CHA	951	307	32.28	3	0.98	15	4.89
8. CEW	1,322	451	34.11	0	-	7	1.55
9. AKW	126	108	85.71	0	-	6	5.56
10. KER							
Total	3,172	1,122	35.37	17	1.52	34	3.03

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

Observer Coverage

During the 2008/09 observer year, 34 observer trips were undertaken onboard 17 vessels in the pelagic trawl fishery. Protected species captures were recorded on 16 observer trips on 10 separate vessels. Comments relating to offal management, mitigation use and other information surrounding protected species captures are detailed in Table A6.5. As in previous years and in other fisheries, bird numbers were observed to increase at hauling and during offal discharge.

Observer coverage occurred in every month of the 2008/09 year (Table 28), with effort peaking in October, December, June and July. Highest levels of observer effort were undertaken in CEW. The greatest increase in coverage was in SEC. Coverage was spread more evenly throughout the year than during the previous observer year.

Table 27: Number of tows observed in the pelagic trawl fishery by area and month during the 2008/09 observer year

FMA	Jul-08	Aug-08	Sept-08	Oct-08	Nov-08	Dec-08	Jan-09	Feb-09	Mar-09	Apr-09	May-09	Jun-09	Total
1. AKE	0	0	0	0	0	0	0	0	0	0	0	0	0
2. CEE	0	0	0	0	0	0	0	0	0	0	0	0	0
3. SEC	30	30	23	5	0	0	0	0	12	3	1	0	104
4. SOE	11	5	40	1	0	0	0	0	0	0	0	1	58
5. SOU	0	0	0	9	11	0	0	47	6	21	0	0	94
6. SUB	0	0	0	0	0	0	0	0	0	0	0	0	0
7. CHA	38	27	6	76	11	40	16	0	0	0	13	80	307
8. CEW	69	6	6	63	28	160	29	0	0	0	1	89	451
9. AKW	3	0	1	65	5	30	2	0	0	0	0	2	108
10. KER	0	0	0	0	0	0	0	0	0	0	0	0	0
SOI	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	151	68	76	219	55	230	47	47	18	24	15	172	1,122

The majority of observed tows in this fishery targeted jack mackerel, accounting for 74% of the tows observed (Table 28). English mackerel was only targeted for 34 tows in CHA and CEW. Barracouta was most commonly targeted in SEC.

Table 28: Number of observed tows in the pelagic trawl fishery by area and target species during the 2008/09 observer year

Target	3. SEC	4. SOE	5. SOU	7. CHA	8. CEW	9. AKW	Total
Barracouta	101	48	72	32	4		257
English Mackerel				3	31		34
Jack Mackerel	3	10	22	272	416	108	831
Total	104	58	94	307	451	108	1,122

Protected species interactions

More protected species interactions were reported compared to the previous year, both when looking at absolute numbers and interaction rates (Rowe 2010). This is primarily due to 2008/09 having the highest number of marine mammal interactions since the 2004/05 observer year (Rowe 2009). Interactions with New Zealand fur seals were the most common protected species interactions (Table 29), with seven vessels capturing a total of 21 fur seals, one capturing six animals. Of 11 common dolphin captures 10 were captured by one vessel in three trawls (five animals were captured in one trawl). This particular vessel was observed to discharge very little offal and haul the trawl doors to the surface whilst turning. Two events (accounting for eight animals) occurred on tows which were shot at night and hauled early morning (0435 and 0438

NZDT) next day. Overall, the number of interactions with common dolphins observed was about half that observed the previous year (Rowe 2010).

Table 29: Protected species interactions in the pelagic trawl fishery during the 2008/09 observer year

Species	Alive	Dead	Total
<u>Seabirds</u>			
Albatross (Unidentified)	1		1
White-capped albatross		1	1
Buller's albatross		2	2
Common diving petrel	1		1
Prions (Unidentified)	1		1
Sooty shearwater		5	5
Westland petrel		1	1
White-chinned petrel		5	5
Fairy prion		1	1
Total seabirds	3	15	18
<u>Mammals</u>			
Common dolphin		11	11
New Zealand fur seal		21	21
Pilot whale		2	2
Total mammals		34	34
Total protected species interactions	3	49	52

Mammal captures occurred whilst targeting all of the three key species in the pelagic trawl fishery (Table 30). Common dolphin captures were reported only on tows which targeted jack mackerel. Jack mackerel tows accounted for two thirds of the mammal captures, however they also accounted for two thirds of the observed tows in this fishery. Of the 18 bird interactions, 12 occurred on Barracouta tows.

Table 30: Protected species interactions in the pelagic trawl fishery during the 2008/09 observer year

Species	Barracouta	English mackerel	Jack mackerel	Total
Seabirds				
Albatross (Unidentified)	1			1
White-capped albatross	1			1
Buller's albatross	2			2
Common diving petrel			1	1
Prions (Unidentified)			1	1
Sooty shearwater	5			5
Westland petrel	1			1
White-chinned petrel	2		3	5
Fairy prion			1	1
Total seabirds	12		6	18
Mammals				
Common dolphin			11	11
New Zealand fur seal	9	2	10	21
Pilot whale			2	2
Total mammals	9	2	23	34
Total protected species interactions	21	2	29	52

Similar to the previous year (Rowe 2010), net captures accounted for the majority of interactions with protected species. Only two observed interactions were not known to be directly related to fishing gear (Table 31).

Table 31: Method of interaction for protected species interactions in the pelagic trawl fishery during the 2008/09 observer year

Species	Caught in net*	Caught on warp or door*	Impact against vessel	Unknown	Total
Seabirds					
Albatross (Unidentified)	1				1
White-capped albatross	1				1
Buller's albatross		2			2
Common diving petrel			1		1
Prions (Unidentified)				1	1
Sooty shearwater	5				5
Westland petrel	1				1
White-chinned petrel	5				5
Fairy prion	1				1
Total seabirds	14	2	1	1	18
Mammals					
Common dolphin	11				11
New Zealand fur seal	21				21
Pilot whale	2				2
Total mammals	9				34
Total protected species interactions	48	2	1	1	52

*Included as a capture in Table 32

Bird interactions with the pelagic trawl fishery were most common during the February to March period (Table 32) which corresponds to when the SOU area was most heavily observed. Outside of this time only three of the 18 interactions occurred.

Table 32: Seabird interactions in the pelagic trawl fishery by area and month during the 2008/09 observer year. A zero indicates that no interactions are observed, a dash indicates that no coverage took place.

FMA	Jul-08	Aug-08	Sept-08	Oct-08	Nov-08	Dec-08	Jan-09	Feb-09	Mar-09	Apr-09	May-09	Jun-09	Total
1. AKE	-	-	-	-	-	-	-	-	-	-	-	-	0
2. CEE	-	-	-	-	-	-	-	-	-	-	-	-	0
3. SEC	0	0	0	0	-	-	-	-	3	1	0	-	4
4. SOE	0	0	0	0	-	-	-	-	-	-	-	0	0
5. SOU	-	-	-	0	0	-	-	5	0	6	-	-	11
6. SUB	-	-	-	-	-	-	-	-	-	-	-	-	0
7. CHA	0	1	0	1	0	1	0	-	-	-	0	0	3
8. CEW	0	0	0	0	0	0	0	-	-	-	0	0	0
9. AKW	0	-	0	0	0	0	0	-	-	-	-	0	0
10. KER	-	-	-	-	-	-	-	-	-	-	-	-	0
Total	0	1	0	1	0	1	0	5	3	7	0	0	18

Marine mammal interactions reported by observers peaked in December. This is due largely to the capture of the 10 dolphins by a single vessel occurring in that month (Table 33). During the previous observer year December also produced the highest number of marine mammal captures (Rowe 2010).

Table 33: Marine mammal interactions in the pelagic trawl fishery by area and month during the 2008/09 observer year. A zero indicates that no interactions are observed, a dash indicates that no coverage took place.

FMA	Jul-08	Aug-08	Sept-08	Oct-08	Nov-08	Dec-08	Jan-09	Feb-09	Mar-09	Apr-09	May-09	Jun-09	Total
1. AKE	-	-	-	-	-	-	-	-	-	-	-	-	0
2. CEE	-	-	-	-	-	-	-	-	-	-	-	-	0
3. SEC	2	3	1	0	-	-	-	-	0	0	0	-	6
4. SOE	0	0	0	0	-	-	-	-	-	-	-	0	0
5. SOU	-	-	-	0	0	-	-	0	0	0	-	-	0
6. SUB	-	-	-	-	-	-	-	-	-	-	-	-	0
7. CHA	4	3	0	1	0	4	0	-	-	-	0	3	15
8. CEW	1	0	0	0	0	5	0	-	-	-	0	1	7
9. AKW	0	-	0	2	0	4	0	-	-	-	-	0	6
10. KER	-	-	-	-	-	-	-	-	-	-	-	-	0
Total	7	6	1	3	0	13	0	0	0	0	0	4	34

5.3 DEEP WATER BOTTOM TRAWL FISHERIES

5.3.1 Orange Roughy and 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 monitoring of the impacts of deepwater bottom trawling on protected corals, particularly on the Chatham rise⁷. Seabird behaviour and abundance is also monitored around the vessels. Offal and management, as well as the mandatory use of bird scaring devices are employed by the fleet to mitigate against seabird captures.

Coverage in 2008/09 was highest on the Chatham rise (SOE) with over 1200 tows being observed (Table 35). While the total number of tows observed in the fishery reduced compared to the previous year, the total fishing effort declined even more resulting in a marginally higher percentage of coverage (Rowe 2010). The rate of seabird captures in this fishery has remained very similar to the previous year. One marine mammal was reported as being captured in this fishery during the 2008/09 observer year.

Table 34: Summary of commercial effort, observer effort and protected species captures in the deepwater trawl fishery during the 2008/09 observer year.

FMA	Effort Tows	Observed Tows	Coverage (%)	Seabird Captures*	Seabirds per 100 tows	Mammal Captures	Mammals per 100 tows
1. AKE	441	209	47.39	0	-	0	-
2. CEE	1203	39	3.24	0	-	0	-
3. SEC	592	190	32.09	1	0.53	0	-
4. SOE	2980	1,277	42.85	4	0.31	0	-
5. SOU	46	9	19.57	0	-	0	-
6. SUB	1340	698	52.09	0	-	1	0.14
7. CHA	24	24	100.00	0	-	0	-
8. CEW							
9. AKW	231	143	61.90	0	-	0	-
10. KER							
Total	6,857	2,589	37.76	5	0.19	0	0.04

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

Observer Coverage

There were 23 observer trips onboard nine separate vessels. Coverage was spread throughout the year, with peaks around July and November (Table 35) corresponding mainly with peaks in fishing effort in the OHR1 fishery which occurs in AKE, AKW and CEW. Comments relating to offal management, mitigation use and other information surrounding protected species captures are detailed in Table A6.6.

⁷ CSP Project - INT 2008/02 Identification of protected corals: Conservation Services Annual Plan 2008/09 p43-44. <http://www.doc.govt.nz/upload/documents/conservation/marine-and-coastal/fishing/csp-final-annual-plan2008-09.pdf>

Table 35: Number of observed tows in the deep water bottom trawl fishery by area and month during the 2008/09 observer year.

FMA	Jul-08	Aug-08	Sept-08	Oct-08	Nov-08	Dec-08	Jan-09	Feb-09	Mar-09	Apr-09	May-09	Jun-09	Total
1. AKE	117	18	0	0	4	0	0	0	0	0	0	70	209
2. CEE	14	0	0	0	25	0	0	0	0	0	0	0	39
3. SEC	0	10	10	35	43	29	0	0	6	6	51	0	190
4. SOE	78	62	0	216	109	75	196	167	104	20	131	119	1,277
5. SOU	0	0	0	0	0	0	0	0	0	2	7	0	9
6. SUB	149	103	0	0	148	139	0	0	0	51	108	0	698
7. CHA	0	0	0	0	0	0	0	0	0	0	0	24	24
8. CEW	0	0	0	0	0	0	0	0	0	0	0	0	0
9. AKW	8	0	0	97	10	0	0	0	0	0	0	28	143
10. KER	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	331	181	5	308	230	177	150	129	82	50	225	242	2,589

Protected species interactions

Observers in this fishery have reported the lowest levels of marine mammal and seabird interactions of any fishery in this report. Inline with the previous observer year there were equal numbers of dead animals and live releases in this fishery (Rowe 2010).

Table 36: Protected species interactions in the deepwater bottom trawl fishery during the 2008/09 observer year.

Species	Alive	Dead	Total
<u>Seabirds</u>			
Albatross (Unidentified)		2	2
Southern royal albatross	1		1
Salvin's albatross	2		2
Chatham Island albatross		1	1
Petrel (Unidentified)	1		1
Common diving petrel		1	1
White-chinned petrel	1		1
Southern cape petrel		1	1
White-faced storm petrel		1	1
Total seabirds	5	6	11
<u>Mammals</u>			
New Zealand fur seal	1		1
Total mammals	1	0	1
Total protected species interactions	6	6	12

Impacts against the vessel were the most prevalent form of interaction in the deep water trawl fishery (Table 37).

Table 37: Method of interaction for all protected species, as recorded on the observer non-fish bycatch form.

Species	Caught in net*	Caught on warp or door*	Impact against vessel	Unknown	Total
Seabirds					
Albatross (Unidentified)	1			1	2
Southern royal albatross			1		1
Salvin's albatross			2		2
Chatham Island albatross		1			1
Petrel (Unidentified)	1				1
Common diving petrel	1				1
White-chinned petrel			1		1
Southern cape petrel		1			1
White-faced storm petrel			1		1
Total seabirds	3	2	5	1	11
Mammals					
New Zealand fur seal	1				1
Total mammals	1	0	0	0	1
Total protected species interactions	4	2	5	1	12

*Included as a capture in Table 32

All but two of the interactions occurred during the spring to summer period (September to February). The majority of interactions took place in SOE; however as this FMA also had the highest number of observed tows it also returned the lowest rate of captures.

Table 38: Protected species interactions in the deepwater trawl fishery by area and month during the 2008/09 observer year. A zero indicates that no interactions are observed, a dash indicates that no coverage took place.

FMA	Jul-08	Aug-08	Sept-08	Oct-08	Nov-08	Dec-08	Jan-09	Feb-09	Mar-09	Apr-09	May-09	Jun-09	Total
1. AKE	0	0	-	-	0	-	-	-	-	-	-	0	0
2. CEE	0	-	-	-	1	-	-	-	-	-	-	-	1
3. SEC	-	0	1	1	0	0	-	-	0	0	1	-	3
4. SOE	0	0	-	1	0	1	1	2	0	0	1	0	6
5. SOU	-	-	-	-	-	-	-	-	-	-	-	-	0
6. SUB	0	0	-	-	1	0	-	-	-	-	-	-	1
7. CHA	-	-	-	-	-	-	-	-	-	-	-	0	0
8. CEW	-	-	-	-	-	-	-	-	-	-	-	-	0
9. AKW	0	-	-	0	0	-	-	-	-	-	-	0	0
10. KER	-	-	-	-	-	-	-	-	-	-	-	-	0
Total	0	0	1	2	1	2	1	2	0	0	2	0	11

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 line, 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.

Observing of inshore fisheries has historically been at very low levels due to the inherent difficulties of placing observers on small vessels often in remote ports with many fishers only operating part time and either seasonally or sporadically. Combined, this means that observers often spend a lot of time on shore or travelling between ports. During the 2008/09 observer year MFish undertook increased levels of observer coverage in both the inshore trawl and setnet fisheries, in order to monitor the draft Hector's and Maui's Dolphin TMP. 963 days were achieved in inshore trawl and setnet around the South Island and West Coast North Island, representing a large increase in coverage levels over previous years. Due to this increased coverage around the South Island, the decision was made to undertake the CSP funded inshore trawl coverage in AKE to prevent duplication of effort and make best use of funding. For completeness the effort and bycatch figures for the MFish funded coverage have been included in these inshore fishing sections.

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 is also one of the few remaining fisheries in New Zealand with no regulated mitigation measures. Data is not currently available to allow the quantification of interaction with protected species, but the substantial fishing effort and lack of mitigation creates potential for significant levels. Monitoring of the inshore trawl fishery using government observers began relatively recently in the 2006/07 observer year with a focus on monitoring seabird and dolphin interactions. Due to the high levels of effort and difficulty of placing observers on these small vessels, historic coverage levels have generally been low and so coverage has been limited to specific areas and times of interest.

The majority of inshore trawl coverage in the 2008/09 observer year was funded by MFish to monitor against the draft Hector's and Maui's dolphin TMP. This coverage was focused on a very specific time period intended to capture the overlap between peak fishing activity and dolphin abundance. Though this coverage only represented a narrow time period it did provide the largest spatial coverage achieved to date.

Table 39 summarises the commercial fishing effort, observer effort and protected species captures for the 2008/09 observer year. In total over 1900 tows were observed over 634 observer seadays which represented 3.45% of the year's inshore fishing effort. The highest level of coverage was

achieved in SEC; this area also had the highest rate of seabird captures. While 31 of these captures can be attributed to a single event, even if this was excluded SEC would still have shown the highest capture rate. The highest marine mammal capture rate occurred in CHA. Five of the nine marine mammal captures in this area occurred in one event. This is discussed in more detail below.

Table 39: Summary of commercial effort, observer effort and protected species captures in the inshore trawl fishery during the 2008/09 observer year.

FMA	Effort Tows	Observed Tows	Coverage (%)	Seabird Captures*	Seabirds per 100 tows	Mammal Captures	Mammals per 100 tows
1. AKE	9,295	241	2.59	2	0.83	1	0.41
2. CEE	10,527	0	-				
3. SEC	12,336	880	7.13	63	7.16	2	0.23
4. SOE	1,320	0	-				
5. SOU	3,205	155	4.84	4	2.58	1	0.65
6. SUB	1,625	0	-				
7. CHA	12,996	509	3.92	13	2.55	9	1.77
8. CEW	1,873	38	2.03	0	-	0	-
9. AKW	2,724	108	3.96	0	-	0	-
10. KER							
Total	55,901	1,931	3.45	82	4.25	13	0.67

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

Observer coverage

Observer coverage during the 2008/09 observer year was focused on the summer months in order to ensure high coverage levels for that chosen period, inline with TMP requirements. Coverage in AKE was CSP funded work to examine inshore trawl fisheries in the Hauraki Gulf area, which have historically received little or no coverage and is an area of diverse seabird distribution. Trawl coverage for 2008/09 represents a twelve fold increase in the number of tows observed compared to the previous year.

Table 40: Number of observed tows in the inshore bottom trawl fishery by area and month during the 2008/09 observer year.

FMA	Jul-08	Aug-08	Sept-08	Oct-08	Nov-08	Dec-08	Jan-09	Feb-09	Mar-09	Apr-09	May-09	Jun-09	Total
1. AKE	0	0	39	21	0	0	0	0	0	0	146	35	241
2. CEE	0	0	0	0	0	0	0	0	0	0	0	0	0
3. SEC	0	0	0	0	0	0	490	390	0	0	0	0	880
4. SOE	0	0	0	0	0	0	0	0	0	0	0	0	0
5. SOU	0	0	0	0	0	0	72	83	0	0	0	0	155
6. SUB	0	0	0	0	0	0	0	0	0	0	0	0	0
7. CHA	0	0	0	0	0	0	234	275	0	0	0	0	509
8. CEW	0	0	0	0	0	0	1	37	0	0	0	0	38
9. AKW	0	0	0	0	0	0	44	64	0	0	0	0	108
10. KER	0	0	0	0	0	0	0	0	0	0	0	0	0
SOI	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	39	21	0	0	841	849	0	0	146	35	1,931

Protected species interactions

Protected species interactions were higher in 2008/09 than in previous years, as expected due to the increase in coverage, but importantly the variety of species interacting was also greater. In the previous year six taxa of protected species were reported interacting with observed vessels. In the 2008/09 observer year this increased with 13 species identified (Table 41). Buller's/Pacific albatross, fairy prion and spotted shags adding to the list of protected species recorded interacting.

In the previous observer year no marine mammal interactions were observed, whereas during 2008/09 12 interactions took place; all resulting in mortalities. Common dolphins made up the greatest part of this group. All common dolphins were captured in CHA with five animals being caught in a single trawl. A single green turtle was caught in AKE but was released by the crew.

Table 41: Protected species interactions in the inshore trawl fishery during the 2008/09 observer year.

Species	Alive	Dead	Decomposing	Total
Seabirds				
Albatross (Unidentified)	3	4	1	8
Smaller albatrosses	1			1
Buller's and Pacific albatross	1			1
White-capped albatross	2	11		13
Salvin's albatross		10		10
Petrel (Unidentified)	4			4
Gull or tern		2		2
Flesh-footed shearwater	1			1
Prions (Unidentified)	1			1
Sooty shearwater	2	10		12
Fairy Prion	1			1
Spotted shag		33		33
Storm Petrel	1			1
Total seabirds	17	70	1	88
Mammals				
Bottlenose dolphin		1		1
Common dolphin		9		9
New Zealand fur seal		2	1	3
Total mammals		12	1	13
Other				
Green turtle	1			1
Total Other	1			1
Total protected species interactions	18	82	2	102

Of the protected species interactions which were observed as live interactions (Table 42a), there was a roughly even split in method of interaction between net captures, impact against vessel and other. Five of the six interactions recorded as 'other' were entanglements with the vessels bird capture mitigation equipment, either the bird baffler or tori line. Two thirds of the protected species interactions which resulted in mortalities were due to net captures, though this is dominated by a single capture event of 31 spotted shags (Table 42b). This capture event was reported by the

observer to occur during rough weather as the vessel attempted a turn during a tow. The vessel was reportedly blown off course as it executed a turn during the tow and was pushed closer to land. No shags were sighted around the vessel during the tow.

Table 42: Method of interaction for a) protected species released alive and b) dead protected species in the inshore trawl fishery during the 2008/09 observer year.

a) Released alive

Species	Caught in net*	Impact against vessel	Other	Total	Observer comments relating to 'Other' capture method
Seabirds					
Albatross (Unidentified)	1	2		3	
Smaller albatrosses			1	1	Tori Line entanglement, released by crew (Either White-capped or Salvin's)
Buller's and Pacific albatross			1	1	Tori Line entanglement, released by crew
White-capped albatross			2	2	Tori Line entanglement, released by crew
Petrel (Unidentified)	1	3		4	
Flesh-footed shearwater			1	1	Entangled in Bird baffler dropper line
Prions (Unidentified)		1		1	
Sooty shearwater	2			2	
Fairy Prion			1	1	Fairy Prion found on deck with injured leg. Put back
Storm Petrel		1		1	
Total seabirds	4	7	6	17	
Other					
Green turtle	1			1	
Total Other	1			1	
Total protected species interactions	5	7	6	18	

*Included as a capture in table 39

b) Dead

Species	Caught in net*	Caught on warp or door	Unknown	Total
<u>Seabirds</u>				
Albatross (Unidentified)		3	1	4
White-capped albatross		11		11
Salvin's albatross		10		10
Gull or tern		2		2
Sooty shearwater	10			10
Spotted shag	33			33
Total seabirds	43	26	1	70
<u>Mammals</u>				
Bottlenose dolphin	1			1
Common dolphin	9			9
New Zealand fur seal	2			3
Total mammals	12			13
Total protected species interactions	56	26	1	84

*Included as a capture in table 39

During the period of peak observer coverage in January-February, February accounted for the majority of seabird interactions (Table 43), even though coverage was similar between January and February. This can partially be accounted for by the capture event of the 31 shags, however even then February's interaction rate would be over double that of January. Marine mammal interactions were also most common in February, with all of the common dolphin captures occurring in that month (Table 44).

Table 43: Seabird interactions in the inshore trawl fishery by area and month during the 2008/09 observer year. A zero indicates that no interactions are observed, a dash indicates that no coverage took place.

FMA	Jul-08	Aug-08	Sept-08	Oct-08	Nov-08	Dec-08	Jan-09	Feb-09	Mar-09	Apr-09	May-09	Jun-09	Total
1. AKE	-	-	0	0	-	-	-	-	-	-	2	0	2
2. CEE	-	-	-	-	-	-	-	-	-	-	-	-	0
3. SEC	-	-	-	-	-	-	7	58	-	-	-	-	65
4. SOE	-	-	-	-	-	-	-	-	-	-	-	-	0
5. SOU	-	-	-	-	-	-	1	8	-	-	-	-	9
6. SUB	-	-	-	-	-	-	-	-	-	-	-	-	0
7. CHA	-	-	-	-	-	-	7	6	-	-	-	-	13
8. CEW	-	-	-	-	-	-	0	0	-	-	-	-	0
9. AKW	-	-	-	-	-	-	0	0	-	-	-	-	0
10. KER	-	-	-	-	-	-	-	-	-	-	-	-	0
Total	0	0	0	0	0	0	15	72	0	0	2	0	89

Table 44: Mammal interactions in the inshore trawl fishery by area and month during the 2008/09 observer year. A zero indicates that no interactions are observed, a dash indicates that no coverage took place.

FMA	Jul-08	Aug-08	Sept-08	Oct-08	Nov-08	Dec-08	Jan-09	Feb-09	Mar-09	Apr-09	May-09	Jun-09	Total
1. AKE	-	-	1	0	-	-	-	-	-	-	0	0	1
2. CEE	-	-	-	-	-	-	-	-	-	-	-	-	0
3. SEC	-	-	-	-	-	-	2	0	-	-	-	-	2
4. SOE	-	-	-	-	-	-	-	-	-	-	-	-	0
5. SOU	-	-	-	-	-	-	1	0	-	-	-	-	1
6. SUB	-	-	-	-	-	-	-	-	-	-	-	-	0
7. CHA	-	-	-	-	-	-	0	9	-	-	-	-	9
8. CEW	-	-	-	-	-	-	0	0	-	-	-	-	0
9. AKW	-	-	-	-	-	-	0	0	-	-	-	-	0
10. KER	-	-	-	-	-	-	-	-	-	-	-	-	0
Total	0	0	1	0	0	0	3	9	0	0	0	0	13

Inshore bottom longline

As with other inshore fishing methods, observer coverage in the inshore bottom longline fishery has been generally limited. In the past it has aimed at focused time periods in selected ports or regions. Historically interactions have been recorded with a number of protected species such as black petrels, flesh-footed shearwaters and white-chinned petrels. Mitigation techniques used and tested (to varying extents) in this fishery include; 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). Since 12th April 2008 regulations on mitigation were introduced for all bottom longline vessels, covering night setting or line weighting, tori line, and offal/discard management⁸.

For the 2008/09 observer year CSP coverage in inshore bottom longline fisheries focussed on vessels targeting snapper North of Auckland and those targeting bluenose and hāpuku, primarily on the Chatham Rise. The snapper fleet tended to operate smaller vessels with lighter gear and in shallower waters. The ling, hāpuku, bass vessels tended to be larger auto liners (up to 46m) operating deeper waters. These vessels tended to undertake longer trips and work areas ranging from those typically considered 'inshore' to the Chatham Rise. Being distinct in both target species and gear use, these two groups of bottom longliners have been separated in this report.

DOC provided turtle de-hooking devices to a wide group of inshore longline fishers. These were generally well received and allow for easy and humane de-hooking of not only turtles but also seals, sharks and a wide range of other bycatch. Along with these devices educational material on how to use them was also distributed. Other mitigation work in this fishery since this reporting period includes CSP project MIT 2009/01 (Development of mitigation strategies: Inshore Fisheries), a project combining the raising of awareness among fishers and the investigation of the sink rates of line weighting currently used by inshore bottom longline vessels⁹. Other relevant previous CSP work has included an 'advisory officer' was placed in the inshore ling, bluenose, hāpuku, 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).

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

Bottom longline vessels targeting the species assemblage of ling, bluenose, hāpuku and bass tend to fish 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 45. Coverage in this fishery in 2008/09 focused almost exclusively on SEC giving 5% coverage overall for that area.

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

⁹ CSP annual plan 2009/10 available at <http://www.doc.govt.nz/publications/conservation/marine-and-coastal/marine-conservation-services/csp-plans/>

Table 45: Summary of commercial effort, observer effort and protected species captures in the inshore bottom longline fishery during the 2008/09 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	2,211	9	0.41	57,824	0	-	0	-
2. CEE	4,225	0	-	0				
3. SEC	1,449	73	5.04	221,050	6	0.027	0	-
4. SOE	2,474	0	-	0				
5. SOU	638	0	-	0				
6. SUB	316	0	-	0				
7. CHA	1,097	0	-	0				
8. CEW	419	0	-	0				
9. AKW	1,201	0	-	0				
10. KER								
Total	14,030	82	0.58	278,874	6	0.022	0	0.00

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

Observer coverage

During 2008/09 three observer trips were undertaken on three separate vessels. Seabird interactions were reported for one of these vessels. The vessels employed various line weighting regimes and offal management measures. 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.

As with previous years, although fishing effort occurred throughout the year and in all FMAs, observer coverage was limited, often dependant upon the availability of observers.

Table 46: Number of observed lines in the inshore bottom longline fishery by area and month during the 2008/09 observer year.

FMA	Jul-08	Aug-08	Sept-08	Oct-08	Nov-08	Dec-08	Jan-09	Feb-09	Mar-09	Apr-09	May-09	Jun-09	Total
1. AKE	0	9	0	0	0	0	0	0	0	0	0	0	9
2. CEE	0	0	0	0	0	0	0	0	0	0	0	0	0
3. SEC	42	0	0	0	0	0	0	27	4	0	0	0	73
4. SOE	0	0	0	0	0	0	0	0	0	0	0	0	0
5. SOU	0	0	0	0	0	0	0	0	0	0	0	0	0
6. SUB	0	0	0	0	0	0	0	0	0	0	0	0	0
7. CHA	0	0	0	0	0	0	0	0	0	0	0	0	0
8. CEW	0	0	0	0	0	0	0	0	0	0	0	0	0
9. AKW	0	0	0	0	0	0	0	0	0	0	0	0	0
10. KER	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	42	9	0	0	0	0	0	27	4	0	0	0	82

The most frequently targeted species during observer coverage was ling, with roughly 75% of observed lines targeting this species (Table 47).

Table 47: Observed set in inshore fisheries bottom longline fisheries by area and target species during the 2008/09 observer year.

Target	1.AKE	3. SEC	Total
Bluenose		7	7
Häpuku		15	15
Ling	9	51	60
Total	9	73	82

Protected species interactions

As with previous years all observed protected species fishing interactions were with seabirds (Rowe 2009, 2010), and all interactions occurred on one observer trip. Two Buller's albatross were recorded as live interactions and four grey petrels were reported killed in the fishery (Table 48). All interactions were hook captures (Table 49).

Table 48: Protected species interactions with the ling, bluenose, häpuku, bass inshore bottom longline fisher during the 2008/09 observer year.

Species	Alive	Dead	Total
<u>Seabirds</u>			
Buller's albatross		4	4
Grey petrel	2		2
Total seabirds	2	4	6
Total protected species interactions	2	4	6

Table 49: Method of interaction for all protected species, as recorded on the observer non-fish bycatch form.

Species	Caught on hook*	Total
<u>Seabirds</u>		
Buller's albatross	4	4
Grey petrel	2	2
Total seabirds	6	6
Total protected species interactions	6	6

*Included as a capture in table 47

All interactions look place in July of 2008 which was also the month of most intense coverage (Table 50).

Table 50: Seabird interactions in the inshore bottom longline fishery by area and month during the 2008/09 observer year. A zero indicates that no interactions are observed, a dash indicates that no coverage took place.

FMA	Jul-08	Aug-08	Sept-08	Oct-08	Nov-08	Dec-08	Jan-09	Feb-09	Mar-09	Apr-09	May-09	Jun-09	Total
1. AKE	-	0	-	-	-	-	-	-	-	-	-	-	0
2. CEE	-	-	-	-	-	-	-	-	-	-	-	-	0
3. SEC	6	-	-	-	-	-	-	0	0	-	-	-	6
4. SOE	-	-	-	-	-	-	-	-	-	-	-	-	0
5. SOU	-	-	-	-	-	-	-	-	-	-	-	-	0
6. SUB	-	-	-	-	-	-	-	-	-	-	-	-	0
7. CHA	-	-	-	-	-	-	-	-	-	-	-	-	0
8. CEW	-	-	-	-	-	-	-	-	-	-	-	-	0
9. AKW	-	-	-	-	-	-	-	-	-	-	-	-	0
10. KER	-	-	-	-	-	-	-	-	-	-	-	-	0
Total	6	0	0	0	0	0	0	0	0	0	0	0	6

5.4.3 Inshore bottom longline - Snapper

CSP observer coverage of the bottom longline snapper fishery began in 2004/05 and continued into the 2005/06 observer year, focusing on the summer months and largely on AKE. Interactions have been recorded with black and grey-faced petrels, flesh-footed and Buller's shearwaters and Australasian gannets (Debski, in press). An interaction with a green turtle has also been reported (Rowe 2009, Debski in press). No coverage was undertaken in this fishery in 2006/07 or 2007/08.

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

During the course of the 2008/09 observer year port visits were undertaken in a number of ports North of Auckland by MCS staff, in order to explain the purpose of coverage and answer any questions fishers had. Turtle de-hookers and bird identification guides were also distributed at these meetings.

Table 51 summarises the commercial effort, observer effort and protected species captures in the snapper inshore bottom longline fishery. In total 276 lines were observed which represented 4.81% of the total fishing effort for the 2008/09 observer year. During that time 31 birds were captured which represents a capture rate of approximately one bird for every 10,000 hooks set. This is a similar capture rate to that reported from the 2005/06 observer year (Rowe 2009).

Table 51: Summary of commercial effort, observer effort and protected species captures in the snapper inshore bottom longline fishery during the 2008/09 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	5,666	276	4.81	324,450	31	0.096		
2. CEE	2	0	-	0				
3. SEC								
4. SOE								
5. SOU								
6. SUB								
7. CHA	7	0	-	0				
8. CEW	14	0	-	0				
9. AKW	49	0	-	0				
10. KER								
Total	5,738	276	4.81	324,450	31	0.096	0	0.00

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

Observer coverage

During the 2008/09 observer year 20 vessels were observed for between 4 and 22 days each, totalling 252 seadays. All observed fishing took place in AKE and seabird interactions were observed on 12 of the 21 vessels. Vessels employed various line weighting, mitigation techniques and offal management measures. Comments relating to offal management, mitigation techniques, protected species interactions and captures (i.e. interactions with fishing gear only) for each vessel observed are given in Table A6.9.

Peak observer coverage was achieved in April. While all coverage took place within AKE, the coverage was designed to cover a wider spatial area than in previous years and also to observe more vessels.

Table 52: Number of observed lines in the snapper inshore bottom longline fishery by area and month during the 2008/09 observer year.

FMA	Jul-08	Aug-08	Sept-08	Oct-08	Nov-08	Dec-08	Jan-09	Feb-09	Mar-09	Apr-09	May-09	Jun-09	Total
1. AKE	0	0	0	0	0	0	0	0	16	171	87	2	276
2. CEE	0	0	0	0	0	0	0	0	0	0	0	0	0
3. SEC	0	0	0	0	0	0	0	0	0	0	0	0	0
4. SOE	0	0	0	0	0	0	0	0	0	0	0	0	0
5. SOU	0	0	0	0	0	0	0	0	0	0	0	0	0
6. SUB	0	0	0	0	0	0	0	0	0	0	0	0	0
7. CHA	0	0	0	0	0	0	0	0	0	0	0	0	0
8. CEW	0	0	0	0	0	0	0	0	0	0	0	0	0
9. AKW	0	0	0	0	0	0	0	0	0	0	0	0	0
10. KER	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	16	171	87	2	276

Protected species interactions

All observed protected species fishing interactions were with seabirds, with roughly even division between live interactions and dead captures reported (Table 53). Petrels and shearwaters made up the bulk of the interactions. The blue penguin reported was an animal which was recovered already dead from around the vicinity of the vessel by an observer on one vessel.

Table 53: Protected species interactions with the snapper inshore bottom longline fishery during the 2008/09 observer year.

Species	Alive	Dead	Total
Seabirds			
Petrels, Prions and Shearwaters	1		1
Black petrel	3	8	11
Grey petrel		4	4
Common diving petrel	1		1
Buller's shearwater	2	1	3
Flesh-footed shearwater	12	4	16
Fluttering shearwater		1	1
Black-backed gull*	1	1	2
Blue penguin		1	1
Total seabirds	20	20	40
Total protected species interactions	20	20	40

*Although black-backed are not protected under the Wildlife Act 1953, this has been included for completeness

The majority of interactions (both live and dead) were attributed to hook captures, with almost half of live released animals being caught on the hook and almost all dead animals being captured this way (Table 54). Of the dead captures all eight black petrels were recorded from the same vessel within a two week period.

Table 54: Method of interaction for a) protected species released alive and b) dead protected species in the snapper inshore bottom longline fishery.

a) Alive

Species	Caught on hook*	Impact against vessel	Tangled in line	Other	Unknown	Total	Observer comments relating to 'Other' capture method
Seabirds							
Petrels, Prions and Shearwaters			1			1	Landed on deck. Released by crew
Black petrel		2			1	3	
Common diving petrel				1		1	
Buller's shearwater	2					2	
Flesh-footed shearwater	4	3	5			12	
Black-backed gull**	1					1	
Total seabirds	7	5	6	1	1	22	
Total protected species interactions	7	5	6	1	1	20	

*Included as a capture in table 51

**Although black-backed are not protected under the Wildlife Act 1953, this has been included for completeness

b) Dead

Species	Caught on hook*	Tangled in line	Other	Total	Observer comments relating to 'Other' capture method
Seabirds					
Black petrel	7	1		8	XLB dead when gaffed out of water. Very smelly. No visible injuries. Found in water, not related to fishing activity'. Rotten.
Buller's shearwater	1			1	
Flesh-footed shearwater	4			4	
Fluttering shearwater		1		1	
Black-backed gull**	1			1	
Blue penguin			1	1	
Total seabirds	13	2	1	20	
Total protected species interactions	13	2	1	16	

*Included as a capture in table 51

**Although black-backed gulls are not protected under the Wildlife Act 1953, this has been included for completeness

Most observed seabird interactions were in the month of April which this corresponds with the month of highest coverage (Table 55).

Table 55: Seabird interactions in the snapper inshore bottom longline fishery, by area and month during the 2008/09 observer year. A zero indicates that no interactions are observed, a dash indicates that no coverage took place.

FMA	Jul-08	Aug-08	Sept-08	Oct-08	Nov-08	Dec-08	Jan-09	Feb-09	Mar-09	Apr-09	May-09	Jun-09	Total
1. AKE	-	-	-	-	-	-	-	-	0	28	8	0	36
2. CEE	-	-	-	-	-	-	-	-	-	-	-	-	0
3. SEC	-	-	-	-	-	-	-	-	-	-	-	-	0
4. SOE	-	-	-	-	-	-	-	-	-	-	-	-	0
5. SOU	-	-	-	-	-	-	-	-	-	-	-	-	0
6. SUB	-	-	-	-	-	-	-	-	-	-	-	-	0
7. CHA	-	-	-	-	-	-	-	-	-	-	-	-	0
8. CEW	-	-	-	-	-	-	-	-	-	-	-	-	0
9. AKW	-	-	-	-	-	-	-	-	-	-	-	-	0
10. KER	-	-	-	-	-	-	-	-	-	-	-	-	0
Total	0	0	0	0	0	0	0	0	0	28	8	0	36

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.

Along with inshore trawl, the setnet fishery received a significant increase in observer coverage as part of the coverage related to the Hectors and Maui's dolphin TMP. The 2008/09 coverage occurred after several closures of historic fishing grounds close to shore, meaning that the distribution of effort changed in this fishery. As part of the monitoring of the draft Hector's and Maui's dolphin TMP MFish-funded observer coverage of the inshore setnet fishery was conducted during January and February 2009. During April to June, DOC funded setnet coverage was also undertaken in other areas of interest, thus avoiding overlap of effort.

The greatest number of nets observed was in SEC. The highest percentage coverage was achieved in SOU where 24% of the year's commercial setnetting was observed during the two month period. Bird captures were highest in SEC; the rate of seabird capture was also highest in this area. Overall, the rate as well as absolute amount of seabird captures was higher than in previous years (Rowe 2009, 2010). No seabirds were observed captured in CHA. Two marine mammals were captured during the setnet coverage as was one white pointer shark.

Table 56: Summary of commercial effort, observer effort and protected species captures in the inshore setnet fishery during the 2008/09 observer year.

FMA	Effort Nets	Observed Nets	Coverage (%)	Length of nets observed (m)	Seabird Captures*	Seabirds per 1000m net	Mammal Captures	Mammals per 1000m net	Protected Fish Captures	Fish per 1000m net
1. AKE	6,277	0	-	0						
2. CEE	1,437	0	-	0						
3. SEC	3,459	743	21.48	338,297	20	0.059	1	0.003	0	-
4. SOE	13	0	-	0						
5. SOU	505	121	23.96	99,990	1	0.010	0	-	1	0.010
6. SUB										
7. CHA	1,182	83	7.02	99,440	0	-	1	0.010	0	-
8. CEW	1,606	0	-	0						
9. AKW	7,512	0	-	0						
10. KER										
Total	21,991	947	4.31	537,727	21	0.039	2	0.004	1	0.002

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

Observer coverage

During the 2008/09 observer year 17 observer trips were undertaken on 17 setnet vessels. Protected species captures were observed on 13 of these vessels. Mitigation devices in the form of pingers¹⁰ were used occasionally by only four vessels and for only 16 of the 947 observed nets. Offal management was observed to be practiced by most setnet vessels in one form or another. 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. As with previous observer coverage, bird abundance was highest while the vessels were processing catches and discharging offal.

Observer coverage focused on two time periods, January and February, and then April to June 2009 (Table 57).

Table 57: Number of observed nets in the inshore setnet fishery by area and month during the 2008/09 observer year.

FMA	Jul-08	Aug-08	Sept-08	Oct-08	Nov-08	Dec-08	Jan-09	Feb-09	Mar-09	Apr-09	May-09	Jun-09	Total
1. AKE	0	0	0	0	0	0	0	0	0	0	0	0	0
2. CEE	0	0	0	0	0	0	0	0	0	0	0	0	0
3. SEC	0	0	0	0	0	0	157	64	0	128	361	33	743
4. SOE	0	0	0	0	0	0	0	0	0	0	0	0	0
5. SOU	0	0	0	0	0	0	64	57	0	0	0	0	121
6. SUB	0	0	0	0	0	0	0	0	0	0	0	0	0
7. CHA	0	0	0	0	0	0	56	27	0	0	0	0	83
8. CEW	0	0	0	0	0	0	0	0	0	0	0	0	0
9. AKW	0	0	0	0	0	0	0	0	0	0	0	0	0
10. KER	0	0	0	0	0	0	0	0	0	0	0	0	0
SOI	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	277	148	0	128	361	33	947

Protected species interactions

Interactions with protected species are reported in Table 58. The majority of seabird interactions resulted in live releases. One Hector's dolphin was captured dead in May in SEC; the observer noted that the capture occurred after a period of heavy rain, resulting in murky water in the area. Five dead yellow-eyed penguins were captured in four events by three vessels over the January and February period in SEC and SOU. A four metre white pointer shark was captured in SOU in February. One unidentified petrel was captured in the net and discarded by crew before the observer could assess whether it was alive or dead.

The majority of interactions between setnet vessels and protected species were categorised as net captures, making up 70% of the total interactions (Table 59 a & b), the remaining interactions were forms of vessel impact. Of the net captures, over half of the seabirds were released alive.

Seabird interactions were observed in every month of coverage and in every area except for CHA (Table 60).

¹⁰ Pingers are acoustic devices designed to deter marine mammals. They are attached to the setnet and work by emitting sounds which are intended to prevent the mammals from getting too close to the setnet.

Table 58: Protected species interactions with the inshore setnet fishery during the 2008/09 observer year.

Species	Alive	Dead	Unknown	Total
Seabirds				
Albatross (Unidentified)	3			3
Buller's Albatross	1			1
White-capped albatross	2			2
Giant petrels (Unidentified)	1			1
Petrel (Unidentified)	1		1	2
Sooty shearwater	6			6
Westland petrel	1			1
White chinned petrel	1			1
Cape petrel	6	2		8
Yellow-eyed penguin		5		5
Total seabirds	22	7	1	30
Mammals				
Hector's dolphin		1		1
New Zealand fur seal		1		1
Total mammals	0	2	0	2
Protected Fish				
White pointer shark		1		1
Total protected fish	0	1	0	1
Total protected species interactions	22	10	1	33

Table 59: Method of interaction for a) protected species released alive and b) dead protected species in the inshore setnet fishery.

a) Alive

Species	Caught in net*	Impact against vessel	Other	Total	Observer comments relating to 'Other' capture method
Seabirds					
Albatross (Unidentified)			3	3	Bird landed on vessel- assisted off by crew member
Buller's Albatross			1	1	Bird landed on vessel- assisted off by crew member
White-capped albatross			2	2	Bird landed on vessel- assisted off by crew member
Giant petrels (Unidentified)	1			1	
Petrel (Unidentified)			1	1	Bird landed on vessel, made it's own way into the wheelhouse- assisted off by crew member
Sooty shearwater	6			6	
Westland petrel		1		1	
White chinned petrel		1		1	
Cape petrel	6			6	
Total seabirds	13	2	7	22	

Total protected species interactions | 13 | 2 | 7 | 22

*Included as a capture in table 56

b) Dead

Species	Caught in net*	Impact against vessel	Other	Total
<u>Seabirds</u>				
Cape petrel	2			2
Yellow-eyed penguin	5			5
Total seabirds	7	0	0	7
<u>Mammals</u>				
Hector's dolphin	1			1
New Zealand fur seal	1			1
Total mammals	2	0	0	2
<u>Protected Fish</u>				
White pointer shark	1			1
Total protected fish	1	0	0	1
Total protected species interactions	10	0	0	10

*Included as a capture in table 56

Table 60: Seabird interactions in the inshore setnet fishery, by area and month during the 2008/09 observer year. A zero indicates that no interactions are observed, a dash indicates that no coverage took place.

FMA	Jul-08	Aug-08	Sept-08	Oct-08	Nov-08	Dec-08	Jan-09	Feb-09	Mar-09	Apr-09	May-09	Jun-09	Total
1. AKE	-	-	-	-	-	-	-	-	-	-	-	-	0
2. CEE	-	-	-	-	-	-	-	-	-	-	-	-	0
3. SEC	-	-	-	-	-	-	2	4	-	4	11	1	22
4. SOE	-	-	-	-	-	-	-	-	-	-	-	-	0
5. SOU	-	-	-	-	-	-	1	7	-	-	-	-	8
6. SUB	-	-	-	-	-	-	-	-	-	-	-	-	0
7. CHA	-	-	-	-	-	-	0	0	-	-	-	-	0
8. CEW	-	-	-	-	-	-	-	-	-	-	-	-	0
9. AKW	-	-	-	-	-	-	-	-	-	-	-	-	0
10. KER	-	-	-	-	-	-	-	-	-	-	-	-	0
Total	0	0	0	0	0	0	3	11	0	4	11	1	30

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; during the 2008/09 observer year all fishing trips on all tuna charter vessels were observed, with at least a portion of each line set being observed. The majority of fishing effort occurs in the areas SOU and CHA. Historically this fishery has had high capture numbers though this has reduced in recent years. Protected species captures have generally been of albatross and petrel species, although small numbers of marine mammals have also been captured in this fishery

All surface longline vessels are required to use seabird mitigation methods, with the requirement for night setting or line weighting, and the use of tori lines whilst setting. Some vessels also employ mitigation devices during hauling with brikle curtains¹¹ and water cannons being most common.

Table 61 summarises commercial fishing effort, observer effort and captures during the 2008/09 observer year. All four surface longline charter vessels were observed and at least part of each line set and hauled was observed, in accordance with the observers' briefing requirements. Inline with previous years the majority of fishing effort occurred in areas SOU and CHA, with one line being recorded in each of areas AKE and AKW. In total 601,082 hooks were observed out of a total of 678,780 being set. Seabird captures were observed on all four vessels and in both SOU and CHA. Effort was relatively evenly spread between areas SOU and CHA however 80% of captures occurred in area SOU. Conversely, 80% of mammal captures occurred in area CHA. Total numbers of seabirds captured and capture rates were similar to the previous observer year (Rowe 2010). This rate is lower than that recorded in the 2006/07 observer year which recorded the highest number of captures and was similar to the 2004/05 and 2005/06 observer years (Rowe 2009). The number of mammal captures was the same as the previous year (Rowe 2010) and similar to the three observer years between 2004 and 2007 (Rowe 2009).

The areas SOU and CHA show anomalies in coverage levels, appearing from the data to have received over 100% coverage. This is due to differences between the number of sets recorded by observers, and that reported by the vessels. There is no clear explanation for why the observers have recorded more lines than the vessels. The anomaly is not limited to any particular vessel, month or area.

¹¹ A brikle curtain is a frame which is set up above the point of hauling on some longline vessels it is equipped with streamers which hang down to the water level in order to work as a physical barrier, discouraging birds from feeding on the hauling line.

Table 61: Summary of commercial effort, observer effort and protected species captures in the Tuna charter surface longline fishery during the 2008/09 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	1	1	100.00	2,841	0	-	0	-
2. CEE								
3. SEC								
4. SOE								
5. SOU	94	98	104.26	281,157	27	0.096	3	0.011
6. SUB								
7. CHA	103	110	106.80	314,385	6	0.019	8	0.025
8. CEW								
9. AKW	1	1	100.00	2,699	0	-	0	-
10. KER								
Total	199	210	105.53	601,082	33	0.055	11	0.018

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

Observer coverage

During the 2008/09 observer year all four charter vessels fishing in the New Zealand EEZ were observed on all fishing trips. Both seabird and marine mammal captures were observed on all vessels. All vessels used between one and three tori lines, depending on the individual vessel and weather conditions at time of setting. Comments from observers indicate that tori lines appeared effective in reducing seabird interactions, even in foul weather. Some vessels also regularly operated mitigation devices during hauling. Night setting, line weighting regimes (snood weighting, lead-cored line), use of thawed baits and offal management was also used. Comments relating to offal management and mitigation are included in Table A6.11.

Observer coverage was undertaken through the three months April 09 to June 09 with some trips overlapping into the 2009/10 observer year. Fishing activity and protected species captures occurring during the 2008/09 observer year are reported here (Table 62).

Table 62: Number of observed lines in the Tuna charter surface longline fishery by area and month during the 2008/09 observer year.

FMA	Jul-08	Aug-08	Sept-08	Oct-08	Nov-08	Dec-08	Jan-09	Feb-09	Mar-09	Apr-09	May-09	Jun-09	Total
1. AKE	0	0	0	0	0	0	0	0	0	0	0	1	1
2. CEE	0	0	0	0	0	0	0	0	0	0	0	0	0
3. SEC	0	0	0	0	0	0	0	0	0	0	0	0	0
4. SOE	0	0	0	0	0	0	0	0	0	0	0	0	0
5. SOU	0	0	0	0	0	0	0	0	0	5	83	10	98
6. SUB	0	0	0	0	0	0	0	0	0	0	0	0	0
7. CHA	0	0	0	0	0	0	0	0	0	0	27	83	110
8. CEW	0	0	0	0	0	0	0	0	0	0	0	0	0
9. AKW	0	0	0	0	0	0	0	0	0	0	0	1	1
10. KER	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	5	110	95	210

Protected species interactions

In total there were 44 observed captures of protected species during the 2008/09 observer year. 42% of birds captured were released alive. All but two birds were albatross species with Buller's albatross making up 80% of the seabird captures. New Zealand fur seals were the only marine mammals to be captured and all but one decomposing animal were cut free and released alive (Table 63).

In areas SOU and CHA, seabirds were captured in every month of fishing activity (Table 64), with the bulk of captures occurring in May. Marine mammal captures were evenly distributed between May and June (Table 65).

Table 63: Protected species interactions with the Tuna charter surface longline fishery during the 2008/09 observer year.

Species	Alive	Dead	Decomposing	Total
Seabirds				
Black-browed albatross (Unidentified)	1			1
Buller's albatross	12	14	1	27
New Zealand white capped albatross		2		2
Wandering albatross (Unidentified)	1			1
White-chinned petrel		2		2
Total seabirds	14	18	1	33
Mammals				
New Zealand fur seal	10		1	11
Total mammals	10	0	1	11
Total protected species interactions	24	18	2	44

Table 64: Seabird interactions in the Tuna charter surface longline fishery by area and month during the 2008/09 observer year. A zero indicates that no interactions are observed, a dash indicates that no coverage took place.

FMA	Jul-08	Aug-08	Sept-08	Oct-08	Nov-08	Dec-08	Jan-09	Feb-09	Mar-09	Apr-09	May-09	Jun-09	Total
1. AKE	-	-	-	-	-	-	-	-	-	-	-	0	0
2. CEE	-	-	-	-	-	-	-	-	-	-	-	-	0
3. SEC	-	-	-	-	-	-	-	-	-	-	-	-	0
4. SOE	-	-	-	-	-	-	-	-	-	-	-	-	0
5. SOU	-	-	-	-	-	-	-	-	-	1	25	1	27
6. SUB	-	-	-	-	-	-	-	-	-	-	-	-	0
7. CHA	-	-	-	-	-	-	-	-	-	-	2	4	6
8. CEW	-	-	-	-	-	-	-	-	-	-	-	-	0
9. AKW	-	-	-	-	-	-	-	-	-	-	-	0	0
10. KER	-	-	-	-	-	-	-	-	-	-	-	-	0
Total	0	0	0	0	0	0	0	0	0	1	27	5	33

Table 65: Marine mammal interactions in the Tuna charter surface longline fishery by area and month during the 2008/09 observer year. A zero indicates that no interactions are observed, a dash indicates that no coverage took place.

FMA	Jul-08	Aug-08	Sept-08	Oct-08	Nov-08	Dec-08	Jan-09	Feb-09	Mar-09	Apr-09	May-09	Jun-09	Total
1. AKE	-	-	-	-	-	-	-	-	-	-	-	0	0
2. CEE	-	-	-	-	-	-	-	-	-	-	-	-	0
3. SEC	-	-	-	-	-	-	-	-	-	-	-	-	0
4. SOE	-	-	-	-	-	-	-	-	-	-	-	-	0
5. SOU	-	-	-	-	-	-	-	-	-	0	2	1	3
6. SUB	-	-	-	-	-	-	-	-	-	-	-	-	0
7. CHA	-	-	-	-	-	-	-	-	-	-	4	4	8
8. CEW	-	-	-	-	-	-	-	-	-	-	-	-	0
9. AKW	-	-	-	-	-	-	-	-	-	-	-	0	0
10. KER	-	-	-	-	-	-	-	-	-	-	-	-	0
Total	0	0	0	0	0	0	0	0	0	0	6	5	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 in on at the start of the 2004/05 fishing year. After a large capture event during November 2006 regulations were put in place requiring departure notices and seabird mitigation use (deployment of a streamer line and either line weighting or night setting). CSP has also distributed turtle dehookers to aid in the quick and efficient release of not only turtles but also fur seals and a number of fish species.

Commercial fishing effort, observer coverage and protected species captures are summarised in Table 67. Commercial effort (measured by number of hooks set) was higher than the previous year however observer effort was lower resulting 6.93% observer coverage. Capture rate of seabirds was down overall when compared to two of the previous four observer years (Rowe 2009, Rowe 2010). Of the 14 seabird captures, four were from a single line. Mammal captures rates were higher than three of the previous four years. No more than one mammal capture event was recorded for any one line. Two leatherback turtles were also observed captured.

Table 67: Summary of commercial effort, observer effort and protected species captures in the domestic tuna surface longline fishery during the 2008/09 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	Reptiles per 1000 Hooks
1. AKE	1,073	94	8.76	99,955	9	0.090	2	0.020	0	-
2. CEE	815	41	5.03	37,140	3	0.081	1	0.027	0	-
3. SEC										
4. SOE										
5. SOU	2	0	-	0						
6. SUB										
7. CHA	92	5	5.43	6,200	2	0.323	1	0.161	0	-
8. CEW	5	0	-	0						
9. AKW	202	11	5.45	12,550	0	-	2	0.159	2	0.159
10. KER	5	1	20.00	1,000	0	-	0	-	0	-
Total	2,194	152	6.93	156,845	14	0.089	6	0.038	2	0.013

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

Observer coverage

During the 2008/09 observer year, 17 observer trips were undertaken on 12 different domestic surface longline vessels. Protected species captures were reported from 10 of the 12 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 A6.12.

Observer coverage was spread throughout the year with only September, December and March not receiving observer coverage. The majority of observed effort was in AKE which is consistent with commercial effort being highest in that area (Table 68).

Table 68: Number of observed lines in the domestic tuna surface longline fishery by area and month during the 2008/09 observer year.

FMA	Jul-08	Aug-08	Sept-08	Oct-08	Nov-08	Dec-08	Jan-09	Feb-09	Mar-09	Apr-09	May-09	Jun-09	Total
1. AKE	25	19	0	12	6	0	5	7	0	0	3	17	94
2. CEE	17	0	0	0	0	0	0	0	0	0	12	12	41
3. SEC	0	0	0	0	0	0	0	0	0	0	0	0	0
4. SOE	0	0	0	0	0	0	0	0	0	0	0	0	0
5. SOU	0	0	0	0	0	0	0	0	0	0	0	0	0
6. SUB	0	0	0	0	0	0	0	0	0	0	0	0	0
7. CHA	0	0	0	0	0	0	0	0	0	0	0	5	5
8. CEW	0	0	0	0	0	0	0	0	0	0	0	0	0
9. AKW	0	4	0	0	0	0	0	0	0	3	4	0	11
10. KER	0	0	0	0	0	0	0	0	0	1	0	0	1
SOI	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	42	23	0	12	6	0	5	7	0	4	19	34	152

Protected species interactions

A total of 22 protected species interactions were recorded by observers in 2008/09 (Table 69). This included the capture and release of two leatherback turtles. These events occurred on the same observed trip on two successive lines approximately 24 hours apart. The whale capture was identified as a bottlenose whale; this was the first reported capture of this species.

Seabird interactions were spread throughout the year (Table 70), while marine mammal interactions occurred during the winter months (Table 71). The two leatherback turtle capture events occurred during May.

Table 69: Protected species interactions with the domestic tuna surface longline fishery during the 2008/09 observer year.

Species	Alive	Dead	Total
<u>Seabirds</u>			
Antipodean albatross		2	2
Northern royal albatross		1	1
Black-browed albatross (Unidentified)	1		1
Buller's albatross	1	2	3
Campbell albatross		1	1
New Zealand white capped albatross		1	1
Salvin's albatross		1	1
Mid-sized Petrels & Shearwaters		1	1
Black petrel		2	2
Westland petrel		1	1
Total seabirds	2	12	14
<u>Mammals</u>			
New Zealand fur seal	5		5
Whale (Unspecified)	1		1
Total mammals	6	0	6
<u>Reptiles</u>			
Leatherback turtle	2		2
Total reptiles	2	0	2
Total protected species interactions	10	12	22

Table 70: Seabird interactions in the domestic tuna surface longline fishery by area and month during the 2008/09 observer year. A zero indicates that no interactions are observed, a dash indicates that no coverage took place.

FMA	Jul-08	Aug-08	Sept-08	Oct-08	Nov-08	Dec-08	Jan-09	Feb-09	Mar-09	Apr-09	May-09	Jun-09	Total
1. AKE	0	0	-	4	3	-	0	1	-	-	0	1	9
2. CEE	2	-	-	-	-	-	-	-	-	-	0	1	3
3. SEC	-	-	-	-	-	-	-	-	-	-	-	-	0
4. SOE	-	-	-	-	-	-	-	-	-	-	-	-	0
5. SOU	-	-	-	-	-	-	-	-	-	-	-	-	0
6. SUB	-	-	-	-	-	-	-	-	-	-	-	-	0
7. CHA	-	-	-	-	-	-	-	-	-	-	-	2	2
8. CEW	-	-	-	-	-	-	-	-	-	-	-	-	0
9. AKW	-	0	-	-	-	-	-	-	-	0	0	-	0
10. KER	-	-	-	-	-	-	-	-	-	0	-	-	0
SOI	-	-	-	-	-	-	-	-	-	-	-	-	0
Total	2	0	0	4	3	0	0	1	0	0	0	4	14

Table 71: Marine mammal interactions in the domestic tuna surface longline fishery by area and month during the 2008/09 observer year. A zero indicates that no interactions are observed, a dash indicates that no coverage took place.

FMA	Jul-08	Aug-08	Sept-08	Oct-08	Nov-08	Dec-08	Jan-09	Feb-09	Mar-09	Apr-09	May-09	Jun-09	Total
1. AKE	2	0	-	0	0	-	0	0	-	-	0	0	2
2. CEE	0	-	-	-	-	-	-	-	-	-	0	1	1
3. SEC	-	-	-	-	-	-	-	-	-	-	-	-	0
4. SOE	-	-	-	-	-	-	-	-	-	-	-	-	0
5. SOU	-	-	-	-	-	-	-	-	-	-	-	-	0
6. SUB	-	-	-	-	-	-	-	-	-	-	-	-	0
7. CHA	-	-	-	-	-	-	-	-	-	-	-	1	1
8. CEW	-	-	-	-	-	-	-	-	-	-	-	-	0
9. AKW	-	2	-	-	-	-	-	-	-	0	0	-	2
10. KER	-	-	-	-	-	-	-	-	-	0	-	-	0
SOI	-	-	-	-	-	-	-	-	-	-	-	-	0
Total	2	2	0	0	0	0	0	0	0	0	0	2	6

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. The relatively small fleet conducts a large amount of fishing effort, mainly in the areas of SEC, SOE and SOU. Regulations on this fishery require the use of tori lines use and either night-setting or line weighting. Other mitigation techniques include, gas cannons, offal and bait discard management and line throwers.

Commercial fishing effort, observer effort and protected species interactions are summarised in Table 72. Observer coverage occurred in only two FMAs, most observer effort was focused on SUB, the area with the highest level of commercial fishing effort. The highest percentage of effort was observed in SOE. Overall, observer coverage was approximately 30% of the commercial effort in this fishery. No marine mammals were reported captured by observers in this fishery and the seabird capture rate was lower than any of the previous four observer years.

Table 72: Summary of commercial effort, observer effort and protected species captures in the deep-sea ling bottom longline fishery during the 2008/09 observer year.

FMA	Effort Tows	Observed Lines	Coverage (%)	Number of hooks observed	Seabird Captures*	Seabirds per 1000 hooks	Mammal Captures	Mammals per 1000 hooks
1. AKE								
2. CEE	170	0	-	0				
3. SEC	32	0	-	0				
4. SOE	134	103	76.87	1,064,700	0	-	0	-
5. SOU	220	0	-	0				
6. SUB	284	146	51.41	1,400,700	2	0.001	0	-
7. CHA								
8. CEW								
9. AKW								
10. KER								
Total	840	249	29.64	2,465,400	2	0.001	0	0.000

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

Observer coverage

During the 2008/09 observer year two trips were observed onboard one vessel. One trip operated solely in SOE, the other solely in SUB. Tori lines were used at all times, occasionally in conjunction with a 'jiggler', which worked by constantly shaking the tori line. The vessel also used a gas cannon occasionally and offal was not discharged during shooting. A deck hose was occasionally used to deter birds who moved in too close during hauling. Comments relating to offal management, mitigation techniques and protected species interaction and captures (i.e. interactions with the fishing gear only) are given in Table A6.13.

Observer coverage took place in two blocks spanning a total of five months (Table 73).

Table 73: Number of observed lines in deep-sea ling bottom longline fishery by area and month during the 2008/09 observer year.

FMA	Jul-08	Aug-08	Sept-08	Oct-08	Nov-08	Dec-08	Jan-09	Feb-09	Mar-09	Apr-09	May-09	Jun-09	Total
1. AKE	0	0	0	0	0	0	0	0	0	0	0	0	0
2. CEE	0	0	0	0	0	0	0	0	0	0	0	0	0
3. SEC	0	0	0	0	0	0	0	0	0	0	0	0	0
4. SOE	0	37	57	9	0	0	0	0	0	0	0	0	103
5. SOU	0	0	0	0	0	0	0	0	0	0	0	0	0
6. SUB	0	0	0	0	0	0	0	0	0	65	81	0	146
7. CHA	0	0	0	0	0	0	0	0	0	0	0	0	0
8. CEW	0	0	0	0	0	0	0	0	0	0	0	0	0
9. AKW	0	0	0	0	0	0	0	0	0	0	0	0	0
10. KER	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	37	57	9	0	0	0	0	0	65	81	0	249

Protected species interactions

Protected species interaction are listed in Table 74, both interactions were hook captures. This was the first record of an erect crested penguin being captured by a fishing vessel. The bird was foul hooked in the flipper during hauling and was released alive. The grey petrel was hooked in the leg during shooting.

Both seabird interactions took place in April and May, on the trip in area SUB (Table 75).

Table 74: Protected species interactions with the deep-sea ling bottom longline fishery during the 2008/09 observer year.

Species	Alive	Dead	Total
<u>Seabirds</u>			
Grey petrel		1	1
Erect-crested penguin	1		1
Total seabirds	1	1	2
Total protected species interactions	1	1	2

Table 75: Marine mammal interactions in the deep-sea ling bottom longline fishery by area and month during the 2008/09 observer year. A zero indicates that no interactions are observed, a dash indicates that no coverage took place.

FMA	Jul-08	Aug-08	Sept-08	Oct-08	Nov-08	Dec-08	Jan-09	Feb-09	Mar-09	Apr-09	May-09	Jun-09	Total
1. AKE	-	-	-	-	-	-	-	-	-	-	-	-	0
2. CEE	-	-	-	-	-	-	-	-	-	-	-	-	0
3. SEC	-	-	-	-	-	-	-	-	-	-	-	-	0
4. SOE	-	0	0	0	-	-	-	-	-	-	-	-	0
5. SOU	-	-	-	-	-	-	-	-	-	-	-	-	0
6. SUB	-	-	-	-	-	-	-	-	-	1	1	-	2
7. CHA	-	-	-	-	-	-	-	-	-	-	-	-	0
8. CEW	-	-	-	-	-	-	-	-	-	-	-	-	0
9. AKW	-	-	-	-	-	-	-	-	-	-	-	-	0
10. KER	-	-	-	-	-	-	-	-	-	-	-	-	0
Total	0	0	0	0	0	0	0	0	0	1	1	0	2

6. Discussion

6.1 MIDDLE DEPTH TRAWL FISHERIES

6.1.1 Hake, hoki, ling and warehou species

In keeping with the previous year, coverage levels in 08/09 were around 20%, with a degree of observer coverage (9% - 44%) occurring in every FMA in which this fishery operated. Protected species interactions were observed on approximately half of the observed trips (22 out of 56) and on approximately half of the observed vessels (17 out of 30) in this fishery. Based on observer comments, crew awareness of bycatch issues was generally good. A number of vessels operated both primary and secondary bird scaring devices in the event of either device failure or adverse weather conditions causing problems.

A subset of vessels was responsible for a large proportion of both seabirds and marine mammals captures observed. For example, over half the total observed captures of sooty shearwaters and white-capped albatross were from a single vessel, and 27% of New Zealand fur seal captures occurred on a single vessel over the course of two observer trips in CHA. While the highest number of New Zealand fur seal captures were observed in CHA, the highest rate of captures per 100 observed tows was in CEE (representing the Cook Strait hoki fishery). Combining observations from CHA and CEE as the primary hoki fishery, the capture rate of New Zealand fur seals was 1.6 animals per 100 tows. Outside of these two FMAs only 12 mammal captures occurred, averaging 0.74 captures per 100 tows. Net captures continue to be the largest cause of both interaction and mortality, representing 81% of interactions recorded in this fishery (when combining mammal and seabird captures).

Seabird capture mitigation devices are mandatory for all trawl vessels over 28m in length, and while this represents the majority of effort in this fishery a smaller but not insignificant portion is conducted on smaller vessels (Cook Strait hoki fishing). There is continuing research on reducing net captures (e.g. net binding, Clement and Associates Limited 2009), offal management (Abraham et. al 2009), and bird scaring devices. Offal management consistently appears as a factor in bird attendance at vessels and trials of different offal batching regimes as well as different treatment of offal (mincing) are continuing to be funded by CSP with promising results. There are also plans to further investigate effective mitigation practices for smaller vessels, with the aims of developing effective and practical mitigation strategies specific to these vessels.

6.1.2 Southern Blue Whiting

The southern blue whiting fishery is a particularly focused seasonal fishery operating in a two key areas, around the Bounty Islands and the around Campbell Island. Both island groups have important bird breeding colonies (e.g. Salvin's albatross on the Bounty Islands) and pinniped colonies (a large colony of New Zealand fur seals on the Bounty Islands and New Zealand sea lions on Campbell Island). The fishery received some of the highest levels of observer coverage and the 40% coverage level for 2008/09 has proved to be the highest since 2004/05.

All trawlers in this fishery are over 28m in length and so are subject to regulations regarding mitigation practices. Additionally, many vessels operated meal plants, meaning a reduction in the offal produced by the fishery as a whole. However due to the nature of the fishery, where large fish catches are common, a number of observers noted that offal production sometimes outstripped meal plant capacity and vessels having to discharge offal to keep up with processing. Vessels which did not operate meal plants tended to have some form of mincer or hasher which macerated offal before discharge, in some cases discharging below the waterline.

The 2008/09 observer year saw the lowest levels of observed seabird and fur seal bycatch since 2004/05 and also a reduction in sea lion captures compared to the previous two years. While there are still no mitigation devices in place to reduce pinniped captures, VMPs and MMOPs have been developed to provide procedural guidelines to reduce bycatch. Vessels were generally noted to be adhering to VMPs and MMOPs in regards to offal discharge (not discharging during shooting or hauling), having a crew member on watch for marine mammals and conducting shooting and hauling operations as quickly as practicable.

6.1.3 Scampi

The scampi fishery received its lowest overall coverage levels since 2005/06. As in the previous year AKE received the highest number of coverage days. Notably the areas receiving the least observer coverage were SOE and SUB; the primary areas for the scampi fishery. More days were subsequently planned for the 2009/10 observer year.

While coverage levels were the lowest in recent years, capture rates of pinnipeds were the highest recorded, with two animals observed captured over 72 tows in SUB resulting in a rate of 2.78 animals per 100 tows. Capture rates of seabirds were also higher than in the previous year with four of the seven interactions from a single vessel. Most of the vessels observed were less than 28m in length and therefore not subject to seabird mitigation regulations, however all vessels utilised tori lines as bird scaring devices and offal batching was conducted to some degree on three of the four vessels.

6.1.4 Squid

Observer coverage in the squid trawl fishery was similar to the previous year with around 35% of commercial effort being observed. Observer coverage was conducted in every FMA where significant amounts of squid fishing took place, with the highest levels of coverage occurring in SUB and centring on the SQU6T fishery. While the amount of observer effort in SUB was higher than in the previous year, the amount of commercial effort was also higher, resulting in a lower percentage of coverage than in 2007/08.

Overall 2008/09 saw a large increase in the numbers of seabirds observed captured with 100 more birds than the previous year. Combined with a reduction in observer effort in this fishery for 2008/09 the capture rate doubled over the previous year, to 20.56 birds per 100 tows. While in

previous years sooty shearwaters have been the numerically dominant species, for 2008/09 white chinned petrels were the most commonly captured species. As has been seen in other fisheries, captures are not evenly distributed throughout the observer trips. Two vessels had particularly high levels of captures, one capturing 44 birds, and another capturing 35 birds (25 of which were sooty shearwaters). Of note is that all but one of these captures were net captures. Observer comments relating to these trips revealed a number of factors which could have contributed to these large scale captures. These include high levels of deck lighting, gear problems leading to the net being at the surface for an extended period and crew failing to adequately clean the net between shots. In the particular case of net cleaning it was noted that once this was done more thoroughly, captures decreased. While the overall number of captures increased from the previous year, the number of warp captures decreased by almost half. During the 2008/09 observer year two New Zealand sea lions were captured in the SQU6T fishery. This represents a reduction on the previous year's total of five captures and the lowest number of captures in recent years with an overall downward trend since 2004/05. The period corresponds to a period of SLED usage on almost all tows in SQU6T

Observer comments indicated that as with the hoki, hake, ling and warehou fishery crews displayed good awareness of bycatch issues and mitigation practices. Most vessels carried and/or operated both twin tori lines and bird bafflers and observer comments indicated that offal management practices were generally adhered to. With regards to offal management, vessels tended to either meal all offal or pass it through hashers before discharging. One vessel was noted to not have screens in the factory sumps, leading to a constant stream of discharge and a resultant aggregation of birds around the vessel.

6.2 PELAGIC TRAWL FISHERIES

Observer coverage in pelagic trawl was achieved in every area where fishing was conducted. During the 2008/09 year observer effort increased while commercial effort decreased leading to a coverage level of 35.37%, almost double that of the previous year (18.63%). Capture rates for both birds and mammals also increased in comparison to the previous year and were the highest since the 2004/05 observer year.

Of concern over recent years has been the occurrence of multiple-capture events of common dolphins. During the 2008/09 observer year the highest number of common dolphins captured in one event was five, and of the 11 common dolphin captures, 10 occurred in three events on a single vessel. Observer comments indicated very little offal was produced by this vessel. Two of the three tows (accounting for eight captures) were hauled at similar times; 0435 and 0438 hours New Zealand Daylight Time. Overall though, captures of common dolphins have decreased compared to previous years. Both pilot whale captures (one male and one female) occurred in a single event. Observer comments do not highlight any specific causes and the vessel appeared to be adhering to most requirements of the MMOP and VMPs. Fur seal captures were the largest contributor to the 2008/09 year's higher capture rate of mammals with the highest number of captures since 2005/06.

Sea bird captures were the highest since 2004/05 though captures rates were low compared to other fisheries, with no notable multiple capture events observed. One vessel was responsible for six of the 18 seabird observed captures, however observer comments indicate that very little offal was discharged (none during shooting or hauling), the net was cleaned and shooting and hauling was conducted as quickly as possible on that vessel.

6.3 DEEPWATER TRAWL FISHERIES

In keeping with previous years, bird capture rates were lower than in other trawl fisheries. While six interactions were with the fishing gear, five were recorded as impacts against the vessel or ‘deck strikes’. In general, observer comments point to lower seabird abundance around the vessel than some other fisheries. A number of the vessels in this fishery were observed to produce and discharge only very limited quantities of offal which may be a contributing factor to lower bird abundances.

This report does not contain summaries of benthic materials caught in commercial fisheries though this information was collected by observers, and used for the CSP project *Identification of protected corals*¹². The deepwater trawl fishery is where most protected coral bycatch has been observed. Information on protected coral bycatch will be included in future CSP Observer Reports and historic data will be presented in a separate report arising from CSP project MCSINT2010/03¹³ *Bycatch of protected corals in NZ fisheries waters*.

6.4 INSHORE FISHERIES

The large increase in observer coverage in the 2008/09 observer year and coverage of areas which had not previously been observed has revealed types of protected species interactions not previously observed or reported, and also demonstrated some large spatial variations in interactions. Notable capture events of spotted shags and common dolphins along with captures of yellow-eyed penguins, a white pointer shark and Hector dolphins raise concern over the extent and nature of the impacts of these fisheries on protected species, and highlight an urgent need for further information. There still remain difficulties in placing observers onboard these small vessels and this will need to be addressed in order to obtain adequate information.

6.4.1 Inshore trawl

Inshore trawl coverage focused on the areas SEC, SOU and CHA with small amounts of coverage being achieved in AKE, CEW and AKW. While capture rates in areas such as SOU and CHA were similar to off shore fisheries, a much higher capture rate was observed in SEC. This was partially due to a single mass capture event of spotted shags; however even discounting this event, the highest rate of inshore trawl captures in any of the FMAs observed was in SEC. A higher proportion of warp captures occurred in the inshore trawl fishery when compared to the offshore fisheries, indicating a need for further development of seabird mitigation devices or practices for use on trawlers under 28m. There was a clear division in mode of capture amongst seabirds, with observed albatross mortalities resulting solely from warp strike while observed smaller bird captures were predominantly net captures.

¹² INT2007/01, INT2008/02, INT2009/03 see MCS annual plans from 2007/08 onwards.

¹³ See MCS annual plan 2010/11

Based on observer comments there is considerable variation in offal management practices between vessels, with some practicing batching as a matter of course, and others altering practices depending on bird activity. Some vessels were even observed to batch offal until the end of the fishing day and only then discharge. The quantity of offal would also tend to vary, with some vessel's processing very little fish (generally only shark bycatch) while others processed a larger portion of their catch, resulting in more offal. One vessel was observed to operate a specific discharge chute to ensure that offal remained well away from the warps.

While no mitigation devices are regulated for the majority of vessels in this fishery, some form of bird scaring device (tori line, warp scarer, warp deflector etc) was used for approximately 50% of the observed tows. Observer comments indicated that mitigation use by vessels ranged from some vessels operating bird scarers on every tow; others decided on use depending on weather conditions, bird abundance, crew availability and other factors and yet others did not use any forms of mitigation.

Development of effective, safe, convenient and low cost mitigation for small trawl vessels should be a future priority in this fishery in order to reduce both seabird and marine mammal interactions.

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

Coverage in this fishery was focused on SEC, where vessels fished areas ranging from what would be considered 'inshore' to the Chatham Rise, near the boundary with SOE. While 5% coverage was achieved in SEC, just 0.5% was achieved nationally. All captures occurred on one vessel, however given the very low level of coverage achieved in this 'fishery' it is not possible to make robust conclusions, or comparisons with previous years.

Observer comments from the vessel responsible for the captures indicate that the vessel did not discharge any offal during setting and also operated an adjustable tori line which was monitored closely by the crew throughout setting.

6.4.3 Inshore bottom longline- Snapper

In 2008/09, 99% of commercial snapper bottom longlining was conducted in AKE with small numbers of sets in CHA, CEW and AKW. All Observer effort took place in AKE in the period March to June 2009. During this time, 20 vessels were observed from a total of 52 vessels which reported bottom longlining for snapper in AKE during that period. While a number of the vessels had been observed in the past, where possible, coverage was targeted at vessels and locations in the AKE area not previously observed.

Protected species interactions were dominated by flesh-footed shearwaters and black petrels with these species making up 68% of interactions observed. Captures directly on the hook were the most common form of interaction for both the animals released alive and mortalities. Animals which were released alive tended to be caught during hauling, while indications suggest that dead animals were likely to be captured during setting of the line. In general, based on observer comments, bird abundance and activity displayed a large degree of spatial variance with some areas, particularly

those around islands with bird colonies, showing high abundances while in other areas very few birds attended the vessels.

Comments relating to offal management showed that, on the whole, offal discharge in this fishery is limited as much of the catch is landed green¹⁴, also any processing tended to be while the vessel was steaming between lines, limiting the risk of interactions. When unused bait was discarded during haul, it was observed to serve as an attractant to birds, with birds generally moving in closer to the point of hauling whenever baits were discarded. Vessels' management of unused bait varied considerably with a spectrum ranging from retaining baits onboard and discarding them between sets, to discarding on the opposite side to hauling, to simply discarding bait continuously around the point of hauling.

Mitigation practices were variable between vessels, with some vessels employing no mitigation, others employing mitigation depending on bird activity and environmental factors. Tori line construction was observed to vary, ranging from those consisting only of a backbone and no streamers while others were of more substantial construction. A tori line's construction is critical to its effectiveness, and certain requirements are now legislated for all commercial bottom longline fishing¹⁵.

6.4.4 Setnet

Historically very low levels of observer coverage have been achieved in the setnet fishery. In 2008/09 increased funding in relation to the draft Hector's and Maui's Dolphin TMP saw an increase in coverage, focusing on a confined time period in order to achieve maximum relative coverage in key areas/periods. A separate CSP-funded period of coverage was also conducted in the Kaikōura region. In total, approximately twice as many net hauls were observed in the 2008/09 as in the previous year. There was a significant change to the historic fishing grounds in 2008/09, particularly for the rig fishery, due to the spatial closures as part of the draft Hector's and Maui's dolphin TMP, which complicates any comparisons to previous years.

Captures rates of seabirds in this fishery were almost double that of the previous year while mammal captures were lower (both rate and absolute number of captures). The capture of a white pointer shark in SOU was the first observed on a setnet vessel. A Hector's dolphin was captured on the first day of coverage on a vessel operating out of Kaikōura. The observed position was outside of the closed areas, after a period of heavy rain and close to a river mouth, resulting in increased sediment load in the water and poor visibility. The capture was in the general area of a previous observed Hector's dolphin capture. Net captures were the most common form of interaction for both marine mammals and seabirds.

Live releases made up 73% of interactions with seabirds, observer comments indicate that a number of birds were caught on hauling as they strayed too close to the hauling net while feeding. These tended to be released alive with no obvious visible injuries, (however the actual extent of injury is not possible to assess at sea). Therefore, reducing attractants for birds (such as offal discharge) during hauling could lead to a reduction in capture numbers.

¹⁴ The term 'green' refers to fish that are packed whole with no processing of the fish taking place onboard the vessel.

¹⁵ Fisheries (Seabird Sustainability Measures- Bottom Longlines) Notice (No.2) 2008 (No. F441)
www.fish.govt.nz/NR/rdonlyres/BB06E8E0-9B63-48CF-932C-75894478CB4D/0/F441.pdf

For the likes of mammals and white pointer shark it (and some of species of seabird such as shags and penguins) is more difficult to identifying whether the animals were captured on setting, hauling or during the time when the net was on the bottom and fishing. It is critical to be able to discern at what stage in fishing the captures take place, for the purposes of making mitigation recommendations. It is assumed that the highest risk time during fishing is the setting and hauling periods where the net is travelling through the water column and so within the range of most species. Narrowing down the period of risk allows for more efficient forms of mitigation to be developed. While no mitigation is currently regulated in this fishery it was observed that a number of vessels did employ mitigation techniques and practices. Some vessels operated pingers, others used offal management practices or net cleaning in order to limit the attractiveness of fishing activity to protected species.

6.5 SURFACE LONGLINE FISHERIES

6.5.1 Charter tuna

The four vessels operating in the charter tuna fishery were observed for the entire duration of their fishing within the New Zealand EEZ. In previous years, observers in this fishery have recorded high numbers of seabird captures. During 2008/09 capture rates were approximately half that of the previous year. As in previous years the majority of captures occurred in SOU. Captures of both mammals and birds occurred on all vessels.

One vessel was noted to alter its practices following a capture event by increasing line weighting. All vessels were observed to utilise up to three tori lines with two vessels employed a form of bridle curtain during hauling. Observer comments provide valuable insights into the factors which could have contributed to captures (Table A6.11). Fishing close to the full moon yielded eight captures for one vessel while rate of captures on another appeared to increase when the vessel stopped to haul in larger fish or while the line was being hauled perpendicular to the vessel.

6.5.2 Domestic tuna and swordfish

Coverage of the domestic tuna fishery was slightly lower than during the previous year, brought about in part by a reallocation of observers to the inshore trawl and setnet fisheries. While overall coverage decreased, coverage in KER increased to 20% due to reduced commercial effort in that FMA.

There were fewer observed captures of seabirds compared to the previous year while captures of mammals and reptiles increased, though all mammals and reptiles were released alive. The 2008/09 year did not see any large scale capture events as in the previous year. Seabird captures were dominated by albatross species, accounting for 70% of observed seabird captures.

A number of both regulated and voluntary mitigation measures are in place in this fishery. Observer comments indicate that while almost all vessels operated tori lines, there was a wide variation in offal management practices employed. Some vessels were observed to retain all offal and returned bait, whilst others discarded continuously. As in the bottom longline fishery, unused baits can serve as an attractant to seabirds. Discarding of offal away from the point of hauling was

noted to draw birds away from the line. Mitigation research in this fishery is continuing and use of died baits, water cannons and forms of bristle curtains continues within the fleet.

6.6 BOTTOM LONGLINE FISHERY

Only one vessel was observed for two trips during the 2008/09 observer year, however due to the small size of the fleet, this equated to 30% coverage of the fishery for the year. While this is a relatively high amount of coverage compared to some other fisheries, it was limited to two of the five FMA's fished. The difficulty in gaining a more representative coverage in this fishery comes from the very long trips and small fleet of vessels, meaning that spreading the coverage becomes problematic. Observer comments indicate that when offal discards are closely managed and mitigation devices used, seabird capture rates can be reduced. Regulated mitigation measures are in place for this fishery, with offal management, line weighting and tori line use being required and this appears to have resulted in the steady reduction in capture rates over recent years this is combined with a steady reduction in commercial effort in this fishery.

It will be desirable to spread observer effort between the vessels in this fishery in future years in order to gain a more complete understanding of the protected species interactions in this fishery.

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

Table A1: 2 Seabirds

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

Table A1.3: Marine mammals

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

Table A1. 4: Reptiles

MFish Code	Common name	Scientific name
LBT	Leatherback turtle	<i>Dermochelys coriacea</i>
GNT	Green turtle	<i>Chelonia mydas</i>

Table A1. 5: Protected fish species

MFish Code	Common name	Scientific name
SBG	Spotted black grouper	<i>Epinephelus daemeli</i>
WPS	White pointer shark	<i>Carcharodon carcharias</i>

Appendix 2

PROTECTED SPECIES INTERACTIONS DURING THE 2008/09 OBSERVER YEAR

See Appendix 1 for scientific names of species

Species	Alive	Dead	Decomposing	Unknown	Total
<u>Seabirds</u>					
Albatross (Unidentified)	9	8	1		18
Antarctic prion		1			1
Antipodean albatross		2			2
Black petrel	3	10			13
Black-backed gull	1	1			2
Black-bellied storm petrel	1	1			2
Black-browed albatross (Unidentified)	2				2
Blue penguin		1			1
Buller's albatross	20	38	1		59
Buller's and Pacific albatross	1				1
Buller's shearwater	2	1			3
Campbell albatross		1			1
Cape petrel	7	2			9
Chatham Island albatross		1			1
Common diving petrel	2	1			3
Erect-crested penguin	1				1
Fairy Prion	2	1			3
Flesh-footed shearwater	13	6			19
Fluttering shearwater		1			1
Giant petrels (Unidentified)	2				2
Great albatrosses	1				1
Grey petrel		6			6
Grey-headed albatross		1			1
Gull or tern		2			2
Mid-sized Petrels & Shearwaters		1			1
New Zealand white capped albatross		3			3
Northern royal albatross		1			1
Petrel (Unidentified)	35			1	36
Petrels, Prions and Shearwaters	7	2			9
Prions (Unidentified)	4				4
Salvin's albatross	5	16			21
Salvin's prion	1				1
Seabird - Large		1			1
Seabird - Small	1				1
Shy albatross	1				1
Smaller albatrosses (Thalassarche spp.)	3	6			9
Sooty shearwater	44	91	1		136
Southern cape petrel		1			1
Southern royal albatross	1				1
Spotted shag		33			33
Storm Petrel	1				1
Wandering albatross (Unidentified)	1				1

Westland petrel	1	3			4
White-capped albatross	15	68			83
White-chinned petrel	22	77			99
White-faced storm petrel		1			1
Yellow-eyed penguin		5			5
Total seabirds	209	394	3	1	607
<u>Mammals</u>					
Bottlenose dolphin		1			1
Common dolphin		20			20
Dolphins and Toothed whales			2		2
Hector's dolphin		1			1
New Zealand fur seal	41	94	2		137
New Zealand sea lion	1	5			6
Pilot whale		2			2
Baleen whales			2		2
Whale (Unspecified)	1				1
Total mammals	43	123	6	0	172
<u>Reptiles</u>					
Green turtle	1				1
Leatherback turtle	2				2
Total reptiles	3	0	0	0	3
<u>Protected Fish</u>					
White pointer shark		1			1
Total fish	0	1	0	0	1
Total protected species interactions	255	518	9	1	783

Appendix 3

PROTECTED SPECIES INTERACTIONS BY METHOD DURING THE 2008/09 OBSERVER YEAR

See Appendix 1 for scientific names of species

Species	Bottom longline	Setnet	Surface Longline	Trawl	Total
Seabirds					
Albatross (Unidentified)		3		15	18
Antarctic prion				1	1
Antipodean albatross			2		2
Black petrel	11		2		13
Black-backed gull	2				2
Black-bellied storm petrel				2	2
Black-browed albatross (Unidentified)			2		2
Blue penguin	1				1
Buller's albatross	2	1	30	26	59
Buller's and Pacific albatross				1	1
Buller's shearwater	3				3
Campbell albatross			1		1
Cape petrel		8		1	9
Chatham Island albatross				1	1
Common diving petrel	1			2	3
Erect-crested penguin	1				1
Fairy Prion				3	3
Flesh-footed shearwater	16			3	19
Fluttering shearwater	1				1
Giant petrels (Unidentified)		1		1	2
Great albatrosses				1	1
Grey petrel	5			1	6
Grey-headed albatross				1	1
Gull or tern				2	2
Mid-sized Petrels & Shearwaters			1		1
New Zealand white capped albatross			3		3
Northern royal albatross			1		1
Petrel (Unidentified)		1		35	36
Petrels, Prions and Shearwaters	1			8	9
Prions (Unidentified)				4	4
Salvin's albatross			1	20	21
Salvin's prion				1	1
Seabird - Large				1	1
Seabird - Small				1	1
Shy albatross				1	1
Smaller albatrosses (Thalassarche spp.)				9	9
Sooty shearwater		7		129	136
Southern cape petrel				1	1
Southern royal albatross				1	1
Spotted shag				33	33
Storm Petrel				1	1

Wandering albatross (Unidentified)			1		1
Westland petrel		1	1	2	4
White-capped albatross		2		81	83
White-chinned petrel		1	2	96	99
White-faced storm petrel				1	1
Yellow-eyed penguin		5			5
Total seabirds	44	30	47	486	607
<u>Mammals</u>					
Bottlenose dolphin				1	1
Common dolphin				20	20
Dolphins and Toothed whales				2	2
Hector's dolphin		1			1
New Zealand fur seal		1	16	120	137
New Zealand sea lion				6	6
Pilot whale				2	2
Baleen whales				2	2
Whale (Unspecified)			1		1
Total mammals	0	2	17	153	172
<u>Reptiles</u>					
Green turtle				1	1
Leatherback turtle			2		2
Total reptiles	0	0	2	1	3
<u>Protected Fish</u>					
White pointer shark		1			1
Total fish	0	1	0	0	1
Total protected species interactions	44	33	66	640	780

Appendix 4

PROTECTED SPECIES INTERACTIONS BY MONTH DURING THE 2008/09 OBSERVER YEAR

See Appendix 1 for scientific names of species

Species	Jul-08	Aug-08	Sep-08	Oct-08	Nov-08	Dec-08	Jan-09	Feb-09	Mar-09	Apr-09	May-09	Jun-09	Total
<u>Seabirds</u>													
Albatross (Unidentified)					1	1	2	10	3	1			18
Antarctic prion								1					1
Antipodean albatross				1	1								2
Black petrel				1	1					9	2		13
Black-backed gull										1	1		2
Black-bellied storm petrel				1						1			2
Black-browed albatross (Unidentified)	1											1	2
Blue penguin										1			1
Buller's albatross	9	3		1			1		1	5	33	6	59
Buller's and Pacific albatross								1					1
Buller's shearwater											3		3
Campbell albatross					1								1
Cape petrel			1							2	5	1	9
Chatham Island albatross							1						1
Common diving petrel										1	2		3
Erect-crested penguin										1			1
Fairy Prion		1				1	1						3
Flesh-footed shearwater						2					15	2	19
Fluttering shearwater										1			1
Giant petrels (Unidentified)			1								1		2
Great albatrosses								1					1
Grey petrel	4	1									1		6
Grey-headed albatross								1					1
Gull or tern							2						2
Mid-sized Petrels & Shearwaters				1									1

New Zealand white capped albatross												3	3
Northern royal albatross								1					1
Petrel (Unidentified)							1	7	27		1		36
Petrels, Prions and Shearwaters								1	6	2			9
Prions (Unidentified)	1			2				1					4
Salvin's albatross		1	1	2	3	2		11	1				21
Salvin's prion	1												1
Seabird - Large										1			1
Seabird - Small		1											1
Shy albatross												1	1
Smaller albatrosses (Thalassarche spp.)					1		1		4	3			9
Sooty shearwater				5	7		2	43	46	28	5		136
Southern cape petrel				1									1
Southern royal albatross					1								1
Spotted shag								33					33
Storm Petrel							1						1
Wandering albatross (Unidentified)											1		1
Westland petrel		2									1	1	4
White-capped albatross					2	4	8	21	24	15	9		83
White-chinned petrel		2		2		1		38	32	20	4		99
White-faced storm petrel								1					1
Yellow-eyed penguin							1	4					5
Total seabirds	16	11	3	17	18	11	21	175	144	107	71	13	607
<u>Mammals</u>													
Bottlenose dolphin			1										1
Common dolphin				1		10		9					20
Dolphins and Toothed whales										2			2
Hector's dolphin											1		1
New Zealand fur seal	26	49	30	3	2	2	4	1	1		6	13	137
New Zealand sea lion			3		1			1		1			6
Pilot whale						2							2
Baleen whales											2		2
Whale (Unspecified)	1												1
Total mammals	27	49	34	4	3	14	4	11	1	3	9	13	172
<u>Reptiles</u>													

Green turtle											1		1
Leatherback turtle											2		2
Total reptiles	0	0	0	0	0	0	0	0	0	0	3	0	3
<u>Protected Fish</u>													
White pointer shark								1					1
Total fish	0	0	0	0	0	0	0	1	0	0	0	0	1
Total protected species interactions	43	60	37	21	21	25	25	187	145	110	83	26	783

Appendix 5

PROTECTED SPECIES INTERACTIONS BY FISHERIES MANAGEMENT AREA DURING THE 2008/09 OBSERVER YEAR

See Appendix 1 for scientific names of species

Species	1.AKE	2.CEE	3.SEC	4.SOE	5.SOU	6.SUB	7.CHA	8.CEW	9.AKW	Total
<u>Seabirds</u>										
Albatross (Unidentified)			8	2	5	2	1			18
Antarctic prion						1				1
Antipodean albatross	2									2
Black petrel	13									13
Black-backed gull	2									2
Black-bellied storm petrel						2				2
Black-browed albatross (Unidentified)		1					1			2
Blue penguin	1									1
Buller's albatross	1	2	3	4	36	1	12			59
Buller's and Pacific albatross					1					1
Buller's shearwater	3									3
Campbell albatross	1									1
Cape petrel		1	8							9
Chatham Island albatross				1						1
Common diving petrel	1			1	1					3
Erect-crested penguin						1				1
Fairy Prion			1				2			3
Flesh-footed shearwater	19									19
Fluttering shearwater	1									1
Giant petrels (Unidentified)		1	1							2
Great albatrosses						1				1
Grey petrel			4			2				6
Grey-headed albatross					1					1
Gull or tern			2							2
Mid-sized Petrels & Shearwaters	1									1

New Zealand white capped albatross							3			3
Northern royal albatross	1									1
Petrel (Unidentified)			26		5	5				36
Petrels, Prions and Shearwaters	1		1		1	6				9
Prions (Unidentified)					2		2			4
Salvin's albatross	1		15			4	1			21
Salvin's prion							1			1
Seabird - Large						1				1
Seabird - Small							1			1
Shy albatross					1					1
Smaller albatrosses (Thalassarche spp.)			1		3	5				9
Sooty shearwater			53	1	48	33	1			136
Southern cape petrel				1						1
Southern royal albatross		1								1
Spotted shag			33							33
Storm Petrel					1					1
Wandering albatross (Unidentified)					1					1
Westland petrel			1				3			4
White-capped albatross			1		28	44	10			83
White-chinned petrel			14		33	50	2			99
White-faced storm petrel				1						1
Yellow-eyed penguin			4		1					5
Total seabirds	48	6	176	11	168	158	40	0	0	607
<u>Mammals</u>										
Bottlenose dolphin	1									1
Common dolphin							11	5	4	20
Dolphins and Toothed whales					1	1				2
Hector's dolphin			1							1
New Zealand fur seal	1	19	18		6	21	66	2	4	137
New Zealand sea lion						6				6
Pilot whale							2			2
Baleen whales					2					2
Whale (Unspecified)	1									1
Total mammals	3	19	19	0	9	28	79	7	8	172
<u>Reptiles</u>										

Green turtle	1									1
Leatherback turtle									2	2
Total reptiles	1	0	0	0	0	0	0	0	2	3
<u>Protected Fish</u>										
White pointer shark					1					1
Total fish	0	0	0	0	1	0	0	0	0	1
Total protected species interactions	52	25	195	11	178	186	119	7	10	783

Appendix 6

OBSERVER COMMENTS FROM OBSERVED VESSELS AND TRIPS IN EACH FISHERY DURING THE 2008/09 OBSERVER YEAR

See Appendix 1 for scientific names of species

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

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

Vessel No.	No. Times Observed	FMA's Fished	Offal Management	Mitigation used	Seabird interactions	Seabird Capture?	Marine mammal interactions	Marine mammal capture?
1	1	SEC	No Meal plant, no specific comments. Vessel followed Vessel management plan so avoided discharge during shooting or hauling.	BB	Seabirds following the vessel at all times, most abundant after every haul.	Y	No Specific Comments	N
2	1	CHA	Vessel did not discharge during shooting or hauling.	Twin TL	Birds observed feeding from the codend. Bird abundance highest during discharge of offal	N	FUR seen chasing the net during hauling	Y
3	3	1.CHA 2.CHA 3.SOU	Meal plant onboard. Vessel discharged offal very rarely, did not discharge during shooting or hauling except for one tow.	BB	Seabirds present at all times in high numbers.	N Y N	FUR seen beside vessel feeding on discharge.	N N N
4	2	1.SEC, SOU, SUB, CHA 2.SEC, SOU, SUB	Meal plant onboard. No specific comments.	BB, TL	Present at all times but peaked during hauling when birds would feed on codend. Bird numbers increased in relation to wind and decreased with the presence of other vessels.	N N	FUR, HSL and PIW sighted. Level of interaction would vary between trips.	Y N
5	2	1. SEC, SOU, SUB 2. SEC, SOE, SOU, SUB	Meal plant onboard. No offal discharged during the trip. Factory scupper pumps fitted with mincers.	BB	Birds around the vessel at all times, fed aggressively on the codend and on factory floor wash.	Y Y	Few Marine mammals sighted.	N N
6	3	1. SOU, SUB, CHA 2. SOU, SUB 3. SEC, SOE, SOU, SUB	Meal Plant onboard. No discarding of whole fish only rare discarding of offal.	BB	Bird abundance peaked during hauling. Smaller albatross observed to feed aggressively on codend.	N Y Y	Small number of FUR sighted	N Y Y
7	1	SEC, SOE, CHA	Factory sumps fitted with screens	Twin TL	Bird abundance increased dramatically as codend surfaced. Albatross feeding on 'floaters' small birds feeding on sump discharge	Y	Vessel maintained watch for marine mammals before shooting. FUR and HSL observed to feed aggressively on the codend.	Y
8	2	1. SEC, SOE 2. SEC, SOU	No meal plants or miners onboard so offal discharge was constant during processing. Discharge stopped during shooting and hauling.	Twin TL	High bird abundance, birds would congregate around discharge points	Y N	FUR sighted occasionally	N N

9	1	CEE, CHA	No specific comments.	Nil	Seabirds present.	N	FUR and CDD observed. FUR attracted to codend at surface. CDD did not interact with vessel	Y
10	3	1. CHA 2. SUB 3. CHA	Vessel had meal plant. Offal only discarded on rare occasions	Twin TL	Seabirds constantly followed vessel feeding on factory deck-wash, any discarded offal and net lengthener. Most birds caught in the net's wings.	Y	FUR fed regularly on the codend. Vessel made all turns with doors on the surface	Y
						Y		N
						N		N
11	2	1. CHA 2. CHA	Meal plant onboard. Continuous flow of deck-wash and livers	Twin TL (Poor condition)	Bird numbers increased with offal discard, birds fed aggressively on offal.	Y	Fur present for most hauls.	N
						N		N
12	4	1. SOE 2. SEC, SOE 3. SEC, SOE, SOU 4. SEC	No meal plant. Offal was not discarded during hauling; however it was frequently discarded during shooting.	BB, Twin TL	Birds observed to feed aggressively when codend surfaced.	N	FUR only present occasionally	Y
						N		N
						N		N
						N		N
13	2	1. CHA 2. CHA	Meal plant on vessel	Twin TL	Birds fed aggressively from codend	Y	Mammals observed to feed aggressively from codend	Y
						N		N
14	1	CEE, CHA	No meal plant. No discarding during setting or hauling.	BB	Seabirds present in large numbers during hauling, feeding aggressively on the net.	N	FUR present during all observed hauls, actively feeding on codend, only seen twice during setting.	Y
15	1	SOU	Offal discarded during most hauls from both port and starboard sides of vessel.	Twin TL	Seabirds present at all times	N	Mammals present on occasion	N
16	1	SEC, SOU, SUB	No specific comments.	Twin TL	Birds constantly present.	Y	Marine mammals seldom sighted.	N
17	3	1. CHA 2. CHA 3. SOU	Offal discharged during set and haul.	Not stated	Birds observed feeding on offal discharge.	Y	FUR seen alongside vessel regularly, not seen interacting with net.	Y
						N		N
						N		N
18	3	1. CHA 2. SEC, SOE, CHA 3. SEC, SOU	Vessel equipped with mincers. Offal never discharged during shooting and rarely during hauling.	Twin TL	Bird numbers increased during processing. Birds fed from codend. Most birds caught during hauling.	N	Marine mammals seldom sighted.	N
						Y		Y
						Y		N
19	2	1. CHA 2. SOU	Meal plant present, offal not discharged during shooting or hauling as a matter of course but did occur occasionally.	BB	Bird activity increased rapidly during hauling, feeding aggressively off stickers.	Y	FUR sighted occasionally	N
						N		N
20	1	CEE, CHA	Offal held during shooting and hauling	Nil	Seabirds sighted in large numbers.	N	FUR, CDD and DDO sighted in large numbers.	Y

21	1	CEE, CHA	No offal discharged during shooting or hauling	Nil	Birds would congregate at stern during shooting and hauling	N	No specific comments	Y
22	2	1. SEC, SOU 2. SEC, SOE	No discarding of offal or whole fish during shooting or hauling.	BB, Twin TL	Seabirds fed opportunistically on fish and detritus from the trawl net at hauling times.	Y N	Few marine mammals sighted.	N Y
23	2	1. SEC, SOE 2. SEC, SOU	Meal plant on board. Deck wash was minced before passing through sump pumps.	Twin TL, BB also onboard but not used	Seabirds present at all times with abundance increasing as net surfaced. Bird fed aggressively from the net	Y Y	FUR sighted on occasion	N N
24	1	SOE	Offal mealed, when meal plant was not operating offal was batch discarded. No discharge during setting or hauling.	BB	Birds present at a distance. Abundance varied between areas.	N	FUR fed on codend	N
25	1	AKW	No meal plant. No offal or whole fish discarded at any time	BB	Birds in very low numbers. Not aggressive.	N	No marine mammals sighted.	N
26	4	1. CHA 2. CHA 3. SEC 4. SOU	All offal minced before discharging and batched discharged. No discharging during shooting or hauling.	Twin TL, BB	Large numbers of birds attended the vessel at all times, peaked during hauling. Birds observed to be attracted to offal discharge.	N N Y Y	Marine mammals only occasionally sighted.	Y Y Y N
27	1	CEE, CHA	Very small amount off offal was discharged during towing. None was produced during hauling or setting.	BB	Bird abundance peaked during hauling.	N	FUR commonly observed following codend, actively fed on hoki from the net.	Y
28	1	CEE, CHA	Vessel held offal and avoided discharging during shooting or hauling.	Nil	Seabird abundance increased rapidly with hauling and birds fed aggressively on stickers.	Y	FUR sighted frequently. CDD, DDO and BDO also present on occasion. FUR appeared to be attracted by winch noise. FUR fed from the net.	Y
29	1	SEC	Whole fish generally minced before being discharged. No offal discharged during shooting or hauling.	BB	Large numbers of seabirds observed feeding on net. Seabird numbers increased as codend surfaced, remained high during processing and then reduced again.	Y	Large numbers of FUR observed feeding on net	N
30	2	1. SOU, SUB 2. SOU, SUB 3. SOU	Occasions of offal discharge during shooting or hauling	BB	Seabirds followed vessel at all times.	Y Y N	FUR sighted occasionally.	N N N

Table A6.2 Southern blue whiting trawl Fishery

Vessel No.	No. Times Observed	FMA's Fished	Offal Management	Mitigation used	Seabird interactions	Seabird Capture?	Marine mammal interactions	Marine mammal capture?
1	1	SUB	Meal plant onboard. Offal only discarded when meal plant was beyond capacity. Offal only discharged during one tow however was during shooting and hauling.	BB	Up to 1000 seabirds present.	N	FUR sighted on 5% of hauls, HSL sighted on 10% feeding on discarded livers and fish from the net.	N
2	1	SUB	No offal discharged and stickers removed.	BB, Twin TL	Birds followed vessel at all times, numbers increased at hauling, feeding on codend when it came to surface. With greater wind, more birds. Bird numbers declined when other vessels present.	N	FUR and PIW sighted but no interactions.	N
3	1	SUB	Meal plant onboard. No whole fish discards and on only 2 occasions were any discards noted.	BB	Seabirds ever present, in numbers 20 - 2000, most numerous XCP, then XWC. Few feeding opportunities from factory operations. XCP fed on minute morsels amid milky bilge water discharge but only opportunity for larger birds was the incoming codend.	N	FURs sighted sporadically throughout the voyage in numbers 1 - 5.	N
4	1	SUB	Offal was batch discarded during fishing. Factory scuppers had screens.	Twin TL	XAL observed to feed on floaters while smaller birds were observed to feed on floor wash.	N	FUR and HSL feeding on floaters and stickers during hauling, numbers increased during hauling.	Y
5	1	SUB	The vessel discharged minced offal during shooting and hauling.	TL deployed except for last four tows of trip. Badly damaged by end of trip	Birds present in low to moderate numbers, abundance varied between areas. Numbers and activity increased dramatically during hauling with birds feeding on loose fish.	N	FUR commonly seen in high numbers feeding on loose fish during hauling. The majority of FUR captures occurred after other vessels left the area.	Y
6	1	SUB	Continuous flow of deck wash. Meal plant present however with	Twin TL	Around 300-400 birds around vessel, with numbers close by	Y	3-18 FUR present around stern most hauls, fed on SBW	Y

			continual processing meal plant couldn't cope with offal and whole fish so backed up. Then heads and offal were discarded out of the port scupper on an intermittent basis. Stickers cleaned from the net.		increasing when offal discarded, fed aggressively on offal and from net and floaters.		liver and roe deck wash, and around net when on surface.	
7	1	SUB	Offal mealed. When meal plant overloaded head and guts were saved in a buffer hopper and batch discharged, not during setting or hauling. Spilled offal washed out through sumps.	BB	XAL stayed mainly outside 100m	Y	HSL and FUR sighted. FURs feeding at codend during hauls, not aggressively feeding on sump offal.	Y
8	1	SUB	Offal discarded during most hauls from both the starboard and port discard chutes.	TL	Seabirds present in varying numbers, typically gathering astern during hauling and near discard chutes.	N	FUR seen regularly, usually arriving during hauling, swimming alongside net, pulling fish from net sometimes.	N
9	1	SUB	All discards and offal minced before discarding.	BB	No Specific comments	N	FUR and HSL present at all times, numbers varied by grounds fished.	Y

Table A6.3 Scampi trawl Fishery

Vessel No.	No. Times Observed	FMA's Fished	Offal Management	Mitigation used	Seabird interactions	Seabird Capture?	Marine mammal interactions	Marine mammal capture?
1	1	SUB	The vessel did not discharge until doors were back in the water during shooting, always finished processing before the next hauling event.	Twin TL used whenever processing and fishing at same time.	Seabirds commonly seen around vessel during hauling and while discharging during processing. Greatest number present when net on surface. During hauling. Numbers peaked at 300 birds.	N	Small numbers of HSL sighted.	N
2	1	AKE	Vessel had a hopper to hold offal for batch discharges, only used on rare occasions.	Used TL during all tows. BB onboard but not used.	Between 30 and 320 birds observed around vessel, mostly XFS.	Y	No specific comments.	N
3	1	SUB	Offal was only discarded periodically; however birds were able to feed on occasional scraps washed out through the sump pumps.	Twin TL	Seabirds were present throughout the trip with up to 12 species present, usually sitting near the discard chute and astern during hauling.	Y	FURs were seen regularly during hauling, swimming alongside the net while it was on the surface.	Y
4	1	CEE, SUB	Vessel withheld offal and whole fish discards by blocking discard chute until the winch had stopped during shooting of the trawl.	Twin TL	Seabirds present in varying numbers on all sets and hauls. Interactions common during hauling when large numbers of seabirds would gather near the vessel and times of offal or whole fish discarding when seabirds fed actively.	Y	No specific comments.	N

Table A6.4 Squid trawl Fishery

Vessel No.	No. Times Observed	FMA's Fished	Offal Management	Mitigation used	Seabird interactions	Seabird Capture?	Marine mammal interactions	Marine mammal capture?
1	1	SEC, SOU, SUB	No specific comments.	BB, SLED	Seabirds accompanied the vessel at all times.	Y	No specific comments.	N
2	1	SOU, SUB	Vessel had meal plant and all offal, damaged fish and non-processed bycatch species were mealed.	WS, SLED	Seabirds present all times with numbers increasing when net close to surface. All birds feeding aggressively from the net.	Y	Marine mammals sighted on five occasions	N
3	1	SOU, SUB	Vessel had meal plant so only factory floor wash was produced.	BB, SLED	Seabirds fed actively on stickers in the net. Crew cleaned stickers but mainly just in the codend.	Y	Small group of PIW sighted on one occasion and small numbers of FUR present around vessel.	N
4	1	SOU	No offal discharged and stickers removed.	BB, Twin TL	No specific comments	N	FUR and PIW sighted but no interactions.	N
5	1	SOU, SUB	The majority of offal and unprocessed whole fish was mealed.	BB, Twin TL	Seabirds fed aggressively on floaters and stickers during hauling and shooting.	Y	Watch kept for marine mammals. FUR and HSL rarely observed; numbers were low. Both species seen following codend during hauling and fed on floaters.	N
6	1	SEC, SOU, SUB	There was no offal discharge during shooting and hauling.	Twin TL	Seabirds always present, interacting with the net as soon as it hits the surface on every shoot and haul.	Y	Marine mammals sighted occasionally during the trip.	N
7	1	SEC, SOU, SUB	The vessel held offal during shooting and hauling. Offal was discharged sporadically during processing and when finfish catch volumes were high the vessel appeared to be discharged offal continuously.	Twin TL, SLED	Bird numbers often doubled from when the doors came up to when the codend was at the surface. XWM and XSH most common birds and around 5-20 XGA during hauling. XPEs diving under codend when it was at surface. When the vessel was discharging, large numbers flocked behind vessel.	Y	Two HSL observed swimming around stern ramp during hauling in Squid 6T, no other sightings of marine mammals.	Y
8	1	SOU, SUB	Offal was held during shooting and hauling.	Twin TL	No warp strikes observed.	Y	Only one HSL seen during the hauling of Tow 1.	N
9	1	SOU, SUB	Meal plant onboard. Vessel did not produce offal.	Twin TL, SLED	Birds were seen feeding off the lengthener and codend during shooting and hauling.	Y	A total of 9 HSL sighted on four separate occasions, observed following the	N

10	1	SEC, SUB	Offal was managed through the processing of squid offal to gut by-product or sent to meal plant. Whole fish discarding frequent but of low volume. The vessel refrained from discharging either offal or whole fish during shooting and hauling.	Twin TL, SLED	Seabirds were constant presence, the most frequently captured species were observed to feed most aggressively from the nets wings, lengthener or codend.	Y	codend at hauling. Marine mammal abundance low, single HSL seen at stern twice, and 3 marine mammals seen on another occasion. None of these animals were seen feeding.	N
11	1	SOU, SUB	Meal plant onboard so vessel had few whole fish discards. When meal plant was full offal was discharged during tows but not shooting or hauling. Due to the nature of processing large amounts of factory floor wash was produced. Scuppers had no screening device, so offal discharged during shooting and hauling from floors. This lead to large amounts of seabirds congregating around vessel and feeding on offal.	Twin TL, SLED	Seabirds present constantly feeding on factory floor wash.	Y	No marine mammals observed.	N
12	1	SEC, SOU, SUB	When fishing in Squid 6T there were low levels of bycatch and packing squid green resulted in limited offal production. In other areas when vessel processing during fishing, the two TLs deployed and bycatch stored in bins for batch disposal. When finfish processed, heads continuously discharged. Offal not discharged during hauling, but sometimes during shooting.	BB, Twin TL, SLED	Bird numbers high, increased during hauling, birds actively feeding off the net, mostly off lengthener section, forward of the codend. During first half of trip only minimal effort to clean net. Captures reduced once vessel started cleaning net more thoroughly.	Y	No specific comments.	N
13	1	SOU, SUB	No offal discharged during shooting, towing or hauling. Trawl nets cleared of stickers.	BB, SLED	Bird numbers increased rapidly during hauling and shooting. XWM aggressive feeding from codend and lengthener, petrels dived around and under the net	Y	FUR sighted on one occasion, not interacting.	N
14	1	SUB	Offal discarded during most	Twin TL	Seabirds present in varying	N	FUR sighted regularly on	N

			hauls from both the starboard and port discard chutes.		numbers, typically gathering astern during hauling and near discard chutes.		Campbell Is rise, usually arriving during hauling, swimming alongside net, pulling fish from net sometimes.	
15	1	SOU, SUB	All SQU processed green so no offal produced, crabs main bycatch and batch discarded in Squid 6T.	Twin TL, SLED	Birds were ever present.	Y	Marine mammals were seldom sighted, a solitary female HSL was sighted at stern ramp for the first haul in Squid 6T. No further sightings. FUR seen occasionally at stern ramp during hauling but not sighted at discard chute.	N
16	1	SEC, SOU, SUB	Offal was held during shooting and hauling.	Twin TL	Birds always interacting with the net during shooting and hauling. The contributing factor to the 26 bird captures appeared to be the long period of time the net remained on the surface during hauling.	Y	FUR sighted on occasion.	N
17	1	SEC, SOU, SUB	Except for a few tows, vessel didn't produce discards during shooting and no discards during hauling. Most discards and offal minced. Stickers not removed.	Twin TL	Birds following vessel day and night. They were looking for fish from the net at hauling and shooting, and discards from the factory on portside. Seabirds essentially caught during hauling, mostly in the beginning of the body of the net and at night. No warp strikes observed. The main reasons for seabird bycatch appeared to be - the high levels of light at stern, the body of the net was relatively flat at the surface, not a lot of tension. Also, the crew need to carry the rope of first part of net from aft deck to stern deck, so hauling takes long time.	Y	One HSL observed, during hauling, for three tows in Squid 6T, took some SQU from the net.	N
18	1	SUB	All offal was mealed, any whole fish discards were not discarded	BB, SLED	Seabirds fed very aggressively and dangerously on stickers in the	Y	HSL sighted in Squid 6T on 10 occasions, usually males	N

			during hauling and shooting.		net and off the codend during hauling. Sometimes birds became entangled in the net meshes and the free themselves again. Birds climbed all over the meshes, lengthener and codend, actively pulled fish from net of SLED hood.		and at night. Often seen feeding on SQU off the net and often seen hanging around the codend. Single FUR seen twice, not seen feeding.	
19	2	1. SOU, SUB 2. SUB	Offal from squid and bycatch as well as whole SPD & CAR were discarded while vessel was not fishing with the exception of two tows where SPD was discharged as discard tank full. No offal discharged during shooting and hauling.	BB, Twin TL, SLED	Birds attracted to codend at hauling but were only seen feeding on one occasion.	N Y	No FUR or HSL sighted, but one HSL captured.	N Y
20	1	SOU, SUB	Prior to shooting net had whole and damaged fish caught in mesh. No discards, in deck wash intermittent. Intention to meal, but ongoing issues with meal plant. Floor wash macerated into fine particles prior to discharge through sump pumps.	BB, Twin TL, SLED	During shooting birds arrived and landed close to net. Up to 2000 birds present. A rush for food as net surfaced, shearwaters dived and larger birds pulled fish from the net. Birds in SUB less hungry / aggressive than in SEC.	Y	Crew kept watch for marine mammals. FURs and HSL seldom sighted.	Y
21	1	SOU, SUB	Offal was minced before discard and was not discarded during setting or hauling. stickers were cleaned from the net	BB, Twin TL, SLED	Seabirds were a constant presence and were attracted to the net at both set and haul. Birds were observed to be feeding on fish stuck in the net's wings and lengthener. Seabirds also observed around the discard outlets	Y	Marine mammals were rarely sighted. IN Squid 6T a single HSL were observed on two occasions swimming either up and down the codend or around the discard chute.	N
22	1	SOU, SUB	During squid processing there was no offal produced as the squid were packed green. If there was a small amount of discarded fish species it was retained in baskets until the end of processing and then minced and discharged. Spiny dogfish and carpet sharks were the only	BB, Twin TL, SLED	Birds were present at all times. Most captures were net captures in the lengthener portion of the net.	Y	Three New Zealand lions were spotted around the stern during the hauling of tow 4 in SQU6T, and three fur seals were spotted on the port side during the hauling of tow 10 in SOU.	N

23	2	1. SOU 2. SOU	whole fish discards as they could not go through the mincer. All offal was passed through a mincer before discharge. Discharge on the starboard side was almost continuous. Net was cleaned of stickers.	BB	Seabirds always present around the vessel. Numbers peaked when the vessel processed during daylight hours.	Y	Small numbers of marine mammals occasionally sighted.	N N
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Table A6.5 Jack mackerel and barracouta pelagic trawl Fishery

Vessel No.	No. Times Observed	FMA's Fished	Offal Management	Mitigation used	Seabird interactions	Seabird Capture?	Marine mammal interactions	Marine mammal capture?
1	1	SEC	No specific comments.	BB	Seabirds accompanied the vessel at all times.	Y	No specific comments.	N
2	3	1. CHA, CEW, AKW 2. CHA, CEW, AKW	Vessel operated a meal plant and did not discharge during shooting or hauling.	WD	XCP in numbers up to 500 most common bird sighted. Birds feeding from codend. Numbers increased when vessel discharging offal	N Y	FUR sighted during trip, two seen chasing net.	N N
3	5	3. SEC, SOU 1. CHA 2. CHA, CEW 3. CHA, CEW, AKW 4. SOU 5. CHA, CEW, AKW	Vessel operated a meal plant and discharges were of minimal quantity (mainly livers). Vessel did not discharge during setting or hauling.	BB	Seabirds were present at all times. Birds tended to congregate around the factory sumps scavenging on livers.	N N Y N N	FUR observed feeding from net	N N Y N N
4	1	SEC	All bony fish offal, non-quota bycatch was retained and batch dumped or discarded while not fishing. Factory sumps had screens. Stickers removed prior to shooting.	Twin TL	XAL feeding on floaters during hauling Small seabirds feeding on sump water during processing. Bird numbers increased dramatically as codend surfaced.	N	FUR feeding on floaters during hauling. A watch maintained for marine mammals prior to shooting and did not shoot around congregations of marine mammals.	N
5	1	SEC	There was no offal discharge during shooting and hauling.	Twin TL	Seabirds always present, interacting with the net as soon as it hits the surface on every shooting and hauling.	Y	Marine mammals occasionally sighted.	N
6	1	SOE	No meal plant or mincer on board so discards continuous during processing, but stopped during shooting and hauling.	Twin TL	Seabirds present throughout trip, typically gathering near the discard shoots on the port side while processing and astern when hauling.	N	No marine mammals sighted.	N
7	4	1. CHA 2. CHA,	Most offal was mealed, on a few occasions it over flowed and was	Twin TL	Birds followed vessel feeding on floor wash and offal, densities	N N	FURs feeding from codend and on lost fish; could be seen	N Y

		CEW, AKW 3. SOU 4. CHA, CEW	discarded. All stickers removed and hauling undertaken as quickly as possible. Vessel did not discharge offal during shooting or hauling.		increased during hauling. Birds were observed to be feeding off the lengthener and codend during shooting and hauling.	N N	swimming to vessel when hauling began. FUR harassed by XMM and fish stolen. PIW and a number of other whales were sighted	N N
8	1	CHA, CEW, AKW	Offal and fin fish processed into meal. Discharge limited to accidental spillage. Occasionally had to discharge due to volume of offal.	Twin TL. WS rigged ready to deploy if TL lost.	XWM fed on floaters and stickers during hauling. XWM and XGT also observed to dive on fish escaping through the net meshes. Smaller birds feeding on debris released from the net, XPN and XFS quite noisy.	N	Ten CDD and 1 FUR caught during the trip, the fur and 8 CDD captures occurred during the night. 7 CDD found mid codend, 3 CDD found at the aft end of the codend.	Y
9	3	1. CHA 2. CHA, CEW, AKW 3. SEC, CHA, CEW	Vessel operated a meal plant, very little offal waste spilled onto the deck and washed overboard. Stickers were cleaned from the net.	Twin TL	Around 300-400 birds around vessel, with numbers close by increasing when offal discarded, fed aggressively on offal and from net and floaters.	N N N	Possible Sei whales sighted. All FUR captures associated with mid-water trawls.	N N Y
10	4	1. SEC, SOE 2. SEC, SOE, SOU 3. SEC, SOU 4. SEC	Offal collected into fish basket and emptied onto discard conveyer which was usually stopped during shooting and hauling. Vessel discharge offal during shooting on occasion but never during hauling.	BB, Twin TL	Buller's albatrosses by far most abundant, with up to 500 within 100 m of the vessel. Birds often frenzied as the net was hauled and flew so close to the vessel there were a few deck strikes.	N N N N	FUR sighted on occasion.	Y Y N N
11	2	1. CHA, CEW, AKW 2. SOU	Offal retained and mealed on vessel. No offal discharged during shooting, towing or hauling. Trawl nets cleared of stickers.	BB	Bird numbers ranged from 110 to 1300, primarily XCP, XBM and XKM. Birds and FUR primarily feeding on offal being discarded from factory deck wash.	N N	FUR present throughout the trip.	Y N
12	1	CHA	Vessel did not discard during shooting or hauling.	Twin TL	Seabirds were abundant around the vessel at all times.	N	No marine mammals were sighted throughout the trip.	n
13	1	SEC, CHA	Offal and whole fish discharge held during shooting but not always during hauling. Larger fish like sharks were minced and then discharged.	Twin TL	Seabirds sighted everyday around the vessel.	N	No specific comments.	N
14	3	1. CHA, CEW 2. SOU 3. CHA,	Trawl nets were cleared of all stickers prior to shooting. Factory mealed and withheld offal and avoided discharging	BB	Bird numbers increased rapidly during hauling and birds observed feeding aggressively off stickers and from codend. Bird activity	N Y Y	Marine mammals occasionally sighted.	N N N

		CEW, AKW	throughout the trip except for the last 12 tows, when processing intensified and offal was discharged regularly during shooting, hauling and towing.		increased towards end of trip.			
15	1	SOE	Offal and whole discards from the factory were held and batch discarded once per day when possible. No discarding of offal or whole fish occurred during shooting or hauling.	BB, Twin TL	Seabirds fed opportunistically on fish and detritus from the trawl net at hauling times.	N	Marine mammals only seen twice, FUR observed following codend once.	N
16	1	SEC, SOE	All offal and whole fish discards minced. Vessel discharged offal once during shooting, but not during hauling.	BB	No specific comments.	N	FUR sighted around the vessel on occasion following the codend.	N
17	1	SOU	When there were large catches of processed finfish or discarded species, minced offal and whole fish were discharged continuously. Spiny dogfish and carpet sharks were the only whole fish discards as they could not go through the mincer. The vessel suspended the discharge of minced offal and whole fish during shooting and hauling.	Twin TL	White cap albatross was the most common albatross sighted and a small number of Buller's and great albatross were also identified during estimates. Petrels frequently identified were giant petrels, white-chinned petrels and cape petrels. Sooty shearwaters were also frequently sighted.	N	Three FUR were sighted on the port side during the hauling	N

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

Vessel No.	No. Times Observed	FMA's Fished	Offal Management	Mitigation used	Seabird interactions	Seabird Capture?	Marine mammal interactions	Marine mammal capture?
1	3	1. SUB	Offal discharged directly from factory during processing. Offal was discarded during shooting and hauling.	BB	Birds observed feeding on whole fish, heads and offal which remained in continuous supply throughout the trip.	N	FUR observed swimming around discard outlet actively feeding also picking fish from the net.	Y
		2. SEC, SUB				Y		N
		3. SEC, SOE, SOU, SUB				Y		N
2	2	1. AKW	No specific comments.	BB	Seabird numbers low around the vessels, event at set and haul. Not observed to feed aggressively.	N	No marine mammals sighted.	N
		2. CEE, SEC				N		N
3	1	SEC	Discharging of offal and whole fish occurred four times during fishing, this was a very small amount from the discharge chute.	Nil (Under 28m)	Seabirds accompanied vessel at all times. Bird numbers ranged from 129 to 433.	N	FUR observed on 4% of tows at time of hauling. No FUR seen eating fish from codend.	N
4	1	SOE	All fish kept green except a few GSH. No offal produced. Discards consisted mainly of deepwater sharks and rattails, no discards during shooting or hauling.	BB	Quantity of seabirds during trip relatively limited. They were following vessel day and night, attracted by discards.	N	No specific comments.	N
5	2	1. AKE, CEE	Vessel did not discard bycatch or offal while shooting or hauling.	Twin TL (used for all daylight and most night tows)	Few birds seen around vessel, most abundance species XAL and XCM in small numbers. Birds tried to feed from codend.	N	No marine mammals sighted.	N
		2. AKW				N		N
6	7	1. SOE, SUB	Vessel operates a meal plant. Throughout trip intermittent discharging of offal particles via the sump water discharge, this provided continual food source to XCP. Sump pump equipped with a cutter. Lack of XMM numbers may be due to nil gut discard policy (except some in SUB) and nil whole fish discard.	BB	Seabirds present throughout trip, typically gathering near the discard chute and astern of the vessel during hauling. Bird abundance noticeably greater when meal plant not operating. XAL sometimes attempted to remove fish from net but were unsuccessful. Feeding frenzy of royals and wanderers when ORH spilled from net.	N	PIW seen on one occasion. Other unidentified whales also sighted intermittently.	N
		2. SEC, SOE				N		N
		3. SEC, SOE				Y		N
		4. SEC, SOE				Y		N
		5. SOE				Y		N
		6. SEC, SOE				N		N
		7. SOE				N		N
7	1	AKW	No specific comments.	Twin TL deployed on rare	Concentrations of between 1 and 120 birds were observed around the vessel. Seabirds fed	N	No specific comments.	N

				occasions	opportunistically from fish escaping through net mesh.			
8	3	1. AKE	No offal or whole fish discharge during shooting or hauling, all fish retained green. No fish processing undertaken on board.	BB	Seabirds seen spread out behind vessel, very few observed around the vessel. Those observed showed little interest in the vessel, occasionally taking fish from the net on the surface.	N	No marine mammals sighted.	N
		2. AKE, CEE, AKW				N		N
		3. AKE, AKW				N		N
9	3	1. SOE	Offal and small fish were hashed and discharged every 3 to 5 minutes and larger fish were discharged whole. All offal and whole fish were held during shooting and hauling. Vessel equipped with a mincer.	BB	Seabirds were observed everyday around the vessel. Large seabirds sighted congregating astern of the vessel at bag rise and feeding on floaters and stickers during haul and offal discharged during processing. Small seabirds fed on offal lost from net during haul and minced offal during processing. XSH dived around net during haul. Seabird numbers increased at bag rise, remained high during processing then dispersed. Feeding frenzy of royals and wanderers when ORH spilled from net.	N	FUR occasionally observed as codend surfaced.	N
		2. SEC				N		N
		3. CHA				N		N

Table A6.7 Inshore trawl Fishery

Vessel No.	No. Times Observed	FMA's Fished	Offal Management	Mitigation used	Seabird interactions	Seabird Capture?	Marine mammal interactions	Marine mammal capture?
1	2	AKE	All fish packaged green, only whole non-quota or undersized fish discarded (too large for birds present).	WS or TL depending on skipper	Very few marine birds observed, most showed no interest in the vessel. Greatest bird activity when net at surface, picking up small fish spilling from net.	N	Minke whales and CDD seen from vessel, minimal interaction (bow riding CDD).	Y
2	1	SEC	Offal was batched into fish bins and discharged between the warps during trawling	WS	On average 20 birds around the vessels which increased to around 100 during hauling and processing, birds congregating around the stern.	N	BDO and DDO observed around the vessel. Fishing activity did not seem to affect mammal behaviour	N
3	1	AKW	Offal continuously discarded during processing which occurs immediately after hauling.	Nil	Bird intermittently present around vessel, feeding on lost or discarded fish. Abundance or behaviour of birds was not affected by vessels activity.	N	CDD sighted on a number of occasions. One Maui's dolphin sighted on return to port.	N
4	1	SEC	Offal continuously discarded during processing which occurs immediately after hauling. Offal could be discharged from both sides of the vessels and the stern depending on the crew involved in processing.	WS introduced after a number of captures	Birds were always in attendance of the vessels with numbers increasing in to the hundreds during hauling and offal production. Frequent warp strikes were observed before implementation of mitigation devices. Bycatch was always preceded by high levels of activity around the warp	Y	FUR sighted commonly, but never interacting with the vessel. On occasion HDO sighted while transiting to and from port.	N
5	1	CHA, CEE	Offal was produced after the net had been shot away again and was at fishing depth. If bird numbers were high offal was batched, if bird numbers were low it would be discharged continuously during processing.	Twin TL	Seabird abundance varied from 2 to 15 while steaming and up to 200 during hauling and processing.	Y	CDD sighted in pods of 3 to 15, generally bow riding. Never sighted during hauling and sighted once during shooting.	N
6	1	SOU	Offal discharged continuously during processing at times this occurred whilst the vessel was trawling	Twin TL	Seabird abundance and feeding aggression increased markedly during offal discharge. YEP sighted on occasion whilst steaming into port.	N	HDO sighted on four occasions however not whilst fishing activity was taking place. A single FUR was sighted on one occasion.	N

7	1	CHA	Offal discharged once net was at fishing depth.	Nil	Seabird abundance and activity increased during hauling and processing.	N	No specific comments.	Y
8	1	SEC	Offal produced continuously during processing, with occurred immediately after hauling.	WS/WD	Birds tended to appear around the vessel during the first haul of the day, with numbers increasing dramatically during hauling and offal production.	Y	HDO observed swimming above the general area of the codend during fishing. They would move in closer during hauling but would not generally get closer than 20m from the stern of the vessel except for one occasion when they got within 10 and 20m of the stern. HDO also regularly sighted bow-riding	N
9	1	SEC	Offal was produced after the trawl had been hauled and shot away again and while it was at fishing depth. Offal was continuously discharged during this time	WD	Seabirds were in constant attendance with numbers increasing to 300-500 during hauling and processing. Interactions with the warps would be highest while offal was discharged.	N	HDO sighted regularly during transit to and from port- up to 20 at a time but averaging around 5. HDO were not sighted during shooting or hauling.	N
10	1	CHA	Offal discharge did not occur during shooting or hauling.	WD	Seabirds in constant attendance of the vessel, this increased immediately prior to the commencement of hauling. Birds fed actively on the codend as well as on offal discharge.	N	CDD sighted frequently, no direct interactions with fishing. HDO sighted on three occasions, not interacting.	N
11	1	SEC	Offal discharged while net was at fishing depth. In general it would be continuously discharged however on occasion it was batched.	WD	On commencement of hauling seabird numbers increased from around 10 to over 200.	Y	FUR observed frequently during trawling and hauling actively feeding on the net.	N
12	1	SEC	Offal was not discharged during shooting or hauling only while the net was at fishing depth. Discharges were made through PVC chutes on both sides of the vessel.	WS	Large numbers of birds present around the vessel, particularly during hauling. Birds were observed to actively feed on the net and on offal.	Y	DDO, HDO and FUR sighted around the vessel regularly. At times HDO appeared to follow the trawl net, swimming above it behind the vessel during tows.	N
13	1	SOU	Offal was only produced and discharged once the net had been reshot and was at fishing depth.	Nil	Seabird abundance would increase rapidly on commencement of processing	N	FUR sighted once, otherwise no other sightings of marine mammals.	N

14	1	SEC	Processing would commence once the net had been reshot. Offal would be continuously discharged during processing while the net was at fishing depth.	WS	Seabird abundance and species composition was observed to vary with weather conditions. Birds were most abundant during haul and offal discharge. Birds were observed to actively feed from the net.	Y	HDO observed to follow the vessel, swimming above the net during tows and during hauling.	N
15	1	AKW, CEE	Minimal offal produced and on an intermittent basis. Offal was never discharged during shooting and hauling.	Nil	Seabirds sighted only in low numbers and activity or abundance only changed minimally with vessel activities such as shooting or hauling.	N	CDD sighted sporadically either at a distance or bow-riding.	N
16	1	CHA	Offal was batched on deck and only discharged while the net and warps were out of the water.	Nil	Seabird observed to feed aggressively on the trawl net. Birds were most aggressive and abundant during hauling and offal discharge.	Y	HDO and CCD sighted regularly, either bow riding or swimming behind the vessel above the trawl net's position. Interactions with dolphins tended to occur more frequently in the late afternoons.	N
17	1	SEC	Offal was batched during processing and discharged from a starboard side chute once the net had been re-shot and was at fishing depth.	WS	Seabirds, in particular the smaller albatrosses, were present at all times. Numbers increased to up to 1200 during hauling. Birds would actively feed on the net and on offal discharge.	N	HDO were sighted on occasion, sightings were brief and no interaction took place.	N
18	1	SOU	Offal was batched on deck then discarded once the net was at fishing depth.	Nil	Smaller albatrosses present at all times. Petrels only observed once offal was discharged. Offal was the only factor observed to change bird abundance and activity.	N	FUR sighted on two occasions. No cetaceans observed at any point.	N
19	1	SEC	Offal production and discharge did not begin until the trawl had been re-shot and was at fishing depth. Offal would be batched on deck and discharged in one load.	Nil	Seabird observed to feed actively on the codend and any offal discharge.	N	HDO observed frequently bow riding and swimming around the trawl net during tows	N
20	1	SEC, SOU	Offal batched onboard until the day's fishing activity had been completed.	WD used on one occasion	Seabirds were in constant attendance of the vessel however behaviour only changed with the	Y	FUR and CDD sighted on occasion, not interacting. HDO sighted on one occasion	N

21	1	CHA	Offal processing and discharge began once the net had been re-shot and was at fishing depth.	WS	discharge of offal which occurred outside any fishing activity. Seabird activity was observed to be affected by winch noise.	N	while vessel was on anchor. CDD commonly observed during the day and on two occasions at night. It was observed that at the starting of the winched CDD would change activity from bow-riding to investigation the net.	Y
22	1	CHA	Offal production occurred while the net was at fishing depth. Discharge was continuous during this process.	Nil	Albatross attendance was observed to be affected by wind speed- higher winds meant more birds would attend the vessel. Birds were observed to increase in abundance and aggression during hauling and offal production.	Y	CDD, DDO, HDO, PIW and sperm whales sighted during the trip. FUR were the only mammals to interact with the fishing gear, feeding on the codend.	N
23	1	SEC	After a number of warp strikes were observed the vessel began to batch it's offal and discharge it as a whole once the final net of the day had been hauled. From then no more warp strikes were observed.	Nil	Seabirds were observed to feed actively on both discharged offal and directly from the net. Bird abundance was noted to increase at hauling.	N	HDO sighted daily. HDO were commonly observed swimming behind the vessel above the general area of the net. They were also observed to take discarded or lost fish, though this was not common.	N
24	1	SEC	Offal was discharged while the net was at fishing depth and was discharged at a central point over the stern of the vessel 'well away from the warps'.	Nil	Birds were observed to begin attending the vessel at the first tow of the day and then follow it for the duration of that day. Winch noise was noted to draw birds in closer but not alter the overall abundance significantly.	N	FUR commonly sighted but not interacting.	N
25	1	SEC, SOU	Offal was produced and discharged while the net was at fishing depth, generally on the post side whose warp was equipped with a tori line.	TL used on one warp	Seabird activity was observed to be highest during daylight hauls and offal discharge. Birds would regularly feed directly from the net	Y	HDO only sighted while steaming. FUR and CDD were also sighted. No marine mammals interacted with the fishing gear.	N
26	1	SEC	Offal management varied between skippers however vessel only produced and discharged offal while net was at fishing depth. One skipper also only	WS	Seabirds in constant attendance of the vessel	Y	HDO sighted only while transiting to and from port. FUR often sighted, sometimes diving on the net.	Y

27	1	SEC, SOU	discharged offal when the net was out of the water. Vessel processed all fish and batch discarded all offal while the net was out of the water between tows.	WS	Birds in constant attendance of the vessel. Activity increased notably during shooting and hauling.	Y	DDO sighted twice, interactions were limited to bow-riding. Single HDO sighted briefly on one occasion.	N
28	1	SEC	Offal was only produced and discharged after the net had been re-shot and was at fishing depth. Discharge would be continuous for the duration of processing.	Nil	Seabirds in constant attendance of the vessel, abundance varied with weather conditions and presence of other vessels. Birds would actively feed on offal and interact with the trawl net at the surface.	Y	HDO sighted daily on transit to and from port. They were also observed to follow the vessel at a position roughly above the trawl net. HDO showed some interest in the net even at hauling but showed no interest in offal being produced.	N
29	1	SEC	Offal discharge was continuous during processing.	Nil	Birds observed actively feeding on both the net and offal discharge. Species composition was noted to change with proximity to shore.	Y	HDO sighted daily and at all times. They were observed swimming behind the vessel during trawling in a position roughly above the net in the water. No behavioural changes were observed while the vessel produced offal.	Y
30	1	AKW	Very little offal produced this was discarded immediately after hauling while the net was out of the water.	Nil	Birds were abundant around the vessel, this increased with setting and hauling.	N	CCD sighted on one occasion interaction with the vessel was limited to bow riding.	N
31	1	SEC	No specific comments.	Nil	Birds in constant attendance of the vessel, observe to actively feed on the codend.	N	FUR sighted occasionally. No interaction	N
32	1	SOU	All offal was batched and only discarded once the vessel had left it's fishing grounds and gear was no longer in the water.	WD	Birds in constant attendance and the observer noted that behaviour was altered by fishing activity. Winch noise was observed to have no discernable effect while the discharge of offal caused birds to gather around the stern of the vessel and scavenge.	N	FUR were sighted on one occasion.	Y
33	1	AKE	No offal was produced onboard the vessel.	Nil	Seabird assemblages were noted to vary markedly between fishing	N	None sighted.	N

34	1	AKE, AKW	Only small quantities of offal were produced. Both continuous discharge and offal batching were practiced.	BB	grounds. As was activity with the birds in one area showing no interest in fishing activity while in the other birds were attracted by setting and hauling. Bird abundance was generally low. Seabird species assemblages varied spatially and with distance from the shore. In general though bird abundance increased with hauling or offal discharge in all areas. Birds in all areas were observed to maintain a distance from the vessel, not moving closer to actively feed on the codend or discards.	N	None sighted.	N
35	1	AKE	Offal discharge occurred after the net had been reshot and was at fishing depth.	Nil	XBP, XBG and XWM observed feeding directly from the net.	N	CCD and BDO observed.	N
36	1	AKE	Very little offal was produced.	Nil	Offal was not observed to affect bird behaviour; similarly hauling did not appear to alter either bird abundance or behaviour.	N	BDO sighted on two occasions.	N

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

Vessel No.	No. Times Observed	FMA's Fished	Offal Management	Mitigation used	Seabird interactions	Seabird Capture?	Marine mammal interactions	Marine mammal capture?
1	1	SEC	No specific comments.	NS, LW	Seabirds present in all areas fished following the vessel and feeding on discarded offal, bait and bycatch.	N	Occasional sightings of FUR.	N
2	1	AKE	No specific comments.	LW, no form of bird scaring device used	Seabirds accompanied vessel intermittently, not seen interacting with fishing gear.	N	No marine mammals sighted.	N
3	1	SEC	No offal or discards discharged during setting.	TL (adjustable) closely monitored during setting and hauling.	Seabirds following vessel while hauling, feeding on offal and lost fish.	Y	A pod of 60 plus CDD passed the vessel and a pod of 22 plus PIW also crossed paths with vessel, neither interacted. FUR observed alongside vessel on 14 occasions, observed eating conger eels discarded by vessel.	N

Table A6.9 Inshore Bottom longline- Snapper Fishery

Vessel No.	No. Times Observed	FMA's Fished	Offal Management	Mitigation used	Seabird interactions	Seabird Capture?	Marine mammal interactions	Marine mammal capture?
1	1	AKE	Offal discharge was minimal however regularly occurred during hauling. Initially the vessel batched offal; however this practice was not maintained. Unused bait was also continuously discarded.	TL	XFP and XDP were the most common seabirds sighted- numbering up to 450. Smaller albatrosses were observed close to the vessel fishing over discards during some hauls.	N	Two CDD sighted on one occasion. Did not interact with the vessel.	N
2	1	AKE	Very little offal was produced, and this was only produced and discharged while steaming back from fishing grounds.	TL	While birds were present around the vessel none were in close proximity. During hauling some individuals moved in closer and fed on lost baits, even then birds were noted to maintain a distance from the vessel.	N	None sighted.	N
3	1	AKE	Offal was discharged only after hauling had ended.	NS	Birds observed to stay clear of the line during hauling. When unused bait was discarded birds would move in closer but not close enough to interact with the fishing gear.	N	Pod of BDO sighted on one occasion, not interacting with the vessel	N
4	1	AKE	All returned bait was retained until the end of hauling; this had a notable effect at deterring following birds during hauling.	TL	Seabird composition changed over the course of the trip.	N	Small pods of CDD seen accompanying the vessel on two occasions. No interactions.	N
5	1	AKE	Very little processing occurred and what did was conducted while the vessel was steaming between lines.	Nil	XBS, XFS and XFL observed to be attracted to the vessel during hauling and observed to feed directly from the hauling line. XBS were noted to be the most aggressive in their behaviour. In general though birds abundances were observed to be low.	N	BDO sighted on two occasions during hauling. No interaction with the vessel of fishing gear.	N
6	1	AKE	No processing occurred onboard the vessel. Unused bait was immediately discarded during hauling.	Nil	XFL and XBG commonly fed from the line during hauling and were noted to be attracted by the discharge of offal and unused bait on one occasion a pied shag was	N	BDO sighted on three occasions. Interaction was limited to bow riding.	N

7	1	AKE	Old baits retained if birds around vessel.	Nil	observed taking discarded fish. Overall low numbers of birds were present around the vessel at any one time. Main bird species interacting with vessel were XFS and XBP, 1-10 birds seen around vessel during setting, they would fly over mainline looking to land in water close to bait entry point and dive on baited hooks. When TL set, worked well, keeping birds out behind float. If birds present during hauling would sit in water behind vessel hoping to feed on the odd returning baits. At times, no birds observed during setting or hauling.	N	No specific comments.	N
8	1	AKE	No offal discharged during setting.	TL	Seabirds in constant attendance. All birds were captured during the set and retrieved at the haul. During each set a capture occurred, NIL birds were observed making it difficult to attribute a reason. During first 4 captures, large amounts of phosphorescence present in the water. On 3 occasions birds became hooked at the hauler after diving down on returning baits and becoming entangled (released alive).	Y	Pod of 100 CDD observed feeding. No interaction with the vessel.	N
9	1	AKE	Offal was processed while steaming between lines. The small amount of unused bait was continually discarded during hauling. It would often be discarded around the hauling point drawing birds in closer to the hauling line.	TL	XFS, XFL, XBP and XBS observed regularly. XFS consistently the most abundant species. Unused bait and offal discards drew birds in closer to the vessel and increased feeding aggression.	N	Pod of dolphins sighted during hauling on one occasion, animals did not pass close and no interaction occurred.	N
10	1	AKE	No specific comments.	Deck hose	Bird activity noted to be very low	Y	CDD, BDO, FUR and ORC	N

				attached to engine room bilge pump	during night-time and early morning. XFS, XBP, XCP, XWM, XBM were the most common birds around the vessel. XFS and XBP observed to congregate around the hauling line attempting to take food from it.		sighted. However no interactions took place.	
11	1	AKE	No fish was processed onboard and no offal was produced. Unused bait was discarded during hauling.	Nil	XBP and XFS were the most abundant species around the vessel. Bird number increased during hauling but even then only amounted to a maximum of 25 birds.	N	CDD sighted on one occasion but not in close proximity to the vessel. No interaction occurred.	N
12	1	AKE	No fish processed onboard and so no offal was produced. Unused bait was discarded during hauling	NS	Bait discard was noted to elicit aggressive feeding behaviour from birds.	Y	CDD and BDO sighted on two occasions. No interactions occurred.	N
13	1	AKE	Unused baits were retained and discarded as a batch once hauling was complete. The small amount of processing was conducted while steaming between fishing grounds.	NS, TL (used on one occasion)	XFS, XBP and XBS were observed diving on the line during setting. XFS noted to be particularly aggressive. XFS also interacted with the lien during hauling, attempting to feed on the returned baits.	Y	CDD sighted on one occasion bow riding while the vessel was steaming.	N
14	1	AKE	Offal only produced on two occasions and this occurred while steaming between fishing grounds. Unused bait was discarded over the opposite side to the line being hauled.	Twin TL, NS	XFS, XBG and XBS sighted regularly. Birds observed to avoid the TL. Birds noted to be attracted by hauling operations.	N	BDO observed on two occasions; bow -riding briefly.	N
15	1	AKE	Offal was not discharged during setting or hauling. Vessel used pilchards as bait as this reduced the amount of returned bait compared to SQU or BAR	TL, NS	XFS and XFL observed attempting to feed on the hauling line, also diving on the line during setting.	Y	BDO and CDD sighted. Interaction with the vessel was limited to bow-riding.	N
16	1	AKE	No offal was produced by the vessel however unused baits were discarded during hauling.	NS (for some shots), TL (for all shots)	XFS and XFL were the most abundant around the vessel but even then only in low numbers. XFS and XBP were observed to be the most aggressive feeders.	Y	CDD observed bow riding on one occasion.	N

17	1	AKE	Unused bait was retained during hauling and then batch discarded once complete. The vessel did not process fish and so did not produce offal.	TL (without streamers)	XFS and XBP observed diving on the line during setting with XBP arriving first. XFS, XBP, XFL and XGP observed regularly with XFS and XBP interacting most frequently. Bird abundance increased during hauling and XFS were noted to be the most aggressive.	Y	CDD observed on occasion feeding. No interaction with the vessel occurred.	N
18	1	AKE	Offal was produced and discharged during hauling. Unused bait was also discharged during hauling.	Used engine oil dripped onto the sea, creating a slick during setting	Discarded bait and offal was noted to attract birds during hauling.	Y	Mammal sighted on occasion but not interaction occurred.	N
19	1	AKE	No specific comments.	TL	Changes in seabird composition throughout the trip. Overall, interactions were minimal with often no interest shown.	Y	No marine mammals observed.	N
20	1	AKE	No specific comments.	TL, NS	Seabird interactions minimal. Seven of nine sets observed, no seabird activity was seen. On two sets, XFS showed up towards the end of setting. On most hauls, XFS, XBP, XBS following vessel but no attempts were made to feed from line. Skipper would stop setting line if birds arrived.		Marine mammals observed interacting. No captures.	N

Table A6.10 Inshore Setnet Fishery

Vessel No.	No. Times Observed	FMA's Fished	Offal Management	Mitigation used	Seabird interactions	Seabird Capture?	Marine mammal interactions	Marine mammal capture?
1	1	SEC	Offal was only produced after fishing activity was completed for the day and away from the fishing grounds.	PI	Seabirds ever present but did not interact with the vessel until offal was being produced.	N	HDO commonly sighted bow-riding, particularly during steaming to and from port. Never interacted with fishing gear.	N
2	1	SEC	If catches were small, processing and discharge of offal would occur during hauling. If catches were larger then discharge would not commence until hauling was complete.	Nil	Bird activity increased during processing and discharge of offal.	Y	CDD, DDO and HDO sighted on occasion, interactions were limited to bow riding.	N
3	1	SOU	Offal produced and discharged between hauling nets. Only if catches were very small did processing and offal discharge occur during hauling.	Nil	Low numbers of albatross (10 to 50) present alt any one time. XSH were the most prevalent species with abundances up to 200 in some areas	N	FUR sighted twice (no interactions)	N
4	1	SEC	Offal produced continuously during hauling and discharged on the opposite side of the vessel to hauling.	Nil	Bird appeared at all times.	Y	HDO sighted during fishing, interacting with the vessel but not with the fishing gear. This tended to occur when the water was more turbid.	N
5	1	SOU	Processing only commenced once the net had been reset, meaning that offal discharge occurred away from fishing activity.	Nil	Offal discharge was observed to lead to a large increase in bird abundance and activity. This was noted to vary depending on weather patterns with birds becoming more aggressive prior of bad weather.	Y	On one occasion a pod of unidentified cetaceans were sighted but at too great a distance to be identified further.	N
6	1	SEC	Offal only produced and discharged during the steam back to port. Whole fish discards did occur during hauling however most of these were alive.	Nil	Birds present around the vessel at all times. This only increased marginally during hauling.	N	30 – 50 HDO observed per day. Encounters lasting only a few minutes.	N
7	1	CHA	Offal was discharged continuously during hauling.	Nil	Seabird abundances were generally low, ranging form 10 while steaming to 50 / 60 while hauling and offal production.	N	CDD commonly sighted bow-riding. HDO sighted on two or three occasions. Did not interact with the vessel in any	Y

8	1	SEC, SOU	Depending on catch size offal was either batched or continuously discarded. This occurred during the hauling of the net.	Nil	Seabird abundance and behaviour was observed to be affected by vessel hauling. With birds increasing in abundance and aggression during this time.	Y	way. A pod of unidentified dolphins was sighted at a distance on one occasion, no interaction occurred.	N
9	1	CHA	Offal discharge occurred once the gear was in the water and away from the vessel.	Nil	Seabirds were always in close proximity to the vessel but were never observed to actively interact with the fishing gear.	N	CDD sighted on one occasion while vessel was on anchor, no interaction took place.	N
10	1	SOU	Offal was batched on deck. No offal was discharged during either setting or hauling	Nil	Seabird behaviour was observed to change with the processing of fish. Abundance and aggression increased	N	Rare sightings of CDD, HDO and FUR, no interactions	N
11	1	SOU	Processing and offal discharge only occurred once the nets had been re-set and were away from the vessel.	Nil	Bird abundance was observed to increase during fish processing and offal discharge.	N	FUR and CDD sighted on occasion. FUR observed swimming close to the set nets however no interaction took place.	N
12	1	CHA	No offal was produced by the vessel	Nil	Small numbers of seabirds in attendance of the vessel but no interactions.	N	Small numbers of HDO sighted on a regular basis this included while setting and hauling. They were observed in close proximity to the vessel but were not interacting directly with it.	N
13	1	SEC	Processing and offal discharge was completed while steaming and away from fishing gear.	Nil	Seabirds were observed to arrive at first light, with their numbers increasing throughout the day. Birds only interacted with the vessel during processing; they were noted to avoid the nets during setting and hauling.	Y	FUR sighted regularly. HDO sighted occasionally. CDD and DDO also sighted, dolphins in general did not come close to the vessel.	N
14	1	SEC	Offal was not discharged during setting or hauling. Net was always cleaned before resetting.	Offal control	Seabird abundance and activity was observed to increase with offal discharge, some would also attempt to feed from the setnet as it was being hauled.	Y	Small pod of DDO observed as was the occasional FUR. DDO would swim around the vessel during hauling and swim along with it during setting	N
15	1	SEC	No offal discharge occurred during setting. During hauling	Offal control	Birds in regular attendance of the vessel, most species observed to	Y	DDO sighted occasionally though never observed to	N

			offal was discharged to the other side of the vessel to the net.		feed on discharged offal. Bird numbers were observed to increase during the course of the haul.		show an interest in the fishing gear.	
16	1	SEC	Offal only discharged while steaming between nets.	Offal control	Birds were observed to be attracted by hauling activity rather than being in constant attendance of the vessel.	Y	DDO and FUR sighted regularly. Vessel avoided setting or hauling with dolphins in the area, it would also attempt to lead dolphins away before beginning to set or haul.	N
17	1	SEC	Net cleaned between events. Offal was discharged during hauling but not while steaming.	Offal control	Offal production was observed to bring birds in closer to the vessel. Bird numbers would increase rapidly during the first haul of the day and then follow the vessel for the duration of that day's fishing.	Y	FUR sighted on occasion and once sighted feeding from the net. HDO observed once when leaving port.	N
18	1	SEC	Net cleaned between events. Avoided offal discharge during setting and hauling though while fish were discarded into the general area of the net being hauled.	Offal control	Numbers of birds around the vessel would generally increase during the course of hauling. Fish processing was also noted to increase bird activity with aggressive feeding common during this period	Y	DDO and FUR sighted on a daily basis. Both appeared to interact with the net during hauling.	Y

Table A6.11 Surface Longline – Charter tuna Fishery

Vessel No.	No. Times Observed	FMA's Fished	Offal Management	Mitigation used	Seabird interactions	Seabird Capture?	Marine mammal interactions	Marine mammal capture?
1	1	SOU, CHA	Bait and offal discarded on the opposite side to hauling.	Twin TL, plus BB, WC used during hauling	Eight birds were caught during the five day period of the full moon.	Y	No marine mammals were sighted except for the FUR once hooked.	Y
2	1	SOU, CHA	Old bait and offal was batch discarded through the port side discard hatch (opposite side to haul).	TL, NS, BB used for hauling	Birds attended vessel at all times, constantly diving beside vessel on uneaten bait. Birds sighted trying to eat baits during setting. After captures, vessel added weights to every snood, this proved effective.	Y	Marine mammals encountered twice, a pod of CDD seen, no interaction. One FUR caught alive.	Y
3	1	SOU, CHA	Offal and incoming baits during hauling carefully managed. Port side disposal chute was used to discourage foraging on the starboard side. Returning baits stowed.	Triple TL, AC, Additional weighting after captures	Live captures mostly happen when vessel stopped to haul in a large fish or backline running perpendicular to sea door.	Y	CDD and PIW sighted, no interaction. FURs usually only noticed when hooked on a snood.	Y
4	1	SOU, CHA, AKE, AKW	No specific comments.	Twin TL, LW	Seabirds constantly present during the haul, mostly XBM and XWM. Numbers higher when vessel fishing on its own away from the 3 other charter tuna vessels. Interactions constant, attempts to take bait.	Y	FUR often sighted in CHA, in numbers from 1-30. Interactions with line during haul.	Y

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

Vessel No.	No. Times Observed	FMA's Fished	Offal Management	Mitigation used	Seabird interactions	Seabird Capture?	Marine mammal interactions	Marine mammal capture?
1	1	CEE, AKE	No specific comments.	Nil	Birds followed vessel throughout haul in groups of less than 80, feeding on baits as line hauled and crew discarded them.	Y	Two CDD seen near vessel but no interest.	N
2	3	1. CEE 2. AKW 3. CHA	Unused baits and offal constantly discarded during hauling.	TL	Birds followed vessel during hauling due to constant stream of uneaten bait being discarded. No birds observed during setting.	N N Y	Marine mammals not sighted except when caught.	N Y Y
3	1	AKE	Bait was retained in some instances.	TL, NS	Seabirds constantly present around vessel, feeding on any offal or bait discharged, numbers increased during hauling.	N	No marine mammals observed.	N
4	1	CEE	No specific comments.	TL	Seabirds accompanied the vessel at all times, XKM most abundant, about 20 a day. Birds attempted to feed on discarded bait.	Y	Four ORC present on one occasion, eating fish on line. Six PIW present on another occasion, the vessel did not shoot away near the pod and steamed for several hours before shooting.	N
5	1	CEE, AKE	Vessel kept all baits on board whilst hauling.	TL	Mainly XKM, XGP, XAL and XCP following vessel.	N	No marine mammals observed apart from those caught alive.	Y
6	2	1. AKE 2. CEE	Vessel practiced bait retention. Batch discarded offal discharged on portside (hauling on starboard side).	TL, WC	Seabirds attended vessel in low numbers. Seabirds numbers were significantly higher at hauling, scavenged on batch discarded offal. Fewer birds in proximity to hauling location, yet there were several observations of XKM actively pursuing baited snoods, which were deterred with a water hose.	N N	No specific comments.	N Y
7	2	1. CEE, AKE 2. AKE, CEE	Vessel retained majority of offal during haul for discard at completion. No offal discarded during setting.	TL, DB, NS	Between 10 and 50 seabirds present, feeding on discarded offal. Occasionally XBM and XKM observed taking pieces of bait falling from the hooks on	N N	A pod of approximately 50 BDO were observed playing around vessel before start one haul, but did not interact. At same time, pod of	Y N

					hauling.		approximately 15 PIW arrived but soon disappeared. No interaction or predation seen. No marine mammals sighted.	
8	2	1. AKE 2. CEE, AKW, AKE, KER	Vessel discharged offal and unused baits during haul.	TL, LW, NS	Up to 50 XBP sighted. Birds observed about vessel during hauls actively targeting discarded baits and offal.	N N		N N
9	1	AKE	Partial bait retention practices.	NS, (TL onboard but not used)	Seabirds constantly present, feeding on offal or bait discharged by the vessel. Numbers increased considerably during hauling of lines.	N	No marine mammals sighted.	N
10	1	AKE	Vessel was discharging offal and baits during hauling. No discharges during setting.	TL	Marine birds were observed at each haul feeding on lost bait	Y	No marine mammals sighted.	N
11	1	AKE	All baits retained onboard until the end of hauling. Offal was discharged during hauling but not during setting.	TL, NS	Seabirds constantly present, would scavenge on any lost bait during hauling.	Y	CDD observed on one occasion (pod of 20-30). Not interacting with fishing.	N
12	1	CEE, AKE	Offal and old baits retained onboard until the end of the haul.	TL, LS, NS, Two TLs during hauling.	Bird abundance generally low, around 20 individuals at hauling.	Y	No marine mammals observed	N

Table A6.13 Bottom longline- Deepsea Ling Fishery

Vessel No.	No. Times Observed	FMA's Fished	Offal Management	Mitigation used	Seabird interactions	Seabird Capture?	Marine mammal interactions	Marine mammal capture?
1	2	1. SOE 2. SUB	Vessel operated a meal plant. No offal discarded during setting or hauling. Discards retained onboard until hauling completed.	TL, AC, IWL	Birds constantly following vessel and feeding on factory floor wash, fish lost during hauling and bait lost from hooks during setting. Bird abundance varied depending on presence or absence of other vessels in the area which did not have meal plants on board and numbers increased when these boats not in vicinity.	N	FUR around vessel during hauling, feeding on fish taken from line.	N