Conservation Services Programme observer report

01 July 2004 to 30 June 2007

S.J. Rowe

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CONTENTS

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S.J. Rowe

Marine Conservation Services, Department of Conservation, PO Box 10420, Wellington 6143, New Zealand. Email: srowe@doc.govt.nz

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

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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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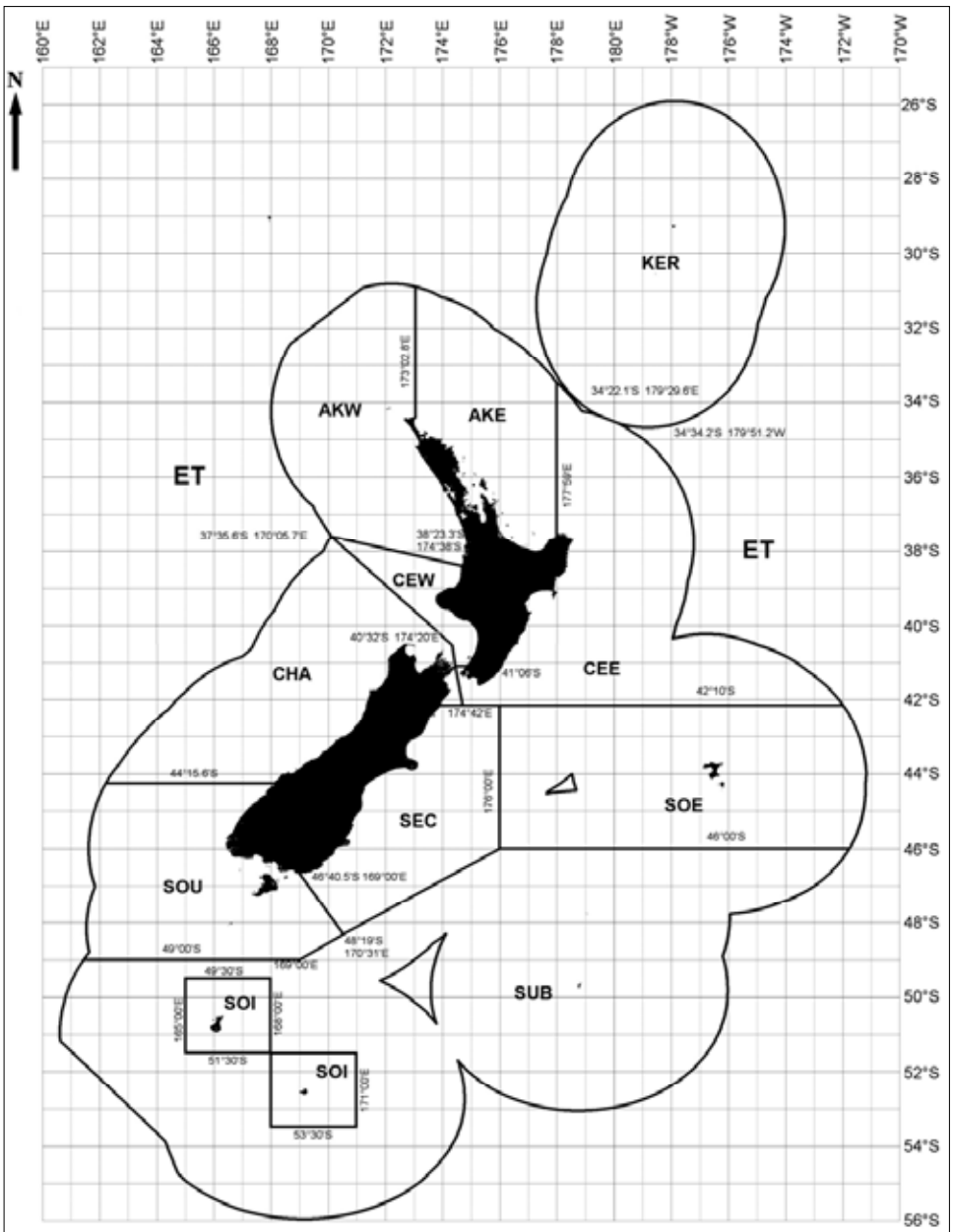
[2] The group of organisms collectively known as 'black corals' (Cnidaria, Antipitharia) is currently protected under the Wildlife Act 1953. 'Red corals' are also listed as protected under the Wildlife Act 1953. The definition of 'red corals' is currently being clarified through the revision of Schedule 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

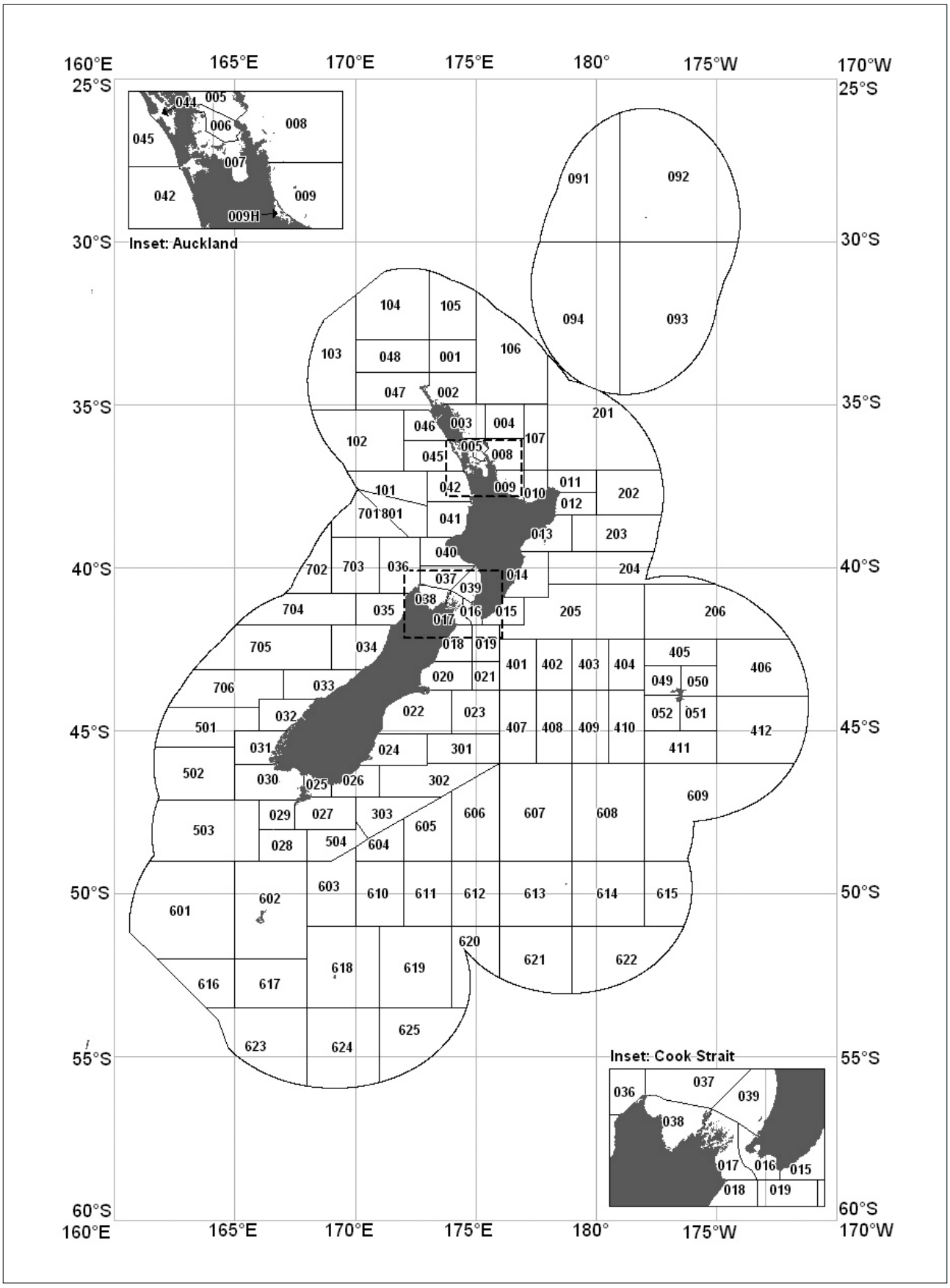


Figure 2. New Zealand Fisheries Statistical Areas. (Source: Ministry of Fisheries.)

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**

Continue to next file: dmcs1a