Conservation Services Programme observer report

01 July 2004 to 30 June 2007

S.J. Rowe

DOC MARINE CONSERVATION SERVICES SERIES 1

Published by
Publishing Team
Department of Conservation
PO Box 10420, The Terrace
Wellington 6143, New Zealand

DOC Marine Conservation Services Series is a published record of scientific research and other work conducted to guide fisheries management in New Zealand, with respect to the conservation of marine protected species. This series includes both work undertaken through the Conservation Services Programme, which is funded in part by levies on the commercial fishing industry, and Crown-funded work. For more information about DOC's work undertaken in this area, including the Conservation Services Programme, see www.doc.govt.nz/mcs.

Individual copies are printed, and are also available from the departmental website in pdf form. Titles are listed in our catalogue on the website, refer www.doc.govt.nz under *Publications*, then *Science & technical*.

ISSN 1179-3139 (hardcopy)
ISSN 1179-3147 (web PDF)
ISBN 978-0-478-14642-4 (hardcopy)
ISBN 978-0-478-14643-1 (web PDF)

This text was prepared for publication by the Publishing Team; editing by Helen O'Leary and layout by Amanda Todd. Publication was approved by the General Manager, Research and Development Group, Department of Conservation, Wellington, New Zealand.

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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 protected species and fisheries. To fulfil this role, government observers are placed on commercial fishing vessels operating in New Zealand's Exclusive Economic Zone (EEZ). This report details protected species captures by fishery, fishing method and area over 3 observer years (2004/05, 2005/06 and 2006/07) in relation to observer effort and commercial fishing effort. Protected species known to interact with commercial fishing operations include seabirds, marine mammals and marine turtles. Protected corals are also landed in some fisheries. Information on where fishing effort, observer coverage and captures occur is presented at a coarse level, so that potential gaps in monitoring can be identified along with high-risk areas and time periods in various fisheries. The information collected by observers can be used to identify where the most significant interactions are occurring, and contribute to the development and application of strategies to minimise adverse effects.

Keywords: commercial fishing, fisheries observers, seabirds, marine mammals, bycatch, New Zealand EEZ

Rowe, S.J. 2009: Conservation Services Programme observer report: 01 July 2004 to 30 June 2007. *DOC Marine Conservation Services Series 1*. Department of Conservation, Wellington. 93 p.

1. Introduction

Understanding the nature and extent of interactions between commercial fisheries and protected species in New Zealand is the foundation of the Conservation Services Programme (CSP), which is run by the Department of Conservation (DOC). The Programme also works to develop effective solutions to mitigate adverse effects of commercial fishing on protected species in New Zealand fisheries' waters.

Government observers are placed on commercial fishing vessels operating in New Zealand's Exclusive Economic Zone (EEZ) in order to monitor interactions with protected species. This information can be used to identify where the most significant interactions are occurring, and can inform development and application of strategies to minimise adverse effects. Such data contribute to assessments of whether protected species mortality is sustainable and whether mitigation strategies employed by fishing fleets are effective at reducing protected species captures.

The specific objectives of the project are currently to:

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

In recent years, protected species interactions with some fisheries have become well understood, although sometimes rarely quantified. For example, trends in seabird bycatch in parts of the hoki (*Macruronus novaezelandiae*) fishery and squid (*Nototodarus sloanii* and *N. gouldi*) fishery are relatively clear, and our understanding of those interactions is well developed. However, interactions with other fisheries are less well understood, especially for inshore fisheries, where the nature of interactions still need to be determined and robust estimates of the extent of interactions are not yet broadly possible.

Progress with mitigating known interactions is at various stages in different fisheries, depending on both the degree to which interactions are understood and the ability to find practical and cost-effective solutions to those interactions. For example, it has been shown that seabird warp captures on trawlers have been reduced through various bird scaring devices (Middleton & Abraham 2007) and offal management (Abraham et al. 2009). In contrast, dolphin bycatch in pelagic trawl fisheries is more difficult to address and currently no mitigation techniques are in place. Mitigation methods have been introduced through regulations into several fisheries, including trawlers over 28 m in length (which are required to use seabird scaring devices) and surface longline vessels (which are required to night set and use streamer lines). In other fisheries, mitigation techniques or fishing practices are being investigated and/or developed (e.g. offal management, line weighting). However, for inshore fisheries, particularly setnet and trawl, little is currently known from the observer programme about fishing practices, due to limited

coverage. This makes it more difficult to assess the need or potential for mitigation measures to be developed and implemented.

This report details protected species captures by fishery, fishing method and area over 3 observer years (2004/05, 2005/06 and 2006/07) in relation to observer effort and commercial fishing effort. Information is presented at a coarse level to indicate 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. More analytical assessments of protected species bycatch are being undertaken through other projects[1].

All data used in this report have been provided by the Ministry of Fisheries Research Data Management team. Observer diaries and reports have also been used to provide information on mitigation, general observations and fishing practices.

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 to the Conservation Services Programme can be summarised as:

- Monitoring and recording the interactions of protected species with fishing operations
- Reporting on the efforts made to mitigate the adverse effects of commercial fishing on protected species
- Recording, photographing and tagging all protected species bycatch
- Recovering and retaining specimens for autopsy and/or identification
- 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) 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 to obtain actual bycatch rates by fishery, location or other desired variables. 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. Data quality 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 fisheries observers is currently considered to be the most reliable and flexible means of acquiring data on protected species interactions with fisheries.

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

3. Format

The remainder of this document is divided into separate 'fisheries', within which certain target species are grouped according to fishing method. This approach has been taken because the mix of target species is of less importance to protected species interactions than the method, location and timing of fishing. For each 'fishery', an overall summary of commercial effort, observer effort and protected species interactions is provided by Fisheries Management Area (FMA; see Fig. 1). Note that the words 'capture' and 'interaction' in this report refer to captures and interactions reported by government observers. 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. Data are divided into the 3 observer years, which ran from 01 July to 30 June the following year. All species are referred to either by common name (seabirds, marine mammals, reptiles and corals) or species code (fish) in this report. A full list of scientific names of all species mentioned is included in Appendix 1. A summary of protected species interactions (excluding corals) by observer year are provided in Appendix 2. Reported coral[2] catches are presented by fishery and year in Appendix 3; and by FMA, fishery and year in Appendix 4.

4. Definitions

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

Interaction Any interaction with fishing activity, including captures on fishing gear, impacts against the vessels (i.e. deck strikes) and other non-fishing gear events (e.g. landing on vessel, marine mammals climbing up stern ramp).

SOI The Fisheries Management Area within SUB that is located around the Auckland and Campbell Island groups where the squid 6T fishery operates (see Fig. 1).

Squid 6T fishery The squid quota management area that operates around the Auckland and Campbell Island groups in the SOI area (FMA 6A) (see Fig. 1).

Statistical Area (STA) An area that is used for reporting commercial fishing activity. Statistical areas are smaller than Fisheries Management Areas (see Fig. 2).

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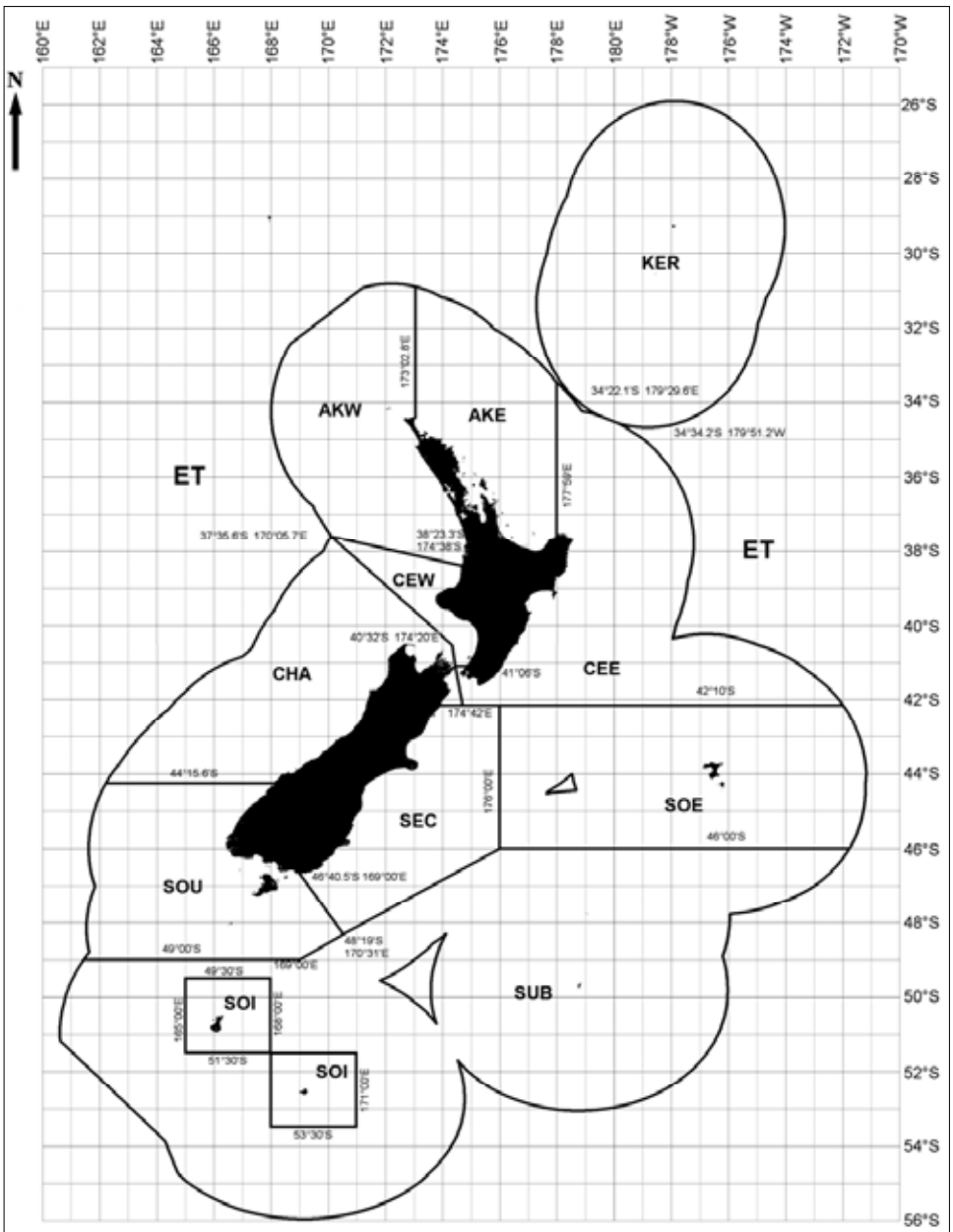
[2] The group of organisms collectively known as 'black corals' (Cnidaria, Antipitharia) is currently protected under the Wildlife Act 1953. 'Red corals' are also listed as protected under the Wildlife Act 1953. The definition of 'red corals' is currently being clarified through the revision of Schedule 7A of the Wildlife Act and the definition may be extended to other species or groups, including bubblegum coral and precious corals.

Figure 1. New Zealand Fisheries Management Areas (FMAs). (Source: Ministry of Fisheries.)



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

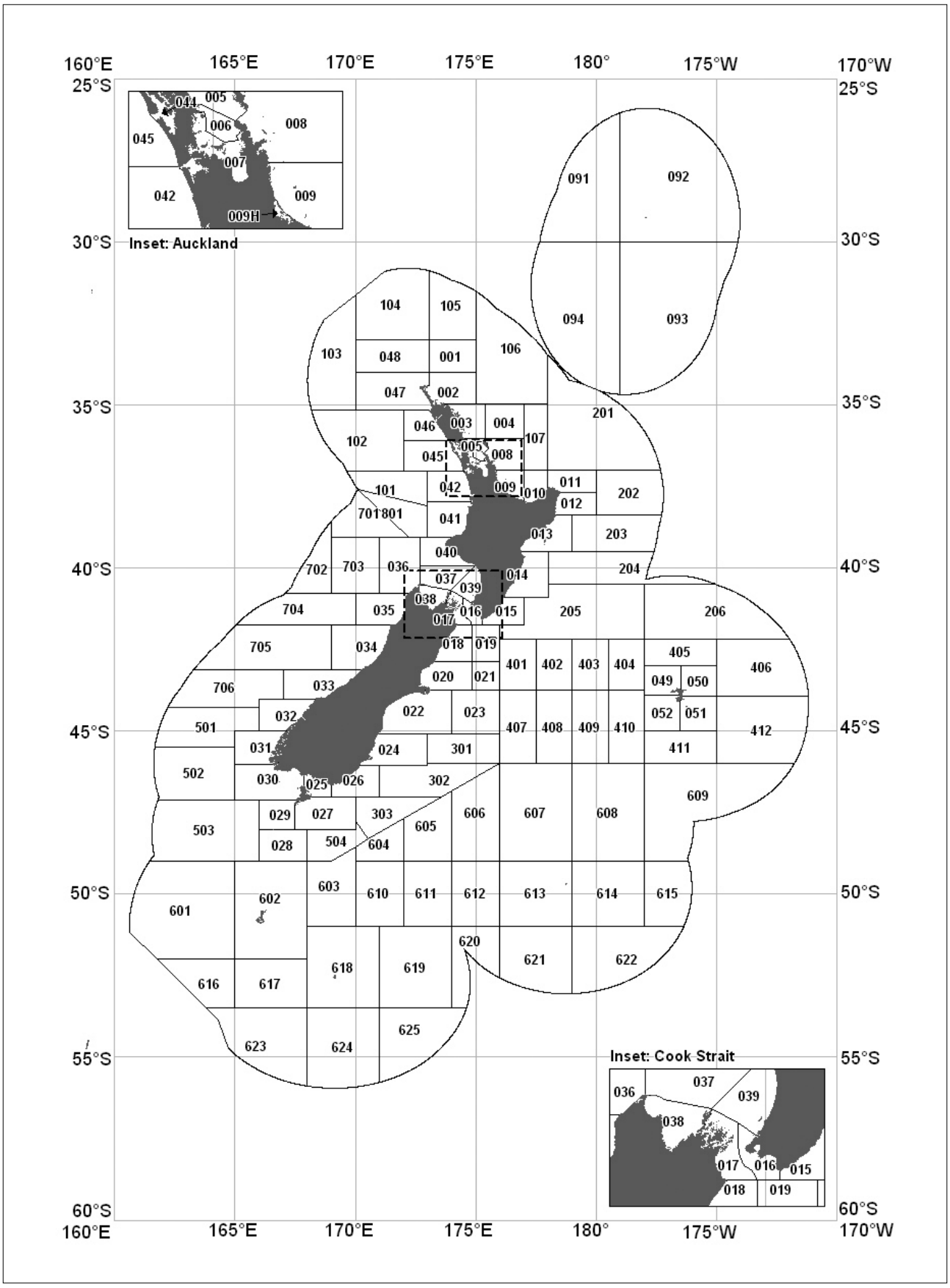


Figure 2. New Zealand Fisheries Statistical Areas. (Source: Ministry of Fisheries.)

5. Protected species interactions

5.1 MIDDLE DEPTH TRAWL FISHERIES

5.1.1 Hoki, hake, silver warehou and ling

Protected species observer coverage of tows targeting the middle depth trawl stocks of hoki, hake, silver warehou and ling are discussed together. While additional stocks may also be targeted through this fishing method, these four stocks are subject to the greatest targeted effort, resulting in a higher number of reported protected species interactions than other target species.

Coverage in this middle depth trawl fishery can be split into the 'hoki season' and 'out of season' hoki fisheries, which operate during different months and fisheries areas. The 'hoki season' is focused in CHA and around the CEE–CHA boundary in Cook Strait, where both hoki and hake are predominantly targeted from June to September. The 'out of season' hoki fishery operates from September until June, and hoki, hake and silver warehou are targeted, mostly in SOE and SUB, with some coverage in SEC and SOU.

Mitigation techniques employed in this 'fishery' include offal and discard management, and the use of bird scaring devices. Trawl vessels over 28 m in length are required to use paired streamer (tori) lines, bird bafflers or warp deflectors (scarers). Based on observer reports, most vessels use tori lines or bird bafflers and few vessels use warp scarers. At present, no mitigation devices are in place to reduce pinniped captures, although fishing practices such as not setting while marine mammals are present around the vessel are carried out by some vessels. The potential to use Seal Exclusion Devices in this fishery is currently being investigated by the CSP (CSP MIT 2006/09: Mitigating fur seal bycatch in trawl fisheries). Research into seabird net captures is also underway (CSP MIT 2006/02: Mitigating seabird interactions with trawl nets). Offal management research (started under MIT2004/01: Developing and testing of discard management technologies), which is currently supported by Crown funding, is ongoing.

The number of seabird interactions was highest in 2005/06 and reduced in 2006/07. More captures of sooty shearwaters in trawl nets were reported in 2005/06 compared to other years. New Zealand (NZ) fur seal captures were highest in 2005/06. Seabird and marine mammal interactions per observer year are detailed in Table 1.

TABLE 1. PROTECTED SPECIES INTERACTIONS IN THE HAK, HOK, LIN, SWA MIDDLE DEPTH TRAWL FISHERY BETWEEN 1 JULY 2004 AND 30 JUNE 2007.

SPECIES	2004/05		2005/06		2006/07	
	DEAD	ALIVE	DEAD	ALIVE	DEAD	ALIVE
SEABIRDS						
Albatross (unidentified)		16	2			
Black petrel		2				
Black-browed albatross	1					
Black-browed albatross (unidentified)		1				2
Buller's albatross	9	1	6		1	
Campbell albatross	2		1			
Cape petrels	1	34	2	14	1	4
Common diving petrel			1	3		
Grey petrel		1		1		
Grey-backed storm petrel			1			1
Petrel (unidentified)		1				
Prion (unidentified)		1		1		
Salvin's albatross	11	2	8	1	6	2
Seabird				2		
Seabird—large		8	3			
Seabird—small		16				
Shy albatross*		1	2			
Snares cape petrel	1	1				
Sooty shearwater	2		78	6	10	5
Storm petrels		1				
Wandering albatross		1				
Westland petrel	1	3				
White-capped albatross*	9	2	15	2	2	
White-chinned petrel	3		4	1	3	
Total	**40**	**92**	**123**	**31**	**23**	**14**
MARINE MAMMALS						
NZ fur seal	54	9	101	11	72	13
Total	**54**	**9**	**101**	**11**	**72**	**13**

* Historically, white-capped albatrosses (*Thalassarche steadi*) were reported by observers under a general code for shy albatrosses (*T. cauta*). Some observers still use this code, although these birds are most likely to be white-capped albatrosses.

Seabird and NZ fur seal interactions by target fish species are given in Tables 2 & 3. While the majority of seabirds were caught on tows targeting hoki, in 2005/06 tows targeting silver warehou caught a large number of birds. These birds were mostly sooty shearwaters, but 16 albatrosses were also caught. Captures were reported across three trips, on one of which 35 seabirds were caught. The number of NZ fur seal captures was also higher on tows targeting hoki (Table 3). However, from Table 4 it can been seen that a greater number of hoki tows were observed.

TABLE 2. SEABIRD INTERACTIONS IN THE HAK, HOK, LIN, SWA MIDDLE DEPTH TRAWL FISHERY BY TARGET FISH SPECIES FOR EACH OBSERVER YEAR.

TARGET SPECIES	2004/05		2005/06		2006/07	
	DEAD	ALIVE	DEAD	ALIVE	DEAD	ALIVE
Hake	4	2	3	3	2	5
Hoki	32	89	62	25	18	8
Ling	4	1	1	0	2	1
Silver warehou	0	0	57	3	1	0
Total	**40**	**92**	**123**	**31**	**23**	**14**

TABLE 3. NZ FUR SEAL INTERACTIONS IN THE HAK, HOK, LIN, SWA MIDDLE DEPTH TRAWL FISHERY BY TARGET FISH SPECIES FOR EACH OBSERVER YEAR.

TARGET SPECIES	2004/05		2005/06		2006/07	
	DEAD	ALIVE	DEAD	ALIVE	DEAD	ALIVE
Hake	0	0	5	1	6	4
Hoki	49	8	93	10	59	8
Ling	5	1	3	0	7	0
Sliver warehou	0	0	0	0	0	1
Total	**54**	**9**	**101**	**11**	**72**	**13**

TABLE 4. NUMBER OF TOWS OBSERVED IN THE HAK, HOK, LIN, SWA MIDDLE DEPTH TRAWL FISHERY BY TARGET FISH SPECIES FOR EACH OBSERVER YEAR.

TARGET SPECIES	2004/05	2005/06	2006/07
Hake	96	236	397
Hoki	2677	1973	2059
Ling	71	118	95
Silver warehou	13	116	102
Total	**2857**	**2443**	**2653**

2004/05

Middle depth trawl effort in the 2004/05 observer year was spread throughout almost all FMAs, with the least effort on the west coast of the upper North Island and no effort in the Kermadec region (Table 5). During this observer year, most coverage in terms of days was in CHA, followed by SEC and SOE. The percentage of commercial fishing days observed was fairly even through most FMAs observed, with the highest coverage in CHA. Overall, less than 15% of total effort was observed. The highest rates of seabird captures occurred in SEC and SOE, while the highest rates of marine mammal captures occurred in SEC, SOU and SUB.

Observer coverage in middle depth trawl fisheries was spread through the year, with most effort in SEC and CHA from July to September (Table 6). Coverage through the rest of the year was mainly in SEC, SOE and SOU. Observer coverage followed fishing effort of vessels operating in this fishery throughout the year.

TABLE 5. SUMMARY OF COMMERCIAL EFFORT, OBSERVER EFFORT AND PROTECTED SPECIES INTERACTIONS IN THE HAK, HOK, LIN, SWA MIDDLE DEPTH TRAWL FISHERY FOR THE PERIOD 01 JULY 2004 TO 30 JUNE 2005.

FMA	EFFORT DAYS	OBSERVER DAYS	COVERAGE (%)	NO. TOWS OBSERVED	SEABIRDS		MAMMALS	
					NUMBER	RATE*	NUMBER	RATE*
1. AKE	108	0	0.00					
2. CEE	951	14	1.47	124	0	0.00	1	0.81
3. SEC	2668	285	10.68	570	59	10.35	25	4.39
4. SOE	1614	241	14.93	489	32	6.54	0	0.00
5. SOU	445	47	10.56	95	1	1.05	3	3.16
6. SUB	546	66	12.09	142	5	3.52	7	4.93
7. CHA	2825	591	20.92	1436	35	2.44	27	1.88
8. CEW	2	0	0.00					
9. AKW	1	1	100.00	1	0	0.00	0	0.00
10. KER								
Total	**9160**	**1245**	**13.59**	**2857**	**132**	**4.62**	**63**	**2.24**

* Number per 100 tows.

TABLE 6. OBSERVER DAYS IN THE HAK, HOK, LIN, SWA MIDDLE DEPTH TRAWL FISHERY BY AREA AND MONTH FOR THE PERIOD 01 JULY 2004 TO 30 JUNE 2005.

FMA	2004						2005						TOTAL
	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	
2. CEE	6	1	3	0	0	0	0	0	0	0	2	2	14
3. SEC	39	47	42	16	11	11	9	36	17	1	3	53	285
4. SOE	4	0	0	9	14	7	87	56	25	0	0	39	241
5. SOU	5	12	9	8	3	3	2	0	3	1	0	1	47
6. SUB	3	0	0	32	16	2	0	0	1	12	0	0	66
7. CHA	178	335	52	0	12	0	0	0	0	0	3	11	591
9. AKW	0	0	0	0	0	1	0	0	0	0	0	0	1
Total	**235**	**395**	**106**	**65**	**56**	**24**	**98**	**92**	**46**	**14**	**8**	**106**	**1245**

Seabird interactions were reported throughout the year and in all seven FMAs observed, with the exception of CEE and AKW, where the least observer effort occurred (Table 7). The highest numbers of seabird interactions were recorded in August and June.

NZ fur seal interactions were recorded from July to November 2004 and in June 2005 in all FMAs where observer effort was recorded, with the exception of SOE and AKW (Table 8). The greatest number of NZ fur seal interactions was recorded in CHA in August, a time period with the greatest observer effort.

TABLE 7. SEABIRD INTERACTIONS IN THE HAK, HOK, LIN, SWA MIDDLE DEPTH TRAWL FISHERY BY AREA AND MONTH FOR THE PERIOD 01 JULY 2004 TO 30 JUNE 2005.

FMA	2004						2005						TOTAL
	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	
2. CEE	0	0	0	–	–	–	–	–	–	–	0	0	0
3. SEC	0	0	1	2	0	2	0	2	3	0	0	49	59
4. SOE	0	–	–	0	0	0	3	4	4	–	–	21	32
5. SOU	0	0	0	0	1	0	0	–	0	0	–	0	1
6. SUB	0	–	–	1	3	0	–	–	0	1	–	–	5
7. CHA	6	23	2	–	0	–	–	–	–	–	0	4	35
9. AKW	–	–	–	–	–	0	–	–	–	–	–	–	**0**
Total	**6**	**23**	**3**	**3**	**4**	**2**	**3**	**6**	**7**	**1**	**0**	**74**	**132**

TABLE 8. NZ FUR SEAL INTERACTIONS IN THE HAK, HOK, LIN, SWA MIDDLE DEPTH TRAWL FISHERY BY AREA AND MONTH FOR THE PERIOD 01 JULY 2004 TO 30 JUNE 2005.

FMA	2004						2005						TOTAL
	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	
2. CEE	1	0	0	–	–	–	–	–	–	–	0	0	1
3. SEC	2	2	12	3	0	0	0	0	0	0	0	6	25
4. SOE	0	–	–	0	0	0	0	0	0	–	–	0	0
5. SOU	0	3	0	0	0	0	0	–	0	0	–	0	3
6. SUB	0	–	–	5	2	0	–	–	0	0	–	–	7
7. CHA	3	24	0	–	0	–	–	–	–	–	0	0	27
9. AKW	–	–	–	–	–	0	–	–	–	–	–	–	0
Total	**6**	**29**	**12**	**8**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**6**	**63**

2005/06

There was a lower commercial effort in terms of fishing days and a concurrent reduction in observer effort in 2005/06 compared with 2004/05 (Table 9). The spread of commercial fishing effort was similar to 2004/05, with reductions in all areas, although reductions were especially large in CEE, SOE and SUB. In contrast, the spread of observer effort was somewhat different to 2004/05, with higher levels of coverage in SOU and SUB. As in 2004/05, the highest rate of seabird interactions occurred in SEC, followed by CEE and SOU. The highest rate of marine mammal interactions per 100 tows was recorded in CEE, while the highest number of marine mammal captures was reported in CHA.

Observer coverage in 2005/06 was similar to that in 2004/05, with days spread throughout the year but most effort in SEC and CHA (Table 10). Coverage through the rest of the year was mainly in SEC, SOE and SOU.

TABLE 9. SUMMARY OF COMMERCIAL EFFORT, OBSERVER EFFORT AND PROTECTED SPECIES INTERACTIONS IN THE HAK, HOK, LIN, SWA MIDDLE DEPTH TRAWL FISHERY FOR THE PERIOD 01 JULY 2005 TO 30 JUNE 2006.

FMA	EFFORT	OBSERVER	COVERAGE	NO. TOWS	SEABIRDS		MAMMALS	
	DAYS	DAYS	(%)	OBSERVED	NUMBER	RATE*	NUMBER	RATE*
1. AKE	74	0	0.00					
2. CEE	498	15	3.01	90	9	10.00	24	26.67
3. SEC	2239	293	13.09	511	95	18.59	7	1.37
4. SOE	1014	100	9.86	189	3	1.59	0	0.00
5. SOU	524	125	23.85	265	22	8.30	12	4.53
6. SUB	178	74	41.57	184	6	3.26	4	2.17
7. CHA	2289	412	18.00	1203	19	1.58	65	5.40
8. CEW								
9. AKW	3	0	0.00					
10. KER								
Total	**6819**	**1019**	**14.94**	**2442**	**154**	**6.31**	**112**	**4.59**

* Number per 100 tows.

TABLE 10. OBSERVER DAYS IN THE HAK, HOK, LIN, SWA MIDDLE DEPTH TRAWL FISHERY BY AREA AND MONTH FOR THE PERIOD 01 JULY 2005 TO 30 JUNE 2006.

FMA	2005						2006						TOTAL
	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	
2. CEE	1	1	13	0	0	0	0	0	0	0	0	0	15
3. SEC	8	32	16	23	5	8	8	23	72	11	31	56	293
4. SOE	1	0	0	26	0	13	11	0	0	17	11	21	100
5. SOU	0	30	8	20	3	9	0	1	20	0	27	7	125
6. SUB	0	0	6	19	9	18	0	2	3	1	9	7	74
7. CHA	137	183	37	0	4	0	0	0	0	0	0	51	412
Total	**147**	**246**	**80**	**88**	**21**	**48**	**19**	**26**	**95**	**29**	**78**	**142**	**1019**

Seabird interactions were reported throughout the year, with higher numbers recorded in March and May, mostly in SEC (Table 11). One observed trip targeting silver warehou and hoki incidentally killed over 50 sooty shearwaters (mostly in May), as well as several other seabird species and marine mammals. Several other trips also reported multiple captures.

The number of NZ fur seal interactions was highest from July to September, mostly in CEE and CHA (Table 12). Fewer interactions were recorded outside these months. NZ fur seal captures in CHA were reported across 12 trips, with numbers ranging from 1 individual per trip through to 18 per trip.

TABLE 11. SEABIRD INTERACTIONS IN THE HAK, HOK, LIN, SWA MIDDLE DEPTH TRAWL FISHERY BY AREA AND MONTH FOR THE PERIOD 01 JULY 2005 TO 30 JUNE 2006.

FMA	2005						2006						TOTAL
	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	
2. CEE	0	3	6	–	–	–	–	–	–	–	–	–	9
3. SEC	0	0	0	4	0	0	0	3	33	2	52	1	95
4. SOE	0	–	–	3	–	0	0	–	–	0	0	0	3
5. SOU	–	5	0	1	0	0	–	0	12	–	4	0	22
6. SUB	–	–	1	0	0	0	–	0	0	0	4	1	6
7. CHA	4	10	4	–	1	–	–	–	–	–	–	0	19
Total	**4**	**18**	**11**	**8**	**1**	**0**	**0**	**3**	**45**	**2**	**60**	**2**	**154**

TABLE 12. NZ FUR SEAL INTERACTIONS IN THE HAK, HOK, LIN, SWA MIDDLE DEPTH TRAWL FISHERY BY AREA AND MONTH FOR THE PERIOD 01 JULY 2005 TO 30 JUNE 2006.

FMA	2005						2006						TOTAL
	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	
2. CEE	0	10	14	–	–	–	–	–	–	–	–	–	24
3. SEC	0	2	3	0	0	0	0	0	2	0	0	0	7
4. SOE	0	–	–	0	–	0	0	–	–	0	0	0	0
5. SOU	–	7	3	1	0	0	–	0	0	–	0	1	12
6. SUB	–	–	0	1	0	3	–	0	0	0	0	0	4
7. CHA	24	31	9	–	0	–	–	–	–	–	–	1	65
Total	**24**	**50**	**29**	**2**	**0**	**3**	**0**	**0**	**2**	**0**	**0**	**2**	**112**

2006/07

Commercial effort in 2006/07 was similar to the previous 2 observer years (Table 13). Observer coverage was more evenly spread to provide around 20% coverage in four FMAs. Numbers of seabird and marine mammal interactions were reduced compared to previous years, with the most notable reduction being in the number of marine mammal captures in CHA.

As in previous years, observer coverage was spread throughout the year, with the greatest number of days observed in CHA (Table 14).

TABLE 13. SUMMARY OF COMMERCIAL EFFORT, OBSERVER EFFORT AND PROTECTED SPECIES INTERACTIONS IN THE HAK, HOK, LIN, SWA MIDDLE DEPTH TRAWL FISHERY FOR THE PERIOD 01 JULY 2006 TO 30 JUNE 2007.

FMA	EFFORT	OBSERVER	COVERAGE	NO. TOWS	SEABIRDS		MAMMALS	
	DAYS	DAYS	(%)	OBSERVED	NUMBER	RATE*	NUMBER	RATE*
1. AKE	90	1	1.11	1	0	0.00	0	0.00
2. CEE	499	19	3.81	121	3	2.48	8	6.61
3. SEC	1959	286	14.60	525	15	2.86	17	3.24
4. SOE	1099	241	21.93	493	7	1.42	0	0.00
5. SOU	695	161	23.17	324	6	1.85	8	2.47
6. SUB	133	39	29.32	65	0	0.00	7	10.77
7. CHA	2432	466	19.16	1117	6	0.54	45	4.03
8. CEW								
9. AKW	3	3	100.00	6	0	0.00	0	0.00
10. KER								
Total	**6910**	**1216**	**17.60**	**2652**	**37**	**1.66**	**85**	**3.21**

* Number per 100 tows.

TABLE 14. OBSERVER DAYS IN THE HAK, HOK, LIN, SWA MIDDLE DEPTH TRAWL FISHERY BY AREA AND MONTH FOR THE PERIOD 01 JULY 2006 TO 30 JUNE 2007.

FMA	2006						2007						TOTAL
	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	
1. AKE	0	1	0	0	0	0	0	0	0	0	0	0	1
2. CEE	1	0	0	0	0	11	0	0	0	0	0	7	19
3. SEC	31	14	36	24	21	47	0	1	6	14	57	35	286
4. SOE	6	0	0	0	11	21	34	29	73	29	32	6	241
5. SOU	22	5	8	17	26	48	11	6	4	6	8	0	161
6. SUB	5	0	0	14	3	9	2	5	0	1	0	0	39
7. CHA	96	238	120	0	0	0	0	0	0	0	0	12	466
9. AKW	0	0	0	0	0	0	0	0	0	0	0	3	3
Total	**161**	**258**	**164**	**55**	**61**	**136**	**47**	**41**	**83**	**50**	**97**	**63**	**1216**

Fewer seabird interactions were recorded in middle depth trawl fisheries in 2006/07, particularly in SEC (Table 15). Interactions were reported in all months of the year.

Fewer NZ fur seal interactions were reported in 2006/07 compared to previous years, and most interactions occurred in the latter half of the calendar year (Table 16).

TABLE 15. SEABIRD INTERACTIONS IN THE HAK, HOK, LIN, SWA MIDDLE DEPTH TRAWL FISHERY BY AREA AND MONTH FOR THE PERIOD 01 JULY 2006 TO 30 JUNE 2007.

FMA	2006						2007						TOTAL
	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	
1. AKE	–	0	–	–	–	–	–	–	–	–	–	–	0
2. CEE	0	2	1	–	–	0	–	–	–	–	–	0	3
3. SEC	0	0	1	7	2	1	–	0	2	1	1	0	15
4. SOE	0	–	–	–	1	0	0	2	4	0	0	0	7
5. SOU	1	0	0	2	0	0	1	0	0	1	1	–	6
6. SUB	0	–	–	0	0	0	0	0	–	0	–	–	0
7. CHA	1	3	1	–	–	–	–	–	–	–	–	1	6
9. AKW	–	–	–	–	–	–	–	–	–	–	–	0	0
Total	**2**	**5**	**3**	**9**	**3**	**1**	**1**	**2**	**6**	**2**	**2**	**1**	**37**

TABLE 16. NZ FUR SEAL INTERACTIONS IN THE HAK, HOK, LIN, SWA MIDDLE DEPTH TRAWL FISHERY BY AREA AND MONTH FOR THE PERIOD 01 JULY 2006 TO 30 JUNE 2007.

FMA	2006						2007						TOTAL
	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	
1. AKE	–	0	–	–	–	–	–	–	–	–	–	–	0
2. CEE	2	0	5	–	–	0	–	–	–	–	–	1	8
3. SEC	1	0	11	2	2	0	–	0	0	0	1	0	17
4. SOE	0	–	–	–	0	0	0	0	0	0	0	0	0
5. SOU	2	5	0	1	0	0	0	0	0	0	0	–	8
6. SUB	1	–	–	6	0	0	0	0	–	0	–	–	7
7. CHA	10	22	10	–	–	–	–	–	–	–	–	3	45
9. AKW	–	–	–	–	–	–	–	–	–	–	–	0	0
Total	**16**	**27**	**26**	**9**	**2**	**0**	**0**	**0**	**0**	**0**	**1**	**4**	**85**

5.1.2 Southern blue whiting

The southern blue whiting fishery operates in SUB (mostly within the SOI area of SUB) during August and September. Between 2004 and 2007, observer coverage planned to cover 30% of fishing effort.

NZ fur seals and NZ sea lions have been incidentally caught in this fishery, but the number of seabird interactions has tended to be lower than in other trawl fisheries. Vessels over 28 m in length are required to use seabird mitigation devices. Sea Lion Exclusion Devices are not used in this fishery. Vessels also employ offal and discard management techniques that aim to reduce seabird interactions.

Seabird and marine mammal interactions per observer year are detailed in Table 17.

TABLE 17. PROTECTED SPECIES INTERACTIONS IN THE SOUTHERN BLUE WHITING FISHERY BETWEEN 1 JULY 2004 AND 30 JUNE 2007.

SPECIES	2004/05		2005/06		2006/07	
	DEAD	ALIVE	DEAD	ALIVE	DEAD	ALIVE
SEABIRDS						
Cape petrels				1		
Grey petrel		1	1	1	1	2
Grey-backed storm petrel	1					
Salvin's albatross						1
Total	**1**	**1**	**1**	**2**	**1**	**3**
MARINE MAMMALS						
Leopard seal			1			
NZ fur seal	12	5	32	1	52	
NZ sea lion	1		2		3	
Total	**13**	**5**	**35**	**1**	**55**	**0**

2004/05

In 2004/05, c. 40% of fishing days were observed in SUB (Table 18). Eighteen marine mammal captures were recorded in this fishery, but only two seabird captures (one live, one dead).

Although the fishery runs from August to October, 90% of observer coverage was in September (Table 19).

TABLE 18. SUMMARY OF COMMERCIAL EFFORT, OBSERVER EFFORT AND PROTECTED SPECIES INTERACTIONS IN THE SOUTHERN BLUE WHITING FISHERY FOR THE PERIOD 01 JULY 2004 TO 30 JUNE 2005.

FMA	EFFORT DAYS	OBSERVER DAYS	COVERAGE (%)	NO. TOWS OBSERVED	SEABIRDS		MAMMALS	
					NUMBER	RATE*	NUMBER	RATE*
1. AKE								
2. CEE								
3. SEC								
4. SOE								
5. SOU								
6. SUB	318	129	40.57	247	2	0.81	18	7.29
7. CHA								
8. CEW								
9. AKW								
10. KER								
Total	**318**	**129**	**40.60**	**247**	**2**	**0.81**	**18**	**7.29**

* Number per 100 tows.

TABLE 19. OBSERVER DAYS IN THE SOUTHERN BLUE WHITING FISHERY BY AREA AND MONTH FOR THE PERIOD 01 JULY 2004 TO 30 JUNE 2005.

FMA	2004						2005						TOTAL
	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	
6. SUB	0	5	116	8	0	0	0	0	0	0	0	0	129
Total	**0**	**5**	**116**	**8**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**129**

TABLE 20. NZ FUR SEAL INTERACTIONS IN THE SOUTHERN BLUE WHITING FISHERY BY AREA AND MONTH FOR THE PERIOD 01 JULY 2004 TO 30 JUNE 2005.

FMA	2004			TOTAL
	AUG	SEP	OCT	
6. SUB	9	4	4	17
Total	**9**	**4**	**4**	**17**

Two seabirds and one NZ sea lion were caught in SUB in September, while 17 NZ fur seals interactions were reported throughout the fishing season (Table 20). One observed trip reported the capture of nine NZ fur seals and one NZ sea lion.

2005/06

Fishing effort increased slightly in 2005/06. Although the number of days observed also increased, overall observer coverage reduced to 35% of fishing effort (Table 21). While there were only three seabirds interactions, a greater number of marine mammal interactions were reported.

Observer coverage in 2005/06 was spread through August and September, with the greatest effort in September (Table 22).

TABLE 21. SUMMARY OF COMMERCIAL EFFORT, OBSERVER EFFORT AND PROTECTED SPECIES INTERACTIONS IN THE SOUTHERN BLUE WHITING FISHERY FOR THE PERIOD 01 JULY 2005 TO 30 JUNE 2006.

FMA	EFFORT DAYS	OBSERVER DAYS	COVERAGE (%)	NO. TOWS OBSERVED	SEABIRDS		MAMMALS	
					NUMBER	RATE*	NUMBER	RATE*
1. AKE								
2. CEE								
3. SEC								
4. SOE								
5. SOU								
6. SUB	389	139	35.73	329	3	0.91	36	10.94
7. CHA								
8. CEW								
9. AKW								
10. KER								
Total	**389**	**139**	**35.70**	**329**	**3**	**0.91**	**36**	**10.94**

* Number per 100 tows.

TABLE 22. OBSERVER DAYS IN THE SOUTHERN BLUE WHITING FISHERY BY AREA AND MONTH FOR THE PERIOD 01 JULY 2005 TO 30 JUNE 2006.

FMA	2005						2006						TOTAL
	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	
6. SUB	0	41	98	0	0	0	0	0	0	0	0	0	139
Total	**0**	**41**	**98**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**139**

TABLE 23. NZ FUR SEAL INTERACTIONS IN THE SOUTHERN BLUE WHITING FISHERY BY AREA AND MONTH FOR THE PERIOD 01 JULY 2005 TO 30 JUNE 2006.

FMA	2005		TOTAL
	AUG	SEP	
6. SUB	24	9	33
Total	**24**	**9**	**33**

Two seabirds were caught in August and one in September. Two NZ sea lions and one leopard seal were caught in September. A greater number of NZ fur seal interactions were recorded compared to the previous year, with most interactions occurring in August (Table 23). Nineteen NZ fur seal captures were reported from one trip while another trip reported the capture of two NZ fur seals, one NZ sea lion and the leopard seal.

2006/07

In 2006/07, commercial effort was lower than in previous years, as was the number of observer days (Table 24). Observer coverage as a percentage of effort was similar to 2005/06. While the number of seabird interactions remained low, the number of marine mammal interactions increased again from the previous 2 observer years.

Observer coverage was spread over the 3-month fishing season, with greatest effort still in August and September and few days in October (Table 25).

All seabird captures were reported in August, whereas all NZ sea lion captures were reported in September. Fifty-one of the 52 NZ fur seal captures were reported in August. A few vessels operating in this fishery have contributed to the majority of capture events, particularly for NZ fur seals: one observed trip reported the capture of 24 NZ fur seals and three NZ sea lions; another reported 16 NZ fur seal captures; and a third reported 12 NZ fur seals captures.

TABLE 24. SUMMARY OF COMMERCIAL EFFORT, OBSERVER EFFORT AND PROTECTED SPECIES INTERACTIONS IN THE SOUTHERN BLUE WHITING FISHERY FOR THE PERIOD 01 JULY 2006 TO 30 JUNE 2007.

FMA	EFFORT DAYS	OBSERVER DAYS	COVERAGE (%)	NO. TOWS OBSERVED	SEABIRDS		MAMMALS	
					NUMBER	RATE*	NUMBER	RATE*
1. AKE								
2. CEE								
3. SEC								
4. SOE								
5. SOU								
6. SUB	296	108	36.49	227	4	1.76	55	24.23
7. CHA								
8. CEW								
9. AKW								
10. KER								
Total	**296**	**108**	**36.50**	**227**	**4**	**1.76**	**55**	**24.23**

* Number per 100 tows.

TABLE 25. OBSERVER DAYS IN THE SOUTHERN BLUE WHITING FISHERY BY AREA AND MONTH FOR THE PERIOD 01 JULY 2006 TO 30 JUNE 2007.

FMA	2006						2007						TOTAL
	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	
6. SUB	0	31	71	6	0	0	0	0	0	0	0	0	108
Total	**0**	**31**	**71**	**6**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**108**

5.1.3 Scampi

CSP observer coverage of the scampi fishery was mostly in SOE from July to December and SUB (in the SOI area) from January to April, with lesser coverage in AKE and CEE. In this fishery, observations are undertaken to monitor interactions with seabirds and NZ sea lions, both of which have been recorded (although the latter has been restricted to occasional interactions in the southern scampi fishery). Coral has also occasionally been landed in this fishery (see Appendices 3 & 4).

Mitigation techniques employed in this fishery include offal and discard retention, and the use of bird scaring devices (required for vessels over 28 m). While many scampi vessels are less than 28 m in length, most use seabird mitigation devices of some sort, including tori lines and home-made warp scarers.

Seabird and marine mammal interactions per observer year are detailed in Table 26.

TABLE 26. PROTECTED SPECIES INTERACTIONS IN THE SCAMPI TRAWL FISHERY BETWEEN 1 JULY 2004 AND 30 JUNE 2007.

SPECIES	2004/05		2005/06		2006/07	
	DEAD	ALIVE	DEAD	ALIVE	DEAD	ALIVE
SEABIRDS						
Albatross (unidentified)			1		1	
Black-browed albatross (unidentified)			1			
Buller's albatross	2				1	
Chatham Island albatross	1					
Common diving petrel				6		
Flesh-footed shearwater		2	8		5	1
Northern giant petrel					1	
Pacific albatross						1
Petrels (unidentified)			1		1	
Salvin's albatross	2	2				
Sooty shearwater					14	
Storm petrels				10		
White-capped albatross	1			2	2	
White-chinned petrel	1					
White-headed petrel				1		
Total	**7**	**4**	**11**	**19**	**25**	**2**
MARINE MAMMALS						
NZ sea lion			1		1	
Total	**0**	**0**	**1**	**0**	**1**	**0**

2004/05

In 2004/05, the majority of scampi fishing effort was in SOE, SUB, AKE and CEE (Table 27). No observer effort was achieved in SUB, and minimal observer effort was achieved in AKE, CEE and SOE. Despite the low levels of observer effort, seabird interaction rates were relatively high compared to other trawl fisheries.

The number of days observed was highest in SOE during November and December, with additional effort in CEE in December and AKE in May (Table 28).

TABLE 27. SUMMARY OF COMMERCIAL EFFORT, OBSERVER EFFORT AND PROTECTED SPECIES INTERACTIONS IN THE SCAMPI TRAWL FISHERY FOR THE PERIOD 01 JULY 2004 TO 30 JUNE 2005.

FMA	EFFORT	OBSERVER	COVERAGE	NO. TOWS	SEABIRDS		MAMMALS	
	DAYS	DAYS	(%)	OBSERVED	NUMBER	RATE*	NUMBER	RATE*
1. AKE	305	22	7.21	51	2	3.92	0	0.00
2. CEE	232	11	4.74	15	1	6.67	0	0.00
3. SEC	4	0	0.00					
4. SOE	656	39	5.95	77	8	10.39	0	0.00
5. SOU	1	0	0.00					
6. SUB	429	0	0.00					
7. CHA	5	0	0.00					
8. CEW								
9. AKW	5	0	0.00					
10. KER								
Total	**1637**	**72**	**4.40**	**143**	**11**	**7.69**	**0**	**0.00**

* Number per 100 tows.

TABLE 28. OBSERVER DAYS IN THE SCAMPI TRAWL FISHERY BY AREA AND MONTH FOR THE PERIOD 01 JULY 2004 TO 30 JUNE 2005.

FMA	2004						2005						TOTAL
	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	
1. AKE	0	0	0	0	0	0	0	0	0	0	22	0	22
2. CEE	0	0	0	0	0	11	0	0	0	0	0	0	11
4. SOE	0	0	0	0	17	22	0	0	0	0	0	0	39
Total	**0**	**0**	**0**	**0**	**17**	**33**	**0**	**0**	**0**	**0**	**22**	**0**	**72**

TABLE 29. SEABIRD INTERACTIONS IN THE SCAMPI TRAWL FISHERY BY AREA AND MONTH FOR THE PERIOD 01 JULY 2004 TO 30 JUNE 2005.

FMA	2004		2005	TOTAL
	NOV	DEC	MAY	
1. AKE	–	–	2	2
2. CEE	–	1	–	1
4. SOE	2	6	–	8
Total	**2**	**7**	**2**	**11**

Seabird interactions were reported across three trips from all FMAs in which observer coverage was undertaken (Table 29).

2005/06

Observer coverage across all fishing effort was still low in 2005/06, although better levels of coverage were achieved in AKE and SUB (Table 30). Compared to the previous year, a higher number and rate of seabird interactions were recorded in AKE.

Observer coverage was from October to December, mostly in AKE and SUB, and from May to June in AKE and SOE (Table 31).

TABLE 30. SUMMARY OF COMMERCIAL EFFORT, OBSERVER EFFORT AND PROTECTED SPECIES INTERACTIONS IN THE SCAMPI TRAWL FISHERY FOR THE PERIOD 01 JULY 2005 TO 30 JUNE 2006.

FMA	EFFORT	OBSERVER	COVERAGE	NO. TOWS	SEABIRDS		MAMMALS	
	DAYS	DAYS	(%)	OBSERVED	NUMBER	RATE*	NUMBER	RATE*
1. AKE	423	48	11.35	114	21	18.42	0	0.00
2. CEE	326	0	0.00					
3. SEC	11	0	0.00					
4. SOE	930	12	1.29	25	0	0.00	0	0.00
5. SOU	3	0	0.00					
6. SUB	517	43	8.32	118	9	7.63	1	0.85
7. CHA	1	1	100.00	2	0	0.00	0	0.00
8. CEW								
9. AKW								
10. KER								
Total	**2211**	**104**	**4.70**	**259**	**30**	**11.58**	**1**	**0.39**

* Number per 100 tows.

TABLE 31. OBSERVER DAYS IN THE SCAMPI TRAWL FISHERY BY AREA AND MONTH FOR THE PERIOD 01 JULY 2005 TO 30 JUNE 2006.

FMA	2005						2006						TOTAL
	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	
1. AKE	0	0	0	19	0	0	0	0	0	0	7	22	48
4. SOE	0	0	0	0	0	0	0	0	0	0	0	12	12
6. SUB	0	0	0	12	25	6	0	0	0	0	0	0	43
7. CHA	0	0	0	1	0	0	0	0	0	0	0	0	1
Total	**0**	**0**	**0**	**32**	**25**	**6**	**0**	**0**	**0**	**0**	**7**	**34**	**104**

TABLE 32. SEABIRD INTERACTIONS IN THE SCAMPI TRAWL FISHERY BY AREA AND MONTH FOR THE PERIOD 01 JULY 2005 TO 30 JUNE 2006.

FMA	2005			2006		TOTAL
	OCT	NOV	DEC	MAY	JUN	
1. AKE	8	–	–	1	12	21
4. SOE	–	–	–	–	0	0
6. SUB	1	8	0	–	–	9
7. CHA	0	–	–	–	–	0
Total	**9**	**8**	**0**	**1**	**12**	**30**

One NZ sea lion was caught in SOI (within SUB) in November. Most seabird interactions in AKE were either storm petrels (released alive) or flesh-footed shearwaters (landed dead), whereas captures in SUB were mostly common diving petrels (released alive) (Table 32).

2006/07

In 2006/07, observer coverage of all fishing effort was higher than in previous observer years, but still less than 10% of total effort (Table 33). Greater coverage was achieved in SOE compared to 2005/06. A high rate of seabird interactions was recorded in SUB.

There was a higher number of observer days than in previous years and coverage was spread throughout the year (Table 34). The highest number of observer days was delivered in SOE, yet few seabird interactions were reported there compared to SUB.

TABLE 33. SUMMARY OF COMMERCIAL EFFORT, OBSERVER EFFORT AND PROTECTED SPECIES INTERACTIONS IN THE SCAMPI TRAWL FISHERY FOR THE PERIOD 01 JULY 2006 TO 30 JUNE 2007.

FMA	EFFORT	OBSERVER	COVERAGE	NO. TOWS	SEABIRDS		MAMMALS	
	DAYS	DAYS	(%)	OBSERVED	NUMBER	RATE*	NUMBER	RATE*
1. AKE	423	51	12.06	94	8	8.51	0	0.00
2. CEE	374	11	2.94	30	0	0.00	0	0.00
3. SEC	9	0	0.00					
4. SOE	888	103	11.60	224	3	1.34	0	0.00
5. SOU	1	0	0.00					
6. SUB	431	37	8.58	101	16	15.84	1	0.99
7. CHA								
8. CEW								
9. AKW								
10. KER								
Total	**2126**	**202**	**9.50**	**449**	**27**	**6.01**	**1**	**0.22**

* Number per 100 tows.

TABLE 34. OBSERVER DAYS IN THE SCAMPI TRAWL FISHERY BY AREA AND MONTH FOR THE PERIOD 01 JULY 2006 TO 30 JUNE 2007.

FMA	2006						2007						TOTAL
	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	
1. AKE	0	0	0	30	0	0	0	0	0	0	0	21	51
2. CEE	0	0	0	0	0	0	0	0	0	6	5	0	11
4. SOE	31	9	0	13	20	9	0	0	0	0	21	0	103
6. SUB	0	0	0	0	0	0	12	14	6	5	0	0	37
Total	**31**	**9**	**0**	**43**	**20**	**9**	**12**	**14**	**6**	**11**	**26**	**21**	**202**

The highest numbers of seabird interactions were recorded in SUB in April and in AKE in October (Table 35). All captures reported in AKE were from one trip. Fifteen seabirds were incidentally killed during one trip in SUB in March and April. One NZ sea lion was captured in SUB (in the SOI area) in February.

TABLE 35. SEABIRD INTERACTIONS IN THE SCAMPI TRAWL FISHERY BY AREA AND MONTH FOR THE PERIOD 01 JULY 2006 TO 30 JUNE 2007.

FMA	2006					2007						TOTAL
	JUL	AUG	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	
1. AKE	–	–	8	–	–	–	–	–	–	–	0	8
2. CEE	–	–	–	–	–	–	–	–	0	0	–	0
4. SOE	0	2	1	0	0	–	–	–	–	0	–	3
6. SUB	–	–	–	–	–	0	1	1	14	–	–	16
Total	**0**	**2**	**9**	**0**	**0**	**0**	**1**	**1**	**14**	**0**	**0**	**27**

5.1.4 Squid

Higher levels of observer coverage have been planned and delivered in the squid (SQU) fishery than in other trawl fisheries, due to historically high levels of seabird captures (especially warp captures of white-capped albatrosses, and net captures of sooty shearwaters and white-chinned petrels). Offal has been identified as a key issue leading to warp captures in this fishery (Middleton & Abraham 2007) and practices are currently being developed to manage the discharge of waste during active fishing. Research is also underway to investigate the factors that lead to net captures and possible mitigation techniques (CSP MIT 2006/02). In addition, Deepwater Group Ltd has developed voluntary Vessel Management Plans for deep-water factory trawlers, which outline the offal and discard management measures and mitigation devices or practices employed by each vessel. This fishery is also a focus of observer coverage due to captures of NZ sea lions. Vessels operating in the squid 6T fishery area use Sea Lion Exclusion Devices. Observer coverage in the squid fishery has been focused in the 6T fishery in the Subantarctic FMA (SUB), with additional coverage in SOU, which is usually achieved as vessels are travelling to 6T.

Seabird and marine mammal interactions per observer year are detailed in Table 36. Numbers of seabird interactions have decreased over the 3-year period.

TABLE 36. PROTECTED SPECIES INTERACTIONS IN THE SQUID TRAWL FISHERY BETWEEN 01 JULY 2004 AND 30 JUNE 2007.

SPECIES	2004/05		2005/06		2006/07	
	DEAD	ALIVE	DEAD	ALIVE	DEAD	ALIVE
SEABIRDS						
Albatross (unidentified)	1		6			
Black petrel				2		
Black-bellied storm petrel				1		
Black-browed albatross	1					
Black-browed albatross (unidentified)		2				1
Buller's albatross	7	3	2	1	2	
Cape petrels					1	1
Common diving petrel	1	2	1	1		
Fairy prion		1				
Giant petrels (unidentified)		1		1		
Petrels (unidentified)	2	21	2	1		1
Prions (unidentified)		1				2
Salvin's albatross	9		1	1	3	
Seabird—large	5		1			
Shy albatross*	8	3	1		2	
Sooty shearwater	51	20	48	21	43	10
Southern royal albatross	1	1	1			
Storm petrels		3				
White-capped albatross*	207	18	54	2	36	4
White-chinned petrel	38	10	36	24	16	14
Total	**331**	**86**	**153**	**55**	**103**	**33**
MARINE MAMMALS						
NZ fur seal	14	2	1	3	6	
NZ sea lion	13		7		8	
Total	**27**	**2**	**8**	**3**	**14**	**0**

* Historically, white-capped albatrosses (*Thalassarche steadi*) were reported by observers under a general code for shy albatrosses (*T. cauta*). Some observers still use this code, although these birds are most likely to be white-capped albatrosses.

2004/05

The majority of fishing effort for squid was in SOU, SUB and SEC, while observer coverage was focused in SOU and SUB (Table 37). A high rate of seabird interactions occurred in both SOU and SUB, and the highest rate of marine mammal interactions occurred in SEC.

The majority of observer coverage was in SOU during January and February, and continuing through to June, and in SUB during the 6T season from February through to April (Table 38). Observer coverage is achieved in both SOU and SUB as vessels fish in SOU on the way to the 6T fishing grounds.

TABLE 37. SUMMARY OF COMMERCIAL EFFORT, OBSERVER EFFORT AND PROTECTED SPECIES INTERACTIONS IN THE SQUID TRAWL FISHERY FOR THE PERIOD 01 JULY 2004 TO 30 JUNE 2005.

FMA	EFFORT	OBSERVER	COVERAGE	NO. TOWS	SEABIRDS		MAMMALS	
	DAYS	DAYS	(%)	OBSERVED	NUMBER	RATE*	NUMBER	RATE*
1. AKE	1	0	0.00					
2. CEE								
3. SEC	838	47	5.61	80	5	6.25	4	5.00
4. SOE	23	2	8.70	3	0	0.00	0	0.00
5. SOU	2618	659	25.17	1612	234	14.52	14	0.87
6. SUB	1115	282	25.29	807	178	22.06	11	1.36
7. CHA	21	0	0.00					
8. CEW								
9. AKW								
10. KER								
Total	**4616**	**990**	**21.45**	**2502**	**417**	**16.67**	**29**	**1.16**

* Number per 100 tows.

TABLE 38. OBSERVER DAYS IN THE SQUID TRAWL FISHERY BY AREA AND MONTH FOR THE PERIOD 01 JULY 2004 TO 30 JUNE 2005.

FMA	2004						2005						TOTAL
	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	
3. SEC	0	0	0	0	0	0	1	3	0	8	29	6	47
4. SOE	0	0	0	0	0	0	0	0	0	0	2	0	2
5. SOU	0	0	0	0	0	7	183	269	97	46	26	31	659
6. SUB	0	0	0	1	0	0	0	82	151	48	0	0	282
Total	**0**	**0**	**0**	**1**	**0**	**7**	**184**	**354**	**248**	**102**	**57**	**37**	**990**

Seabird interactions were high in both SOU and SUB, and were recorded throughout the period of highest observer effort (Table 39). The highest numbers of interactions were reported in February and March.

NZ fur seal interactions were reported in SEC, SOU and SUB, with the greatest number reported in SOU (Table 40). Interactions occurred in the first half of the calendar year.

NZ sea lion interactions occurred in both SOU and SUB during the period January to April (Table 41). Sea Lion Exclusion Devices are generally not used in SOU, but are used in the 6T squid fishery in SUB.

TABLE 39. SEABIRD INTERACTIONS IN THE SQUID TRAWL FISHERY BY AREA AND MONTH FOR THE PERIOD 01 JULY 2004 TO 30 JUNE 2005.

FMA	2004		2005						TOTAL
	OCT	DEC	JAN	FEB	MAR	APR	MAY	JUN	
3. SEC	–	–	0	0	–	5	0	0	5
4. SOE	–	–	–	–	–	–	0	–	0
5. SOU	–	0	44	124	27	26	3	10	234
6. SUB	0	–	–	43	124	11	–	–	178
Total	**0**	**0**	**44**	**167**	**151**	**42**	**3**	**10**	**417**

TABLE 40. NZ FUR SEAL INTERACTIONS IN THE SQUID TRAWL FISHERY BY AREA AND MONTH FOR THE PERIOD 01 JULY 2004 TO 30 JUNE 2005.

FMA	2004		2005						TOTAL
	OCT	DEC	JAN	FEB	MAR	APR	MAY	JUN	
3. SEC	–	–	0	0	–	0	2	2	4
4. SOE	–	–	–	–	–	–	0	–	0
5. SOU	–	0	2	0	4	0	1	4	11
6. SUB	0	–	–	1	0	0	–	–	1
Total	**0**	**0**	**2**	**1**	**4**	**0**	**3**	**6**	**16**

TABLE 41. NZ SEA LION INTERACTIONS IN THE SQUID TRAWL FISHERY BY AREA AND MONTH FOR THE PERIOD 01 JULY 2004 TO 30 JUNE 2005.

FMA	2004		2005						TOTAL
	OCT	DEC	JAN	FEB	MAR	APR	MAY	JUN	
3. SEC	–	–	0	0	–	0	0	0	0
4. SOE	–	–	–	–	–	–	0	–	0
5. SOU	–	0	1	1	1	0	0	0	3
6. SUB	0	–	–	4	3	3	–	–	10
Total	**0**	**0**	**1**	**5**	**4**	**3**	**0**	**0**	**13**

2005/06

As in the previous year, the greatest commercial effort in 2005/06 was in SOU, followed by SUB and SEC (Table 42). Over 20% observer coverage was achieved in SUB, but this was lower in SOU (14%). Seabird interaction rates were again high in SOU and SUB, as well as in SEC. Only 11 days were observed in SEC, less than 2% of fishing effort. Marine mammal interaction rates were lower than the previous year.

Fewer days were observed in 2005/06 compared to the previous year (Table 43). Most coverage was in SOU from November through to May and in SUB from February to April during the 6T squid season.

TABLE 42. SUMMARY OF COMMERCIAL EFFORT, OBSERVER EFFORT AND PROTECTED SPECIES INTERACTIONS IN THE SQUID TRAWL FISHERY FOR THE PERIOD 01 JULY 2005 TO 30 JUNE 2006.

FMA	EFFORT	OBSERVER	COVERAGE	NO. TOWS	SEABIRDS		MAMMALS	
	DAYS	DAYS	(%)	OBSERVED	NUMBER	RATE*	NUMBER	RATE*
1. AKE	9	1	11.11	1	0	0.00	0	0.00
2. CEE								
3. SEC	795	11	1.38	18	4	22.22	1	5.56
4. SOE	15	0	0.00					
5. SOU	2209	309	13.99	630	99	15.71	2	0.32
6. SUB	1231	289	23.48	687	105	15.28	8	1.16
7. CHA	33	0	0.00					
8. CEW								
9. AKW								
10. KER								
Total	**4292**	**610**	**14.21**	**1336**	**208**	**15.57**	**11**	**0.82**

* Number per 100 tows.

TABLE 43. OBSERVER DAYS IN THE SQUID TRAWL FISHERY BY AREA AND MONTH FOR THE PERIOD 01 JULY 2005 TO 30 JUNE 2006.

FMA	2005						2006						TOTAL
	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	
1. AKE	0	0	0	0	0	0	0	0	0	0	0	1	1
3. SEC	0	0	0	0	0	0	0	0	6	0	5	0	11
5. SOU	0	0	0	0	11	15	48	54	99	67	15	0	309
6. SUB	0	0	0	0	0	0	0	128	127	34	0	0	289
Total	**0**	**0**	**0**	**0**	**11**	**15**	**48**	**182**	**232**	**101**	**20**	**1**	**610**

Seabird interactions were reported in all months when observer coverage was undertaken and in all FMAs except AKE, where minimal effort was observed (Table 44). The majority of interactions occurred from February through to April in both SOU and SUB.

Four NZ fur seals were caught between January and May: one in SEC, one in SUB and two in SOU. NZ sea lion captures occurred in SUB, with two caught in February and five in March.

TABLE 44. SEABIRD INTERACTIONS IN THE SQUID TRAWL FISHERY BY AREA AND MONTH FOR THE PERIOD 01 JULY 2005 TO 30 JUNE 2006.

FMA	2005		2006						TOTAL
	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	
1. AKE	–	–	–	–	–	–	–	0	0
3. SEC	–	–	–	–	1	–	3	–	4
5. SOU	2	1	1	15	19	53	8	–	99
6. SUB	–	–	–	81	22	2	–	–	105
Total	**2**	**1**	**1**	**96**	**42**	**55**	**11**	**0**	**208**

2006/07

In 2006/07, higher levels of observer coverage were achieved in SOU and SUB, and more observer days were achieved in SEC, although the number of days remained low (Table 45). Seabird interaction rates were highest in SEC, but were lower than in previous years in SOU and SUB.

A greater number of fishing days was observed in 2006/07 compared to the previous 2 observer years (Table 46). Coverage was high in both SOU and SUB, especially from February to April.

TABLE 45. SUMMARY OF COMMERCIAL EFFORT, OBSERVER EFFORT AND PROTECTED SPECIES INTERACTIONS IN THE SQUID TRAWL FISHERY FOR THE PERIOD 01 JULY 2006 TO 30 JUNE 2007.

FMA	EFFORT	OBSERVER	COVERAGE	NO. TOWS	SEABIRDS		MAMMALS	
	DAYS	DAYS	(%)	OBSERVED	NUMBER	RATE*	NUMBER	RATE*
1. AKE	9	2	22.22	4	0	0.00	0	0.00
2. CEE								
3. SEC	682	25	3.67	45	10	22.22	1	2.22
4. SOE	33	0	0.00					
5. SOU	1531	370	24.17	680	77	11.32	6	0.88
6. SUB	780	302	38.72	538	49	9.11	7	1.30
7. CHA	7	0	0.00					
8. CEW	2	0	0.00					
9. AKW	1	0	0.00					
10. KER								
Total	**3045**	**699**	**22.96**	**1267**	**136**	**10.73**	**14**	**1.10**

* Number per 100 tows.

TABLE 46. OBSERVER DAYS IN THE SQUID TRAWL FISHERY BY AREA AND MONTH FOR THE PERIOD 01 JULY 2006 TO 30 JUNE 2007.

FMA	2006						2007						TOTAL
	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	
1. AKE	0	0	0	0	0	0	0	0	1	1	0	0	2
3. SEC	0	0	0	0	4	5	0	1	1	11	3	0	25
5. SOU	0	0	0	2	4	0	52	89	129	84	10	0	370
6. SUB	0	0	0	0	0	0	0	153	119	30	0	0	302
Total	**0**	**0**	**0**	**2**	**8**	**5**	**52**	**243**	**250**	**126**	**13**	**0**	**699**

As in previous years, most seabird interactions occurred from February to April in SOU and SUB (Table 47).

NZ fur seal captures occurred from February to April, with five NZ fur seals caught in SOU and one in SEC. Seven NZ sea lions were caught in SUB from February to March, and one was caught in SOU in March.

TABLE 47. SEABIRD INTERACTIONS IN THE SQUID TRAWL FISHERY BY AREA AND MONTH FOR THE PERIOD 01 JULY 2006 TO 30 JUNE 2007

FMA	2006			2007					TOTAL
	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	
1. AKE	–	–	–	–	–	0	0	–	0
3. SEC	–	0	3	–	0	0	2	5	10
5. SOU	0	0	–	8	27	18	22	2	77
6. SUB	–	–	–	–	27	15	7	–	49
Total	**0**	**0**	**3**	**8**	**54**	**33**	**31**	**7**	**136**

5.2 PELAGIC TRAWL FISHERIES

5.2.1 Jack mackerel and barracouta

The highest number of common dolphin captures for any fishery was recorded in this pelagic trawl fishery. This included the capture of 17 dolphins by three vessels west of Auckland in November 2004. Captures of dusky dolphins, NZ fur seals and seabirds have also been recorded in this fishery. The majority of observer coverage is from October to December, with some coverage from April to July. Vessels can employ several techniques aimed at reducing the likelihood of interacting with dolphins, including not fishing during hours of the day when dolphin interactions are more likely and not setting nets when dolphins are present around the vessel. An industry-led Marine Mammal Operating Procedure is in place, which provides guidance on best practice to reduce dolphin bycatch. Seabird and marine mammal interactions per observer year are detailed in Table 48. Interactions by target fish species are given in Tables 49–51.

TABLE 48. PROTECTED SPECIES INTERACTIONS IN THE PELAGIC TRAWL FISHERY BETWEEN 01 JULY 2004 AND 30 JUNE 2007.

SPECIES	2004/05		2005/06		2006/07	
	DEAD	ALIVE	DEAD	ALIVE	DEAD	ALIVE
SEABIRDS						
Albatross (unidentified)			1			
Black-bellied storm petrel				1		
Buller's albatross	1		1		1	
Cape pigeons		1		1		
Common diving petrel					1	
Fairy prion	2		1	1		
Petrels (unidentified)		2		1		
Prion (unidentified)	1			2		
Seabird—large	1					
Sooty shearwater	1	1	7	3	3	
Southern giant petrel				1		
Storm petrels		2		1		
White-capped albatross	1		8	5		1
White-chinned petrel			1		2	
Total	**7**	**6**	**19**	**16**	**7**	**1**
MARINE MAMMALS						
Bottlenose dolphin	1					
Common dolphin	22		2		8	
Dusky dolphin			1			
NZ fur seal	6		22		6	1
Pilot whale	6					
Total	**35**	**0**	**25**	**0**	**14**	**1**

TABLE 49. SEABIRD INTERACTIONS IN THE PELAGIC TRAWL FISHERY BY TARGET FISH SPECIES FOR EACH OBSERVER YEAR.

TARGET SPECIES	2004/05		2005/06		2006/07	
	DEAD	ALIVE	DEAD	ALIVE	DEAD	ALIVE
Barracouta	3	0	18	14	7	1
Jack mackerel	3	6	1	2	0	0
Total	**6**	**6**	**19**	**16**	**7**	**1**

TABLE 50. CETACEAN INTERACTIONS IN THE PELAGIC TRAWL FISHERY BY TARGET FISH SPECIES FOR EACH OBSERVER YEAR.

TARGET SPECIES	2004/05		2005/06		2006/07	
	DEAD	ALIVE	DEAD	ALIVE	DEAD	ALIVE
Barracouta	0	0	1	0	0	0
Jack mackerel	28	0	3	0	8	0
Total	**28**	**0**	**4**	**0**	**8**	**0**

TABLE 51. NZ FUR SEAL INTERACTIONS IN THE PELAGIC TRAWL FISHERY BY TARGET FISH SPECIES FOR EACH OBSERVER YEAR.

TARGET SPECIES	2004/05		2005/06		2006/07	
	DEAD	ALIVE	DEAD	ALIVE	DEAD	ALIVE
Barracouta	0	0	20	0	3	0
Jack mackerel	6	0	2	0	3	1
Total	**6**	**0**	**22**	**0**	**6**	**1**

2004/05

In 2004/05, pelagic trawl fishing effort was spread through most FMAs, with the majority of effort in CHA, CEW, SEC and AKW (Table 52). Observer coverage was spread through those FMAs with greater than 100 days of commercial effort, but was highest in SOU and AKW, followed by CEW. The highest rate of seabird interactions was reported in SOU, while the highest rate of marine mammal interactions occurred in AKW.

The most concentrated periods of observer coverage were in November and December on the west coast of the upper North Island (AKW and CEW), and in June in CHA and CEW (Table 53).

TABLE 52. SUMMARY OF COMMERCIAL EFFORT, OBSERVER EFFORT AND PROTECTED SPECIES INTERACTIONS IN THE PELAGIC TRAWL FISHERY FOR THE PERIOD 01 JULY 2004 TO 30 JUNE 2005.

FMA	EFFORT DAYS	OBSERVER DAYS	COVERAGE (%)	NO. TOWS OBSERVED	SEABIRDS		MAMMALS	
					NUMBER	RATE*	NUMBER	RATE*
1. AKE	36	0	0.00					
2. CEE	62	0	0.00					
3. SEC	553	7	1.27	9	0	0.00	0	0.00
4. SOE	16	0	0.00					
5. SOU	142	31	21.83	47	3	6.38	0	0.00
6. SUB								
7. CHA	1054	61	5.79	131	4	3.05	2	1.53
8. CEW	622	99	15.92	188	2	1.06	0	0.00
9. AKW	421	91	21.62	231	4	1.73	33	14.29
10. KER								
Total	**2906**	**289**	**9.94**	**606**	**13**	**2.15**	**35**	**5.78**

* Number per 100 tows.

TABLE 53. OBSERVER DAYS IN THE PELAGIC TRAWL FISHERY BY AREA AND MONTH FOR THE PERIOD 01 JULY 2004 TO 30 JUNE 2005.

FMA	2004						2005						TOTAL
	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	
3. SEC	0	0	0	0	1	0	1	1	0	1	2	1	7
5. SOU	0	0	0	0	0	4	0	2	11	14	0	0	31
7. CHA	0	10	1	1	5	0	0	0	0	6	4	34	61
8. CEW	0	11	4	0	14	31	0	0	0	4	1	34	99
9. AKW	0	0	8	0	65	13	0	0	0	0	2	3	91
Total	**0**	**21**	**13**	**1**	**85**	**48**	**1**	**3**	**11**	**25**	**9**	**72**	**289**

Seabird interactions were reported in several FMAs, mostly in the middle of the calendar year (Table 54).

Two NZ fur seal captures occurred in CHA in August and four occurred in AKW in November. All dolphin interactions were reported from AKW between September and December (Table 55).

TABLE 54. SEABIRD INTERACTIONS IN THE PELAGIC TRAWL FISHERY BY AREA AND MONTH FOR THE PERIOD 01 JULY 2004 TO 30 JUNE 2005.

FMA	2004					2005						TOTAL
	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	
3. SEC	–	–	–	0	–	0	0	–	0	0	0	0
5. SOU	–	–	–	–	0	–	0	0	3	–	–	3
7. CHA	0	0	0	0	–	–	–	–	1	0	3	4
8. CEW	0	0	–	0	0	–	–	–	0	1	1	2
9. AKW	–	0	–	0	4	–	–	–	–	0	0	4
Total	**0**	**0**	**0**	**0**	**4**	**0**	**0**	**0**	**4**	**1**	**4**	**13**

TABLE 55. CETACEAN INTERACTIONS IN THE PELAGIC TRAWL FISHERY BY AREA AND MONTH FOR THE PERIOD 01 JULY 2004 TO 30 JUNE 2005.

FMA	2004					2005						TOTAL
	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	
3. SEC	–	–	–	0	–	0	0	–	0	0	0	0
5. SOU	–	–	–	–	0	–	0	0	0	–	–	0
7. CHA	0	0	0	0	–	–	–	–	0	0	0	0
8. CEW	0	0	–	0	0	–	–	–	0	0	0	0
9. AKW	–	2	–	17	10	–	–	–	–	0	0	29
Total	**0**	**2**	**0**	**17**	**10**	**0**	**0**	**0**	**0**	**0**	**0**	**29**

2005/06

The number of commercial fishing days in 2005/06 was similar to the previous year, but almost twice as many days were observed (Table 56). The highest levels of observer coverage were in SOU and CEW, and over 16% of all fishing effort was observed. Numbers of seabird interactions and interaction rates were, again, highest in SOU. Unlike 2004/05, the number of marine mammal interactions was highest in CHA and no interactions were recorded in AKW.

Observer coverage was highest in CEW, CHA and SOU, with the most coverage in December (Table 57).

TABLE 56. SUMMARY OF COMMERCIAL EFFORT, OBSERVER EFFORT AND PROTECTED SPECIES INTERACTIONS IN THE PELAGIC TRAWL FISHERY FOR THE PERIOD 01 JULY 2005 TO 30 JUNE 2006.

FMA	EFFORT	OBSERVER	COVERAGE	NO. TOWS	SEABIRDS		MAMMALS	
	DAYS	DAYS	(%)	OBSERVED	NUMBER	RATE*	NUMBER	RATE*
1. AKE	41	0	0.00					
2. CEE	9	0	0.00					
3. SEC	540	12	2.22	30	0	0.00	1	3.33
4. SOE	36	0	0.00					
5. SOU	226	82	36.28	232	32	13.79	1	0.43
6. SUB	1	0	0.00					
7. CHA	1040	154	14.81	192	1	0.52	21	10.94
8. CEW	704	189	26.85	502	2	0.40	2	0.40
9. AKW	203	26	12.81	67	0	0.00	0	0.00
10. KER								
Total	**2800**	**463**	**16.54**	**1023**	**35**	**3.42**	**25**	**2.44**

* Number per 100 tows.

TABLE 57. OBSERVER DAYS IN THE PELAGIC TRAWL FISHERY BY AREA AND MONTH FOR THE PERIOD 01 JULY 2005 TO 30 JUNE 2006.

FMA	2005						2006						TOTAL
	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	
3. SEC	0	0	0	0	1	0	0	0	11	0	0	0	12
5. SOU	0	0	0	0	0	0	0	8	69	0	0	5	82
7. CHA	21	34	8	0	6	73	0	0	0	0	0	12	154
8. CEW	28	0	0	0	24	112	0	0	0	0	0	25	189
9. AKW	11	0	0	0	13	2	0	0	0	0	0	0	26
Total	**60**	**34**	**8**	**0**	**44**	**187**	**0**	**8**	**80**	**0**	**0**	**42**	**463**

More seabird interactions were recorded in 2005/06 than in 2004/05 (Table 58). Over 30 seabirds were caught in SOU in March, with few captures outside this period or area. Fourteen live seabird interactions were reported across five trips targeting barracouta.

A greater number of NZ fur seal interactions was reported compared to 2004/05, including 19 captures in CHA between July and September across three trips (Table 59).

TABLE 58. SEABIRD INTERACTIONS IN THE PELAGIC TRAWL FISHERY BY AREA AND MONTH FOR THE PERIOD 01 JULY 2005 TO 30 JUNE 2006.

FMA	2005					2006			TOTAL
	JUL	AUG	SEP	NOV	DEC	FEB	MAR	JUN	
3. SEC	–	–	–	0	–	–	0	–	0
5. SOU	–	–	–	–	–	0	32	0	32
7. CHA	1	0	0	0	0	–	–	0	1
8. CEW	0	–	–	0	2	–	–	0	2
9. AKW	0	–	–	0	0	–	–	–	0
Total	**1**	**0**	**0**	**0**	**2**	**0**	**32**	**0**	**35**

TABLE 59. NZ FUR SEAL INTERACTIONS IN THE PELAGIC TRAWL FISHERY BY AREA AND MONTH FOR THE PERIOD 01 JULY 2005 TO 30 JUNE 2006.

FMA	2005					2006			TOTAL
	JUL	AUG	SEP	NOV	DEC	FEB	MAR	JUN	
3. SEC	–	–	–	0	–	–	0	–	0
5. SOU	–	–	–	–	–	0	1	0	1
7. CHA	1	17	1	0	0	–	–	0	19
8. CEW	1	–	–	0	0	–	–	1	2
9. AKW	0	–	–	0	0	–	–	–	0
Total	**2**	**17**	**1**	**0**	**0**	**0**	**1**	**1**	**22**

2006/07

In 2006/07, levels of both commercial fishing effort and observer effort were similar to 2005/06 (Table 60). More than 10% observer coverage was achieved in five FMAs, and over 15% of total commercial effort was observed. As in previous years, the highest rate of seabird interactions was in SOU and the highest rate of marine mammal interactions was in AKW.

Observer days were spread throughout the year, with peak periods from October to January and April to June (Table 61). As in 2005/06, the greatest number of observer days occurred in CEW and CHA.

Eight seabird captures occurred in SOU: seven in March and April, and one in May. Seven NZ fur seals were caught throughout the year and across four FMAs. Eight common dolphins were caught: three in AKW in October and five in CHA in April.

TABLE 60. SUMMARY OF COMMERCIAL EFFORT, OBSERVER EFFORT AND PROTECTED SPECIES INTERACTIONS IN THE PELAGIC TRAWL FISHERY FOR THE PERIOD 01 JULY 2006 TO 30 JUNE 2007.

FMA	EFFORT	OBSERVER	COVERAGE	NO. TOWS	SEABIRDS		MAMMALS	
	DAYS	DAYS	(%)	OBSERVED	NUMBER	RATE*	NUMBER	RATE*
1. AKE	53	0	0.00					
2. CEE	28	0	0.00					
3. SEC	461	38	8.24	84	0	0.00	2	2.38
4. SOE	111	21	18.91	38	1	2.63	0	0.00
5. SOU	302	35	11.59	68	7	10.29	2	2.94
6. SUB								
7. CHA	917	135	14.72	217	0	0.00	5	2.30
8. CEW	674	167	24.78	410	0	0.00	2	0.49
9. AKW	194	26	13.40	59	0	0.00	4	6.78
10. KER								
Total	**2740**	**422**	**15.40**	**876**	**8**	**0.91**	**15**	**1.71**

* Number per 100 tows.

TABLE 61. OBSERVER DAYS IN THE PELAGIC TRAWL FISHERY BY AREA AND MONTH FOR THE PERIOD 01 JULY 2006 TO 30 JUNE 2007.

FMA	2006						2007						TOTAL
	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	
3. SEC	0	12	2	3	4	3	1	0	1	9	0	3	38
4. SOE	0	0	0	0	0	0	0	0	0	0	20	1	21
5. SOU	0	0	0	0	6	0	0	0	5	24	0	0	35
7. CHA	4	3	1	26	1	13	24	0	0	24	0	39	135
8. CEW	12	3	0	36	3	56	35	0	0	14	0	8	167
9. AKW	7	0	0	11	2	6	0	0	0	0	0	0	26
Total	**23**	**18**	**3**	**76**	**16**	**78**	**60**	**0**	**6**	**71**	**20**	**51**	**422**

5.3 DEEP-WATER BOTTOM TRAWL FISHERIES

5.3.1 Orange roughy and oreo

The majority of observer coverage on vessels targeting orange roughy and oreo has been in the Subantarctic (SUB) and Chatham Rise (SOE) FMAs, with lesser coverage in other areas. A particular focus of observer coverage in this fishery is to monitor impacts of deep-water trawling on protected corals, particularly on the Chatham Rise. Seabird interactions and behaviour around vessels are also monitored. Mitigation techniques employed in this fishery include offal and discard management, and the use of bird scaring devices to mitigate seabird captures. Coral captures tend to occur when vessels are looking for new fishing grounds or miss known marks. Seabird and marine mammal interactions per observer year are detailed in Table 62.

TABLE 62. PROTECTED SPECIES INTERACTIONS IN THE DEEP-WATER BOTTOM TRAWL FISHERY BETWEEN 01 JULY 2004 AND 30 JUNE 2007.

SPECIES	2004/05		2005/06		2006/07	
	DEAD	ALIVE	DEAD	ALIVE	DEAD	ALIVE
SEABIRDS						
Albatross (unidentified)			1			
Black-bellied storm petrel						2
Broad-billed prion						1
Buller's albatross			2			
Cape petrels	1	14		1		
Chatham Island albatross		1				
Common diving petrel		1				
Fairy prion		8				
Fluttering shearwater		1				
Grey petrel	1	2				
Grey-backed storm petrel		3				
Northern giant petrel		1				
Northern royal albatross	1					
Petrel (unidentified)						1
Salvin's albatross	1	1				1
Seabird—large		2				
Seagull		1				
Shy albatross*				1		
Southern royal albatross						
Storm petrels		5				2
Wandering albatross				1		
White-chinned petrel				1		4
White-faced storm petrel			1			
Total	**4**	**40**	**4**	**4**	**0**	**11**
MARINE MAMMALS						
NZ fur seal	1	3	1	1	2	0
Total	**1**	**3**	**1**	**1**	**2**	**0**

* Historically, white-capped albatrosses (*Thalassarche steadi*) were reported by observers under a general code for shy albatrosses (*T. cauta*). Some observers still use this code, although these birds are most likely to be white-capped albatrosses.

2004/05

In 2004/05, deep-water trawl effort for orange roughy and oreo species was undertaken through all FMAs except the Kermadecs (Table 63). The majority of observer days were in SOE and SUB. The highest number of seabird captures was reported from SOE, many of which were live captures. NZ fur seal captures were reported from SUB.

Observer days in deep-water fisheries in the 2004/05 observer year were spread throughout the year, with the greatest number of observer days recorded in October, mostly in SUB (Table 64). While observer effort was undertaken in seven FMAs, over 80% of observer days were delivered in SUB and SOE.

TABLE 63. SUMMARY OF COMMERCIAL EFFORT, OBSERVER EFFORT AND PROTECTED SPECIES INTERACTIONS IN THE DEEP-WATER BOTTOM TRAWL FISHERY FOR THE PERIOD 01 JULY 2004 TO 30 JUNE 2005.

FMA	EFFORT	OBSERVER	COVERAGE	NO. TOWS	SEABIRDS		MAMMALS	
	DAYS	DAYS	(%)	OBSERVED	NUMBER	RATE*	NUMBER	RATE*
1. AKE	94	22	23.40	31	0	0.00	0	0.00
2. CEE	353	7	1.98	10	0	0.00	0	0.00
3. SEC	341	39	11.44	144	0	0.00	0	0.00
4. SOE	760	230	30.26	911	42	4.61	0	0.00
5. SOU	68	0	0.00					
6. SUB	354	116	32.77	372	1	0.27	4	1.08
7. CHA	84	4	4.76	28	0	0.00	0	0.00
8. CEW	7	0	0.00					
9. AKW	84	9	10.71	60	1	1.67	0	0.00
10. KER								
Total	**2145**	**427**	**19.91**	**1556**	**44**	**2.83**	**4**	**0.26**

* Number per 100 tows.

TABLE 64. OBSERVER DAYS IN THE DEEP-WATER BOTTOM TRAWL FISHERY BY AREA AND MONTH FOR THE PERIOD 01 JULY 2004 TO 30 JUNE 2005.

FMA	2004						2005						TOTAL
	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	
1. AKE	12	0	0	8	0	0	0	0	0	0	0	2	22
2. CEE	0	0	0	0	0	0	0	0	0	4	0	3	7
3. SEC	0	0	16	10	1	11	0	0	1	0	0	0	39
4. SOE	8	2	4	3	35	0	18	27	9	11	60	53	230
6. SUB	0	0	14	81	0	0	0	0	0	0	16	5	116
7. CHA	0	0	0	0	0	0	0	0	0	0	0	4	4
9. AKW	0	0	0	9	0	0	0	0	0	0	0	0	9
Total	**20**	**2**	**34**	**111**	**36**	**11**	**18**	**27**	**10**	**15**	**76**	**67**	**427**

Seabird interactions were reported mostly in SOE (Table 65). In the majority of cases, birds were released alive (Table 62), including 19 birds reported as deck strikes. Four NZ fur seals were caught in SUB in October.

Most coral landed during the 2004/05 observer year was in SOE (Chatham Rise; see Appendices 3 & 4), but the majority of coral was unidentified by observers (Table 66). Observers estimated the landed weight of coral at over 1000 kg on five tows from various trips, on one of which the recorded weight was 10 000 kg.

TABLE 65. SEABIRD INTERACTIONS IN THE DEEP-WATER BOTTOM TRAWL FISHERY BY AREA AND MONTH FOR THE PERIOD 01 JULY 2004 TO 30 JUNE 2005.

FMA	2004						2005						TOTAL
	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	
1. AKE	0	–	–	0	–	–	–	–	–	–	–	0	0
2. CEE	–	–	–	–	–	–	–	–	–	0	–	0	0
3. SEC	–	–	0	0	0	0	–	–	0	–	–	–	0
4. SOE	3	0	0	0	10	–	0	15	0	0	0	14	42
6. SUB	–	–	0	1	–	–	–	–	–	–	0	0	1
7. CHA	–	–	–	–	–	–	–	–	–	–	–	0	0
9. AKW	–	–	–	1	–	–	–	–	–	–	–	–	1
Total	**3**	**0**	**0**	**2**	**10**	**0**	**0**	**15**	**0**	**0**	**0**	**14**	**44**

TABLE 66. ESTIMATED WEIGHT (kg) OF CORAL TAXA LANDED IN THE DEEP-WATER BOTTOM TRAWL FISHERY BY AREA FOR THE PERIOD 01 JULY 2004 TO 30 JUNE 2005.

CORAL TAXON	1. AKE	2. CEE	3. SEC	4. SOE	6. SUB	7. CHA	9. AKW	TOTAL
Black corals				2	3			5
Bubblegum coral				485				485
Red coral				2329	38			2367
Unidentified coral	1	1	52	18887	1364		532	20837
Total	**1**	**1**	**52**	**21703**	**1405**	**0**	**532**	**23694**

2005/06

Fishing effort for deep-water stocks in 2005/06 occurred in eight of the ten FMAs, as did observer coverage (Table 67). Compared to other trawl fisheries, few seabird or marine mammal interactions were reported.

Observer effort was spread throughout the year, with the highest number of observer days in July, October, May and June (Table 68). As in the previous observer year, the majority of observer days were delivered in SOE and SUB.

TABLE 67. SUMMARY OF COMMERCIAL EFFORT, OBSERVER EFFORT AND PROTECTED SPECIES INTERACTIONS IN THE DEEP-WATER BOTTOM TRAWL FISHERY FOR THE PERIOD 01 JULY 2005 TO 30 JUNE 2006.

FMA	EFFORT	OBSERVER	COVERAGE	NO. TOWS	SEABIRDS		MAMMALS	
	DAYS	DAYS	(%)	OBSERVED	NUMBER	RATE*	NUMBER	RATE*
1. AKE	64	36	56.25	54	0	0.00	0	0.00
2. CEE	214	1	0.47	1	0	0.00	0	0.00
3. SEC	295	26	8.81	72	3	4.17	0	0.00
4. SOE	864	180	20.83	596	4	0.67	0	0.00
5. SOU	42	10	23.81	20	0	0.00	0	0.00
6. SUB	323	100	30.96	318	1	0.31	2	0.63
7. CHA	105	5	4.76	24	0	0.00	0	0.00
8. CEW								
9. AKW	99	21	21.21	121	0	0.00	0	0.00
10. KER								
Total	**2006**	**379**	**18.89**	**1206**	**8**	**0.66**	**2**	**0.17**

* Number per 100 tows.

TABLE 68. OBSERVER DAYS IN THE DEEP-WATER BOTTOM TRAWL FISHERY BY AREA AND MONTH FOR THE PERIOD 01 JULY 2005 TO 30 JUNE 2006.

FMA	2005						2006						TOTAL
	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	
1. AKE	8	0	0	14	0	0	0	0	0	0	0	14	36
2. CEE	0	0	0	0	0	0	0	0	0	0	1	0	1
3. SEC	1	0	0	19	0	0	0	4	1	0	1	0	26
4. SOE	14	1	0	8	13	10	0	0	0	19	50	65	180
5. SOU	10	0	0	0	0	0	0	0	0	0	0	0	10
6. SUB	18	0	4	44	0	0	0	0	0	0	34	0	100
7. CHA	5	0	0	0	0	0	0	0	0	0	0	0	5
9. AKW	0	0	0	8	4	0	0	0	0	0	0	9	21
Total	**56**	**1**	**4**	**93**	**17**	**10**	**0**	**4**	**1**	**19**	**86**	**88**	**379**

Seabird captures occurred in SOE (four captures), SEC (three captures) and SUB (one capture).

In 2005/06, the greatest estimated weight of coral landed was recorded from AKW (Table 69). This high value is partly explained by one tow that recorded 3000 kg of unidentified coral. The observer record for that trip confirmed that a large quantity of coral was landed and immediately discarded on one tow.

TABLE 69. ESTIMATED WEIGHT (kg) OF CORAL TAXA LANDED IN THE DEEP-WATER BOTTOM TRAWL FISHERY BY AREA FOR THE PERIOD 01 JULY 2005 TO 30 JUNE 2006.

CORAL TAXON	1. AKE	2. CEE	3. SEC	4. SOE	5. SOU	6. SUB	7. CHA	9. AKW	TOTAL
Bamboo corals	1		36			49			86
Black corals	2			6		4		1	13
Bubblegum coral			72	401		305			778
Bushy hard coral			6	63		5			74
Coral rubble*			23	506		10			539
Deep-water branching corals				14				60	74
Flabellum cup corals				7					7
Golden corals						10		1	11
Gorgonian coral						1			1
Hydroids						1		6	7
Precious corals						1			1
Red coral	2			1					3
Unidentified coral	31		16	123		230		4611	5011
Total	**36**	**0**	**153**	**1121**	**0**	**616**	**0**	**4679**	**6605**

* Branching, structure-forming deep sea stony corals (Order Scleractinia) can form areas of 'reef' or 'thicket' habitat on the sea floor. Owing to their fragility, these corals can become rubble-like when taken as bycatch in trawl gear. The corals can also become rubble-like due to natural processes. The 'coral rubble' sampled on deck often comprises live polyps on the growing tips and branches (D. Tracey, National Institute of Water & Atmospheric Research (NIWA), pers. comm. 2008).

2006/07

In 2006/07, almost 30% of all fishing effort was observed, with high coverage achieved in AKE, AKW, SUB and SOU (Table 70). As in previous years, few seabird or marine mammal interactions were reported compared to other trawl fisheries.

Observer coverage was spread throughout the year. Unlike other years, only 60% of coverage was in SOE and SUB, as a higher number of observer days was delivered in other FMAs (Table 71).

TABLE 70. SUMMARY OF COMMERCIAL EFFORT, OBSERVER EFFORT AND PROTECTED SPECIES INTERACTIONS IN THE DEEP-WATER BOTTOM TRAWL FISHERY FOR THE PERIOD 01 JULY 2006 TO 30 JUNE 2007.

FMA	EFFORT	OBSERVER	COVERAGE	NO. TOWS	SEABIRDS		MAMMALS	
	DAYS	DAYS	(%)	OBSERVED	NUMBER	RATE*	NUMBER	RATE*
1. AKE	116	92	79.31	151	1	0.66	0	0.00
2. CEE	209	0	0.00					
3. SEC	187	26	13.90	111	3	2.70	0	0.00
4. SOE	799	176	22.03	646	3	0.46	0	0.00
5. SOU	45	17	37.78	89	0	0.00	0	0.00
6. SUB	294	135	45.92	418	4	0.96	2	0.48
7. CHA	70	0	0.00					
8. CEW								
9. AKW	83	61	73.49	233	0	0.00	0	0.00
10. KER								
Total	**1803**	**507**	**28.12**	**1648**	**11**	**0.67**	**2**	**0.12**

* Number per 100 tows.

TABLE 71. OBSERVER DAYS IN THE DEEP-WATER BOTTOM TRAWL FISHERY BY AREA AND MONTH FOR THE PERIOD 01 JULY 2006 TO 30 JUNE 2007.

FMA	2006						2007						TOTAL
	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	
1. AKE	25	8	0	16	6	4	0	0	0	0	17	16	92
3. SEC	0	0	0	14	9	0	0	0	3	0	0	0	26
4. SOE	16	0	6	0	0	8	21	28	16	0	26	55	176
5. SOU	13	0	0	2	2	0	0	0	0	0	0	0	17
6. SUB	0	0	0	41	44	24	0	1	4	10	11	0	135
9. AKW	0	0	0	18	7	0	0	0	0	0	7	29	61
Total	**54**	**8**	**6**	**91**	**68**	**36**	**21**	**29**	**23**	**10**	**61**	**100**	**507**

Seabird interactions within the NZ EEZ were reported from October through to February (Table 72). Two NZ fur seal captures occurred in SUB: one in October and one in November.

In 2006/07, the greatest estimated weight of coral landed was recorded from SOE and SUB (Table 73). Two tows within one trip in SOE recorded 5000 kg and 6000 kg of coral landed, and the observer estimated the volume of coral at over 200 fish bins full on both occasions. Two tows from two separate trips in SUB each recorded 2000 kg of coral landed.

TABLE 72. SEABIRD INTERACTIONS IN THE DEEP-WATER BOTTOM TRAWL FISHERY BY AREA AND MONTH FOR THE PERIOD 01 JULY 2006 TO 30 JUNE 2007. (LOUR = LOUISVILLE RIDGE.)

FMA	2006						2007						TOTAL
	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	
1. AKE	0	0	–	1	0	0	–	–	–	–	0	0	1
3. SEC	–	–	–	3	0	–	–	–	0	–	–	–	3
4. SOE	0	–	0	–	–	1	0	2	0	–	0	0	3
5. SOU	0	–	–	0	0	–	–	–	–	–	–	–	0
6. SUB	–	–	–	0	1	3	–	0	0	0	0	–	4
9. AKW	–	–	–	0	0	–	–	–	–	–	0	0	0
Total	**0**	**0**	**0**	**4**	**1**	**4**	**0**	**2**	**0**	**0**	**0**	**0**	**11**

TABLE 73. ESTIMATED WEIGHT (kg) OF CORAL TAXA LANDED IN THE DEEP-WATER BOTTOM TRAWL FISHERY BY AREA FOR THE PERIOD 01 JULY 2006 TO 30 JUNE 2007.

CORAL TAXON	1. AKE	3. SEC	4. SOE	5. SOU	6. SUB	9. AKW	TOTAL
Bamboo corals	17	3	6	1	158	19	204
Black corals	9		16	1	40	14	80
Bubblegum coral		207	161		274	420	1062
Bushy hard coral	3	101	2		2134	138	2378
Coral rubble*	3	17	11087		2014	63	13184
Crested cup coral					13		13
Deep-water branching coral	1	5			15	1	22
Flabellum cup corals		1	1		2	2	6
Golden corals	7	3	1			3	14
Hydroids			2				2
Long polyp soft corals			45				45
Madrepora coral				1		2	3
Precious corals					1		1
Red coral	2				20		22
Red hydrocorals					6		6
Spiny white hydrocorals	1					1	2
Unidentified coral		18	87		487	212	804
Total	**43**	**355**	**11408**	**3**	**5164**	**875**	**17848**

* Branching, structure-forming deep sea stony corals (Order Scleractinia) can form areas of 'reef' or 'thicket' habitat on the sea floor. Owing to their fragility, these corals can become rubble-like when taken as bycatch in trawl gear. The corals can also become rubble-like due to natural processes. The 'coral rubble' sampled on deck often comprises live polyps on the growing tips and branches (D. Tracey, National Institute of Water & Atmospheric Research (NIWA), pers. comm. 2008).

5.4 INSHORE FISHERIES

Due to the large amount of inshore fishing effort throughout the EEZ, it is difficult to achieve sufficient coverage to enable an estimation of total bycatch in these fisheries. Therefore, to improve the accuracy of any such estimate, observer coverage has been focused in specific areas (and sometimes specific seasons) where protected species interactions may occur, and coverage has been rotated through different areas between years—with some success. It should also be noted that observer coverage is aimed at describing the fishing methods employed and identifying whether any protected species interactions are occurring and, if so, how those interactions might be mitigated, rather than estimating total bycatch levels. To provide more detailed information on where observer effort and commercial effort is undertaken, data are provided at the Statistical Area (STA) level where possible (STA boundaries are shown in Fig. 2).

5.4.1 Inshore trawl

The extent to which inshore trawl vessels interact with protected species is extremely poorly known due to minimal historic observer coverage in almost all areas. Observer coverage of the inshore trawl fishery in the Pegasus Bay–Canterbury Bight area in 1997/98 reported the capture of one Hector's dolphin (Starr & Langley 2000). Prior to observing this fishery, five Hector's dolphins were known to have been caught by trawlers off the east coast of the South Island. Hector's dolphins have also been recorded as caught on unobserved inshore trawl vessels operating on the west coast of the South Island in the late 1980s. Between 1997/98 and 2006/07, four dolphin mortalities were reported from inshore trawlers, including three animals caught in one trawling event in April 2006 (Hector's dolphin incident database, DOC; viewed 2008).

Observations aboard inshore trawl vessels began in the 2006/07 observer year, with coverage undertaken in AKE to monitor seabird interactions, CHA to monitor Hector's dolphin and seabird interactions, and CEW and AKW to monitor Maui's dolphin interactions. A total of nine vessels were observed during the 2006/07 observer year, during which 106 observer days were achieved.

Monitoring priorities include collecting data on protected species interactions and behaviours, and the mitigation and offal management techniques employed aboard inshore trawl vessels.

Protected species interactions for the 2006/07 observer year are detailed in Table 74.

TABLE 74. PROTECTED SPECIES INTERACTIONS IN THE INSHORE TRAWL FISHERY BETWEEN 01 JULY 2006 TO 30 JUNE 2007.

SPECIES	DEAD	ALIVE
Black petrel	1	
Flesh-footed shearwater	1	
Unidentified albatross	1	
Unidentified petrel		1
White-capped albatross	6	
Total	**9**	**1**

Over 35 000 inshore trawl fishing days were reported from July 2006 until June 2007, of which only 106 days were observed (Table 75). However, despite minimal observer coverage, seabird interactions were reported, including warp captures of white-capped albatrosses in CHA and CEE. The black petrel and flesh-footed shearwater were both captured in nets on one trip operating in AKE.

During the 2006/07 observer year, observations aboard inshore trawl vessels occurred at various times throughout the year and in five different FMAs (Table 76). However, relatively few days were observed when the total number of fishing days undertaken in these areas is considered (Table 75).

TABLE 75. SUMMARY OF COMMERCIAL EFFORT, OBSERVER EFFORT AND PROTECTED SPECIES INTERACTIONS IN THE INSHORE TRAWL FISHERY FOR THE PERIOD 01 JULY 2006 TO 30 JUNE 2007.

FMA	EFFORT DAYS	OBSERVER DAYS	COVERAGE (%)	SEABIRD INTERACTIONS	MAMMAL INTERACTIONS
1. AKE	4338	39	0.90	3	0
2. CEE	5737	4	0.07	3	0
3. SEC	9351	0	0.00		
4. SOE	757	0	0.00		
5. SOU	3667	2	0.05	0	0
6. SUB					
7. CHA	8391	34	0.41	4	
8. CEW	1245	0	0.00		
9. AKW	1578	27	1.71	0	0
10. KER					
Total	**35 064**	**106**	**0.30**	**10**	**0**

TABLE 76. OBSERVER DAYS IN THE INSHORE TRAWL FISHERY BY AREA AND MONTH FOR THE PERIOD 01 JULY 2006 TO 30 JUNE 2007.

FMA	2006						2007						TOTAL
	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	
1. AKE	0	0	0	0	0	0	0	0	19	20	0	0	39
2. CEE	4	0	0	0	0	0	0	0	0	0	0	0	4
5. SOU	0	0	0	0	0	0	0	2	0	0	0	0	2
7. CHA	0	6	0	0	0	0	0	18	7	3	0	0	34
9. AKW	0	0	0	14	0	0	0	6	5	2	0	0	27
Total	**4**	**6**	**0**	**14**	**0**	**0**	**0**	**26**	**31**	**25**	**0**	**0**	**106**

Protected species interactions during the 2006/07 observer year are summarised in Table 77. It should be noted that observers working in CHA reported warp strikes occurring, but were not specifically tasked with undertaking warp strike observations using the Ministry of Fisheries protocol.

Five of the nine vessels used bird mitigation devices, one of which was required to do so as it was 32 m in length. Two vessels used bird bafflers and on one of these vessels the observer stated that the device did not appear to be effective. The other three vessels used streamer lines of varying designs. One of these vessels, operating in CHA and CEE, used a buoyed line from the stern, clipped closely to the warp, as a mitigation device; while the observer considered this device to be effective, warp strikes were recorded from this vessel. The second vessel (18 m in length) attempted to use a tori line while the observer was aboard, but found it difficult to operate due to the vessel set-up and lack of familiarity of crew with this gear. The third vessel used a tori line throughout the trip with no operational difficulties.

All nine vessels avoided discharging offal during hauling and three of the nine also avoided discharging during shooting. In the case of the one vessel that incidentally killed four white-capped albatrosses, the observer noted: 'No mitigation measures are in place on this vessel and the one factor that appeared to influence incidental seabird bycatch was discarding of NQBC [Non-Quota Bycatch] and offal. Offal discharged during shooting, towing but not hauling'.

Up to 400 white-capped albatrosses were seen attending inshore trawl vessels on the west coast of the South Island, and up to 200 petrels attended vessels in AKE. Hector's dolphins were seen on three trips, all on the west coast of the South Island.

TABLE 77. PROTECTED SPECIES INTERACTIONS IN THE INSHORE TRAWL FISHERY BETWEEN 01 JULY 2006 AND 30 JUNE 2007.

SPECIES	FMA	TARGET	JUL-06		MAR-07		APR-07	
		SPECIES	DEAD	ALIVE	DEAD	ALIVE	DEAD	ALIVE
Black petrel	1. AKE	JDO					1	
Flesh-footed shearwater	1. AKE	JDO					1	
Unidentified albatross	2. CEE	TAR	1					
Unidentified petrel	1. AKE	TAR						1
White-capped albatross	2. CEE	TAR	2					
	7. CHA	TAR			2		2	
Total			**3**	**0**	**2**	**0**	**4**	**1**

5.4.2 Inshore bottom longline—ling, blue nose, hapuku and bass

Information about protected species interactions in the inshore bottom longline fishery is limited, due to little or no historic observer coverage. The nature of the fishery, including variability in governance structure, small vessel size and weather dependence, can make placing observers difficult. Observations of this inshore bottom longline fishery began in 2004/05.

CSP observer coverage in the inshore ling, blue nose, hapuku and bass (LIN, BNS, HPB) fishery has been focused in AKE, CEE, SOE and SOU. Through CSP, an advisory officer was placed in the inshore 'ling' fishery to learn about fishing practices and pass on knowledge regarding protected species behaviour and mitigation techniques (Kellian 2004; Johnson 2005). Mitigation methods include tori lines, line weighting regimes and using fish oil to deter birds behind vessels (Pierre & Norden 2006).

Protected species interactions (per observer year) reported from bottom longline vessels (< 46 m in length) targeting ling, blue nose, hapuku and bass are detailed in Table 78. No interactions were reported in 2004/05.

TABLE 78. PROTECTED SPECIES INTERACTIONS IN THE LING, BLUE NOSE, HAPUKU AND BASS INSHORE BOTTOM LONGLINE FISHERY BETWEEN 1 JULY 2004 AND 30 JUNE 2007.

SPECIES	2004/05		2005/06		2006/07	
	DEAD	ALIVE	DEAD	ALIVE	DEAD	ALIVE
Black petrel						4
Salvin's albatross			1			
White-chinned petrel			8	2		1
Total	**0**	**0**	**9**	**2**	**0**	**5**

2004/05

Over 4500 fishing days were reported from inshore bottom longline vessels in 2004/05 (Table 79). Nine active fishing days were observed in two FMAs, with an additional 7 days observed just outside the EEZ boundary. No protected species interactions were reported in 2004/05.

Two observer days were achieved in AKE in December and seven were achieved in CEE in June (Table 80).

TABLE 79. SUMMARY OF COMMERCIAL EFFORT, OBSERVER EFFORT AND PROTECTED SPECIES INTERACTIONS IN THE LING, BLUE NOSE, HAPUKU AND BASS INSHORE BOTTOM LONGLINE FISHERY FOR THE PERIOD 01 JULY 2004 TO 30 JUNE 2005.

FMA	EFFORT	OBSERVER	COVERAGE	NO. HOOKS	SEABIRDS		MAMMALS		REPTILES	
	DAYS	DAYS	(%)	OBSERVED	NUMBER	RATE*	NUMBER	RATE*	NUMBER	RATE*
1. AKE	1206	2	0.17	3600	0	0.00	0	0.00	0	0.00
2. CEE	952	7	0.74	14304	0	0.00	0	0.00	0	0.00
3. SEC	544	0	0.00							
4. SOE	613	0	0.00							
5. SOU	186	0	0.00							
6. SUB	1	0	0.00							
7. CHA	575	0	0.00							
8. CEW	172	0	0.00							
9. AKW	332	0	0.00							
10. KER										
ET	32	7	0.22	9140	0	0.00	0	0.00	0	0.00
Total	**4613**	**16**	**0.35**	**27044**	**0**	**0.00**	**0**	**0.00**	**0**	**0.00**

* Number per 1000 hooks.

TABLE 80. OBSERVER DAYS IN THE LING, BLUE NOSE, HAPUKU AND BASS INSHORE BOTTOM LONGLINE FISHERY BY AREA AND MONTH FOR THE PERIOD 01 JULY 2004 TO 30 JUNE 2005.

FMA	2004						2005						TOTAL
	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	
1. AKE	0	0	0	0	0	2	0	0	0	0	0	0	2
2. CEE	0	0	0	0	0	0	0	0	0	0	0	7	7
ET	0	0	0	0	0	0	1	6	0	0	0	0	7
Total	**0**	**0**	**0**	**0**	**0**	**2**	**1**	**6**	**0**	**0**	**0**	**7**	**16**

2005/06

Fewer commercial fishing days were reported from inshore bottom longline vessels in 2005/06 compared to the previous year (Table 81). Forty days of fishing activity were observed in three FMAs and 9 days were observed outside the EEZ boundary (ET). Eleven seabirds were caught in SOE during one trip in January 2006.

Observer coverage was spread from July through to January when days could be achieved. The greatest number of days was delivered in AKE and SOE (Table 82).

The capture of ten white-chinned petrels (two released alive) and one Salvin's albatross were all reported from one trip in SOE in January 2006.

TABLE 81. SUMMARY OF COMMERCIAL EFFORT, OBSERVER EFFORT AND PROTECTED SPECIES INTERACTIONS IN LING, BLUE NOSE, HAPUKU AND BASS INSHORE BOTTOM LONGLINE FISHERIES FOR THE PERIOD 01 JULY 2005 TO 30 JUNE 2006.

FMA	EFFORT	OBSERVER	COVERAGE	NO. HOOKS	SEABIRDS		MAMMALS		REPTILES	
	DAYS	DAYS	(%)	OBSERVED	NUMBER	RATE*	NUMBER	RATE*	NUMBER	RATE*
1. AKE	1227	18	1.47	55590	0	0.00	0	0.00	0	0.00
2. CEE	855	0	0.00							
3. SEC	449	6	1.34	12220	0	0.00	0	0.00	0	0.00
4. SOE	673	16	2.38	352200	11	0.03	0	0.00	0	0.00
5. SOU	164	0	0.00							
6. SUB										
7. CHA	648	0	0.00							
8. CEW	124	0	0.00							
9. AKW	256	0	0.00							
10. KER										
ET	22	9	0.41	11920	0	0.00	0	0.00	0	0.00
Total	**4418**	**49**	**1.11**	**431930**	**11**	**0.03**	**0**	**0.00**	**0**	**0.00**

* Number per 1000 hooks.

TABLE 82. OBSERVER DAYS IN THE LING, BLUE NOSE, HAPUKU AND BASS INSHORE BOTTOM LONGLINE FISHERY BY AREA AND MONTH FOR THE PERIOD 01 JULY 2005 TO 30 JUNE 2006.

FMA	2005						2006						TOTAL
	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	
1. AKE	0	3	5	0	4	6	0	0	0	0	0	0	18
3. SEC	6	0	0	0	0	0	0	0	0	0	0	0	6
4. SOE	0	0	0	0	0	0	16	0	0	0	0	0	16
ET	0	0	0	0	9	0	0	0	0	0	0	0	9
Total	**6**	**3**	**5**	**0**	**13**	**6**	**16**	**0**	**0**	**0**	**0**	**0**	**49**

2006/07

In 2006/07, 48 active fishing days were observed, representing around 1% of total commercial effort days (Table 83). Almost all observer effort was in AKE, where five seabird interactions were reported; all these birds were released alive.

Observer coverage in 2006/07 was from August through to June, with 43 of the 48 days observed in AKE (Table 84). Five seabird interactions were reported in December 2006 from one trip—two black petrels were hooked during hauling and released alive, while reports of three deck strikes were also made (two black petrels and one white-chinned petrel).

TABLE 83. SUMMARY OF COMMERCIAL EFFORT, OBSERVER EFFORT AND PROTECTED SPECIES INTERACTIONS IN THE LING, BLUE NOSE, HAPUKU AND BASS INSHORE BOTTOM LONGLINE FISHERY FOR THE PERIOD 01 JULY 2006 TO 30 JUNE 2007.

FMA	EFFORT	OBSERVER	COVERAGE	NO. HOOKS	SEABIRDS		MAMMALS		REPTILES	
	DAYS	DAYS	(%)	OBSERVED	NUMBER	RATE*	NUMBER	RATE*	NUMBER	RATE*
1. AKE	1270	43	3.39	112219	5	0.04	0	0.00	0	0.00
2. CEE	994	0	0.00							
3. SEC	615	0	0.00							
4. SOE	552	0	0.00							
5. SOU	119	0	0.00							
6. SUB										
7. CHA	584	0	0.00							
8. CEW	153	0	0.00							
9. AKW	356	1	0.28	62	0	0.00	0	0.00	0	0.00
10. KER										
ET 00	29	4	0.14	6700	0	0.00	0	0.00	0	0.00
Total	**4672**	**48**	**1.03**	**118981**	**5**	**0.04**	**0**	**0.00**	**0**	**0.00**

* Number per 1000 hooks.

TABLE 84. OBSERVER DAYS IN THE LING, BLUE NOSE, HAPUKU AND BASS INSHORE BOTTOM LONGLINE FISHERY BY AREA AND MONTH FOR THE PERIOD 01 JULY 2006 TO 30 JUNE 2007.

FMA	2006						2007						TOTAL
	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	
1. AKE	0	0	0	0	0	8	0	0	0	5	13	17	43
9. AKW	0	0	0	0	0	0	0	0	1	0	0	0	1
ET	0	4	0	0	0	0	0	0	0	0	0	0	4
Total	**0**	**4**	**0**	**0**	**0**	**8**	**0**	**0**	**1**	**5**	**13**	**17**	**48**

5.4.3 Inshore bottom longline—snapper

Obtaining information on protected species interactions in the snapper bottom longline fishery faces similar problems as in the ling, blue nose, hapuku and bass fishery. Observations in the snapper fishery were undertaken in 2004/05 and 2005/06 in the AKE area to monitor interactions with seabirds, particularly black petrels. During this period, bottom longliners targeting snapper were observed separately from those targeting other stocks. Observer coverage was concentrated over the summer months to coincide with the peak of fishing activity and the petrel breeding seasons.

Through CSP, an advisory officer was placed in the inshore snapper fishery to learn about fishing practices and pass on knowledge regarding protected species behaviour and mitigation techniques (Kellian 2004; Johnson 2005). Mitigation methods include tori lines, line weighting regimes and using fish oil to deter birds behind vessels (Pierre & Norden 2006).

Protected species interactions (per observer year) reported from bottom longline vessels targeting snapper are detailed in Table 85. Three black petrels were caught over 2 observer years. This fishery was not observed in 2006/07.

TABLE 85. PROTECTED SPECIES INTERACTIONS IN THE SNAPPER INSHORE BOTTOM LONGLINE FISHERY BETWEEN 01 JULY 2004 AND 30 JUNE 2007.

SPECIES	2004/05		2005/06	
	DEAD	ALIVE	DEAD	ALIVE
SEABIRDS				
Australasian gannet		1		
Black petrel	1		2	
Buller's shearwater				4
Flesh-footed shearwater	4	5		
Petrel (unidentified)		2		6
Seabird—small		1		
Total	**5**	**9**	**2**	**10**
REPTILES				
Green turtle				1
Total	**0**	**0**	**0**	**1**

2004/05

Over 6000 fishing days were reported from the snapper bottom longline fishery, 98% of which were reported from AKE (Table 86). Around 2% of fishing effort was observed, with 135 days observed in AKE and 1 day observed in AKW. In total, 14 seabird interactions were reported in 2004/05.

Observer days were from December until March and were spread through different Statistical Areas within AKE (Table 87).

Seabird interactions occurred in all months where there was fishing effort, with the highest number reported in March. Nine of 14 captures were released alive (Table 85). Four flesh-footed shearwaters and one black petrel were incidentally killed.

TABLE 86. SUMMARY OF COMMERCIAL EFFORT, OBSERVER EFFORT AND PROTECTED SPECIES INTERACTIONS IN THE SNAPPER INSHORE BOTTOM LONGLINE FISHERY FOR THE PERIOD 01 JULY 2004 TO 30 JUNE 2005.

FMA	EFFORT	OBSERVER	COVERAGE	NO. HOOKS	SEABIRDS		MAMMALS		REPTILES	
	DAYS	DAYS	(%)	OBSERVED	NUMBER	RATE*	NUMBER	RATE*	NUMBER	RATE*
1. AKE	5898	135	2.29	262 204	14	0.05	0	0.00	0	0.00
2. CEE										
3. SEC	18	0	0.00							
4. SOE	2	0	0.00							
5. SOU										
6. SUB										
7. CHA	9	0	0.00							
8. CEW	2	0	0.00							
9. AKW	93	1	1.08	3200	0	0.00	0	0.00	0	0.00
10. KER										
Total	**6022**	**136**	**2.26**	**265 404**	**14**	**0.05**	**0**	**0.00**	**0**	**0.00**

* Number per 1000 hooks.

TABLE 87. OBSERVER DAYS IN THE SNAPPER INSHORE BOTTOM LONGLINE FISHERY IN FMA AKE BY STATISTICAL AREA AND MONTH FOR THE PERIOD 01 JULY 2004 TO 30 JUNE 2005.

STA	2004						2005						TOTAL
	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	
002	0	0	0	0	0	7	11	3	0	0	0	0	21
003	0	0	0	0	0	0	3	1	4	0	0	0	8
005	0	0	0	0	0	4	7	10	7	0	0	0	28
006	0	0	0	0	0	7	15	7	9	0	0	0	38
007	0	0	0	0	0	4	8	0	9	0	0	0	21
008	0	0	0	0	0	1	3	5	4	0	0	0	13
009	0	0	0	0	0	0	2	2	2	0	0	0	6
Total	**0**	**0**	**0**	**0**	**0**	**23**	**49**	**28**	**35**	**0**	**0**	**0**	**135**

2005/06

Fewer fishing days were reported from snapper bottom longline fisheries in 2005/06 compared to the previous year (Table 88). The majority of effort was again in AKE, as was all observer coverage. Twelve seabird interactions were reported, with ten of these birds released alive.

Observer coverage was from December to April, with the highest number of days delivered in Statistical Area 002 (Table 89). Seabird captures occurred in January and February, and included the incidental mortality of two black petrels. One green turtle was also captured alive.

TABLE 88. SUMMARY OF COMMERCIAL EFFORT, OBSERVER EFFORT AND PROTECTED SPECIES INTERACTIONS IN THE SNAPPER INSHORE BOTTOM LONGLINE FISHERY FOR THE PERIOD 01 JULY 2005 TO 30 JUNE 2006.

FMA	EFFORT	OBSERVER	COVERAGE	NO. HOOKS	SEABIRDS		MAMMALS		REPTILES	
	DAYS	DAYS	(%)	OBSERVED	NUMBER	RATE*	NUMBER	RATE*	NUMBER	RATE*
1. AKE	5314	45	0.85	125894	12	0.10	0	0.00	1	0.01
2. CEE										
3. SEC	8	0	0.00							
4. SOE										
5. SOU										
6. SUB										
7. CHA										
8. CEW	21	0	0.00							
9. AKW	57	0	0.00							
10. KER										
Total	**5400**	**45**	**0.83**	**125894**	**12**	**0.10**	**0**	**0.00**	**1**	**0.01**

* Number per 1000 hooks.

TABLE 89. OBSERVER DAYS IN THE SNAPPER INSHORE BOTTOM LONGLINE FISHERY IN AKE BY STATISTICAL AREA AND MONTH FOR THE PERIOD 01 JULY 2005 TO 30 JUNE 2006.

STA	2005						2006						TOTAL
	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	
002	0	0	0	0	0	10	5	9	0	0	0	0	24
003	0	0	0	0	0	1	0	0	0	0	0	0	1
005	0	0	0	0	0	0	4	0	0	0	0	0	4
006	0	0	0	0	0	2	3	0	0	5	0	0	10
007	0	0	0	0	0	5	0	0	0	0	0	0	5
008	0	0	0	0	0	0	0	1	0	0	0	0	1
Total	**0**	**0**	**0**	**0**	**0**	**18**	**12**	**10**	**0**	**5**	**0**	**0**	**45**

5.4.4 Setnet

The extent to which commercial setnet fishing activities interact with protected species is largely unknown due to very low historical achievement of observer coverage. Despite historical intent to collect observer data, this fishery has been difficult to observe because, as with other inshore fisheries, it encompasses smaller vessels carrying out short trips, with less predictable operations. There are also practical difficulties with placing observers on small vessels notwithstanding the legal requirement to take government fisheries observers. The Pegasus Bay–Canterbury Bight setnet fishery (Statistical Areas 020 and 022) was observed during the 1997/98 fishing year, during which time eight Hector's dolphins were observed caught in setnets, of which two were released alive (Starr & Langley 2000).

In the 2005/06 fishing year, observations were undertaken in Southland (SOU) and the Nelson/Marlborough regions (CHA) to monitor interactions with Hector's dolphins and seabirds. During this fishing year, a small number of NZ fur seals and shags were recorded as caught. Setnet fisheries were also observed in the 2006/07 fishing year in Kaikoura (SEC), Nelson (CHA) and Southland (SOU). Protected species mortalities during 2006/07 included one dusky dolphin, one Hector's dolphin, one fluttering shearwater and two yellow-eyed penguins, all of which were separate incidents (Table 90).

Mitigation methods to avoid the incidental capture of dolphins included avoiding river mouths and murky water, not setting when dolphins were present around the vessel and the use of acoustic alarms (particularly off the east coast of the South Island). Catch processing and discarding of waste generally took place outside the periods of setting and hauling, so that nets were not in the water when birds were feeding on waste around the vessel. Nets were also cleaned to some extent, providing less of an attractant to foraging seabirds. Some vessels also practised night setting.

TABLE 90. PROTECTED SPECIES INTERACTIONS IN THE SETNET FISHERY BETWEEN 1 JULY 2005 AND 30 JUNE 2007.

SPECIES	2005/06		2006/07	
	DEAD	ALIVE	DEAD	ALIVE
SEABIRDS				
Cape petrels				3
Fluttering shearwater			1	
Pied shag	1			
Seagull				1
Shag				6
Sooty shearwater				1
Spotted shag	2			
White-chinned petrel		1		
Yellow-eyed penguin			2	
Total	**3**	**1**	**3**	**11**
MARINE MAMMALS				
Dusky dolphin			1	
Hector's dolphin			1	
NZ fur seal	3		1	
Total	**3**	**0**	**3**	**0**

2004/05

Although 100 days of setnet observer coverage were planned in 2004/05, no coverage was achieved.

2005/06

Over 20 000 setnet fishing days were reported in 2005/06, of which 83 (< 0.5%) were observed (Table 91).

Setnet observations were achieved from November to April, during which time almost 9% of coverage was achieved across the areas where fishing was observed (Table 92). The highest levels of coverage were in Statistical Areas 025 and 027 in Southland, and 038 in Nelson.

Three shags were incidentally caught in the Nelson region and three NZ fur seals were reported caught in Southland.

TABLE 91. SUMMARY OF COMMERCIAL EFFORT, OBSERVER EFFORT AND PROTECTED SPECIES INTERACTIONS IN THE SETNET FISHERY FOR THE PERIOD 01 JULY 2005 TO 30 JUNE 2006.

FMA	EFFORT DAYS	OBSERVER DAYS	COVERAGE (%)	SEABIRD INTERACTIONS	MAMMAL INTERACTIONS
1. AKE	7657	0	0.00		
2. CEE	1126	0	0.00		
3. SEC	3237	14	0.43	0	0
4. SOE	27	0	0.00		
5. SOU	615	32	5.20	0	3
6. SUB					
7. CHA	682	35	5.13	4	0
8. CEW	1193	2	0.17	0	0
9. AKW	7385	0	0.00		
10. KER					
Total	**21922**	**83**	**0.38**	**4**	**3**

TABLE 92. TOTAL COMMERCIAL FISHING EFFORT (E) AND OBSERVER COVERAGE (O) IN DAYS FOR MONTHS AND STATISTICAL AREAS WHERE SETNET OBSERVER COVERAGE WAS UNDERTAKEN DURING THE PERIOD 01 JULY 2005 TO 30 JUNE 2006.

	NOV-05		JAN-06		FEB-06		MAR-06		APR-06		TOTAL		COVERAGE
STA	E	O	E	O	E	O	E	O	E	O	E	O	(%)
024	95	0	67	0	44	0	60	7	40	7	306	14	4.58
025	58	0	24	7	29	12	15	2	22	0	148	21	14.19
027	1	0	7	0	13	4	7	0	4	0	32	4	12.50
030	34	0	17	3	7	4	13	0	2	0	73	7	9.59
037	0	0	13	0	5	0	17	3	11	1	46	4	8.70
038	42	18	34	0	29	9	41	2	30	2	176	31	17.61
040	19	2	24	0	22	0	9	0	10	0	84	2	2.38
Total	**249**	**20**	**186**	**10**	**149**	**29**	**162**	**14**	**119**	**10**	**865**	**83**	**9.60**

2006/07

A greater number of observer days was achieved in 2006/07 compared to the previous year, but the percentage of total fishing effort observed remained below 1% (Table 93). However, 10% observer coverage was achieved in SOU. A greater number of seabird captures were reported than in 2005/06, along with two dolphin captures.

Setnet observations were undertaken from November until March across three FMAs, with over 8% observer coverage achieved in that time period (Table 94). Good levels of observer coverage were achieved in Statistical Areas 031 (Southland) and 037 (north of Nelson).

TABLE 93. SUMMARY OF COMMERCIAL EFFORT, OBSERVER EFFORT AND PROTECTED SPECIES INTERACTIONS IN THE SETNET FISHERY FOR THE PERIOD 01 JULY 2006 TO 30 JUNE 2007.

FMA	EFFORT DAYS	OBSERVER DAYS	COVERAGE (%)	SEABIRD INTERACTIONS	MAMMAL INTERACTIONS
1. AKE	7774	0	0.00		
2. CEE	889	0	0.00		
3. SEC	3402	30	0.88	5	2
4. SOE	6	0	0.00		
5. SOU	506	55	10.87	2	1
6. SUB					
7. CHA	532	31	5.83	7	0
8. CEW	1313	0	0.00		
9. AKW	6888	0	0.00		
10. KER					
Total	**21310**	**116**	**0.54**	**14**	**3**

TABLE 94. TOTAL COMMERCIAL FISHING EFFORT (E) AND OBSERVER COVERAGE (O) IN DAYS FOR MONTHS AND STATISTICAL AREAS WHERE SETNET OBSERVER COVERAGE WAS UNDERTAKEN DURING THE PERIOD 01 JULY 2006 TO 30 JUNE 2007.

	NOV-06		DEC-06		JAN-07		FEB-07		MAR-07		TOTAL		COVERAGE
STA	E	O	E	O	E	O	E	O	E	O	E	O	(%)
018	106	19	82	7	148	0	122	0	95	0	553	26	4.70
024	72	0	59	0	43	0	47	0	36	4	257	4	1.56
025	41	10	23	18	40	3	29	2	16	0	149	33	22.15
027	2	0	0	0	0	0	9	3	5	0	16	3	18.75
030	5	0	18	0	22	8	14	8	19	0	78	16	20.51
031	0	0	2	0	0	0	2	3	0	0	4	3	75.00
037	2	0	5	12	8	0	7	0	6	0	28	12	42.86
038	66	16	15	3	20	0	17	0	19	0	137	19	13.87
Total	**294**	**45**	**204**	**40**	**281**	**11**	**247**	**16**	**196**	**4**	**1222**	**116**	**9.49**

TABLE 95. SEABIRD INTERACTIONS IN SETNET FISHERIES BY AREA AND MONTH FOR THE PERIOD 01 JULY 2006 TO 30 JUNE 2007.

FMA	2006		2007	TOTAL
	NOV	DEC	JAN	
3. SEC	5			5
5. SOU		1	1	2
7. CHA	7			7
Total	**12**	**1**	**1**	**14**

Seabird interactions were reported from November to January (Table 95), and included the incidental mortality of two yellow-eyed penguins and one fluttering shearwater. Eleven live seabird captures were also reported. One NZ fur seal was caught in February in SOU. A dusky dolphin was caught in Kaikoura (SEC) in November and a Hector's dolphin was caught there in December. The two penguins were caught in nets set in water depths of 51 m and 35 m, while the Hector's dolphin was caught in a net set on the bottom at a water depth of 27 m.

5.5 SURFACE LONGLINE FISHERIES

5.5.1 Charter tuna

CSP observer coverage of charter tuna (STN, BIG) vessels has mostly been in SOU and CHA from March until July, with some coverage in CEE and KER. This fishery has historically had high captures of seabirds (including a variety of albatrosses and petrels), and while captures were lower during the 2004/05 and 2005/06 observer years, high seabird captures were recorded during 2006/07. NZ fur seals and sea turtles are occasionally caught on hooks or entangled in lines, but are usually released alive after being cut free.

Surface longline vessels are required to use streamer lines and to night set or weight lines in accordance with regulated requirements. Some vessels use brickle curtains and water cannons during hauling to try to reduce the likelihood of seabird captures.

Protected species interactions per observer year are detailed in Table 96.

2004/05

Over 80% of charter tuna fishing effort in 2004/05 occurred in SOU and CHA (Table 97). As only two vessels were operating in this fishery, almost 100% of fishing effort was observed. Note that some discrepancies in FMAs reported by fishers and observers resulted in apparent coverage of > 100% in some areas.

Observer coverage and fishing effort occurred from April to July each calendar year, with most effort in CHA and SOU (Table 98).

The greatest number of seabird interactions occurred in April in SOU and in May in CHA. NZ fur seal captures were reported in CHA from May to June (ten captures), and in SOU in April and May (six captures). One leatherback turtle was caught and released alive in AKW in May.

TABLE 96. PROTECTED SPECIES INTERACTIONS IN THE CHARTER TUNA SURFACE LONGLINE FISHERY BETWEEN 1 JULY 2004 AND 30 JUNE 2007.

SPECIES	2004/05		2005/06		2006/07	
	DEAD	ALIVE	DEAD	ALIVE	DEAD	ALIVE
SEABIRDS						
Albatross (unidentified)		1			1	
Antipodean albatross					1	
Buller's albatross	7	13	4	6	34	15
Campbell albatross			4		1	
Gibson's albatross					1	
Grey petrel			2			
Shy albatross*					1	
Sooty shearwater						1
Southern giant petrel			2			
Southern royal albatross				1		
White-capped albatross*	2	1	1		27	1
White-chinned petrel	2		1		3	
Total	**11**	**15**	**14**	**7**	**69**	**17**
MARINE MAMMALS						
NZ fur seal	2	14		8	1	4
Whale (unidentified)		2				
Total	**2**	**16**	**0**	**8**	**1**	**4**
REPTILES						
Leatherback turtle		1				
Total	**0**	**1**	**0**	**0**	**0**	**0**

* Historically, white-capped albatrosses (*Thalassarche steadi*) were reported by observers under a general code for shy albatrosses (*T. cauta*). Some observers still use this code, although these birds are most likely to be white-capped albatrosses.

TABLE 97. SUMMARY OF COMMERCIAL EFFORT, OBSERVER EFFORT AND PROTECTED SPECIES INTERACTIONS IN THE CHARTER TUNA SURFACE LONGLINE FISHERY FOR THE PERIOD 01 JULY 2004 TO 30 JUNE 2005.

FMA	EFFORT DAYS	OBSERVER DAYS	COVERAGE (%)	NO. HOOKS OBSERVED	SEABIRDS		MAMMALS		REPTILES	
					NUMBER	RATE*	NUMBER	RATE*	NUMBER	RATE*
1. AKE										
2. CEE	6	1	16.67	3300	0	0.00	0	0.00	0	0.00
3. SEC										
4. SOE										
5. SOU	68	75	110.29†	227 490	17	0.07	6	0.03	0	0.00
6. SUB										
7. CHA	91	92	101.10†	366 750	9	0.02	11	0.03	0	0.00
8. CEW										
9. AKW	14	14	100.00	51 550	0	0.00	1	0.02	1	0.02
10. KER										
Null‡	6									
Total	**185**	**182**	**98.38**	**649 090**	**26**	**0.04**	**18**	**0.03**	**1**	**<0.01**

* Number per 1000 hooks.

† Discrepancies in FMAs reported by fishers and observers resulted in apparent coverage of >100% in some areas.

‡ Null indicates the total number of effort days for which no FMA was recorded.

TABLE 98. OBSERVER DAYS IN THE CHARTER TUNA SURFACE LONGLINE FISHERY BY AREA AND MONTH FOR THE PERIOD 01 JULY 2004 TO 30 JUNE 2005.

FMA	2004						2005						TOTAL
	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	
2. CEE	0	0	0	0	0	0	0	0	0	0	0	1	1
5. SOU	0	0	0	0	0	0	0	0	0	43	23	9	75
7. CHA	18	0	0	0	0	0	0	0	0	0	37	37	92
9. AKW	14	0	0	0	0	0	0	0	0	0	0	0	14
Total	**32**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**43**	**60**	**47**	**182**

2005/06

Fishing effort in 2005/06 was in CHA, SOU and CEE, as was observer effort (Table 99). All fishing effort was observed. Note there are a few discrepancies in FMAs reported by fishers and observers, resulting in apparent coverage > 100%.

Observer coverage ran for the period April until July each observer year (Table 100). Seabird captures occurred in all observed FMAs and months where observer coverage was undertaken. Marine mammal captures were reported in CHA and CEE.

TABLE 99. SUMMARY OF COMMERCIAL EFFORT, OBSERVER EFFORT AND PROTECTED SPECIES INTERACTIONS IN THE CHARTER TUNA SURFACE LONGLINE FISHERY FOR THE PERIOD 01 JULY 2005 TO 30 JUNE 2006.

FMA	EFFORT DAYS	OBSERVER DAYS	COVERAGE (%)	NO. HOOKS OBSERVED	SEABIRDS		MAMMALS		REPTILES	
					NUMBER	RATE*	NUMBER	RATE*	NUMBER	RATE*
1. AKE										
2. CEE	40	39	97.50	134 190	8	0.06	1	0.01	0	0.00
3. SEC										
4. SOE										
5. SOU	59	61	103.39†	201 340	10	0.05	0	0.00	0	0.00
6. SUB										
7. CHA	84	84	100.00	304 730	3	0.01	7	0.02	0	0.00
8. CEW										
9. AKW										
10. KER										
Null‡	1									
Total	**184**	**184**	**100.00**	**640 260**	**21**	**0.03**	**8**	**0.01**	**0**	**0.00**

* Number per 1000 hooks.

† Discrepancies in FMAs reported by fishers and observers resulted in apparent coverage of > 100% in some areas.

‡ Null indicates the total number of effort days for which no FMA was recorded.

TABLE 100. OBSERVER DAYS IN THE CHARTER TUNA SURFACE LONGLINE FISHERY BY AREA AND MONTH FOR THE PERIOD 01 JULY 2005 TO 30 JUNE 2006.

FMA	2005						2006						TOTAL
	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	
2. CEE	39	0	0	0	0	0	0	0	0	0	0	0	39
5. SOU	0	0	0	0	0	0	0	0	0	30	31	0	61
7. CHA	0	0	0	0	0	0	0	0	0	0	30	54	84
Total	**39**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**30**	**61**	**54**	**184**

2006/07

In 2006/07, fishing effort and observer coverage were undertaken in CHA, SOU and CEE, as in previous years, but also in AKE and KER (Table 101). Four vessels were operating in the charter tuna fishery, of which two were observed, so that 62% of total fishing effort was observed. The overall reported interaction rate of seabirds was higher than in previous years.

Observer coverage of charter tuna vessels was undertaken over a greater time period compared to previous years (Table 102). The greatest number of observer days was delivered in CHA, particularly from May to June.

TABLE 101. SUMMARY OF COMMERCIAL EFFORT, OBSERVER EFFORT AND PROTECTED SPECIES INTERACTIONS IN THE CHARTER TUNA SURFACE LONGLINE FISHERY FOR THE PERIOD 01 JULY 2006 TO 30 JUNE 2007.

FMA	EFFORT	OBSERVER	COVERAGE	NO. HOOKS	SEABIRDS		MAMMALS		REPTILES	
	DAYS	DAYS	(%)	OBSERVED	NUMBER	RATE*	NUMBER	RATE*	NUMBER	RATE*
1. AKE	6	5	83.33	17090	0	0.00	0	0.00	0	0.00
2. CEE	15	13	86.67	30724	2	0.07	0	0.00	0	0.00
3. SEC										
4. SOE										
5. SOU	87	69	79.31	236280	55	0.23	1	<0.01	0	0.00
6. SUB										
7. CHA	229	128	55.90	454840	29	0.06	4	0.01	0	0.00
8. CEW										
9. AKW										
10. KER	20	10	50.00	10596	0	0.00	0	0.00	0	0.00
Null†	4									
Total	**361**	**225**	**62.33**	**749530**	**86**	**0.11**	**5**	**0.01**	**0**	**0.00**

* Number per 1000 hooks.

† Null indicates the total number of effort days for which no FMA was recorded.

TABLE 102. OBSERVER DAYS IN THE CHARTER SURFACE LONGLINE FISHERY BY AREA AND MONTH FOR THE PERIOD 01 JULY 2006 TO 30 JUNE 2007.

FMA	2006						2007						TOTAL
	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	
1. AKE	5	0	0	0	0	0	0	0	0	0	0	0	5
2. CEE	11	0	0	0	0	2	0	0	0	0	0	0	13
5. SOU	0	0	0	0	0	0	0	0	17	48	4	0	69
7. CHA	13	0	0	0	0	0	0	0	0	9	55	51	128
10. KER	0	0	8	0	0	2	0	0	0	0	0	0	10
Total	**29**	**0**	**8**	**0**	**0**	**4**	**0**	**0**	**17**	**57**	**59**	**51**	**225**

The greatest number of seabird interactions occurred in SOU from March to May and in CHA from April to June (Table 103). One NZ fur seal capture was reported from SOU in April and four captures from CHA in June.

TABLE 103. SEABIRD INTERACTIONS IN THE CHARTER TUNA SURFACE LONGLINE FISHERY BY AREA AND MONTH FOR THE PERIOD 01 JULY 2006 TO 30 JUNE 2007.

FMA	2006			2007				TOTAL
	JUL	SEP	DEC	MAR	APR	MAY	JUN	
1. AKE	0	–	–	–	–	–	–	0
2. CEE	2	–	0	–	–	–	–	2
5. SOU	–	–	–	11	40	4	–	55
7. CHA	0	–	–	–	10	16	3	29
10. KER	–	0	0	–	–	–	–	0
Total	**2**	**0**	**0**	**11**	**50**	**20**	**3**	**86**

5.5.2 Domestic tuna and swordfish

Historically, there has been difficulty placing observers on smaller domestic tuna (BIG, STN, SWO) vessels. Further data are required to allow better assessment of protected species interactions. Through CSP, an Advisory Officer was placed in this fishery from April 2003 to June 2004 to learn about fishing practices, and to share information on protected species behaviour and mitigation techniques (Hibell 2005). Swordfish has recently been introduced into the quota management system, so observations in 2006/07 included vessels targeting tuna and swordfish. Following the large bycatch event of 58 birds (including 51 albatrosses) during one trip targeting swordfish in November 2006, the Ministry of Fisheries introduced regulations in January 2007 requiring all surface longline fishers to provide notice of departure to the Ministry of Fisheries observer programme. This has facilitated observer placement. Vessels must also use streamer lines and set at night, or weight lines, in accordance with legal requirements.

Protected species interactions per observer year are detailed in Table 104.

TABLE 104. PROTECTED SPECIES INTERACTIONS IN THE DOMESTIC SURFACE LONGLINE FISHERY BETWEEN 01 JULY 2004 AND 30 JUNE 2007.

SPECIES	2004/05		2005/06		2006/07	
	DEAD	ALIVE	DEAD	ALIVE	DEAD	ALIVE
SEABIRDS						
Albatross (unidentified)					32	2
Antipodean albatross					2	
Black-browed albatross (unidentified)			2		2	
Buller's albatross	2	1	1	1	1	
Campbell albatross			3			
Flesh-footed shearwater		1		4		3
Gibson's albatross			1		5	
Grey petrel	1		6		5	
Grey-faced petrel					2	
Pacific albatross			1			
Petrel (unidentified)	1				1	
Seabird—large					3	
Sooty shearwater					1	
Wandering albatross				2	2	17
White-capped albatross			2			
White-chinned petrel					3	
Total	**4**	**2**	**16**	**7**	**59**	**22**
MARINE MAMMALS						
NZ fur seal	1	10		3		2
Pilot whale		1				
Total	**1**	**11**	**0**	**3**	**0**	**2**
REPTILES						
Leatherback turtle		1				4
Total	**0**	**1**	**0**	**0**	**0**	**4**

2004/05

In 2004/05, only 3.9% observer coverage was achieved across all domestic surface longline fishing effort (Table 105). While fishing effort was greatest in AKE and CEE, low levels of observer coverage were achieved in these FMAs, with the greatest percentage of observer coverage achieved in CHA.

Observer coverage in the domestic surface longline fishery was greatest during April to July (Table 106).

TABLE 105. SUMMARY OF COMMERCIAL EFFORT, OBSERVER EFFORT AND PROTECTED SPECIES INTERACTIONS IN THE DOMESTIC SURFACE LONGLINE FISHERY FOR THE PERIOD 01 JULY 2004 TO 30 JUNE 2005.

FMA	EFFORT	OBSERVER	COVERAGE	NO. HOOKS	SEABIRDS		MAMMALS		REPTILES	
	DAYS	DAYS	(%)	OBSERVED	NUMBER	RATE*	NUMBER	RATE*	NUMBER	RATE*
1. AKE	1136	32	2.82	31741	1	0.03	1	0.03	0	0.00
2. CEE	1052	55	5.23	55656	5	0.09	3	0.05	1	0.02
3. SEC	9	0	0.00							
4. SOE	1	0	0.00							
5. SOU	9	0	0.00							
6. SUB										
7. CHA	149	17	11.41	36935	0	0.00	8	0.22	0	0.00
8. CEW	3	0	0.00							
9. AKW	432	5	1.16	4960	0	0.00	0	0.00	0	0.00
10. KER										
Total	**2791**	**109**	**3.91**	**129292**	**6**	**0.05**	**12**	**0.09**	**1**	**0.01**

* Number per 1000 hooks.

TABLE 106. OBSERVER DAYS IN THE DOMESTIC SURFACE LONGLINE FISHERY BY AREA AND MONTH FOR THE PERIOD 01 JULY 2004 TO 30 JUNE 2005.

FMA	2004						2005						TOTAL
	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	
1. AKE	7	4	0	0	0	0	0	0	0	5	8	8	32
2. CEE	10	0	0	0	0	0	0	0	0	7	9	29	55
7. CHA	9	0	0	0	0	0	0	0	0	1	0	7	17
9. AKW	1	0	0	0	0	0	0	0	0	1	3	0	5
Total	**27**	**4**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**14**	**20**	**44**	**109**

Seabird interactions occurred throughout the period of observer coverage, with all in-zone captures reported from AKE and CEE (Table 107). An additional seabird capture occurred out of zone (ET) in February.

Most NZ fur seal interactions occurred in CHA in July (Table 108). One long finned pilot whale was caught and released alive in CEE in July. One leatherback turtle was also caught and released alive in CEE in June and a green turtle was caught alive out of zone in February.

TABLE 107. SEABIRD INTERACTIONS IN THE DOMESTIC SURFACE LONGLINE FISHERY BY AREA AND MONTH FOR THE PERIOD 01 JULY 2004 TO 30 JUNE 2005.

FMA	2004		2005			TOTAL
	JUL	AUG	APR	MAY	JUN	
1. AKE	0	0	0	0	1	1
2. CEE	1	–	3	1	0	5
7. CHA	0	–	0	–	0	0
9. AKW	0	–	0	0	–	0
Total	**1**	**0**	**3**	**1**	**1**	**6**

TABLE 108. NZ FUR SEAL INTERACTIONS IN THE DOMESTIC SURFACE LONGLINE FISHERY BY AREA AND MONTH FOR THE PERIOD 01 JULY 2004 TO 30 JUNE 2005.

FMA	2004		2005			TOTAL
	JUL	AUG	APR	MAY	JUN	
1. AKE	0	0	1	0	0	1
2. CEE	1	–	0	1	0	2
7. CHA	8	–	0	–	0	8
9. AKW	0	–	0	0	–	0
Total	**9**	**0**	**1**	**1**	**0**	**11**

2005/06

As in 2004/05, less than 4% observer coverage of total fishing effort was achieved in 2005/06 (Table 109). Over 80% of fishing effort was in AKE and CEE, and over 90% of observer effort was also in those two FMAs. The highest rate of seabird interactions per 1000 hooks was in CHA.

The end of the observer year bisected the peak of observer days in CEE, with observer days running from February to August each calendar year (Table 110). In contrast, observer days in AKE were delivered from June through to October.

TABLE 109. SUMMARY OF COMMERCIAL EFFORT, OBSERVER EFFORT AND PROTECTED SPECIES INTERACTIONS IN THE DOMESTIC SURFACE LONGLINE FISHERY FOR THE PERIOD 01 JULY 2005 TO 30 JUNE 2006.

FMA	EFFORT	OBSERVER	COVERAGE	NO. HOOKS	SEABIRDS		MAMMALS		REPTILES	
	DAYS	DAYS	(%)	OBSERVED	NUMBER	RATE*	NUMBER	RATE*	NUMBER	RATE*
1. AKE	1043	24	2.30	23880	0	0.00	0	0.00	0	0.00
2. CEE	1370	80	5.84	107480	19	0.18	3	0.03	0	0.00
3. SEC	4	0	0.00							
4. SOE										
5. SOU	6	0	0.00							
6. SUB										
7. CHA	94	7	7.45	7026	4	0.57	0	0.00	0	0.00
8. CEW	11	0	0.00							
9. AKW	338	1	0.30	600	0	0.00	0	0.00	0	0.00
10. KER	22	0	0.00							
Total	**2888**	**112**	**3.88**	**138986**	**23**	**0.17**	**3**	**0.02**	**0**	**0.00**

* Number per 1000 hooks.

TABLE 110. OBSERVER DAYS IN THE DOMESTIC SURFACE LONGLINE FISHERY BY AREA AND MONTH FOR THE PERIOD 01 JULY 2005 TO 30 JUNE 2006.

FMA	2005						2006						TOTAL
	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	
1. AKE	9	6	4	4	0	0	0	0	0	0	0	1	24
2. CEE	34	2	0	0	0	0	0	2	10	0	11	21	80
7. CHA	0	0	0	0	0	0	0	0	0	0	4	3	7
9. AKW	0	0	0	0	1	0	0	0	0	0	0	0	1
Total	**43**	**8**	**4**	**4**	**1**	**0**	**0**	**2**	**10**	**0**	**15**	**25**	**112**

The highest number of seabird interactions was in CEE (Table 111), although the rate of interaction was higher in CHA (Table 109). The three NZ fur seal captures were reported from CEE in June and July.

TABLE 111. SEABIRD INTERACTIONS IN THE DOMESTIC SURFACE LONGLINE FISHERY BY AREA AND MONTH FOR THE PERIOD 01 JULY 2005 TO 30 JUNE 2006.

FMA	2005					2006				TOTAL
	JUL	AUG	SEP	OCT	NOV	FEB	MAR	MAY	JUN	
1. AKE	0	0	0	0	–	–	–	–	0	0
2. CEE	3	0	–	–	–	1	5	1	9	19
7. CHA	–	–	–	–	–	–	–	2	2	4
9. AKW	–	–	–	–	0	–	–	–	–	0
Total	**3**	**0**	**0**	**0**	**0**	**1**	**5**	**3**	**11**	**23**

2006/07

Fishing effort in 2006/07 was lower than in previous years (Table 112). While observer effort was again focused in the two FMAs with the greatest fishing effort (AKE and CEE), the greatest number of observer days was delivered in KER, coinciding with the introduction of swordfish to the Quota Management System. The level of observer coverage achieved was highest in KER, with over 20% of total effort observed. The greatest rate of seabird interactions also occurred in KER. Observer coverage of total effort was higher than in previous years—but still below 5%.

TABLE 112. SUMMARY OF COMMERCIAL EFFORT, OBSERVER EFFORT AND PROTECTED SPECIES INTERACTIONS IN THE DOMESTIC SURFACE LONGLINE FISHERY FOR THE PERIOD 01 JULY 2006 TO 30 JUNE 2007.

FMA	EFFORT	OBSERVER	COVERAGE	NO. HOOKS	SEABIRDS		MAMMALS		REPTILES	
	DAYS	DAYS	(%)	OBSERVED	NUMBER	RATE*	NUMBER	RATE*	NUMBER	RATE*
1. AKW	983	28	2.85	32380	9	0.28	0	0.00	0	0.00
2. CEE	928	35	3.77	36012	9	0.25	0	0.00	1	0.03
3. SEC										
4. SOE										
5. SOU										
6. SUB	1	0	0.00							
7. CHA	21	3	14.29	2815	0	0.00	0	0.00	0	0.00
8. CEW	6	0	0.00							
9. AKW	150	4	2.67	5050	0	0.00	0	0.00	0	0.00
10. KER	161	39	24.22	33725	63	1.87	0	0.00	3	0.09
Total	**2250**	**109**	**4.84**	**109982**	**81**	**0.74**	**0**	**0.00**	**4**	**0.04**

* Number per 1000 hooks.

Observer coverage was spread throughout the year, mostly in KER and CEE (Table 113).

Seabird interactions were recorded in CEE from March to June (Table 114), in AKE from November to December and in KER from October to November. Interactions in KER included one large capture event during which two leatherback turtles were caught and released alive as well as 58 seabirds, mostly albatrosses, of which 18 were released alive. In other years, NZ fur seals have most frequently been caught in CEE during June or July, but no NZ fur seals were caught in 2006/07. In total, four leatherback turtles were caught during the 2006/07 observer year: one in March in CEE and three from September to December in KER.

TABLE 113. OBSERVER DAYS IN THE DOMESTIC SURFACE LONGLINE FISHERY BY AREA AND MONTH FOR THE PERIOD 01 JULY 2006 TO 30 JUNE 2007.

FMA	2006						2007						TOTAL
	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	
1. AKE	5	0	0	0	2	1	2	9	2	0	0	7	28
2. CEE	4	0	0	0	0	0	0	0	12	9	3	7	35
7. CHA	0	3	0	0	0	0	0	0	0	0	0	0	3
9. AKW	0	0	0	0	0	0	0	0	4	0	0	0	4
10. KER	0	0	0	3	18	1	0	0	4	10	3	0	39
Total	**9**	**3**	**0**	**3**	**20**	**2**	**2**	**9**	**22**	**19**	**6**	**14**	**109**

TABLE 114. SEABIRD INTERACTIONS IN THE DOMESTIC SURFACE LONGLINE FISHERY BY AREA AND MONTH FOR THE PERIOD 01 JULY 2006 TO 30 JUNE 2007.

FMA	2006					2007						TOTAL
	JUL	AUG	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	
1. AKE	0	–	–	5	3	0	0	0	–	–	1	9
2. CEE	2	–	–	–	–	–	–	3	1	0	3	9
7. CHA	–	0	–	–	–	–	–	–	–	–	–	0
9. AKW	–	–	–	–	–	–	–	0	–	–	–	0
10. KER	–	–	1	62	0	–	–	0	0	0	–	63
Total	**2**	**0**	**1**	**67**	**3**	**0**	**0**	**3**	**1**	**0**	**4**	**81**

5.6 BOTTOM LONGLINE FISHERIES

5.6.1 Deep-sea ling

The deep-sea ling bottom longline fishery is observed to monitor seabird and marine mammal interactions. Mitigation methods employed include tori lines, integrated weighted line, and offal and bait discard management.

During the 2006/07 observer year, the majority of observer coverage was from August to October in SOU, with some coverage in CEE and SEC. In previous years, there was more even coverage in terms of days, spread between CEE, SOE, SOU and SUB.

Protected species interactions per observer year are detailed in Table 115. Only one marine mammal interaction was reported.

TABLE 115. PROTECTED SPECIES INTERACTIONS IN THE DEEP-SEA LING BOTTOM LONGLINE FISHERY BETWEEN 1 JULY 2004 AND 30 JUNE 2007.

SPECIES	2004/05		2005/06		2006/07	
	DEAD	ALIVE	DEAD	ALIVE	DEAD	ALIVE
SEABIRDS						
Albatross (unidentified)			1			
Black-browed albatross (unidentified)		1				
Broad-billed prion			1			
Cape petrels		1	1			2
Chatham Island albatross			2			
Common diving petrel	1	12	3	3		
Grey petrel	1					
Northern giant petrel				2		
Prion (unidentified)				1	1	
Sooty shearwater	2	1	4	2	1	
Storm petrels	1			4		
Wandering albatross		1		2		
White-capped albatross				1		
White-chinned petrel	10		4	1	13	
Total	**15**	**16**	**16**	**16**	**15**	**2**
MARINE MAMMALS						
NZ fur seal			1			
Total	**0**	**0**	**1**	**0**	**0**	**0**

2004/05

During 2004/05, over 600 commercial fishing days were reported by vessels over 46 m in length that used the method of bottom longline. Observations were made on 121 of these days (Table 116). The highest rate of seabird interactions was reported from SOU.

In 2004/05, there was observer coverage in SOE, SOU and SUB (Table 117).

TABLE 116. SUMMARY OF COMMERCIAL EFFORT, OBSERVER EFFORT AND PROTECTED SPECIES INTERACTIONS IN THE DEEP-SEA LING BOTTOM LONGLINE FISHERY FOR THE PERIOD 01 JULY 2004 TO 30 JUNE 2005.

FMA	EFFORT DAYS	OBSERVER DAYS	COVERAGE (%)	NO. HOOKS OBSERVED	SEABIRDS		MAMMALS	
					NUMBER	RATE*	NUMBER	RATE*
1. AKE								
2. CEE	77	0	0.00					
3. SEC	15	0	0.00					
4. SOE	230	59	25.65	1595600	2	<0.01	0	0.00
5. SOU	160	18	11.25	44338	25	0.56	0	0.00
6. SUB	155	44	28.39	1304400	4	<0.01	0	0.00
7. CHA	2	0	0.00					
8. CEW	1	0	0.00					
9. AKW								
10. KER								
Total	**640**	**121**	**18.91**	**2944338**	**31**	**0.01**	**0**	**0.00**

* Number per 1000 hooks.

TABLE 117. OBSERVER DAYS IN THE DEEP-SEA LING BOTTOM LONGLINE FISHERY BY AREA AND MONTH FOR THE PERIOD 01 JULY 2004 TO 30 JUNE 2005.

FMA	2004						2005						TOTAL
	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	
4. SOE	12	26	21	0	0	0	0	0	0	0	0	0	59
5. SOU	0	0	0	0	18	0	0	0	0	0	0	0	18
6. SUB	0	0	0	0	9	0	0	0	0	0	26	9	44
Total	**12**	**26**	**21**	**0**	**27**	**0**	**0**	**0**	**0**	**0**	**26**	**9**	**121**

TABLE 118. SEABIRD INTERACTIONS IN THE DEEP-SEA LING BOTTOM LONGLINE FISHERY BY AREA AND MONTH FOR THE PERIOD 01 JULY 2004 TO 30 JUNE 2005.

FMA	2004				2005		TOTAL
	JUL	AUG	SEP	NOV	MAY	JUN	
4. SOE	2	0	0	–	–	–	2
5. SOU	–	–	–	25	–	–	25
6. SUB	–	–	–	2	2	0	4
Total	**2**	**0**	**0**	**27**	**2**	**0**	**31**

The 25 seabird interactions reported in SOU in November were all from one trip, during which 13 petrels were incidentally killed and 12 petrels were released alive (Table 118). A further two birds were caught and released alive from this trip when the vessel was fishing in SUB.

2005/06

Fewer commercial fishing days were reported in 2005/06 than in the previous year, but a higher number of observer days were achieved, so that the level of observer coverage almost doubled (Table 119). Seabird interaction rates were lower than in the previous year.

Observer coverage was undertaken from August to November and April to June, with days spread fairly evenly between CEE, SOE and SOU (Table 120).

TABLE 119. SUMMARY OF COMMERCIAL EFFORT, OBSERVER EFFORT AND PROTECTED SPECIES INTERACTIONS IN THE DEEP-SEA LING BOTTOM LONGLINE FISHERY FOR THE PERIOD 01 JULY 2005 TO 30 JUNE 2006.

FMA	EFFORT	OBSERVER	COVERAGE	NO. HOOKS	SEABIRDS		MAMMALS	
	DAYS	DAYS	(%)	OBSERVED	NUMBER	RATE*	NUMBER	RATE*
1. AKE								
2. CEE	61	53	86.89	974050	9	0.01	1	<0.01
3. SEC	23	0	0.00					
4. SOE	203	42	20.69	1085450	8	0.01	0	0.00
5. SOU	81	41	50.62	984475	15	0.02	0	0.00
6. SUB	51	0	0.00					
7. CHA	51	0	0.00					
8. CEW								
9. AKW								
10. KER								
Total	**420**	**136**	**32.38**	**3043975**	**32**	**0.01**	**1**	**< 0.01**

* Number per 1000 hooks.

TABLE 120. OBSERVER DAYS IN THE DEEP-SEA LING BOTTOM LONGLINE FISHERY BY AREA AND MONTH FOR THE PERIOD 01 JULY 2005 TO 30 JUNE 2006.

FMA	2005						2006						TOTAL
	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	
2. CEE	0	0	0	0	0	0	0	0	0	8	34	11	53
4. SOE	0	4	30	8	0	0	0	0	0	0	0	0	42
5. SOU	0	0	0	15	26	0	0	0	0	0	0	0	41
Total	**0**	**4**	**30**	**23**	**26**	**0**	**0**	**0**	**0**	**8**	**34**	**11**	**136**

TABLE 121. SEABIRD INTERACTIONS IN THE DEEP-SEA LING BOTTOM LONGLINE FISHERY BY AREA AND MONTH FOR THE PERIOD 01 JULY 2005 TO 30 JUNE 2006.

FMA	2005				2006			TOTAL
	AUG	SEP	OCT	NOV	APR	MAY	JUN	
2. CEE	–	–	–	–	2	7	0	9
4. SOE	0	5	3	–	–	–	–	8
5. SOU	–	–	3	12	–	–	–	15
Total	**0**	**5**	**6**	**12**	**2**	**7**	**0**	**32**

Seabird interactions occurred in most months where there was coverage, with the highest number of interactions occurring in SOU (Table 121). One NZ fur seal was incidentally killed in CEE in May 2006.

2006/07

Almost 30% observer coverage was achieved across all deep-sea ling bottom longline fishing effort in 2006/07, which was slightly down on the previous year (Table 122). The number of seabird interactions was lower than in previous years and no marine mammal interactions were reported.

Observer coverage was undertaken from August to November and May to June, as in previous years (Table 123). A greater number of FMAs was observed compared to previous years, although only 1 day was observed in CHA.

TABLE 122. SUMMARY OF COMMERCIAL EFFORT, OBSERVER EFFORT AND PROTECTED SPECIES INTERACTIONS IN THE DEEP-SEA LING BOTTOM LONGLINE FISHERY FOR THE PERIOD 01 JULY 2006 TO 30 JUNE 2007.

FMA	EFFORT	OBSERVER	COVERAGE	NO. HOOKS	SEABIRDS		MAMMALS	
	DAYS	DAYS	(%)	OBSERVED	NUMBER	RATE*	NUMBER	RATE*
1. AKE								
2. CEE	72	16	22.22	381 800	0	0.00	0	0.00
3. SEC	49	19	38.78	377 800	0	0.00	0	0.00
4. SOE	126	42	33.33	1 101 000	2	<0.01	0	0.00
5. SOU	88	30	34.09	763 200	15	0.02	0	0.00
6. SUB	56	0	0.00					
7. CHA	3	1	33.33	39 000	0	0.00	0	0.00
8. CEW								
9. AKW								
10. KER								
Total	**394**	**108**	**27.41**	**2 662 800**	**17**	**0.01**	**0**	**0.00**

* Number per 1000 hooks.

TABLE 123. OBSERVER DAYS IN THE DEEP-SEA LING BOTTOM LONGLINE FISHERY BY AREA AND MONTH FOR THE PERIOD 01 JULY 2006 TO 30 JUNE 2007.

FMA	2006						2007						TOTAL
	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	
2. CEE	0	0	0	0	0	0	0	0	0	0	0	16	16
3. SEC	0	3	0	0	0	0	0	0	0	0	4	12	19
4. SOE	0	13	29	0	0	0	0	0	0	0	0	0	42
5. SOU	0	0	0	29	1	0	0	0	0	0	0	0	30
7. CHA	0	0	0	0	0	0	0	0	0	0	0	1	1
Total	**0**	**16**	**29**	**29**	**1**	**0**	**0**	**0**	**0**	**0**	**4**	**29**	**108**

Seabird interactions only occurred in September and October, and most of these were in SOU in October (Table 124), when 13 white-chinned petrels, one sooty shearwater and one prion were reported incidentally killed during one trip.

TABLE 124. SEABIRD INTERACTIONS IN THE DEEP-SEA LING BOTTOM LONGLINE FISHERY BY AREA AND MONTH FOR THE PERIOD 01 JULY 2006 TO 30 JUNE 2007.

FMA	2006				2007		TOTAL
	AUG	SEP	OCT	NOV	MAY	JUN	
2. CEE	–	–	–	–	–	0	0
3. SEC	0	–	–	–	0	0	0
4. SOE	0	2	–	–	–	–	2
5. SOU	–	–	15	0	–	–	15
7. CHA	–	–	–	–	–	0	0
Total	**0**	**2**	**15**	**0**	**0**	**0**	**17**

6. Discussion

6.1 MIDDLE DEPTH TRAWL FISHERIES

6.1.1 Hoki, hake, silver warehou and ling

Levels of observer coverage in this fishery have generally been around 15% of total fishing effort, with greater coverage achieved in priority FMAs. In most FMAs where commercial fishing activity is undertaken for hake, hoki, silver warehou or ling, some level of observer coverage has been achieved. However, in AKE, over 70 commercial fishing days targeting ling were reported in each of the 3 years covered by this report, yet only 1 day of observer coverage was achieved. Thus, no information exists on whether protected species interactions occur in AKE.

Moderate numbers of seabirds and NZ fur seals have been reported as being incidentally caught by vessels using the method of middle depth trawl to target hoki, hake, silver warehou and ling. Captures of seabirds and marine mammals have been reported from most areas where there has been observer effort. The highest rates of seabird captures were reported from SEC, despite lower observer coverage in that fishery area. Seabird captures were highest in 2005/06, due to several large capture events of sooty shearwaters in nets. The number of NZ fur seal captures was also higher in 2005/06, and while the highest numbers of NZ fur seals were reported caught on the west coast of the South Island, capture rates were higher in other areas. Numbers of interactions with both seabirds and NZ fur seals were reduced in 2006/07, mostly due to a lower number of multiple capture events being reported than in 2005/06, indicating that individual vessels contributed less to the overall total.

Mitigation devices and practices are currently being investigated for use in this fishery. Research into offal management is currently underway, with the hope that this will address warp capture interactions in SEC and other areas. NZ fur seal mitigation devices are being trialled, and observer reports of seabird net captures have been investigated to help determine the feasibility of mitigating against net captures during setting and hauling.

6.1.2 Southern blue whiting

The southern blue whiting fishery operates in a discrete space and time and has had higher levels of observer coverage than most other trawl fisheries. Of greatest concern in this fishery was the increasing numbers of marine mammal captures over the 3 observer years, particularly of NZ sea lions. At present, no mitigation devices or practices are currently in place in this fishery to reduce the likelihood of pinniped interactions, even though interaction rates are higher than in other trawl fisheries where mitigation is employed or under development.

6.1.3 Scampi

The scampi fishery has, historically, had poor observer coverage, although levels are slowly increasing due to wider interest in gaining observer coverage in this fishery (this was previously observed solely through CSP). No observer coverage was achieved in SUB in 2004/05, even though this area had the second highest level of commercial fishing effort, but coverage was achieved in SUB during the next 2 observer years. While moderate levels of coverage have more recently been achieved in AKE, SOE and SUB, greater levels of observer coverage are desirable in this fishery given the number of seabird captures and occasional NZ sea lion captures.

Despite low coverage, seabird capture rates were generally higher in this fishery compared to other trawl fisheries (except squid). Seabird interactions were most frequently reported in AKE and SUB, where the majority of observer coverage was focused. A variety of seabird mitigation devices are employed by scampi vessels, although many do not meet regulated specifications as they are not required to do so due to vessel length.

6.1.4 Squid

Levels of observer coverage have generally been greater than 15% for squid vessels operating in SOU or SUB, due to priorities of both DOC and the Ministry of Fisheries to monitor protected species interactions in this fishery. The high capture rates of seabirds reported in SEC are of concern considering minimal observer coverage has been achieved in this area. Increased observer coverage is warranted for squid vessels operating in SEC, especially considering the high number of commercial effort days reported relative to other fishery management areas.

Of all trawl fisheries, the squid fishery operating in both SOU and SUB has historically had the highest rates of seabird captures. Capture rates decreased over the 3 observer years examined in this report, with reductions in albatross captures being most notable. Vessels operating in this fishery are required to use regulated seabird mitigation devices.

Collaborative research between the Government and the fishing industry, and the development of discharge management measures has led to changes in offal management. (Offal and discard discharge is the greatest cause of warp captures in this fishery.) In addition, mitigation options for net captures are currently being investigated, as these continue to be a concern. The number of marine mammal captures has fluctuated over the 3 years, particularly for NZ sea lions. Research into the viability of NZ sea lions following escape via Sea Lion Exclusion Devices is ongoing.

6.2 PELAGIC TRAWL FISHERIES

While commercial effort targeting pelagic fish stocks was undertaken in eight FMAs, observer coverage generally focused only on FMAs with the greatest levels of commercial effort. Observer effort varied between FMAs over the 3-year period examined. In 2004/05, the greatest commercial fishing effort was in CHA but relatively few observer days were achieved there compared with other areas (AKW and CEW). In 2005/06, reasonable levels of observer coverage were achieved in four FMAs, and by the 2006/07 observer year coverage was spread between eight FMAs.

The most notable protected species interaction in pelagic trawl fisheries is that of multiple captures of common dolphins. During the 3 observer years discussed in this report, over 20 dolphin captures were reported in 1 year, while fewer dolphins were caught during the other 2 years. In general, only a few vessels contribute to such capture events in this fishery. The number of seabird captures was greatest on vessels operating in SOU, particularly in 2005/06 when targeting barracouta. While vessels over 28 m in length are required to use bird mitigation devices, no mitigation devices are currently in place to avoid capturing common dolphins and no research into such devices is presently underway.

6.3 DEEP-WATER BOTTOM TRAWL FISHERIES

Around 20% of total fishing effort was generally observed in deep-water bottom trawl fisheries, mostly because of Ministry of Fisheries priorities in relation to stock management. In the two FMAs of particular interest to CSP (SOE and SUB), good levels of coverage were achieved over the 3 observer years. During 2005/06 and 2006/07, good levels of observer coverage were also achieved in AKE, AKW and SOU.

Fewer seabird and marine mammal captures have been reported from this fishery than other trawl fisheries. In 2004/05, many of the seabirds reported as interacting with vessels were released alive, including 19 instances where birds had struck the vessel or landed on the deck.

While fewer seabirds and marine mammals have been incidentally caught in this fishery than in other trawl fisheries, the greatest amount of coral has been landed in this fishery. At present, no mitigation practice besides avoidance is known to reduce the likelihood of incidentally 'catching' corals and other invertebrates. However, the likelihood of making contact with the seafloor where corals are present can be reduced by fishing known tracks and using seabed mapping technology.

It is important to note that observers do not weigh corals but are asked to estimate weight (in kg), which may lead to over- or under-reporting of actual weights. It is difficult to assess the accuracy of records, but observers are skilled and experienced in estimating weights at-sea (D. Tracey, NIWA, pers. comm., 2008).

6.4 INSHORE FISHERIES

The development of an inshore observer programme to monitor interactions with protected species is progressing, but there are still difficulties associated with monitoring small setnet, trawl and bottom longline vessels. Ongoing difficulties include the higher cost of placing observers on inshore vessels, access to vessels, the difficulties of vessels accommodating an observer on board and the weather dependence of these fisheries. In addition, conflicting priorities for the small pool of government observers makes it difficult to meet all monitoring requirements. Information gained from these fisheries to date indicates that interactions with seabirds and marine mammals do occur, but the extent of those interactions is currently unknown. Improving understanding of the range of gears and deployment used in inshore fisheries will contribute to the development of mitigation measures.

6.4.1 Inshore trawl

As only nine inshore trawl vessels were observed during the 2006/07 observer year, it is difficult to generalise about interactions between inshore trawl vessels and protected species. The interactions that were observed demonstrate that inshore trawl fishing presents a risk of protected species incidental catch, but the broader extent of this risk is not known. There was variability between vessels in terms of the types of interactions noted (e.g. warp captures versus net captures) and in terms of offal management and mitigation. Avenues for future research in this fishery include offal management, net capture mitigation and the potential to use mitigation devices to reduce warp strikes.

6.4.2 Inshore bottom longline—ling, blue nose, hapuku and bass

While commercial effort in this fishery is undertaken throughout the year and in all FMAs except KER and SUB, observer coverage achieved to date has been very low. While there is scope for higher levels of observer coverage, many of the difficulties in placing observers in this fishery will need to be overcome, including the development of better communication networks with vessel managers and operators, and addressing capacity issues in the observer programme.

Avenues for mitigation and protected species research in this fishery include the development of best practice line-weighting regimes given variable gear types and deployment patterns, safe turtle handling and release practices, and offal and discard management practices.

6.4.3 Inshore bottom longline—snapper

Despite minimal observer coverage in 2004/05, 14 protected species interactions with the snapper inshore bottom longline fishery were reported, including the incidental mortality of four flesh-footed shearwaters and one black petrel. With even lower coverage in 2005/06, 12 interactions were reported, including the mortality of two black petrels. As observer coverage was less than 3% in both years, the extent of interactions in AKE is difficult to determine.

Avenues for mitigation and protected species research in bottom longline fisheries include the development of best practice line-weighting regimes, safe turtle handling and release practices, and offal and discard management practices.

6.4.4 Setnet

Across all setnet fishing effort, low levels of observer coverage have been achieved to date. In some areas, such as SOU, good levels of observer coverage were achieved over the summer period. Protected species interactions were reported in three areas where observer coverage was undertaken. However, due to the low number of observer days achieved, the extent of interactions across the setnet fishery as a whole cannot be determined.

6.5 SURFACE LONGLINE FISHERIES

6.5.1 Charter tuna

Higher levels of observer coverage have been achieved aboard charter tuna vessels than any other fishing fleet due to the small number of vessels operating in this fishery, operator cooperation and the capacity for vessels to accommodate observers. High levels of seabird captures were reported in 2006/07 despite vessels employing multiple mitigation techniques including tori lines, brickle curtains, water cannons and offal management.

6.5.2 Domestic tuna and swordfish

Domestic tuna vessels are difficult to observe due to similar restrictions to those already outlined for other small vessels. Less than 5% observer coverage was achieved in each of the 3 years reported on. The recently introduced requirement for these vessels to provide notice of departure to the observer programme has facilitated observer coverage more recently, and is expected to continue to do so in future years. Despite low levels of coverage, protected species interactions are reported in this fishery, including interactions with seabirds, marine mammals and marine reptiles. The large capture event of 58 seabirds in the 2006/07 observer year led to cooperation between the Government and the industry to develop new mitigation techniques. Safe leads and the use of blue-dyed bait are currently under investigation.

6.6 BOTTOM LONGLINE FISHERY

Approximately 20–30% observer coverage has been achieved in the deep-sea ling bottom longline fishery due to the small number of vessels operating, operator cooperation and the ability of vessels to accommodate observers. Almost 20% observer coverage was achieved in 2004/05, while approximately 30% coverage was achieved in 2005/06 and 2006/07. The increase in coverage levels can partly be explained by decreasing fishing effort each year whilst observer coverage remained at a constant level of around 100 days.

In the 3 years covered by this report, the deep-sea ling bottom longline fishery had a lower rate of seabird captures than surface longline fisheries. Seabird interactions have been reported from all areas where observer coverage was undertaken (except CHA, where only 1 day has been observed). Large capture events have occasionally occurred in this fishery. In the period covered by this report, a multiple seabird capture event was reported from one trip in 2004/05 in SOU. Mitigation techniques are well developed, including tori lines, integrated weighted line and offal management. Few vessels operate in this fishery, allowing greater knowledge to be gained of fishing and mitigation practices that may be relevant for application to smaller bottom longline vessels.

7. Acknowledgements

This work was funded by the Conservation Services Programme projects INT 2004/01, INT 2005/01, INT 2005/02 and INT 2006/01, and published under DOC Science Investigation No. 4067. I am very grateful to the Ministry of Fisheries Observer Services team, especially the Fisheries Observer Offices and the observers, and the Research, Data and Reporting team. Many thanks to Johanna Pierre (DOC), Amanda Todd (DOC), Richard Wells (Deepwater Group Ltd) and Kirstie Knowles (Royal Forest and Bird Protection Society) for feedback and suggestions that improved this report.

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Appendix 1

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

TABLE A1.1. FISH.

CODE	COMMON NAME	SCIENTIFIC NAME
BAR	Barracouta	*Thyrsites atun*
BIG	Bigeye tuna	*Thunnus obesus*
BNS	Blue nose	*Hyperoglyphe antarctica*
BOE	Black oreo	*Allocyttus niger*
BYS	Alfonsino	*Beryx splendens*
BYX	Alfonsino and long finned beryx	*Beryx splendens* and *B. decadactylus*
CDL	Cardinal fish	*Epigonus telescopus*
HAK	Hake	*Merluccius australis*
HOK	Hoki	*Macruronus novaezelandiae*
HPB	Hapuku and bass	*Polyprion oxygeneios* and *P. americanus*
JDO	John dory	*Zeus faber*
JMA	Jack mackerel	*Trachurus declivis*, *T. murphyi*, *T. novaezelandiae*
LIN	Ling	*Genypterus blacodes*
OEO	Oreo	Oreosomatidae (Family)
ORH	Orange roughy	*Hoplostethus atlanticus*
RBY	Rubyfish	*Plagiogeneion rubiginosum*
SBW	Southern blue whiting	*Micromesistius australis*
SCI	Scampi	*Metanephrops challengeri*
SNA	Snapper	*Pagrus auratus*
SQU	Arrow squid	*Nototodarus sloanii*, *N. gouldi*
SSO	Smooth oreo	*Pseudocyttus maculatus*
STN	Southern bluefin tuna	*Thunnus maccoyii*
SWA	Silver warehou	*Seriolella punctata*
SWO	Swordfish	*Xiphias gladius*
TAR	Tarakihi	*Nemadactylus macropterus*; *Nemadactylus* sp. ("King Tarakihi")
WWA	White warehou	*Seriolella caerulea*

TABLE A1.2. SEABIRDS.

COMMON NAME	SCIENTIFIC NAME
Antipodean albatross	*Diomedea antipodensis antipodensis*
Australasian gannet	*Morus serrator*
Black petrel	*Procellaria parkinsoni*
Black-bellied storm petrel	*Fregetta tropica*
Black-browed albatross (southern)	*Thalassarche melanophris*
Black-browed albatross (unidentified)	*Thalassarche melanophris* or *T. impavida*
Broad-billed prion	*Pachyptila vittata*
Buller's albatross (Southern)	*Thalassarche bulleri bulleri*
Buller's shearwater	*Puffinus bulleri*
Campbell albatross	*Thalassarche impavida*
Cape petrel	*Daption capense*
Chatham Island albatross	*Thalassarche eremita*
Common diving petrel	*Pelecanoides urinatrix*
Fairy prion	*Pachyptila turtur*
Flesh-footed shearwater	*Puffinus carneipes*
Fluttering shearwater	*Puffinus gavia*
Giant petrel	*Macronectes* spp.
Gibson's albatross	*Diomedea antipodensis gibsoni*
Grey-headed albatross	*Thalassarche chrysostoma*
Grey petrel	*Procellaria cinerea*
Grey-backed storm petrel	*Garrodia nereis*
Grey-faced petrel (great winged)	*Pterodroma macroptera*
Northern giant petrel	*Macronectes halli*
Northern royal albatross	*Diomedea sanfordi*
Pacific (Northern Buller's) albatross	*Thalassarche bulleri platei*
Pied shag	*Phalacrocorax varius*
Salvin's albatross	*Thalassarche salvini*
Shy albatross*	*Thalassarche cauta*
Snares Cape petrel	*Daption capense australe*
Sooty shearwater	*Puffinus griseus*
Southern giant petrel	*Macronectes giganteus*
Southern royal albatross	*Diomedea epomophora*
Spotted shag	*Stictocarbo punctatus*
Storm petrel	Hydrobatidae (Family)
Wandering albatross (unidentified)	*Diomedea exulans* ssp.
Westland petrel	*Procellaria westlandica*
White-capped albatross*	*Thalassarche steadi*
White-chinned petrel	*Procellaria aequinoctialis*
White-faced storm petrel	*Pelagodroma marina*
White-headed petrel	*Pterodroma lessonii*
Yellow-eyed penguin	*Megadyptes antipodes*

* Historically, white-capped albatrosses (*Thalassarche steadi*) were reported by observers under a general code for shy albatrosses (*T. cauta*). Some observers still use this code, although these birds are most likely to be white-capped albatrosses.

TABLE A1.3. MARINE MAMMALS.

COMMON NAME	SCIENTIFIC NAME
Bottlenose dolphin	*Tursiops truncatus*
Common dolphin	*Delphinus delphis*
Dusky dolphin	*Lagenorhynchus obscurus*
Hector's dolphin	*Cephalorhynchus hectori*
Leopard seal	*Hydrurga leptonyx*
Maui's dolphin	*Cephalorhynchus hectori maui*
New Zealand (NZ) fur seal	*Arctocephalus forsteri*
New Zealand (NZ) sea lion	*Phocarctos hookeri*
Pilot whale	*Globicephala melas*

TABLE A1.4. REPTILES.

COMMON NAME	SCIENTIFIC NAME
Green turtle	*Chelonia mydas*
Leatherback turtle	*Dermochelys coriacea*

TABLE A1.5. CORALS.

COMMON NAME	SCIENTIFIC NAME
Bamboo corals	*Keratosis* spp.
Black corals	Antipatharia (Order)
Bubblegum coral	*Paragorgia arborea*
Bushy hard coral	*Goniocorella dumosa*
Crested cup coral	*Desmophyllum dianthus*
Deep-water branching coral	*Enallopsammia rostrata*
Flabellum cup corals	*Flabellum* spp.
Golden corals	*Chrysogorgia* spp.
Gorgonian coral	Gorgonacea (Order)
Hydroids	Hydrozoa (Class)
Long polyp soft corals	*Telesto* spp.
Madrepora coral	*Madrepora oculata*
Precious corals	*Corallium* spp.
Red coral	Stylasterina (Order)
Red hydrocorals	*Errina* spp.
Soft cora	Alcyonacea (Order)l
Spiny white hydrocorals	*Lepidotheca* spp.

Appendix 2

PROTECTED SPECIES INTERACTIONS BY OBSERVER YEAR

See Appendix 1 for scientific names of species.

SPECIES	2004/05		2005/06		2006/07		TOTAL	
	DEAD	ALIVE	DEAD	ALIVE	DEAD	ALIVE	DEAD	ALIVE
SEABIRDS								
Albatross (unidentified)	1	17	12		34	2	47	19
Antipodean albatross					3		3	0
Australasian gannet		1					0	1
Black petrel	1	2	2	2	1	4	4	8
Black-bellied storm petrel				2		2	0	4
Black-browed albatross (unidentified)		4	3		2	3	5	7
Broad-billed prion			1			1	1	1
Buller's albatross	28	18	16	8	40	15	84	41
Buller's shearwater				4			0	4
Campbell albatross	2		8		1		11	0
Cape petrel	2	50	3	17	2	10	7	77
Chatham Island albatross	1	1	2				3	1
Common diving petrel	2	15	5	13	1		8	28
Fairy prion	2	9	1	1			3	10
Flesh-footed shearwater	4	8	8	4	6	4	18	16
Fluttering shearwater		1			1		1	1
Giant petrels (unidentified)		1		1			0	2
Gibson's albatross			1		6		7	0
Grey petrel	3	4	9	2	6	2	18	8
Grey-backed storm petrel	1	3	1			1	2	4
Grey-faced petrel					2		2	0
Northern giant petrel		1		2	1		1	3
Northern royal albatross	1						1	0
Pacific albatross (Northern Buller's albatross)			1			1	1	1
Petrel (unidentified)	3	26	3	8	2	2	8	36
Pied shag			1				1	0
Prion (unidentified)	1	2		4	1	2	2	8
Salvin's albatross	23	5	10	2	9	4	42	11
Seabird				2			0	2
Seabird—large	6	10	4		4		14	10
Seabird—small		17				1	0	18
Seagull		1				1	0	2
Shag						6	0	6
Shy albatross*	8	4	3	1	3		14	5
Snares cape petrel	1	1					1	1
Sooty shearwater	56	22	137	32	72	17	265	71
Southern black-browed albatross	2						2	0
Southern giant petrel			2	1			2	1
Southern royal albatross	1	1	1	1			2	2

Continued on next page

Appendix 2—continued

SPECIES	2004/05		2005/06		2006/07		TOTAL	
	DEAD	ALIVE	DEAD	ALIVE	DEAD	ALIVE	DEAD	ALIVE
Spotted shag			2				2	0
Storm petrels	1	11		15		2	1	28
Wandering albatross		2		5	2	17	2	24
Westland petrel	1	3					1	3
White-capped albatross*	220	21	80	12	73	6	373	39
White-chinned petrel	54	10	54	30	40	19	148	59
White-faced storm petrel			1				1	0
White-headed petrel				1			0	1
Yellow-eyed penguin					2		2	0
Total	**425**	**271**	**371**	**170**	**314**	**122**	**1110**	**563**
MARINE MAMMALS								
Bottlenose dolphin	1						1	0
Common dolphin	22		2		8		32	0
Dusky dolphin			1		1		2	0
Hector's dolphin					1		1	0
Leopard seal			1				1	0
NZ fur seal	90	43	161	27	140	20	391	90
NZ sea lion	14		10		12		36	0
Pilot whale	6	1					6	1
Whale (unidentified)		2					0	2
Total	**133**	**46**	**175**	**27**	**162**	**20**	**470**	**93**
REPTILES								
Green turtle				1			0	1
Leatherback turtle		2				4	0	6
Total	**0**	**2**	**0**	**1**	**0**	**4**	**0**	**7**

* Historically, white-capped albatrosses (*Thalassarche steadi*) were reported by observers under a general code for shy albatrosses (*T. cauta*). Some observers still use this code, although these birds are most likely to be white-capped albatrosses.

Appendix 3

WEIGHT (kg) OF CORAL LANDED ABOARD OBSERVED VESSELS BY CORAL TAXON AND TARGET FISH SPECIES

See Appendix 1 for scientific names of species and target fish species codes.

TABLE A3.1. 01 JULY 2004 TO 30 JUNE 2005.

CORAL TAXON	BAR	BOE	HOK	OEO	ORH	SQU	SSO	TOTAL
Black corals					78		3	81
Bubblegum coral					485			485
Coral rubble						121		121
Red coral					2330		37	2367
Soft coral	1							1
Unidentified coral		24	41	1898	17667	21	1319	20970
Total	**1**	**24**	**41**	**1898**	**20560**	**142**	**1359**	**24025**

TABLE A3.2. 01 JULY 2005 TO 30 JUNE 2006.

CORAL TAXON	BOE	BYS	CDL	HOK	OEO	ORH	SCI	SQU	SSO	SWA	TOTAL
Bamboo corals	34	1	2	1	5	15			42		100
Black corals		1	5		2	38			1		47
Bubblegum coral	16				496	48			262		822
Bushy hard coral					5	147			6		158
Coral rubble					3	572		482	30		1087
Crested cup coral			1			14					15
Deep-water branching corals		4				74					78
Flabellum cup corals				26		7				2	35
Golden corals			1		1	13			7		22
Gorgonian coral									1		1
Hydroids					1	6					7
Long polyp soft corals						1	35				36
Precious corals									1		1
Red coral						3					3
Red hydrocorals								1			1
Unidentified coral	12	9	84	1	119	4782	5		171		5183
Total	**62**	**15**	**93**	**28**	**632**	**5720**	**40**	**483**	**521**	**2**	**7596**

TABLE A3.3. 01 JULY 2006 TO 30 JUNE 2007.

CORAL TAXON	BNS	BOE	BYS	BYX	HOK	JMA	OEO	ORH	RBY	SCI	SNA	SQU	SSO	SWA	TAR	WWA	TOTAL
Bamboo corals		10	7	1			15	65				1	107			7	213
Black corals		2	4			5	2	74	1	4	1		9				102
Bubblegum coral		11					224	532					297				1064
Bushy hard coral		47		3			11	162		218		4	2175				2620
Coral rubble	30	1		2			13	11151		500			2017				13714
Crested cup coral							2	4					11				17
Deep-water branching coral			2	1			13	29					5			5	55
Flabellum cup corals					5		3	3		3		850		2			866
Golden corals							1	12					2				15
Hydroids													2				2
Long polyp soft corals								45									45
Madrepora coral								2					1				3
Precious corals							1										1
Red coral		5			7			2					15				29
Red hydrocorals							6										6
Spiny white hydrocorals								2									2
Unidentified coral		2	10				485	298		130			18		3		946
Total	**30**	**78**	**23**	**7**	**12**	**5**	**776**	**12381**	**1**	**855**	**1**	**855**	**4659**	**2**	**3**	**12**	**19700**

Appendix 4

WEIGHT (kg) OF CORAL LANDED ABOARD OBSERVED VESSELS BY FISHERIES MANAGEMENT AREA (FMA) AND TARGET FISH SPECIES

See Appendix 1 for target fish species codes.

TABLE A4.1. 01 JULY 2004 TO 30 JUNE 2005.

SPECIES	AKE	AKW	CEE	CHA	ET	SEC	SOE	SOU	SUB	TOTAL
BAR								1		1
BOE									24	24
HOK				36		3	2			41
OEO						47	1851			1898
ORH	1	532	1		123		19847		56	20560
SQU								142		142
SSO						5	5		1349	1359
Total	**1**	**532**	**1**	**36**	**123**	**55**	**21705**	**143**	**1429**	**24025**

TABLE A4.2. 01 JULY 2005 TO 30 JUNE 2006.

SPECIES	AKE	AKW	CET	ET	SEC	SOE	SOI	SOU	SUB	TOTAL
BOE					62					62
BYS	5					10				15
CDL				93						93
HOK					25	1		2		28
OEO					60	462	8		102	632
ORH	31	4679	1	344		649			16	5720
SCI	5						35			40
SQU							51	432		483
SSO					31				490	521
SWA					2					2
Total	**41**	**4679**	**1**	**437**	**180**	**1122**	**94**	**434**	**608**	**7596**

TABLE A4.3. 01 JULY 2006 TO 30 JUNE 2007.

SPECIES	AKE	AKW	CET	CEW	ET	SEC	SOE	SOU	SUB	TOTAL
BNS		30								30
BOE						1			77	78
BYS		20			3					23
BYX	7									7
HOK						10	2			12
JMA				5						5
OEO						2	163		611	776
ORH	36	854	3		71		11241		176	12381
RBY		1								1
SCI							855			855
SNA	1									1
SQU						850		5		855
SSO						352	4	3	4300	4659
SWA						2				2
TAR	1	2								3
WWA								12		12
Total	**45**	**907**	**3**	**5**	**74**	**1217**	**12265**	**20**	**5164**	**19700**

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