Conservation Services Programme
Observer Report for the period 1 July 2004 until 30 June 2007

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Stephanie Rowe
Marine Conservation Services
Department of Conservation
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Abstract

The Department of Conservation, through the Conservation Services Programme, has a statutory role to carry out Conservation Services which include monitoring and data collection related to protected species interactions with fisheries. In order to fulfil this role, Government observers are placed on commercial fishing vessels operating in New Zealand's Exclusive Economic Zone to monitor interactions with protected species.

Protected species known to interact with commercial fishing operations include seabirds, marine mammals and marine turtles. Protected corals are landed in some fisheries. The information collected by observers can identify where the most significant interactions are occurring and can inform development and application of strategies to minimise adverse effects.

This report details protected species captures by fishery, method and area for three 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 inform where fishing effort, observer coverage and captures occur so that potential gaps in monitoring can be identified along with high risk areas and time periods in various fisheries.

Introduction

Understanding the nature and extent of interactions between commercial fisheries and protected species is the foundation of the Conservation Services Programme. The Programme also works to develop effective solutions to mitigate adverse effects of commercial fishing on protected species in NZ fisheries waters.

Government observers are placed on commercial fishing vessels operating in New Zealand's Exclusive Economic Zone in order to monitor interactions with protected species. This information can 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:

1. To identify, describe and, where possible, quantify protected species interactions with commercial fisheries;
2. To identify, describe and, where possible, quantify measures for mitigating protected species interactions;
3. To 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, while interactions with other fisheries are less well understood, especially inshore fisheries. For example, trends in seabird bycatch in parts of the hoki fishery and squid fishery are relatively clear, and our understanding of those interactions well developed. In contrast, in inshore areas, efforts to determine the nature of interactions are still required, and robust estimates of the extent are not yet broadly possible.

Progress with mitigating known interactions are 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, seabird warp captures on trawlers have shown to be reduced through various bird scaring devices (Middleton and Abraham, 2007) and offal management (Abraham *et al.*, 2008). Addressing dolphin bycatch in pelagic trawl fisheries, in contrast, is less clear to solve 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 (requirement to use seabird scaring devices) and surface longline vessels (requirement 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). 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, method and area for three 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 inform where fishing effort, observer coverage and captures occur so that potential gaps in monitoring can be identified along with high risk areas and time periods in various fisheries. More analytical assessments of protected species bycatch are undertaken through other projects[1].

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

Data collection

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

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

- 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, 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 get 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.

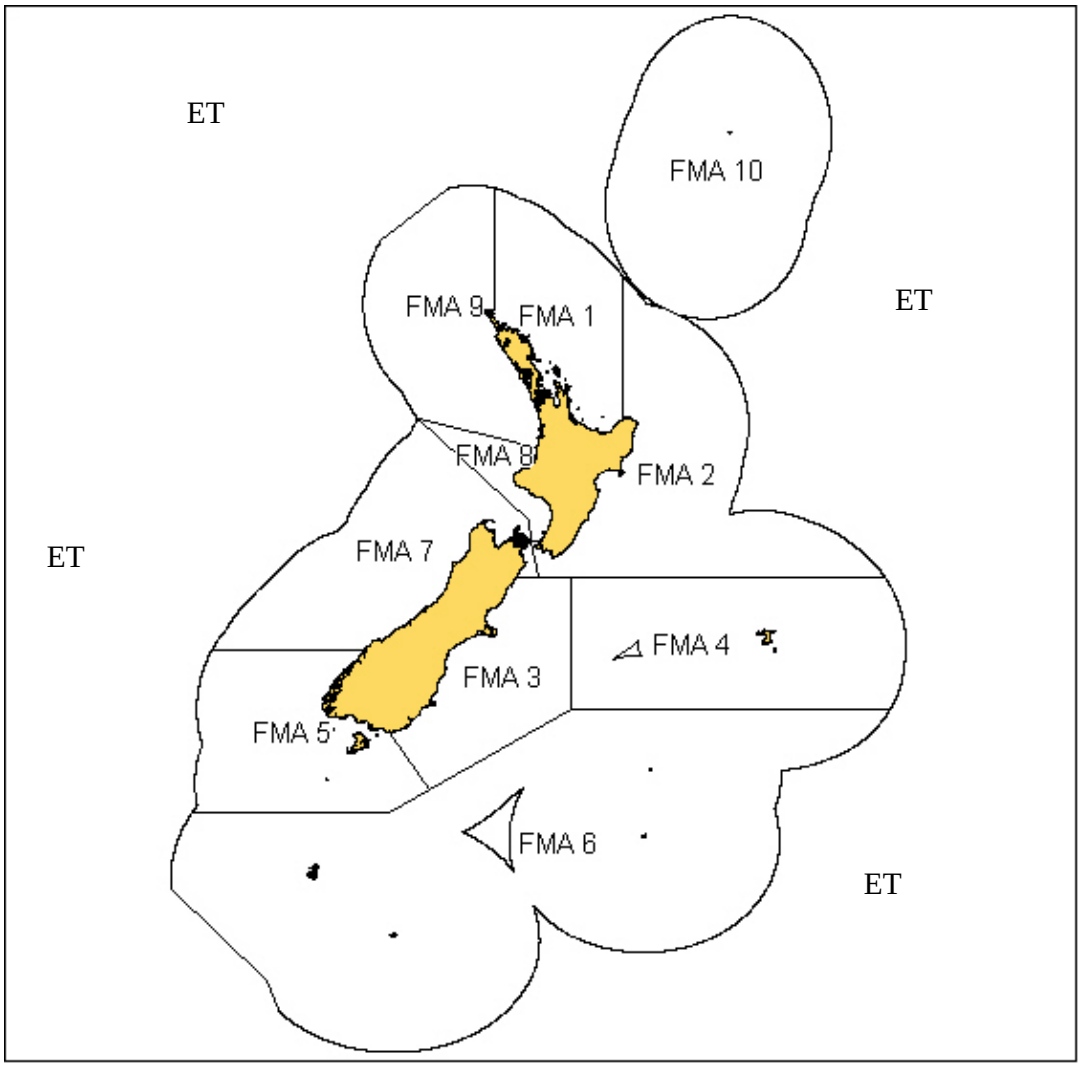
[1] Projects include estimation of total protected species captures, risk assessments, species prioritisation and other modelling projects undertaken by the Department of Conservation or Ministry of Fisheries.

Format

The remainder of this document is divided into separate 'fisheries' where certain target species are grouped according to fishing method. For each 'fishery' an overall summary of commercial effort, observer effort and protected species bycatch is provided by Fisheries Management Area (see Fig 1). Note that the word 'captures' in this report refers to captures reported by government observers. Protected species captures and observer effort are then broken down further for each target stock by area and month in order to view captures and observer effort temporally and spatially. Data is divided into the three observer years which run 1 July to 30 June the following year. A summary of protected species (excluding corals) interactions by observer year and by Fisheries Management Area (FMA) and year are provided in Appendices 1 and 2, respectively. Common names for protected species and fish species are used throughout this report. Scientific names of protected species mentioned in this report are provided in Appendix 3. Reported coral[2] catches are presented by and fishery and year in Appendix 4, and by FMA and year in Appendix 5.

[2] The group of organisms collectively known as 'black corals', (Cnidaria, Antipitharia) are 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 (source: Ministry of Fisheries)



Key:

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

Protected species interactions

MIDDLE DEPTH TRAWL FISHERIES

Hoki, hake, silver warehou and ling

For protected species interactions, the method, location and timing of fishing are all of high importance, with the mix of target species being of less importance. As such, protected species observer coverage of tows targeting the middle depth trawl stocks hoki, hake, ling or silver warehou are discussed together. While additional stocks may be targeted through the method of middle depth trawl, these four stocks have the greatest targeted effort and higher number of protected species interactions relative to 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 on the west coast of the South Island (CHA) and the Cook Strait (CEE, CHA), where both hoki and hake are predominantly targeted from June to September. The 'out of season' hoki fishery operates from September until June when 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 and few vessels use bird bafflers or 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 practiced by some vessels. The potential to use Seal Exclusion Devices in this fishery is currently being investigated (CSP MIT 2006/09). Research into seabird net captures is also underway (CSP MIT 2006/02) and offal management research (started under MIT2004/01, and currently supported with Crown funding) is ongoing.

Seabird captures were highest numerically in 2005/06 and reduced in 2006/07. In 2004/05 and 2005/06, the highest rate of seabird captures per observer tow was in SEC. Higher captures of sooty shearwaters in trawl nets were reported in 2005/06 compared to other years. Fur seal captures were highest in 2005/06.

Seabird and marine mammal captures per observer year are detailed in Tables 1 and 2.

Table 1: Seabird captures in middle depth trawl fisheries (HAK, HOK, LIN, SWA) over three observer years

	2004/05		2005/06		2006/07	
Species	Dead	Alive	Dead	Alive	Dead	Alive
Albatross (unidentified)		16	2			
Black petrel		2				
Black-browed albatross (unidentified)		1				2
Buller's albatross	9	1	6	0	1	0
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	0	8	3	0	0	0
Seabird - small		16				
Shy albatross		1	2			
Snares cape petrel	1	1				
Sooty shearwater	2	0	78	6	10	5
Southern black-browed albatross	1					
Storm petrels		1				
Wandering albatross		1				
Westland petrel	1	3				
White-capped albatross	9	2	15	2	2	0
White-chinned petrel	3	0	4	1	3	0
Total	40	92	123	31	23	14

Table 2: Marine mammal captures in middle depth trawl fisheries (HAK, HOK, LIN, SWA) over three observer years

	2004/05		2005/06		2006/07	
Species	Dead	Alive	Dead	Alive	Dead	Alive
Fur seal	54	9	101	11	74	13
Total	54	9	101	11	74	13

Seabird and fur seal captures by target species are given in Tables 3 and 4. While the majority of seabirds are caught on tows targeting hoki, a large number of birds was caught on tows targeting silver warehou in 2005/06. These birds were mostly sooty shearwaters and 16 were albatrosses. Captures were reported across three trips, one of which caught 35 seabirds. Fur seal captures were also higher on tows targeting hoki (Table 4). However, from Table 5 it can been seen that a greater number of hoki tows are observed (Table 5).

Table 3: Seabird captures by target species for each observer year

	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

Table 4: Fur seal captures by target species for each observer year

	2004/05		2005/06		2006/07	
	Dead	Alive	Dead	Alive	Dead	Alive
Hake			5	1	6	4
Hoki	49	8	93	10	61	8
Ling	5	1	3		7	
Sliver warehou						1

Table 5: Number of tows observed by target species for each observer year

	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 6). During this observer year, most coverage in terms of days was in CHA as well as 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.

Table 6: Summary of commercial effort, observer effort and protected species captures in middle depth trawl fisheries (HAK, HOK, LIN, SWA) for the period 1 July 2004 – 30 June 2005.

FMA	Effort days	Observer days	% coverage	No. tows observed	Seabird captures	Seabirds per 100 tows	Mammal captures	Mammals per 100 tows
1. AKE	108							
2. CEE	951	14	1.5%	124		0.00	1	0.81
3. SEC	2668	286	10.7%	570	59	10.35	26	4.56
4. SOE	1614	241	14.9%	489	32	6.54		0.00
5. SOU	445	46	10.3%	95	1	1.05	3	3.16
6. SUB	546	66	12.1%	142	5	3.52	7	4.93
7. CHA	2825	591	20.9%	1436	35	2.44	27	1.88
8. CEW	2							
9. AKW	1	1	100%	1		0.00		0.00
10. KER								
Total	9160	1245	13.6%	2857	132	4.62	64	2.24

Observer coverage in middle depth trawl fisheries was spread through the year with most effort in SEC and CHA from July to September (Table 7). Coverage through the rest of the year was mainly in SEC, SOE and SOU. Observer coverage follows fishing effort of vessels operating in this fishery throughout the year.

Table 7: Observer days in middle depth trawl fisheries (HAK, HOK, LIN, SWA) by area and month for the period 1 July 2004 – 30 June 2005.

FMA	Jul-04	Aug-04	Sep-04	Oct-04	Nov-04	Dec-04	Jan-05	Feb-05	Mar-05	Apr-05	May-05	Jun-05	Total
2. CEE	6	1	3								2	2	14
3. SEC	39	47	42	16	11	11	9	36	17	1	3	53	286
4. SOE	4			9	14	7	87	56	25			39	241
5. SOU	5	12	9	8	3	3	2		3	1		1	46
6. SUB	3			32	16	2			1	12		0	66
7. CHA	178	335	52		12						3	11	591
9. AKW						1							1
Total	235	395	106	65	56	24	98	92	46	14	8	106	1245

Seabird captures were reported through the year and in all FMAs observed except CEE and AKW (Table 8), where the least observer effort occurred. The highest period of seabird capture was in August and June when the greatest number of observer days were achieved.

Table 8: Seabird captures in middle depth trawl fisheries (HAK, HOK, LIN, SWA) by area and month for the period 1 July 2004 – 30 June 2005.

FMA	Jul-04	Aug-04	Sep-04	Oct-04	Nov-04	Dec-04	Jan-05	Feb-05	Mar-05	Apr-05	Jun-05	Total
3. SEC			1	2		2		2	3		49	59
4. SOE							3	4	4		21	32
5. SOU					1							1
6. SUB				1	3					1		5
7. CHA	6	23	2								4	35
Total	6	23	3	3	4	2	3	6	7	1	74	132

Fur seal captures were recorded from July to November 2004 and in June 2005 in all FMAs where observer effort was recorded, except SOE and AKW (Table 9). The greatest numbers of fur seal captures were in CHA in August, a time period with the greatest observer effort.

Table 9: Fur seal captures in middle depth trawl fisheries (HAK, HOK, LIN, SWA) by area and month for the period 1 July 2004 – 30 June 2005.

FMA	Jul-04	Aug-04	Sep-04	Oct-04	Nov-04	Jun-05	Total
2. CEE	1						1
3. SEC	2	3	12	3		6	26
5. SOU		3					3
6. SUB				5	2		7
7. CHA	3	24					27
Total	6	30	12	8	2	6	64

2005/06

Commercial effort in terms of fishing days was reduced in 2005/06 compared to the 2004/05 observer year with a reduction in observer effort also (Table 10). The spread of commercial fishing effort was similar to 2004/05 with reductions in all areas, especially in CEE, SOE and SUB. The spread of observer effort was somewhat different 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 captures were recorded in CEE, while the highest number of marine mammal captures were reported in CHA.

Table 10: Summary of commercial effort, observer effort and protected species captures in middle depth trawl fisheries (HAK, HOK, LIN, SWA) for the period 1 July 2005 – 30 June 2006.

	Effort days	Observer days	% coverage	No. tows observed	Seabird captures	Seabirds per 100 tows	Mammal captures	Mammals per 100 tows
1. AKE	74							
2. CEE	498	15	3.0%	90	9	10.00	24	26.67
3. SEC	2239	293	13.1%	511	95	18.59	7	1.37
4. SOE	1014	100	9.9%	189	3	1.59		0.00
5. SOU	524	125	23.9%	265	22	8.30	12	4.53
6. SUB	178	74	41.6%	184	6	3.26	4	2.17
7. CHA	2289	412	18.0%	1203	19	1.58	65	5.40
8. CEW								
9. AKW	3							
10. KER								
Total	6819	1019	14.9%	2442	154	6.31	112	4.59

Observer coverage in 2005/06 was similar to that in 2004/05 with days spread throughout the year with most effort in SEC and CHA from July to September (Table 11). Coverage through the rest of the year was mainly in SEC, SOE and SOU.

Table 11: Observer days in middle depth trawl fisheries (HAK, HOK, LIN, SWA) by area and month for the period 1 July 2005 – 30 June 2006.

FMA	Jul-05	Aug-05	Sep-05	Oct-05	Nov-05	Dec-05	Jan-06	Feb-06	Mar-06	Apr-06	May-06	Jun-06	Total
2. CEE	1	1	13										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 captures were reported throughout the year with higher numbers recorded in March and May, mostly in SEC (Table 12). One observed trip targeting SWA and HOK 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.

Table 12: Seabird captures in middle depth trawl fisheries (HAK, HOK, LIN, SWA) by area and month for the period 1 July 2005 – 30 June 2006.

FMA	Jul-05	Aug-05	Sep-05	Oct-05	Nov-05	Feb-06	Mar-06	Apr-06	May-06	Jun-06	Total
1. CEE		3	6								9
3. SEC				4		3	33	2	52	1	95
4. SOE				3							3
5. SOU		5		1			12		4		22
6. SUB			1						4	1	6
7. CHA	4	10	4		1						19
Total	4	18	11	8	1	3	45	2	60	2	154

Fur seal captures were highest from July to September, mostly in FMAs CEE and CHA (Table 13). Fewer captures were recorded outside these months. One trip observed in CEE caught 18 fur seals. Fur seal captures in CHA were reported across 12 trips with captures ranging from one individual per trip through to 18 per trip.

Table 13: Fur seal captures in middle depth trawl fisheries (HAK, HOK, LIN, SWA) by area and month for the period 1 July 2005 – 30 June 2006.

FMA	Jul-05	Aug-05	Sep-05	Oct-05	Dec-05	Mar-06	Jun-06	Total
2. CEE		10	14					24
3. SEC		2	3			2		7
5. SOU		7	3	1			1	12
6. SUB				1	3			4
7. CHA	24	31	9				1	65
Total	24	50	29	2	3	2	2	112

2006/07

Commercial effort in 2006/07 was similar to the previous two observer years (Table 14). Observer coverage was more evenly spread to provide around 20% coverage in four FMAs. Seabird and marine mammal interactions were reduced compared to previous years, most notably marine mammal captures in CHA.

Table 14: Summary of commercial effort, observer effort and protected species captures in middle depth trawl fisheries (HAK, HOK, LIN, SWA) for the period 1 July 2006 – 30 June 2007.

FMA	Effort days	Observer days	% coverage	No. tows	Seabird captures	Seabirds per 100 tows	Mammal captures	Mammals per 100 tows
1. AKE	90	1	1.1%	1		0.00		0.00
2. CEE	499	19	3.8%	121	3	2.48	8	6.61
3. SEC	1959	286	14.6%	525	15	2.86	17	3.24
4. SOE	1099	241	21.9%	493	7	1.42		0.00
5. SOU	695	161	23.2%	324	13	4.01	8	2.47
6. SUB	133	39	29.3%	65		0.00	7	10.77
7. CHA	2432	466	19.2%	1117	6	0.54	45	4.03
8. CEW								
9. AKW	3	3	100.0%	6		0.00		0.00
10. KER								
Total	6910	1216	17.6%	2652	44	1.66	85	3.21

As in previous years, observer coverage was spread throughout the year with the greatest number of days observed in CHA (Table 15).

Table 15: Observer days in middle depth trawl fisheries (HAK, HOK, LIN, SWA) by area and month for the period 1 July 2006 – 30 June 2007.

FMA	Jul-06	Aug-06	Sep-06	Oct-06	Nov-06	Dec-06	Jan-07	Feb-07	Mar-07	Apr-07	May-07	Jun-07	Total
1. AKE		1											1
2. CEE	1					11						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												3	3
Total	161	258	164	55	61	136	47	41	83	50	97	63	1216

Fewer seabird captures were recorded in middle depth trawl fisheries in 2006/07, particularly in SEC (Table 16). Captures were reported in all months of the year.

Table 16: Seabird captures in middle depth trawl fisheries (HAK, HOK, LIN, SWA) by area and month for the period 1 July 2006 – 30 June 2007.

FMA	Jul-06	Aug-06	Sep-06	Oct-06	Nov-06	Dec-06	Jan-07	Feb-07	Mar-07	Apr-07	May-07	Jun-07	Total
2. CEE		2	1										3
3. SEC			1	7	2	1			2	1	1		15
4. SOE					1			2	4				7
5. SOU	1			2			1			1	1		6
7. CHA	1	3	1									1	6
Total	2	5	3	9	3	1	1	2	6	2	2	1	37

Fewer fur seals were reported caught in 2006/07 compared to previous years, and most were caught in the latter half of the year (Table 17).

Table 17: Fur seal captures in middle depth trawl fisheries (HAK, HOK, LIN, SWA) by area and month for the period 1 July 2006 – 30 June 2007.

FMA	Jul-06	Aug-06	Sep-06	Oct-06	Nov-06	May-07	Jun-07	Total
2. CEE	2		5				1	8
3. SEC	1		11	2	2	1		17
5. SOU	2	5		1				8
6. SUB	1			6				7
7. CHA	10	22	10				3	45
8. CEW	2							2
Total	18	27	26	9	2	1	4	87

Southern Blue Whiting

The southern blue whiting fishery operates in specific areas (SOI and SUB) during August and September. Over the past three observer years, observer coverage has been planned to cover 30% of fishing effort.

Fur seals and sea lions have been incidentally caught in this fishery and seabird interactions tend to be lower than in other trawl fisheries. Coral has been landed in this fishery (see Appendices 4 and 5). 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 captures per observer year are detailed in Table18.

Table 18: Protected species captures in the southern blue whiting fishery over three observer years

	2004/05		2005/06		2006/07	
Species	Dead	Alive	Dead	Alive	Dead	Alive
Cape petrels				1		
Fur seal	12	5	32	1	52	
Grey petrel		1	1	1	1	2
Grey-backed storm petrel	1					
Leopard seal			1			
Salvin's albatross						1
Sea lion	1		2		3	
Total	14	6	36	3	56	3

2004/05

In 2004/05, 40% of fishing days were observed in SUB (Table 19). Eighteen marine mammal captures were recorded in this fishery and only two seabird captures (one live, one dead).

Table 19: Summary of commercial effort, observer effort and protected species captures in the southern blue whiting fishery for the period 1 July 2004 – 30 June 2005.

FMA	Effort days	Observer days	% coverage	No. tows	Seabird captures	Seabirds per 100 tows	Mammal captures	Mammals per 100 tows
1. AKE								
2. CEE								
3. SEC								
4. SOE								
5. SOU								
6. SUB	318	129	40.6%	247	2	0.81	18	7.29
7. CHA								
8. CEW								
9. AKW								
10. KER								
Total	318	129	40.6%	247	2	0.81	18	7.29

While the fishery runs from August to October, 90% of observer coverage was in September (Table 20).

Table 20: Observer days in the southern blue whiting fishery by area and month for the period 1 July 2004 – 30 June 2005.

FMA	Aug-04	Sep-04	Oct-04	Total
6. SUB	5	116	8	129
Total	5	116	8	129

Two seabirds and one NZ sea lion were caught in SUB in September. Seventeen fur seals were caught in 2004/05 throughout the fishing season (Table 21). One observed trip reported the capture of nine fur seals and one sea lion.

Table 21: Fur seal captures in the southern blue whiting fishery by area and month for the period 1 July 2004 – 30 June 2005.

Fur seals	Date			
FMA	Aug-04	Sep-04	Oct-04	Total
SUB	9	4	4	17
Total	9	4	4	17

2005/06

Fishing effort increased slightly in 2005/06 and while the number of days observed increased, overall observer coverage reduced to 35% of fishing effort (Table 22). While only three seabirds were caught, a greater number of marine mammal captures was reported.

Table 22: Summary of commercial effort, observer effort and protected species captures in the southern blue whiting fishery for the period 1 July 2005 – 30 June 2006.

FMA	Effort days	Observer days	% coverage	No. tows	Seabird captures	Seabirds per 100 tows	Mammal captures	Mammals per 100 tows
1. AKE								
2. CEE								
3. SEC								
4. SOE								
5. SOU								
6. SUB	389	139	35.7%	329	3	0.91	36	10.94
7. CHA								
8. CEW								
9. AKW								
10. KER								
Total	389	139	35.7%	329	3	0.91	36	10.94

Observer coverage in 2005/06 was spread through August and September with the greatest effort in September (Table 23).

Table 23: Observer days in the southern blue whiting fishery by area and month for the period 1 July 2005 – 30 June 2006.

FMA	Aug-05	Sep-05	Total
6. SUB	41	98	139
Total	41	98	139

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 fur seal captures were recorded compared to the previous year with most captures occurring in August (Table 24). Nineteen fur seal captures were reported from one trip while another trip reported the capture of two fur seals, one NZ sea lion and the leopard seal.

Table 24: Fur seal captures in the southern blue whiting fishery by area and month for the period 1 July 2005 – 30 June 2006.

FMA	Aug-05	Sep-05	Total
6. SUB	24	9	33
Total	24	9	33

2006/07

In 2006/07, commercial effort was decreased compared to previous years, as was the number of observer days (Table 25). Observer coverage as a percentage of effort was similar to 2005/06. While seabird captures remained low, marine mammal captures increased again from the previous two observer years.

Table 25: Summary of commercial effort, observer effort and protected species captures in the southern blue whiting fishery for the period 1 July 2006 – 30 June 2007.

FMA	Effort days	Observer days	% coverage	No. tows	Seabird captures	Seabirds per 100 tows	Mammal captures	Mammals per 100 tows
1. AKE								
2. CEE								
3. SEC								
4. SOE								
5. SOU								
6. SUB	296	108	36.5%	227	4	1.76	55	24.23
7. CHA								
8. CEW								
9. AKW								
10. KER								
Total	296	108	36.5%	227	4	1.76	55	24.23

Observer coverage was spread over the three month fishing season with greatest effort still in August and September and few days in October (Table 26).

Table 26: Observer days in the southern blue whiting fishery by area and month for the period 1 July 2006 – 30 June 2007.

FMA	Aug-06	Sep-06	Oct-06	Total
6. SUB	30	69	6	108
Total	31	71	6	108

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

Scampi

CSP observer coverage in the scampi fishery has been mostly in SOE from July to December and SUB (SOI) from January to April, with lesser coverage in AKE and CEE. Observations are undertaken to monitor interactions with seabirds and NZ sea lions. Interactions with seabirds have been recorded in this fishery as well as occasional interactions with sea lions in the southern scampi fishery. Coral has occasionally been landed in this fishery (see Appendices 4 & 5).

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 captures per observer year are detailed in Table 27.

Table 27: Protected species captures in the scampi trawl fisheries over three observer years

	2004/05		2005/06		2006/07	
Species	Dead	Alive	Dead	Alive	Dead	Alive
Albatross (unidentified)			1		1	
Black-browed albatross (unidentified)			1			
Buller's albatross	2				1	
Chatham 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				
Sea lion			1		1	
Sooty shearwater					14	
Storm petrels				10		
White-capped albatross	1			2	2	
White-chinned petrel	1					
White-headed petrel				1		
Total	7	4	12	19	26	2

2004/05

The majority of scampi fishing effort was in AKE, CEE, SOE and SUB (Table 28). In 2004/05, 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 capture rates were relatively high compared to other trawl fisheries.

Table 28: Summary of commercial effort, observer effort and protected species captures in the scampi trawl fishery for the period 1 July 2004 – 30 June 2005.

FMA	Effort days	Observer days	% coverage	No. tows	Seabird captures	Seabirds per 100 tows	Mammal captures	Mammals per 100 tows
1. AKE	305	22	7.2%	51	2	3.92		0.00
2. CEE	232	11	4.7%	15	1	6.67		0.00
3. SEC	4							
4. SOE	656	39	6.0%	77	8	10.39		0.00
5. SOU	1							
6. SUB	429							
7. CHA	5							
8. CEW								
9. AKW	5							
10. KER								
Total	1637	72	4.4%	143	11	7.69	0	0.00

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 29).

Table 29: Observer days in the scampi trawl fishery by area and month for the period 1 July 2004 – 30 June 2005.

FMA	Nov-04	Dec-04	May-05	Total
1. AKE			22	22
2. CEE		11		11
4. SOE	17	22		39
Total	17	33	22	72

Seabird captures were reported across three trips from all FMAs where observer coverage was undertaken (Table 30).

Table 30: Seabird captures in the scampi trawl fishery by area and month for the period 1 July 2004 – 30 June 2005.

FMA	Nov-04	Dec-04	May-05	Total
1. AKE			2	2
2. CEE		1		1
4. SOE	2	6		8
Total	2	7	2	11

2005/06

Across all fishing effort observer coverage was still low in 2005/06, but better levels of coverage were achieved in AKE and SUB (Table 31). Compared to the previous year, a higher number and rate of seabird captures were recorded in AKE.

Table 31: Summary of commercial effort, observer effort and protected species captures in the scampi trawl fishery for the period 1 July 2005 – 30 June 2006.

FMA	Effort days	Observer days	% coverage	No. tows	Seabird captures	Seabirds per 100 tows	Mammal captures	Mammals per 100 tows
1. AKE	423	48	11.4%	114	21	18.42		0.00
2. CEE	326							
3. SEC	11							
4. SOE	930	12	1.3%	25		0.00		0.00
5. SOU	3							
6. SUB	517	43	8.3%	118	9	7.63	1	0.85
7. CHA	1	1	100.0%	2		0.00		0.00
8. CEW								
9. AKW								
10. KER								
Total	2211	104	4.7%	259	30	11.58	1	0.39

Observer coverage was from October to November, mostly in AKE and SUB, and from May to June in AKE and SOE (Table 32).

Table 32: Observer days in the scampi trawl fishery by area and month for the period 1 July 2005 – 30 June 2006.

FMA	Oct-05	Nov-05	Dec-05	May-06	Jun-06	Total
1. AKE	19			7	22	48
4. SOE					12	12
6. SUB	12	25	6			43
7. CHA	1					1
Total	32	25	6	7	34	104

One NZ sea lion was caught in SUB (SOI) in November. Most seabird interactions (Table 33) in AKE were either storm petrels (released alive) or flesh-footed shearwaters (landed dead) whereas interactions in SUB were mostly common diving petrels (released alive).

Table 33: Seabird captures in the scampi trawl fishery by area and month for the period 1 July 2005 – 30 June 2006.

FMA	Oct-05	Nov-05	May-06	Jun-06	Total
1. AKE	8		1	12	21
6. SUB	1	8			9
Total	9	8	1	12	30

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 34). Greater coverage was achieved in SOE compared to 2005/06. A high rate of seabird interactions was recorded in SUB.

Table 34: Summary of commercial effort, observer effort and protected species captures in the scampi trawl fishery for the period 1 July 2006 – 30 June 2007.

FMA	Effort days	Observer days	% coverage	No. tows	Seabird captures	Seabirds per 100 tows	Mammal captures	Mammals per 100 tows
1. AKE	423	51	12.1%	94	8	8.51		0.00
2. CEE	374	11	2.9%	30		0.00		0.00
3. SEC	9							
4. SOE	888	103	11.6%	224	3	1.34		0.00
5. SOU	1							
6. SUB	431	37	8.6%	101	16	15.84	1	0.99
7. CHA								
8. CEW								
9. AKW								
10. KER								
Total	2126	202	9.5%	449	27	6.01	1	0.22

A higher number of observer days was delivered compared to previous years and coverage was spread throughout the year (Table 35). The highest number of observer days was delivered in SOE, yet few seabird interactions were reported there compared to in SUB.

Table 35: Observer days in the scampi trawl fishery by area and month for the period 1 July 2006 – 30 June 2007.

FMA	Jul-06	Aug-06	Oct-06	Nov-06	Dec-06	Jan-07	Feb-07	Mar-07	Apr-07	May-07	Jun-07	Total
1. AKE			30								21	51
2. CEE									6	5		11
3. SOE	31	9	13	20	9					21		103
6. SUB						12	14	6	5			37
Total	31	9	43	20	9	12	14	6	11	26	21	202

The highest numbers of seabird captures recorded were in SUB in April and in AKE in October (Table 36). All captures reported in AKE were from one trip and fifteen seabirds were incidentally killed during one trip in SUB in March and April. One sea lion was captured in SUB (SOI) in February.

Table 36: Seabird captures in the scampi trawl fishery by area and month for the period 1 July 2006 – 30 June 2007.

FMA	Aug-06	Oct-06	Feb-07	Mar-07	Apr-07	Total
AKE		8				8
SOE	2	1				3
SUB			1	1	14	16
Total	2	9	1	1	14	27

Squid

Higher levels of observer coverage have been planned and delivered in this fishery compared to other trawl fisheries due to historically high levels of seabird bycatch, especially white-capped albatross warp captures 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 (Abraham and Middleton 2007) and practices are currently being developed to manage discharging 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, the Deepwater Group Ltd has developed voluntary Vessel Management Plans for deepwater 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 focussed in the 6T fishery in the Subantarctic FMA with additional coverage in SOU, usually achieved as vessels are travelling to 6T.

Seabird and marine mammal captures per observer year are detailed in Tables 37 and 38. Seabird captures have decreased over the three year period.

Table 37: Seabird captures in the squid trawl fisheries over three observer years

	2004/05		2005/06		2006/07	
Species	Dead	Alive	Dead	Alive	Dead	Alive
Albatross (unidentified)	1		6			
Black petrel				2		
Black-bellied storm petrel				1		
Black-browed albatross (unidentified)		2				1
Buller's albatross	7	3	2	1	2	
Cape petrels						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	42	10
Southern black-browed albatross	1					
Southern royal albatross	1	1	1			
Storm petrels		3				
White-capped albatross	207	18	54	2	35	4
White-chinned petrel	38	10	36	24	16	14
Total	331	86	153	55	100	33

Table 38: Marine mammal captures in the squid trawl fisheries over three observer years

	2004/05		2005/06		2006/07	
Species	Dead	Alive	Dead	Alive	Dead	Alive
Fur seal	14	2	1	3	6	
Sea lion	13		7		8	
Total	27	2	8	3	14	0

2004/05

The majority of fishing effort for squid was in SEC, SOU and SUB while observer coverage is focussed in FMAs SOU and SUB (Table 39). A high rate of seabird captures occurs in both SOU and SUB and the highest rate of marine mammal capture occurs in SUB.

Table 39: Summary of commercial effort, observer effort and protected species captures in the squid trawl fisheries for the period 1 July 2004 – 30 June 2005.

FMA	Effort days	Observer days	% coverage	No. tows	Seabird captures	Seabirds per 100 tows	Mammal captures	Mammals per 100 tows
1. AKE	1		0.0%					
2. CEE								
3. SEC	838	47	5.6%	80	5	6.25	4	5.00
4. SOE	23	2	8.7%	3		0.00		0.00
5. SOU	2618	659	25.2%	1612	234	14.52	14	0.87
6. SUB	1115	282	25.3%	807	178	22.06	11	1.36
7. CHA	21							
8. CEW								
9. AKW								
10. KER								
Total	4616	990	21.5%	2502	417	16.67	29	1.16

The majority of observer coverage was in SOU during January and February, continuing through to June, and in SUB during the 6T season from February through to April (Table 40). Observer coverage is achieved in both SOU and SUB as vessels fish in SOU on the way to the 6T fishing grounds.

Table 40: Observer days in squid fisheries by area and month for the period 1 July 2004 – 30 June 2005

FMA	Oct-04	Dec-04	Jan-05	Feb-05	Mar-05	Apr-05	May-05	Jun-05	Total
3. SEC			1	3		8	29	6	47
4. SOE							2		2
5. SOU		7	183	269	97	46	26	31	659
6. SUB	1			82	151	48			282
Total	1	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 41). The highest periods of captures were in February and March.

Table 41: Seabird captures in squid fisheries by area and month for the period 1 July 2004 – 30 June 2005

FMA	Jan-05	Feb-05	Mar-05	Apr-05	May-05	Jun-05	Total
3. SEC				5			5
5. SOU	44	124	27	26	3	10	234
6. SUB		43	124	11			178
Total	44	167	151	42	3	10	417

Fur seal captures were reported in SEC, SOU and SUB with the greatest number of captures reported in SOU (Table 42). Captures occurred in the first half of the calendar year.

Table 42: Fur seals captures in squid fisheries by area and month for the period 1 July 2004 – 30 June 2005

FMA	Jan-05	Feb-05	Mar-05	May-05	Jun-05	Total
3. SEC				2	2	4
5. SOU	2		4	1	4	11
6. SUB		1				1
Total	2	1	4	3	6	16

New Zealand sea lion captures occurred in both SOU and SUB during the period January to April (Table 43). Sea lion exclusion devices are generally not used in SOU, but are used in the 6T squid fishery in SUB.

Table 43: Sea lion captures in squid fisheries by area and month for the period 1 July 2004 – 30 June 2005

FMA	Jan-05	Feb-05	Mar-05	Apr-05	Total
5. SOU	1	1	1		3
6. SUB		4	3	3	10
Total	1	5	4	3	13

2005/06

As in the previous year, the greatest commercial effort was in SOU, followed by SUB and SEC (Table 44). Over 20% of observer coverage was achieved in SUB with less in SOU (14%). Seabird capture rates were again high in SOU and SUB as well as SEC. Only 11 days were observed in SEC, less than 2% of fishing effort. Marine mammal capture rates were lower than the previous year.

Table 44: Summary of commercial effort, observer effort and protected species captures in the squid trawl fisheries for the period 1 July 2005 – 30 June 2006.

FMA	Effort days	Observer days	% coverage	No. tows	Seabird captures	Seabirds per 100 tows	Mammal captures	Mammals per 100 tows
1. AKE	9	1	11.1%	1		0.00		0.00
2. CEE								
3. SEC	795	11	1.4%	18	4	22.22	1	5.56
4. SOE	15							
5. SOU	2209	309	14.0%	630	99	15.71	2	0.31
6. SUB	1231	289	23.5%	687	105	15.28	8	1.16
7. CHA	33							
8. CEW								
9. AKW								
10. KER								
Total	4292	610	14.2%	1336	208	15.57	11	0.82

Fewer days were observed in 2005/06 compared to the previous year (Table 45). Most coverage was in SOU from November through to May and in SUB from February to April during the 6T squid season.

Table 45: Observer days in squid fisheries by area and month for the period 1 July 2005 – 30 June 2006

FMA	Nov-05	Dec-05	Jan-06	Feb-06	Mar-06	Apr-06	May-06	Jun-06	Total
1. AKE								1	1
3. SEC					6		5		11
5. SOU	11	15	48	54	99	67	15		309
6. SUB				128	127	34			289
Total	11	15	48	182	232	101	20	1	610

Seabird captures were reported in all months when observer coverage was undertaken and in all FMAs except AKE where minimal effort was observed (Table 46). The majority of captures occurred from February through to April in both SOU and SUB.

Table 46: Seabird captures in squid fisheries by area and month for the period 1 July 2005 – 30 June 2006

FMA	Nov-05	Dec-05	Jan-06	Feb-06	Mar-06	Apr-06	May-06	Total
SEC					1		3	4
SOU	2	1	1	15	19	53	8	99
SUB				81	22	2		105
Total	2	1	1	96	42	55	11	208

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

2006/07

Higher levels of observer coverage were achieved in SOU and SUB in 2006/07 and an increase in observer days were achieved in SEC, although the number of days remained low (Table 47). Seabird captures were highest per tow in SEC while capture rates in SOU and SUB were reduced compared to previous years.

Table 47: Summary of commercial effort, observer effort and protected species captures in the squid trawl fisheries for the period 1 July 2006 – 30 June 2007.

FMA	Effort days	Observer days	% coverage	No. tows	Seabird captures	Seabirds per 100 tows	Mammal captures	Mammals per 100 tows
1. AKE	9	2	22.2%	4		0.00		0.00
2. CEE								
3. SEC	682	25	3.7%	45	10	22.22	1	2.22
4. SOE	33							
5. SOU	1531	370	24.2%	680	77	11.32	6	0.88
6. SUB	780	302	38.7%	538	49	9.11	7	1.30
7. CHA	7							
8. CEW	2							
9. AKW	1							
10. KER								
Total	3045	699	23.0%	1267	136	10.73	14	1.11

A greater number of fishing days was observed in 2006/07 compared to the two previous observer years (Table 48). Coverage was high in both SOU and SUB, especially from February to April.

Table 48: Observer days in squid fisheries by area and month for the period 1 July 2006 – 30 June 2007

FMA	Oct-06	Nov-06	Dec-06	Jan-07	Feb-07	Mar-07	Apr-07	May-07	Total
1. AKE						1	1		2
3. SEC		4	5		1	1	11	3	25
5. SOU	2	4		52	89	129	84	10	370
6. SUB					153	119	30		302
Total	2	8	5	52	243	250	126	13	699

As in previous years, most seabird captures occurred from February to April in SOU and SUB (Table 49).

Table 49: Seabird captures in squid fisheries by area and month for the period 1 July 2006 – 30 June 2007

FMA	Dec-06	Jan-07	Feb-07	Mar-07	Apr-07	May-07	Total
3. SEC	3				2	5	10
5. SOU		8	27	18	22	2	77
6. SUB			27	15	7		49
Total	3	8	54	33	31	7	136

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

PELAGIC TRAWL FISHERIES

Jack Mackerel and Barracouta

The highest numbers of common dolphin captures have been recorded in the pelagic trawl fishery including the capture of 17 dolphins by three vessels west of Auckland in November 2004.

Dusky dolphins, fur seals and seabirds have also been recorded caught 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 captures per observer year are detailed in Tables 50 and 51. Captures by target species are given in Tables 52 to 54.

Table 50: Seabird captures in pelagic fisheries over three observer years

	2004/05		2005/06		2006/07	
Species	Dead	Alive	Dead	Alive	Dead	Alive
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)				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	6	6	19	16	7	1

Table 51: Marine mammal captures in pelagic fisheries over three observer years

	2004/05		2005/06		2006/07	
Species	Dead	Alive	Dead	Alive	Dead	Alive
Bottlenose dolphin	1					
Common dolphin	22		3		8	
Dusky dolphin			1			
Fur seal	6		22		6	1
Pilot whale	5					
Total	34	0	26	0	14	1

Table 52: Seabird captures by target species for each observer year

	2004/05		2005/06		2006/07	
Target species	Dead	Alive	Dead	Alive	Dead	Alive
Barracouta	3	0	18	14	7	1
Jack mackerel	3	6	1	2	0	0

Table 53: Cetacean captures by target species for each observer year

	2004/05		2005/06		2006/07	
Target species	Dead	Alive	Dead	Alive	Dead	Alive
Barracouta			1			
Jack mackerel	28	0	3	0	8	0

Table 54: Fur seal captures by target species for each observer year

	2004/05		2005/06		2006/07	
Target species	Dead	Alive	Dead	Alive	Dead	Alive
Barracouta			20		3	
Jack mackerel	6		2		3	1

2004/05

Pelagic trawl fishing effort was spread through most FMAs with the majority of effort in CHA, CEW, SEC and AKW (Table 55). In 2004/05, observer coverage was highest in AKW, followed by SOU and CEW. The highest rate of seabird captures reported in SOU while the highest rate of marine mammal captures occurred in AKW.

Table 55: Summary of commercial effort, observer effort and protected species captures in pelagic trawl fisheries for the period 1 July 2004 – 30 June 2005.

FMA	Effort days	Observer days	% coverage	No. tows	Seabird captures	Seabirds per 100 tows	Mammal captures	Mammals per 100 tows
1. AKE	36							
2. CEE	62							
3. SEC	553	7	1.3%	9		0.00		0.00
4. SOE	16							
5. SOU	142	31	21.8%	47	3	6.38		0.00
6. SUB								
7. CHA	1054	61	5.8%	131	4	3.05	2	1.53
8. CEW	622	99	15.9%	188	2	1.06		0.00
9. AKW	421	91	21.6%	231	4	1.73	33	14.29
10. KER								
Total	2906	289	9.9%	606	13	2.15	35	5.78

Observer coverage was spread through those FMAs with greater than 100 days of commercial effort (Table 56). The most concentrated periods of observer coverage were in November and December on the west coast of the upper North Island and in June in CHA and CEW.

Table 56: Observer days in pelagic trawl fisheries by area and month for the period 1 July 2004 – 30 June 2005.

FMA	Aug-04	Sep-04	Oct-04	Nov-04	Dec-04	Jan-05	Feb-05	Mar-05	Apr-05	May-05	Jun-05	Total
3. SEC				1		1	1		1	2	1	7
5. SOU					4		2	11	14			31
7. CHA	10	1	1	5					6	4	34	61
8. CEW	11	4		14	31				4	1	34	99
9. AKW		8		65	13					2	3	91
Total	21	13	1	85	48	1	3	11	25	9	72	289

Seabird captures occurred through several FMAs mostly in the middle of the year (Table 57).

Table 57: Seabird captures in pelagic trawl fisheries by area and month for the period 1 July 2004 – 30 June 2005.

FMA	Dec-04	Apr-05	May-05	Jun-05	Total
5. SOU		3			3
7. CHA		1		3	4
8. CEW			1	1	2
9. AKW	4				4
Total	4	4	1	4	13

Two fur seal captures occurred in CHA in August and four were caught in November in AKW. All dolphin captures were reported from AKW between September and December (Table 58).

Table 58: Cetacean captures in pelagic trawl fisheries by area and month for the period 1 July 2004 – 30 June 2005.

FMA	Sep-04	Nov-04	Dec-04	Total
9. AKW	2	17	10	29
Total	2	17	10	29

2005/06

The numbers of commercial fishing days in 2005/06 were similar to the previous year, but almost twice as many days were observed (Table 59). The highest levels of observer coverage were in SOU and CEW and over 15% of all fishing effort was observed. Seabird captures were again highest in SOU. Unlike 2004/05, marine mammal captures were highest in CHA and no captures were recorded in AKW.

Table 59: Summary of commercial effort, observer effort and protected species captures in pelagic trawl fisheries for the period 1 July 2005 – 30 June 2006.

FMA	Effort days	Observer days	% coverage	No. tows	Seabird captures	Seabirds per 100 tows	Mammal captures	Mammals per 100 tows
1. AKE	41							
2. CEE	9							
3. SEC	540	12	2.2%	30		0.00	1	3.33
4. SOE	36							
5. SOU	226	82	36.3%	232	32	13.79	1	0.43
6. SUB	1							
7. CHA	1040	154	14.8%	192	1	0.52	21	10.94
8. CEW	704	189	26.9%	502	2	0.40	2	0.40
9. AKW	203	26	12.8%	67		0.00		0.00
10. KER								
Total	2800	463	16.5%	1023	35	3.42	25	2.44

Observer coverage was highest in SOU, CHA and CEW with the most coverage in December (Table 60).

Table 60: Observer days in pelagic trawl fisheries by area and month for the period 1 July 2005 – 30 June 2006.

FMA	Jul-05	Aug-05	Sep-05	Nov-05	Dec-05	Feb-06	Mar-06	Jun-06	Total
3. SEC				1			11		12
5. SOU						8	69	5	80
7. CHA	21	34	8	6	73			12	104
8. CEW	28			24	112			25	180
9. AKW	11			13	2				15
Total	40	1	1	44	177		13	37	313

Higher seabird interactions were recorded compared to 2004/05 (Table 61). 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.

Table 61: Seabird captures in pelagic trawl fisheries by area and month for the period 1 July 2005 – 30 June 2006.

FMA	Jul-05	Dec-05	Mar-06	Total
5. SOU			32	32
7. CHA	1			1
8. CEW		2		2
Total	1	2	32	35

A greater number of fur seal captures was reported compared to 2004/05, including 19 captures in CHA between July to September across three trips (Table 62).

Table 62: Fur seal captures in pelagic trawl fisheries by area and month for the period 1 July 2005 – 30 June 2006.

FMA	Jul-05	Aug-05	Sep-05	Mar-06	Jun-06	Total
5. SOU				1		1
7. CHA	1	17	1			19
8. CEW	1				1	2
Total	2	17	1	1	1	22

Fewer dolphins were caught in 2005/06 with three animals caught in CHA and one caught in SEC.

2006/07

Compared to 2005/06, similar levels of both commercial and observer effort were reported in 2006/07 (Table 63). Observer coverage of greater than 10% was achieved in five FMAs with over 15% of total commercial effort observed. As in previous years, the highest rate of seabird captures were in SOU and the highest rate of marine mammal captures were in AKW.

Table 63: Summary of commercial effort, observer effort and protected species captures in pelagic trawl fisheries for the period 1 July 2006 – 30 June 2007.

FMA	Effort days	Observer days	% coverage	No. tows	Seabird captures	Seabirds per 100 tows	Mammal captures	Mammals per 100 tows
1. AKE	53							
2. CEE	28							
3. SEC	461	38	8.2%	84		0.00	2	2.38
4. SOE	111	21	18.9%	38	1	2.63		0.00
5. SOU	302	35	11.6%	68	7	10.29	2	2.94
6. SUB								
7. CHA	917	135	14.7%	217		0.00	5	2.30
8. CEW	674	167	24.8%	410		0.00	2	0.49
9. AKW	194	26	13.4%	59		0.00	4	6.78
10. KER								
Total	2740	422	15.4%	876	8	0.91	15	1.71

Observer days were spread throughout the year with peak periods from October to January and April to June (Table 64). As in 2005/06, the greatest number of observer days were in CHA and CEW.

Table 64: Observer days in pelagic trawl fisheries by area and month for the period 1 July 2006 – 30 June 2007.

FMA	Jul-06	Aug-06	Sep-06	Oct-06	Nov-06	Dec-06	Jan-07	Mar-07	Apr-07	May-07	Jun-07	Total
3. SEC		12	2	3	4	3	1	1	9		3	38
4. SOE										20	1	21
5. SOU					6			5	24			35
7. CHA	4	3	1	26	1	13	24		24		39	135
8. CEW	12	3		36	3	56	35		14		8	167
9. AKW	7			11	2	6						26
Total	23	18	3	76	16	78	60	6	71	20	51	422

All eight seabird captures occurred in SOU in March and April except for one capture in SOE in May. Seven fur seals were caught in 2006/07 throughout the year and across four FMAs. Eight common dolphins were caught; three in AKW in October and five in CHA in April.

DEEP WATER BOTTOM TRAWL FISHERIES

Orange Roughy and Oreo

The majority of observer coverage on vessels targeting orange roughy and oreo species has been in the Subantarctic and Chatham Rise fishery management areas with lesser coverage in other areas. A particular focus of observer coverage in this fishery is to monitor impacts of deepwater 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. Vessels sometimes trawl known tracks to avoid catching deep sea invertebrates. Coral captures tend to occur when vessels are looking for new fishing grounds or miss known marks. Seabird and marine mammal captures per observer year are detailed in Tables 65.

Table 65. Protected species captures in deep water bottom trawl fisheries over three observer years

	2004/05		2005/06		2006/07	
Species	Dead	Alive	Dead	Alive	Dead	Alive
Albatross (unidentified)			1			
Black-bellied storm petrel						2
Broad-billed prion						1
Buller's albatross			2			
Cape petrels	1	14		1		
Chatham albatross		1				
Common diving petrel		1				
Fairy prion		8				
Fluttering shearwater		1				
Fur seal	1	3	1	1	2	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	5	43	5	5	2	12

2004/05

Deep water trawl effort for orange roughy and oreo species was undertaken through all FMAs except the Kermadecs (Table 66). The majority of observer effort was in SOE, SUB and AKW. The highest number of bird captures were reported from SOE, many of which were live captures. Fur seal captures were reported from SUB.

Table 66: Summary of commercial effort, observer effort and protected species captures in deep water bottom trawl fisheries for the period 1 July 2004 – 30 June 2005.

FMA	Effort days	Observer days	% coverage	No. tows	Seabird captures	Seabirds per 100 tows	Mammal captures	Mammals per 100 tows
1. AKE	94	22	23.4%	31	1	3.22		0.00
2. CEE	353	7	2.0%	10		0.00		0.00
3. SEC	341	39	11.4%	144		0.00		0.00
4. SOE	760	230	30.3%	911	42	4.61		0.00
5. SOU	68							
6. SUB	354	116	32.8%	372	1	0.27	4	1.08
7. CHA	84	4	4.8%	28		0.00		0.00
8. CEW	7							
9. AKW	84	9	10.7%	60		0.00		0.00
10. KER								
Total	2145	427	19.9%	1556	44	2.83	4	0.26

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 67). While observer effort was undertaken in seven FMAs, over 80% of observer days were delivered in SUB and SOE.

Table 67: Observer days in deep water bottom trawl fisheries by area and month for the period 1 July 2004 – 30 June 2005.

FMA	Jul-04	Aug-04	Sep-04	Oct-04	Nov-04	Dec-04	Jan-05	Feb-05	Mar-05	Apr-05	May-05	Jun-05	Total
1. AKE	12			8								2	22
2. CEE										4		3	7
3. SEC			16	10	1	11			1				39
4. SOE	8	2	4	3	35		18	27	9	11	60	53	230
6. SUB			14	81							16	5	116
7. CHA												4	4
9. AKW				9									9
Total	20	2	34	111	36	11	18	27	10	15	76	67	427

Seabird interactions were reported mostly in SOE (Table 68) and in the majority of cases, birds were released alive, including 19 birds reported as deck strikes (Table 65). Four fur seals were caught in the Subantarctic FMA in October.

Table 68: Seabird captures in deep water bottom trawl fisheries by area and month for the period 1 July 2004 – 30 June 2005.

FMA	Jul-04	Oct-04	Nov-04	Feb-05	Jun-05	Total
4. SOE	3		10	15	14	42
6. SUB		1				1
9. AKW		1				1
Total	3	2	10	15	14	44

Most coral landed during the 2004/05 observer year was in SOE (Chatham Rise) and the majority of coral was unidentified by observers (Table 69). Observers estimated the landed weight of coral at over 1000kg on five tows from various trips, on one of which the recorded weight was 10000kg.

Table 69: Estimated weight (kg) of coral taxa landed in deep water bottom trawl fisheries by area for the period 1 July 2004 – 30 June 2005.

	1. AKE	2. CEE	3. SEC	4. SOE	6. SUB	9. AKW	ET	Total
Black corals				2	3		76	81
Bubblegum coral				485				485
Coral (unidentified)	1	1	52	18887	1364	532	47	20884
Red coral				2329	38			2367
Total	1	1	52	21703	1405	532	123	23817

2005/06

Fishing effort for deep water stocks in 2005/06 occurred in eight of ten fishery management areas, as did observer coverage (Table 70). Compared to other trawl fisheries, few seabirds or marine mammals were reported captured.

Table 70: Summary of commercial effort, observer effort and protected species captures in deep water bottom trawl fisheries for the period 1 July 2005 – 30 June 2006.

	Effort days	Observer days	% coverage	No. tows	Seabird captures	Seabirds per 100 tows	Mammal captures	Mammals per 100 tows
1. AKE	64	36	56.3%	54		0.00		0.00
2. CEE	214	1	0.5%	1		0.00		0.00
3. SEC	295	26	8.8%	72	3	4.17		0.00
4. SOE	864	180	20.8%	596	4	0.67		0.00
5. SOU	42	10	23.8%	20		0.00		0.00
6. SUB	323	100	31.0%	318	1	0.31	1	0.31
7. CHA	105	5	4.8%	24		0.00		0.00
8. CEW								
9. AKW	99	21	21.2%	121		0.00		0.00
10. KER								
Total	2006	379	18.9%	1206	8	0.66	1	0.08

Observer effort was spread throughout the year with the highest number of observer days in July, October, May and June (Table 71). As in the previous observer year, the majority of observer days were delivered in SOE and SUB.

Table 71: Observer days in deep water bottom trawl fisheries by area and month for the period 1 July 2005 – 30 June 2006.

FMA	Jul-05	Aug-05	Sep-05	Oct-05	Nov-05	Dec-05	Feb-06	Mar-06	Apr-06	May-06	Jun-06	Total
1. AKE	8			14							14	36
2. CEE										1		1
3. SEC	1			19			4	1		1		26
4. SOE	14	1		8	13	10			19	50	65	180
5. SOU	10											10
6. SUB	18		4	44						34		100
7. CHA	5											5
9. AKW				8	4						9	21
Total	56	1	4	93	17	10	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 72). This high number is partly explained by one tow that recorded 3000 kg of unidentified

coral. The observer record for that trip confirms that a large quantity of coral was landed and immediately discarded on one tow.

Note that branching structure-forming deepsea 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 by-catch in trawl gear. The corals can also become rubble due to natural processes, e.g. as a result of breakup due to the physical weakening of the structure with ageing or possibly disturbance from strong currents. Thus, what is termed "coral rubble" can comprise recently dead and/or long dead coral material. The "coral rubble" sampled on deck often comprises live polyps on the growing tips and branches. The complex physical structure of erect living coral and coral rubble provides habitat for fish and invertebrates (D. Tracey, pers. comm.).

Table 72: Estimated weight (kg) of coral taxa landed in deep water bottom trawl fisheries by area for the period 1 July 2005 – 30 June 2006.

	1. AKE	3. SEC	4. SOE	6. SUB	9. AKW	CET	ET	Total
Bamboo corals	1	36		49			13	99
Black corals	2		6	4	1		34	47
Bubblegum coral		72	401	305			44	822
Bushy hard coral		6	63	5			84	158
Coral (unidentified)	31	16	123	230	4611		166	5177
Coral rubble		23	506	10			66	605
Crested cup coral						1	14	15
Deepwater branching corals			14		60		4	78
Flabellum cup corals			7					7
Golden corals				10	1		11	22
Gorgonian coral				1				1
Hydroids				1	6			7
Long polyp soft corals							1	1
Precious corals				1				1
Red coral	2		1					3
Total	36	153	1121	616	4679	1	437	7043

2006/07

In 2006/07, almost 30% of all fishing effort was observed with high coverage levels achieved in AKE, AKW, SOU and SUB (Table 73). As in previous years, few seabird or marine mammal captures were reported compared to other trawl fisheries.

Table 73: Summary of commercial effort, observer effort and protected species captures in deep water bottom trawl fisheries for the period 1 July 2006 – 30 June 2007.

FMA	Effort days	Observer days	% coverage	No. tows	Seabird captures	Seabirds per 100 tows	Mammal captures	Mammals per 100 tows
1. AKE	116	92	79.3%	151	1	0.66		0.00
2. CEE	209							
3. SEC	187	26	13.9%	111	3	2.70		0.00
4. SOE	799	176	22.0%	646	3	0.46		0.00
5. SOU	45	17	37.8%	89		0.00		0.00
6. SUB	294	135	45.9%	418	4	0.96	2	0.48
7. CHA	70							
8. CEW								
9. AKW	83	61	73.5%	233		0.00		0.00
10. KER								
Total	1803	507	28.1%	1648	11	0.67	2	0.12

Observer coverage was spread throughout the year with only 60% of coverage being in SOE and SUB as a higher number of observer days was delivered in other FMAs (Table 74) compared to previous years.

Table 74: Observer days in deep water bottom trawl fisheries by area and month for the period 1 July 2006 – 30 June 2007.

FMA	Jul-06	Aug-06	Sep-06	Oct-06	Nov-06	Dec-06	Jan-07	Feb-07	Mar-07	Apr-07	May-07	Jun-07	Total
1. AKE	25	8		16	6	4					17	16	92
3. SEC				14	9				3				26
4. SOE	16		6			8	21	28	16		26	55	176
5. SOU	13			2	2								17
6. SUB				41	44	24		1	4	10	11		135
9. AKW				18	7						7	29	61
Total	54	8	6	91	68	36	21	29	23	10	61	100	507

Seabird captures in-zone occurred from October through to February with one capture also reported from the Louisville Ridge in August (Table 75). Two fur seal captures occurred in SUB, one in October and one in November. An additional fur seal capture was reported from the Louisville Ridge in August.

Table 75: Seabird captures in deep water bottom trawl fisheries by area and month for the period 1 July 2006 – 30 June 2007.

FMA	Aug-06	Oct-06	Nov-06	Dec-06	Feb-07	Total
1. AKE		1				1
3. SEC		3				3
4. SOE				1	2	3
6. SUB			1	3		4
LOUR	1					1
Total	1	4	1	4	2	12

In 2006/07, the greatest estimated weight of coral landed was recorded from SOE and SUB (Table 76). 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 76: Estimated weight (kg) of coral taxa landed in deep water bottom trawl fisheries by area for the period 1 July 2006 – 30 June 2007.

	1. AKE	3. SEC	4. SOE	5. SOU	6. SUB	9. AKW	CET	ET	Total
Bamboo corals	17	3	6	1	158	19		1	205
Black corals	9		16	1	40	14		12	92
Bubblegum coral		207	161		274	420		2	1064
Bushy hard coral	3	101	2		2134	138		20	2398
Coral (unidentified)		18	87		487	212		9	813
Coral rubble	3	17	11087		2014	63			13184
Crested cup coral					13		3	1	17
Deepwater branching coral	1	5			15	1		28	50
Flabellum cup corals		1	1		2	2			6
Golden corals	7	3	1			3		1	15
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
Total	43	355	11408	3	5164	875	3	74	17925

INSHORE FISHERIES

As there is a large amount of inshore fishing effort throughout the EEZ, it is difficult to achieve coverage levels that would enable an estimation of total bycatch in these fisheries. In order to enhance the likelihood of achieving such coverage levels, observer coverage is focussed in specific areas (and sometimes specific seasons) where protected species interactions may be occurring and such coverage is rotated through different areas between years with some success. In addition, 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.

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 1997-1998 reported the capture of one Hector's dolphin (Starr and 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 caught on unobserved inshore trawl vessels operating on the west coast of the South Island in the late 1980s. Since 1997-1998, four dolphin mortalities have been caused by inshore trawlers including three animals caught in one trawling event in April 2006 (Hector's dolphin incident database, Department of Conservation).

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 in 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 captures per observer year are detailed in Table 77.

Table 77. Protected species captures in inshore trawl fisheries from 1 July 2006 to 30 June 2007

Species	Dead	Alive
Black petrel	1	
Flesh-footed shearwater	1	
Seabird - large	1	
Seabird - small		1
White-capped albatross	6	
Total	9	1

From Table 78 it can be seen that over 30 000 inshore trawl fishing days were reported from July 2006 until June 2007 of which only 106 days were observed. Despite minimal observer coverage, seabird captures 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.

Table 78: Summary of commercial effort, observer effort and protected species captures in inshore trawl fisheries for the period 1 July 2006 – 30 June 2007.

FMA	Effort days	Observer days	% coverage	Seabirds	Mammals	Reptiles
1. AKE	4338	39	0.9%	3		
2. CEE	5737	4	0.1%	3		
3. SEC	9351		0.0%			
4. SOE	757		0.0%			
5. SOU	3667	2	0.1%			
6. SUB						
7. CHA	8391	34	0.4%	4		
8. CEW	1245		0.0%			
9. AKW	1578	27	1.7%			
10. KER						
Total	35064	106	0.3%	10	0	0

During the 2006/07 observer year, days observed aboard inshore trawl vessels occurred at various times throughout the year and in five different Fisheries Management Areas (Table 79). Few days were observed when considering the total number of fishing days undertaken in these areas (Table 78).

Table 79: Observed days for months and areas where inshore trawl observer coverage was undertaken during the period 1 July 2006 – 30 June 2007.

FMA	Jul-06	Aug-06	Sept-06	Oct-06	Nov-06	Dec-06	Jan-06	Feb-07	Mar-07	Apr-07	Total
1. AKE									19	20	39
2. CEE	4										4
5. SOU								2			2
7. CHA		6						18	7	3	34
9. AKW				14				6	5	2	27
Total	4	6	0	14	0	0	0	26	31	25	106

Protected species interactions during the 2006/07 observer year are summarised in Table 80. 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 MFish protocol.

Table 80: Protected species interactions reported from observed inshore trawl trips from 1 July 2006 – 30 June 2007.

Date	FMA	Target	Species	Dead / Alive
Jul-06	CEE	TAR	Unidentified albatross	Dead
Jul-06	CEE	TAR	White-capped albatross	Dead
Jul-06	CEE	TAR	White-capped albatross	Dead
Apr-07	AKE	TAR	Unidentified petrel	Alive
Apr-07	AKE	JDO	Black petrel	Dead
Apr-07	AKE	JDO	Flesh-footed shearwater	Dead
Mar-07	CHA	TAR	White-capped albatross	Dead
Mar-07	CHA	TAR	White-capped albatross	Dead
Apr-07	CHA	TAR	White-capped albatross	Dead
Apr-07	CHA	TAR	White-capped albatross	Dead

Five of the nine vessels used bird mitigation devices, one of which was required to do so as it is 32 m in length. Two vessels used bird bafflers and on one vessel the observer stated the device did not appear to be effective. Three vessels used streamer lines of varying designs. One vessel, 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. Another 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 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.

Inshore bottom longline (ling, blue nose, hapuku & bass, snapper)

Little is know about protected species interactions in inshore bottom longline fisheries 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 inshore bottom longline fisheries began in 2004/05. During the period of the 2004/05 to 2006/07 observer years, bottom longliners targeting snapper were observed separately from those targeting other stocks.

CSP observer coverage in the inshore LIN, BNS, HPB fisheries has been focussed in AKE, CEE, SOE and SOU. Observations in the snapper fishery were undertaken in AKE to monitor interactions with seabirds, particularly black petrels. Through CSP, an advisory officer was placed in both the inshore 'ling' and inshore snapper fisheries to learn about fishing practices and pass on knowledge regarding protected species behaviour and mitigation techniques (Kellian 2004; Johnson 2005). Mitigation includes tori lines, line weighting regimes and using fish oil to deter birds behind vessels (Pierre and Norden 2006).

Ling, blue nose, hapuku and bass

Protected species captures reported from bottom longline vessels (< 46 m in length) targeting ling, blue nose, hapuku and bass per observer year are detailed in Table 81. No captures were reported in 2004/05.

Table 81: Protected species captures in inshore bottom longline fisheries targeting ling, blue nose, hapuku and bass over three observer years

	2004/05		2005/06		2006/07	
Species	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 4000 fishing days were reported from inshore bottom longline vessels in 2004/05 (Table 82). Nine active fishing days were observed through two Fisheries Management Areas with an additional seven days observed out of zone. No protected species captures were reported in 2004/05.

Table 82: Summary of commercial effort, observer effort and protected species captures in LIN, BNS, HPB bottom longline fisheries for the period 1 July 2004 – 30 June 2005.

	Effort days	Observer days	% coverage	No. hooks observed	Seabirds	Mammals	Reptiles
1. AKE	1206	2	0.2%	3600			
2. CEE	952	7	0.7%	14304			
3. SEC	544						
4. SOE	613						
5. SOU	186						
6. SUB	1						
7. CHA	575						
8. CEW	172						
9. AKW	332						
10. KER							
Null / ET	32	7		9140			
Total	4613	16	0.4%	27044	0	0	0

Of the few observer days achieved in-zone, two were observed in AKE in December and seven were achieved in CEE in June (Table 83).

Table 83: Observer days in LIN, BNS, HPB bottom longline fisheries by area and month for the period 1 July 2004 – 30 June 2005.

FMA	Dec-04	Jan-05	Feb-05	Jun-05	Total
1. AKE	2				2
2. CEE				7	7
ET		1	6		7
Total	2	1	6	7	16

2005/06

Fewer commercial fishing days were reported from inshore bottom longline vessels in 2005/06 (Table 84) compared to the previous year. Forty days of fishing activity were observed through three Fisheries Management Areas and nine days were observed out of zone. Eleven seabirds were caught in SOE during one trip in January 2006.

Table 84: Summary of commercial effort, observer effort and protected species captures in LIN, BNS, HPB bottom longline fisheries for the period 1 July 2005 – 30 June 2006.

	Effort days	Observer days	% coverage	No. hooks observed	Seabirds	Seabirds per 1000 hooks	Mammals	Reptiles
1. AKE	1227	18	1.5%	55590		0.00		
2. CEE	855							
3. SEC	449	6	1.3%	12220		0.00		
4. SOE	673	16	2.4%	352200	11	0.03		
5. SOU	164							
6. SUB								
7. CHA	648							
8. CEW	124							
9. AKW	256							
10. KER								
Null / ET	22	9		11920		0.00		
Total	4418	49	1.1%	431930	11	0.026	0	0

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 85).

Table 85: Observer days in LIN, BNS, HPB bottom longline fisheries by area and month for the period 1 July 2005 – 30 June 2006.

FMA	Jul-05	Aug-05	Sep-05	Nov-05	Dec-05	Jan-06	Total
1. AKE		3	5	4	6		18
3. SEC	6						6
4. SOE						16	16
ET				9			9
Total	6	3	5	13	6	16	49

The capture of 10 white-chinned petrels (two released alive) and one Salvin's albatross were all reported from one trip in SOE in January 2006.

2006/07

In 2006/07, 48 active fishing days were observed, which is around 1% of total commercial effort days (Table 86). Almost all observer effort was in AKE where five seabird interactions were reported; all these birds were released alive.

Table 86: Summary of commercial effort, observer effort and protected species captures in LIN, BNS, HPB bottom longline fisheries for the period 1 July 2006 – 30 June 2007.

	Effort days	Observer days	% coverage	No. hooks observed	Seabirds	Seabirds per 1000 hooks	Mammals	Reptiles
1. AKE	1270	43	3.4%	112219	5	0.04		
2. CEE	994							
3. SEC	615							
4. SOE	552							
5. SOU	119							
6. SUB								
7. CHA	584							
8. CEW	153							
9. AKW	356	1	0.3%	62		0.00		
10. KER								
Null / ET	29	4		6700		0.00		
Total	4672	48	1.0%	118981	5	0.04	0	0

Observer coverage in 2006/07 was from August through to June with 43 of the 48 days observed in AKE. 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).

Snapper

The snapper fishery operating in AKE was observed in 2004/05 and 2005/06 to monitor for interactions with seabirds, particularly black petrels. Observer coverage was concentrated over the summer months to coincide with the peak of fishing activity and petrel breeding seasons.

Protected species captures reported from bottom longline vessels targeting snapper per observer year are detailed in Table 87. Three black petrels were caught over two observer years. This fishery was not observed in 2006/07.

Table 87. Protected species captures in snapper bottom longline fisheries over two observer years

	2004/05		2005/06	
Species	Dead	Alive	Dead	Alive
Australasian gannet		1		
Black petrel	1		2	
Buller's shearwater				4
Flesh-footed shearwater	4	5		
Green turtle				1
Petrel (unidentified)		2		6
Seabird - small		1		
Total	5	9	2	11

2004/05

Over 6000 fishing days were reported from snapper bottom longline fishers, around 97% of which were reported from AKE (Table 88). Around 2% of fishing effort was observed, with 135 days observed in AKE and one day observed in AKW. In total, 14 seabird interactions were reported in 2004/05.

Table 88: Summary of commercial effort, observer effort and protected species captures in snapper bottom longline fisheries for the period 1 July 2004 – 30 June 2005.

	Effort days	Observer days	% coverage	No. hooks	Seabirds	Seabirds per 1000 hooks	Mammals	Reptiles
1. AKE	5898	135	2.3%	262204	14	0.05		
2. CEE								
3. SEC	18		0.0%					
4. SOE	2		0.0%					
5. SOU								
6. SUB								
7. CHA	9		0.0%					
8. CEW	2		0.0%					
9. AKW	93	1	1.1%	3200		0.00		
10. KER								
Total	6022	136	2.3%	265404	14	0.05	0	0

Observer days were from December until March and spread through different statistical areas within FMA AKE (Table 89).

Table 89: Observer days in snapper bottom longline fisheries by area and month for the period 1 July 2004 – 30 June 2005.

Stat Area	Dec-04	Jan-05	Feb-05	Mar-05	Total
002	7	11	3		21
003		3	1	4	8
005	4	7	10	7	28
006	7	15	7	9	38
007	4	8		9	21
008	1	3	5	4	13
009		2	2	2	6
047	1				1
Total	24	49	28	35	136

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

2005/06

Fewer fishing days were reported from snapper bottom longline fishers in 2005/06 compared to the previous year (Table 90). The majority of effort was again in AKE as was all observer coverage in 2005/06. Twelve seabird interactions were reported, ten of which were released alive.

Table 90: Summary of commercial effort, observer effort and protected species captures in snapper bottom longline fisheries for the period 1 July 2005 – 30 June 2006.

	Effort days	Observer days	% coverage	No. hooks	Seabirds	Seabirds per 1000 hooks	Mammals	Reptiles
1. AKE	5314	45	0.9%	125894	12	0.10		1
2. CEE								
3. SEC	8							
4. SOE								
5. SOU								
6. SUB								
7. CHA								
8. CEW	21							
9. AKW	57							
10. KER								
Total	5400	45	0.8%	125894	12	0.10	0	1

Observer coverage was from December to April with the highest number of days delivered in Statistical Area 002 (Table 91). Seabird captures occurred in January and February including the incidental mortality of two black petrels and live captures of six unidentified petrels, one Buller's shearwater and one green turtle.

Table 91: Observer days in snapper bottom longline fisheries by area and month for the period 1 July 2005 – 30 June 2006.

Stat Area	Dec-05	Jan-06	Feb-06	Apr-06	Total
002	10	5	9		24
003	1				1
005		4			4
006	2	3		5	10
007	5				5
008			1		1
Total	18	12	10	5	45

Setnet

The extent to which commercial setnet fishing activities interact with protected species is largely unknown due to very low historic achievement of observer coverage. Despite historic 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, less predictable operations and there are practical difficulties 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 1997-1998 fishing year, during which time eight Hector's dolphins were observed caught in setnets, of which two were released alive (Starr and Langley 2000).

In the 2005/06 fishing year, observations were undertaken in Southland (SOU) and the Nelson / Marlborough region (CHA) to monitor interactions with Hector's dolphins and seabirds. During the 2005/06 fishing year, a small number of fur seals and shags were recorded caught. Setnet fisheries were also observed in the 2006/07 fishing year in Kaikoura (SEC), Nelson (CHA) and in 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 as separate incidents (Table 92).

Table 92. Protected species captures in setnet fisheries over two observer years

	2005/06		2006/07	
Species	Dead	Alive	Dead	Alive
Cape petrels				3
Dusky dolphin			1	
Fluttering shearwater			1	
Fur seal	3		1	
Hector's dolphin			1	
Pied shag	1			
Seagull				1
Shag				6
Sooty shearwater				1
Spotted shag	2			
White-chinned petrel		1		
Yellow-eyed penguin			2	
Total	6	1	6	11

Mitigation 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 east coast 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 practiced night setting.

2004/05
While 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, less than 1%, were observed (Table 93).

Table 93: Summary of commercial effort, observer effort and protected species captures in setnet fisheries for the period 1 July 2005 – 30 June 2006.

FMA	Effort days	Observer days	% coverage	Seabirds	Mammals	Reptiles
1. AKE	7657					
2. CEE	1126					
3. SEC	3237	14	0.4%			
4. SOE	27					
5. SOU	615	32	5.2%		3	
6. SUB						
7. CHA	682	35	5.1%	4		
8. CEW	1193	2	0.2%			
9. AKW	7385					
10. KER						
Total	21922	83	0.4%	4	3	0

Setnet observations were achieved from November to April during which time almost 9% of coverage was achieved across the areas where coverage was undertaken (Table 94). 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 fur seals were reported caught in Southland.

Table 94: Total commercial fishing days and observed days for months and statistical areas where setnet observer coverage was undertaken during the period 1 July 2005 – 30 June 2006.

	Nov-05		Jan-06		Feb-06		Mar-06		Apr-06		Total		
STA	Effort	Obs cov	Effort	Obs cov	Effort	Obs cov	Effort	Obs cov	Effort	Obs cov	Effort	Obs cov	% cov
024	95		67		44		60	7	40	7	313	14	4.47
025	58		24	7	29	12	15	2	22		169	21	12.43
027	1		7		13	4	7		4		36	4	11.11
030	34		17	3	7	4	13		2		80	7	8.75
037			13		5		17	3	11	1	49	4	8.16
038	42	18	34		29	9	41	2	30	2	205	31	15.12
040	19	2	24		22		9		10		86	2	2.33
Total	249	20	186	10	149	29	162	14	119	10	938	83	8.85

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 95). However, 10% observer coverage was achieved in SOU. A greater number of seabird captures were reported along with two dolphin captures.

Table 95: Summary of commercial effort, observer effort and protected species captures in setnet fisheries for the period 1 July 2006 – 30 June 2007.

FMA	Effort days	Observer days	% coverage	Seabirds	Mammals	Reptiles
1. AKE	7774					
2. CEE	889					
3. SEC	3402	30	0.9%	5	2	
4. SOE	6					
5. SOU	506	55	10.9%	2	1	
6. SUB						
7. CHA	532	31	5.8%	7		
8. CEW	1313					
9. AKW	6888					
10. KER						
Total	21310	116	0.5%	14	3	0

Setnet observations were undertaken from November until March across three Fisheries Management Areas with over 8% observer coverage achieved in that time period (Table 96). Good levels of observer coverage were achieved in 031 (Southland) and 037 (north of Nelson).

Table 96: Total commercial fishing days and observed days for months and statistical areas where setnet observer coverage was undertaken during the period 1 July 2006 – 30 June 2007.

	Nov-06		Dec-06		Jan-07		Feb-07		Mar-07		Total		
STA	Effort	Obs cov	Effort	Obs cov	Effort	Obs cov	Effort	Obs cov	Effort	Obs cov	Effort	Obs cov	% cov
018	106	19	82	7	148		122		95		579	26	4.49
024	72		59		43		47		36	4	257	4	1.56
025	41	10	23	18	40	3	29	2	16		182	33	18.13
027	2						9	3	5		19	3	15.79
030	5		18		22	8	14	8	19		94	16	17.02
031			2				2	3			7	3	42.86
037	2		5	12	8		7		6		40	12	30.00
038	66	16	15	3	20		17		19		156	19	12.18
Total	294	45	204	40	281	11	247	16	196	4	1334	116	8.70

Seabird captures were reported from November to January (Table 97) and included the incidental mortality of two yellow-eyed penguins and one fluttering shearwater. Eleven live seabird captures were also reported. One fur seal was caught in February in SOU. A dusky

dolphin was caught in Kaikoura 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 and 35 m while the Hector's was caught in net set on the bottom in 27 m water depth.

Table 97: Seabird captures in setnet fisheries by area and month for the period 1 July 2006 – 30 June 2007.

FMA	Nov-06	Dec-06	Jan-07	Total
CHA	7			7
SEC	5			5
SOU		1	1	2
Total	12	1	1	14

SURFACE LONGLINE FISHERIES

Charter tuna

CSP observer coverage of charter tuna 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. 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 and reduce the likelihood of seabird captures.

Protected species captures per observer year are detailed in Table 98.

Table 98. Protected species captures in charter surface longline fisheries over three observer years

	2004/05		2005/06		2006/07	
Species	Dead	Alive	Dead	Alive	Dead	Alive
Albatross (unidentified)		1			1	
Antipodean albatross					1	
Buller's albatross	7	13	4	6	34	15
Campbell albatross			4		1	
Fur seal	2	14		8	1	4
Gibson's albatross					1	
Grey petrel			2			
Leatherback turtle		1				
Shy albatross					1	
Sooty shearwater						1
Southern giant petrel			2			
Southern royal albatross				1		
Whale (unidentified)		2				
White-capped albatross	2	1	1		27	1
White-chinned petrel	2		1		3	
Total	13	32	14	15	70	21

2004/05

Over 80% of charter tuna fishing effort in 2004/05 occurred in SOU and CHA (Table 99). As only two vessels were operating in this fishery, 100% of fishing effort was observed. Note there are a few discrepancies in FMAs reported by fishers and observers.

Table 99: Summary of commercial effort, observer effort and protected species captures in the charter surface longline fishery for the period 1 July 2004 – 30 June 2005.

FMA	Effort days	Observer days	% coverage	No. hooks	Seabird captures	Seabirds per 1000 hooks	Mammal captures	Mammals per 1000 hooks	Reptiles
1. AKE									
2. CEE	6	1	17%	3300		0.00		0.00	
3. SEC									
4. SOE									
5. SOU	68	75	110%	227490	6	0.03	17	0.07	
6. SUB									
7. CHA	91	92	101%	366750	10	0.03	11	0.03	
8. CEW									
9. AKW	14	14	100%	51550		0.00		0.00	1
10. KER									
Null	6								
Total	185	182	98%	649090	16	0.02	28	0.04	1

Observer coverage, and fishing effort, occurs from April to July in the calendar year (Table 100) with most effort in CHA and SOU.

Table 100: Observer days in the charter surface longline fishery by area and month for the period 1 July 2004 – 30 June 2005.

FMA	Jul-04	Apr-05	May-05	Jun-05	Total
2. CEE				1	1
5. SOU		43	23	9	75
7. CHA	18		37	37	92
9. AKW	14				14
Total	32	43	60	47	182

The greatest number of seabird captures occurred in April in SOU (14 captures) and in CHA in May (10 captures). Fur seal captures were reported in CHA from May to June (10 captures) and in SOU in April and May (6 captures). One leatherback turtle was caught and released alive in AKW in May.

2005/06

Fishing effort in 2005/06 was in CEE, CHA and SOU, as was observer effort (Table 101). All fishing effort was observed. Note there are a few discrepancies in FMAs reported by fishers and observers.

Table 101: Summary of commercial effort, observer effort and protected species captures in the charter surface longline fishery for the period 1 July 2005 – 30 June 2006.

FMA	Effort days	Observer days	% coverage	No. hooks	Seabird captures	Seabirds per 1000 hooks	Mammal captures	Mammals per 1000 hooks	Reptiles
1. AKE									
2. CEE	40	39	98%	134190	8	0.06	1	0.01	
3. SEC									
4. SOE									
5. SOU	59	61	103%	201340	10	0.05		0.00	
6. SUB									
7. CHA	84	84	100%	304730	3	0.01	7	0.02	
8. CEW									
9. AKW									
10. KER									
Null	1								
Total	184	184	100%	640260	21	0.03	8	0.01	0

Observer coverage runs for the period April until July (Table 102). Seabird captures occurred in all FMAs and months where observer coverage was undertaken. Marine mammal captures were reported in CHA and CEE

Table 102: Observer days in the charter tuna surface longline fishery by area and month for the period 1 July 2005 – 30 June 2006.

FMA	Jul-05	Apr-06	May-06	Jun-06	Total
2. CEE	39				39
5. SOU		30	31		61
7. CHA			30	54	84
Total	39	30	61	54	184

2006/07

As in previous years, fishing effort and observer coverage was undertaken in CEE, CHA and SOU but also in AKE and KER (Table 103). Four vessels were operating in the charter tuna fishery in 2006/07 of which two vessels were observed so that 63% of total coverage was achieved. The overall capture rate of seabirds was higher than in previous years.

Table 103: Summary of commercial effort, observer effort and protected species captures in the charter surface longline fishery for the period 1 July 2006 – 30 June 2007.

FMA	Effort days	Observer days	% coverage	No. hooks	Seabird captures	Seabirds per 1000 hooks	Mammal captures	Mammals per 1000 hooks	Reptiles
1. AKE	6	5	83%	17090		0.00		0.00	
2. CEE	15	13	87%	30724	2	0.07		0.00	
3. SEC									
4. SOE									
5. SOU	87	69	79%	236280	55	0.23	1	0.004	
6. SUB									
7. CHA	229	128	56%	454840	29	0.06	4	0.01	
8. CEW									
9. AKW									
10. KER	20	10	50%	10596		0.00		0.00	
Null	4								
Total	361	225	62%	749530	86	0.11	5	0.01	0

Observer coverage of charter tuna vessels was undertaken over a greater time period compared to previous years (Table 104). The greatest number of observer days was delivered in CHA, particularly from May to June.

Table 104: Observer days in the charter surface longline fishery by area and month for the period 1 July 2006 – 30 June 2007.

FMA	Jul-06	Sep-06	Dec-06	Mar-07	Apr-07	May-07	Jun-07	Total
1. AKE	5							5
2. CEE	11		2					13
5. SOU				17	48	4		69
7. CHA	13				9	55	51	128
10. KER		8	2					10
Total	29	8	4	17	57	59	51	225

The greatest number of seabird captures occurred in SOU from March to May and CHA from April to June (Table 105). One fur seal capture was reported from SOU in April and four captures from CHA in June.

Table 105: Seabird captures in the charter surface longline fishery by area and month for the period 1 July 2006 – 30 June 2007.

FMA	Jul-06	Mar-07	Apr-07	May-07	Jun-07	Total
CEE	2					2
CHA			10	16	3	29
SOU		11	40	4		55
Total	2	11	50	20	3	86

Domestic tuna and swordfish

Historically, there has been difficulty placing observers on smaller domestic tuna vessels and, therefore, further data are required to better assess 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 that observations in 2006/07 include vessels targeting tuna and swordfish. Following the large bycatch event of 58 birds (including 51 albatrosses) during one trip targeting swordfish in November 2006, regulations were introduced by the Ministry of Fisheries 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 captures per observer year are detailed in Table 106.

Table 106: Protected species captures in domestic surface longline fisheries over three observer years

	2004/05		2005/06		2006/07	
Species	Dead	Alive	Dead	Alive	Dead	Alive
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
Fur seal	1	10		3		2
Gibson's albatross			1		5	
Green turtle		1				
Grey petrel	1		6		5	
Grey-faced petrel					2	
Leatherback turtle		1				4
Pacific albatross			1			
Petrel (unidentified)	1				1	
Pilot whale		1				
Seabird - large					3	
Sooty shearwater					1	
Wandering albatross	1			2	2	17
White-capped albatross			2			
White-chinned petrel					3	
Total	6	15	16	10	59	28

2004/05

Across all domestic surface longline fishing effort in 2004/05, only 3.9% observer coverage was achieved (Table 107). While fishing effort was greatest in AKW and CEE, low levels of observer coverage were achieved with the greatest percentage of observer coverage achieved in CHA.

Table 107: Summary of commercial effort, observer effort and protected species captures in domestic surface longline fisheries for the period 1 July 2004 – 30 June 2005.

	Effort days	Observer days	% coverage	No. hooks	Seabird captures	Seabirds per 1000 hooks	Mammal captures	Mammals per 1000 hooks	Reptiles
1. AKE	1136	32	2.8%	31741	1	0.03	1	0.03	
2. CEE	1052	55	5.2%	55656	5	0.09	3	0.05	1
3. SEC	9								
4. SOE	1								
5. SOU	9								
6. SUB									
7. CHA	149	17	11.4%	36935		0	8	0.22	
8. CEW	3								
9. AKW	432	5	1.2%	4960		0		0.00	
10. KER									
Total	2791	109	3.9%	129292	6	0.05	12	0.09	1

Observer coverage in the domestic surface longline fishery was greatest during the months April to July (Table 108).

Table 108: Observer days in the domestic surface longline fishery by area and month for the period 1 July 2004 – 30 June 2005.

FMA	Jul-04	Aug-04	Apr-05	May-05	Jun-05	Total
1. AKE	7	4	5	8	8	32
2. CEE	10		7	9	29	55
7. CHA	9		1		7	17
9. AKW	1		1	3		5
Total	27	4	14	20	44	109

Seabird captures occurred throughout the period of observer coverage with all in-zone captures reported from AKE and CEE (Table 109). An additional seabird capture occurred out of zone in February.

Table 109: Seabird captures in the domestic surface longline fishery by area and month for the period 1 July 2004 – 30 June 2005.

FMA	Jul-04	Feb-05	Apr-05	May-05	Jun-05	Total
1. AKE					1	1
2. CEE	1		3	1		5
ET		1				1
Total	1	1	3	1	1	7

Most fur seal captures occurred in CHA in July (Table 110). One 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 110: Fur seal captures in the domestic surface longline fishery by area and month for the period 1 July 2004 – 30 June 2005.

FMA	Jul-04	Apr-05	May-05	Total
1. AKE		1		1
2. CEE	1		1	2
7. CHA	8			8
Total	9	1	1	11

2005/06

As in 2004/05, less than 4% observer coverage of total fishing effort was achieved (Table 111). Over 80% of fishing effort was in AKE and CEE and over 90% of observer effort was in those two FMAs. The highest rate of seabird capture per 1000 hooks was in CHA.

Table 111: Summary of commercial effort, observer effort and protected species captures in domestic surface longline fisheries for the period 1 July 2005 – 30 June 2006.

	Effort days	Observer days	% coverage	No. hooks	Seabird captures	Seabirds per 1000 hooks	Mammal captures	Mammals per 1000 hooks	Reptiles
1. AKE	1043	24	2.3%	23880		0.00		0.00	
2. CEE	1370	80	5.8%	107480	19	0.18	3	0.03	
3. SEC	4								
4. SOE									
5. SOU	6								
6. SUB									
7. CHA	94	7	7.5%	7026	4	0.57		0.00	
8. CEW	11								
9. AKW	338	1	0.3%	600		0.00		0.00	
10. KER	22								
Total	2888	112	3.9%	138986	23	0.17	3	0.02	0

The end of the observer year bisects the peak of observer days in CEE; days run from February to July each calendar year (Table 112). Observer days in AKE, in contrast, were delivered from July through to October.

Table 112: Observer days in the domestic surface longline fishery by area and month for the period 1 July 2005 – 30 June 2006.

FMA	Jul-05	Aug-05	Sep-05	Oct-05	Nov-05	Feb-06	Mar-06	May-06	Jun-06	Total
1. AKE	9	6	4	4					1	24
2. CEE	34	2				2	10	11	21	80
7. CHA								4	3	7
9. AKW					1					1
Total	43	8	4	4	1	2	10	15	25	112

The highest number of seabird captures was in CEE (Table 113) although the rate of capture was higher in CHA (Table 111). Fur seal captures were all reported from CEE in June and July.

Table 113: Seabird captures in the domestic surface longline fishery by area and month for the period 1 July 2005 – 30 June 2006.

FMA	Jul-05	Feb-06	Mar-06	May-06	Jun-06	Total
2. CEE	3	1	5	1	9	19
7. CHA				2	2	4
Total	3	1	5	3	11	23

2006/07

Fishing effort in 2006/07 was reduced compared to previous years (Table 114). While observer effort was again focussed 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 captures also occurred in KER. Observer coverage of total effort was higher than in previous years but still below 5%.

Table 114: Summary of commercial effort, observer effort and protected species captures in domestic surface longline fisheries for the period 1 July 2006 – 30 June 2007.

	Effort days	Obs days	% coverage	No. hooks	Seabird captures	Seabirds per 1000 hooks	Mammal captures	Reptiles	Reptiles per 1000 hooks
1. AKW	983	28	2.9%	32380	9	0.28			0.00
2. CEE	928	35	3.8%	36012	9	0.25		1	0.03
3. SEC									
4. SOE									
5. SOU									
6. SUB	1								
7. CHA	21	3	14.3%	2815		0.00			0.00
8. CEW	6								
9. AKW	150	4	2.7%	5050		0.00			0.00
10. KER	161	39	24.2%	33725	63	1.87		3	0.09
Total	2250	109	4.8%	109982	81	0.74	0	4	0.04

Observer coverage was spread throughout the year, mostly in CEE and KER (Table 115).

Table 115: Observer days in the domestic surface longline fishery by area and month for the period 1 July 2006 – 30 June 2007.

FMA	Jul-06	Aug-06	Oct-06	Nov-06	Dec-06	Jan-07	Feb-07	Mar-07	Apr-07	May-07	Jun-07	Total
1. AKE	5			2	1	2	9	2			7	28
2. CEE	4							12	9	3	7	35
7. CHA		3										3
9. AKW								4				4
10. KER			3	18	1			4	10	3		39
Total	9	3	3	20	2	2	9	22	19	6	14	109

Seabird captures were recorded in CEE from March to July (Table 116), in AKE from November to December and in KER from October to November. Captures in KER included one large capture event when two leatherback turtles were caught and released alive as well as 58 seabirds, mostly albatrosses, of which 18 were released alive. Fur seals have most frequently been caught in CEE during June or July. In total, four leatherbacks were caught

during the 2006/07 observer year; one in March in CEE and three in KER from September to December.

Table 116: Seabird captures in the domestic surface longline fishery by area and month for the period 1 July 2006 – 30 June 2007.

FMA	Jul-06	Oct-06	Nov-06	Dec-06	Mar-07	Apr-07	Jun-07	Total
AKE			5	3			1	9
CEE	2				3	1	3	9
KER		1	62					63
Total	2	1	67	3	3	1	4	81

BOTTOM LONGLINE FISHERY

Deep-sea ling

The deep-sea ling bottom longline fishery is observed to monitor for 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 in SOU from August to October with some coverage in CEE and SEC. In previous years, there has been more even coverage, in terms of days, spread between CEE, SOE, SOU and SUB. Observer coverage is generally from May to June and August to October.

Protected species captures per observer year are detailed in Table 117. Only one marine mammal capture was reported.

Table 117. Protected species captures in the deep sea bottom longline fisheries over three observer years

	2004/05		2005/06		2006/07	
Species	Dead	Alive	Dead	Alive	Dead	Alive
Albatross (unidentified)			1			
Black-browed albatross (unidentified)		1				
Broad-billed prion			1			
Cape petrels		1	1			2
Chatham albatross			2			
Common diving petrel	1	12	3	3		
Fur seal			1			
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	17	16	15	2

2004/05

During 2004/05, over 600 commercial fishing days were reported by vessels over 46 m in length, using the method of bottom longline. 121 of these days were observed (Table 118). The highest rates of seabird interactions were reported from SOU.

Table 118: Summary of commercial effort, observer effort and protected species captures in the deep water bottom longline fishery for the period 1 July 2004 – 30 June 2005.

	Effort days	Observer days	% coverage	No. hooks	Seabird captures	Seabirds per 1000 hooks	Mammal captures	Mammals per 1000 hooks	Reptiles
1. AKE									
2. CEE	77								
3. SEC	15								
4. SOE	230	59	25.7%	1595600	3	0.001		0.00	
5. SOU	160	18	11.3%	44338	25	0.56			
6. SUB	155	44	28.4%	1304400	4	0.003		0.00	
7. CHA	2								
8. CEW	1								
9. AKW									
10. KER									
Total	640	121	18.9%	2944338	32	0.01	0	0.00	0

Observer coverage in this fishery is undertaken from May through to November each year and in 2004/05 coverage was in SOE, SOU and SUB (Table 119).

Table 119: Observer days in the deep water bottom longline fishery by area and month for the period 1 July 2004 – 30 June 2005.

	Jul-04	Aug-04	Sep-04	Nov-04	May-05	Jun-05	Total
4. SOE	12	26	21				59
5. SOU				18			18
6. SUB				9	26	9	44
Total	12	26	21	27	26	9	121

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 120). A further two birds were caught and released alive from this trip when it was fishing in SUB.

Table 120: Seabird captures in the deep water bottom longline fishery by area and month for the period 1 July 2004 – 30 June 2005.

FMA	Jul-04	Aug-04	Nov-04	May-05	Total
4. SOE	2	1			3
5. SOU			25		25
6. SUB			2	2	4
Total	2	1	27	2	32

2005/06

Compared to the previous year, fewer commercial fishing days were reported, but a higher number of observer days were achieved so that the level of observer coverage almost doubled (Table 121). Seabird capture rates were reduced compared to the previous year.

Table 121: Summary of commercial effort, observer effort and protected species captures in the deep water bottom longline fishery for the period 1 July 2005 – 30 June 2006.

	Effort days	Observer days	% coverage	No. hooks	Seabird captures	Seabirds per 1000 hooks	Mammal captures	Mammals per 1000 hooks	Reptiles
1. AKE									
2. CEE	61	53	86.9%	974050	9	0.01	1	0.0001	
3. SEC	23								
4. SOE	203	42	20.7%	1085450	8	0.01			
5. SOU	81	41	50.6%	984475	15	0.01			
6. SUB	51								
7. CHA	1								
8. CEW									
9. AKW									
10. KER									
Total	420	136	32.4%	3043975	32	0.01	1	0.00	0

Observer coverage was undertaken from April to June and from August to November in 2005/06 with days spread fairly evenly between CEE, SOE and SOU (Table 122).

Table 122: Observer days in the deep water bottom longline fishery by area and month for the period 1 July 2005 – 30 June 2006.

	Aug-05	Sep-05	Oct-05	Nov-05	Apr-06	May-06	Jun-06	Total
2. CEE					8	34	11	53
4. SOE	4	30	8					42
5. SOU			15	26				41
Total	4	30	23	26	8	34	11	136

Seabird captures occurred in most months where there was coverage with the highest number of captures occurring in SOU (Table 123). One fur seal was incidentally killed in CEE in May 2006.

Table 123: Seabird captures in the deep water bottom longline fishery by area and month for the period 1 July 2005 – 30 June 2006.

FMA	Sep-05	Oct-05	Nov-05	Apr-06	May-06	Total
2. CEE				2	7	9
4. SOE	5	3				8
5. SOU		3	12			15
Total	5	6	12	2	7	32

2006/07

Almost 30% observer coverage was achieved across all deep-water bottom longline fishing effort in 2006/07, slightly down on the previous year (Table 124). Seabird captures were lower than in previous years and no marine mammal captures were reported.

Table 124: Summary of commercial effort, observer effort and protected species captures in the deep water bottom longline fishery for the period 1 July 2006 – 30 June 2007.

	Effort days	Observer days	% coverage	No. hooks	Seabird captures	Seabirds per 1000 hooks	Mammal captures	Mammals per 1000 hooks	Reptiles
1. AKE									
2. CEE	72	16	22.2%	381800					
3. SEC	49	19	38.8%	377800					
4. SOE	126	42	33.3%	1101000	2	0.002			
5. SOU	88	30	34.1%	763200	15	0.02			
6. SUB	56								
7. CHA	3	1	33.3%	39000					
8. CEW									
9. AKW									
10. KER									
Total	394	108	27.4%	2662800	17	0.006	0	0.00	0

Observer coverage was undertaken from May to June and August to November as in previous years (Table 125). A greater number of Fisheries Management Areas was observed compared to previous years, although only one day was observed in CHA.

Table 125: Observer days in the deep water bottom longline fishery by area and month for the period 1 July 2006 – 30 June 2007.

	Aug-06	Sep-06	Oct-06	Nov-06	May-07	Jun-07	Total
2. CEE						16	16
3. SEC	3				4	12	19
4. SOE	13	29					42
5. SOU			29	1			30
7. CHA						1	1
Total	16	29	29	1	4	29	108

Seabird captures only occurred in September and October and were mostly in SOU (Table 126) in October, when 13 white-chinned petrels, one sooty shearwater and one prion were reported incidentally killed from one trip.

Table 126: Seabird captures in the deep water bottom longline fishery by area and month for the period 1 July 2006 – 30 June 2007.

FMA	Sep-06	Oct-06	Total
SOE	2		2
SOU		15	15
Total	2	15	17

Discussion

Middle depth trawl fisheries

Hake, hoki, ling and silver warehou

Levels of observer coverage in this fishery are generally around 15% of fishing effort due to priorities of both the Department and the Ministry of Fisheries to monitor various aspects of fishing activity. In most fisheries management areas where commercial fishing activity is undertaken for hake, hoki, ling or silver warehou some level of observer coverage is achieved. However, over 100 commercial fishing days targeting ling were reported in the AKE Fishery Management Area in each year discussed, yet no observer coverage was planned or achieved for this area. As such, no information exists on whether protected species interactions occur in AKE.

Moderate numbers of seabirds and fur seals are reported incidentally caught by vessels using the method of middle depth trawl to target hoki, hake, ling and silver warehou. Captures of seabirds and marine mammals are reported from most areas where there is 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. Fur seal captures were also up in 2005/06 and while the highest numbers of fur seals were reported caught on the west coast of the South Island, capture rates were higher in other areas. Interactions with both seabirds and fur seals were reduced in 2006/07, mostly due to a reduction in multiple capture events as reported 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 and will hopefully address warp capture interactions in SEC and other areas. 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.

Southern blue whiting

The southern blue whiting fishery operates in a discrete space and time and has higher levels of observer coverage than most other trawl fisheries. Of greatest concern in this fishery is increasing numbers of marine mammal captures over the three observer years, particularly 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.

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 (previously observed solely through CSP). No observer coverage was achieved in SUB in 2004/05, even though this area has the second highest level of commercial fishing effort, but coverage was achieved in SUB during the next two 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 are generally higher in this fishery compared to other trawl fisheries (except squid). Seabird interactions are most frequently reported in AKE and SUB, where the majority of observer coverage is 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.

Squid

Levels of observer coverage are generally above 25% for squid vessels operating in SOU or SUB due to priorities of both the Department and the Ministry of Fisheries to monitor protected species interactions. High capture rates of seabirds 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 high rates of seabird captures. Capture rates decreased over the three observer years examined in this report with reductions in albatross captures most notable.

Vessels operating in this fishery are required to use regulated seabird mitigation devices. Collaborative research between 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, Net captures continue to be a concern and mitigation options are currently being investigated. Marine mammal captures, particularly NZ sea lions, have fluctuated over the three years. Research into the survivability of sea lions following escape via sea lion exclusion devices is ongoing.

Pelagic trawl fisheries

While commercial effort targeting pelagic fish stocks is undertaken in eight Fisheries Management Areas, observer coverage is generally focussed in FMAs with the greatest levels of commercial effort. Observer effort has varied between FMAs over the three year period examined. In 2004/05, the greatest commercial fishing effort was in CHA but relatively few observer days were achieved there compared to other areas (AKW, CEW, SOU). 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 three observer years discussed in this report, one year reported over 20 dolphin captures while fewer dolphins were caught during the other two years. In general, a few vessels contribute to such capture events in this fishery. Seabird captures were 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 is presently underway.

Deep water trawl fisheries

Around 20% of total fishing effort is generally observed in this fishery, mostly because of Ministry of Fisheries priorities in relation to stock management. In FMAs of particular interest to CSP (SOE and SUB), good levels of coverage have been achieved over the three observer years. During 2005/06 and 2006/07, good levels of observer coverage have also been achieved in AKE, AKW and SOU.

Compared to other trawl fisheries, fewer seabird and marine mammal captures are reported from this fishery. In 2004/05, many of the seabird interactions reported were released alive including 19 instances where birds struck the vessel or landed on the deck.

While fewer seabirds and marine mammals are incidentally caught in this fishery compared to other trawl fisheries, the greatest amount of coral is landed in this fishery. At present, no mitigation practice besides avoidance is known to reduce the likelihood of incidentally 'catching' corals and other invertebrates. Fishing known tracks and the use of seabed mapping technology reduces the likelihood of making contact with the seafloor where corals are present.

It is important to note that observers do not weigh corals but are asked to estimate weight in kilograms, 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, pers. comm.).

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 in 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 in inshore fisheries will contribute to the development of mitigation measures.

Inshore trawl

As only nine vessels were observed during the 2006/07 observer year it is difficult to generalise about interactions between inshore trawl vessels and protected species. However, interactions detected demonstrate that inshore trawl fishing presents a risk of protected species bycatch risk. 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.

Inshore bottom longline (ling, bluenose, 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 is 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 includes 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.

Inshore bottom longline (snapper)

Despite minimal observer coverage in 2004/05, 14 protected species interactions 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 includes the development of best practice line-weighting regimes, safe turtle handling and release practices and offal and discard management practices.

Setnet

Across all setnet fishing effort, low levels of observer coverage have been achieved to date. As observer placement has been focussed over the summer period and only in certain fisheries areas, viewing observer coverage within the time and place it was undertaken gives a better picture of coverage levels. 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 but, due to the low number of observer days achieved, the extent of interactions across the setnet fishery as a whole cannot be determined.

Surface longline fisheries

Charter

Higher levels of observer coverage are 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.

Domestic

Domestic tuna vessels are difficult to observe due to similar restrictions found with other small vessels. Less than 5% observer coverage has been achieved in each of the years reported on. The recently introduced requirement for these vessels to provide notice of departure to the observer programme has facilitated the achievement of observer coverage

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 seabirds, marine mammals and marine reptiles. The large capture event of 58 seabirds in the 2006/07 observer year led to cooperation between Government and the industry to develop new mitigation techniques. Under current investigation are safe leads and the use of blue-dyed bait.

Deep sea bottom longline fishery

Between 20 and 30% observer coverage has been achieved in this 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 almost 30% coverage was achieved in 2005/06 and 2006/07. The increase in coverage levels is partly explained by decreasing fishing effort each year while observer coverage remains around 100 days.

In the years presented in this report, the deep sea bottom longline fishery has a lower rate of seabird captures compared to surface longline fisheries. Seabird interactions have been reported from all areas where observer coverage has been undertaken (except CHA where only one day has been observed). Large capture events occasionally occur in this fishery. In the period covered in 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.

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Appendices

Appendix 1

Protected species captures by observer year

SEABIRDS	2004/05		2005/06		2006/07		Total	
Species	Dead	Alive	Dead	Alive	Dead	Alive	Dead	Alive
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 petrels	2	50	3	17	1	10	6	77
Chatham 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			1			1	1	1
Petrel (unidentified)	3	26	3	8	2	2	8	36
Pied shag			1				1	0
Prion (unidentified)		2		4	1	2	1	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	71	17	264	71
Southern black-browed albatross	2						2	0
Southern giant petrel			2	1			2	1

SEABIRDS continued..	2004/05		2005/06		2006/07		Total	
Species	Dead	Alive	Dead	Alive	Dead	Alive	Dead	Alive
Southern royal albatross	1	1	1	1			2	2
Spotted shag			2				2	0
Storm petrels	1	11		15		2	1	28
Wandering albatross	1	2		5	2	17	3	24
Westland petrel	1	3					1	3
White-capped albatross	220	21	80	12	72	6	372	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	311	122	1107	563

MARINE MAMMAL	2004/05		2005/06		2006/07		Total	
Species	Dead	Alive	Dead	Alive	Dead	Alive	Dead	Alive
Bottlenose dolphin	1						1	0
Common dolphin	22		5		8		35	0
Dusky dolphin			1		1		2	0
Fur seal	90	43	161	27	142	21	393	91
Hector's dolphin					1		1	0
Leopard seal			1				1	0
Pilot whale	5	1					5	1
Sea lion	14		10		12		36	0
Whale (unidentified)		2					0	2
Total	132	46	178	27	164	21	474	94

MARINE REPTILE	2004/05		2005/06		2006/07		Total	
Species	Dead	Alive	Dead	Alive	Dead	Alive	Dead	Alive
Green turtle		1		1			0	2
Leatherback turtle		2				4	0	6
Total	0	3	0	1	0	4	0	8

Appendix 2

Protected species captures by Fisheries Management Area (FMA)

a) 1 July 2004 to 30 June 2005

	AKE		AKW		CEE		CEW		CHA		SEC		SOE		SOI		SOU		SUB		Total	
Species	D	A	D	A	D	A	D	A	D	A	D	A	D	A	D	A	D	A	D	A	D	A
Bottlenose dolphin			1																		1	
Common dolphin			22																		22	
Fur seal		1	4		1	2			28	19	24	6			1	1	14	6	19	8	91	43
Green turtle																						1
Leatherback turtle				1		1																2
Pilot whale						1																1
Unidentified whale				1						1												2
NZ sea lion															11		3				14	
Albatross (unidentified)									1	1		12		4			1				2	17
Buller's albatross					2	1			8	6	1		4	1			13	10	1		29	18
Black petrel	1											2									1	2
Snares cape petrel									1	1											1	1
Chatham albatross													1	1							1	1
Campbell albatross									2												2	
Cape petrels								1	1	8		11	2	29						1	3	50
Common diving petrel														1	1	1	1	13			2	15
Fluttering shearwater				1																		1
Fairy prion									2					8				1			2	9
Flesh-footed shearwater	4	7				1															4	8
Grey-backed storm petrel														3					1		1	3
Grey petrel					1							1	1	2					1	1	3	4
Australasian gannet		1																				1
Black-browed albatross (unidentified)										1						1		1		1		4
Northern giant petrel														1								1

	AKE		AKW		CEE		CEW		CHA		SEC		SOE		SOI		SOU		SUB		Total	
Species	D	A	D	A	D	A	D	A	D	A	D	A	D	A	D	A	D	A	D	A	D	A
Northern royal albatross													1								1	
Petrel (unidentified)		2		2										1	1	20	1	1			2	26
Prion (unidentified)									1	1						1					1	2
Southern royal albatross																	1	1			1	1
Salvin's albatross					1						3	2	9	2			9		1	1	23	5
Seagull														1								1
Sooty shearwater								1			2	3	1		7	2	46	15		1	56	22
Seabird - large									1			7		2	2		3			1	6	10
Southern black-browed albatross											1				1						2	
Seabird - small		1										16										17
Storm petrels				2						1			1	5		3					1	11
Shy albatross										1							8	3			8	4
Giant petrel (unidentified)																		1				1
Wandering albatross (unidentified)										1				1							1	2
White-chinned petrel	1										1		2		11	4	39	6	1		55	10
White-capped albatross									6	2	2		1		114	9	96	10	1		220	21
Westland petrel									1	3											1	3
Total	6	12	27	7	5	6		2	52	46	34	60	23	62	149	42	235	68	25	14	557	320

A = alive, D = dead

b) 1 July 2005 to 30 June 2006
NB: The two common dolphins captures AKW were reported from a single trip aboard a small trawler targeting trevally.

	AKE		AKW		CEE		CEW		CHA		SEC		SOE		SOI		SOU		SUB		Total	
Species	D	A	D	A	D	A	D	A	D	A	D	A	D	A	D	A	D	A	D	A	D	A
Common dolphin			2						3												5	
Dusky dolphin											1										1	
Fur seal					19	10	2		81	10	5	3			5	1	13	2	33	1	161	27
NZ sea lion															9				1		10	
Leopard seal															1						1	
Green turtle		1																				1
Albatross (unidentified)	1				1						2		1		4		3				12	
Gibson's albatross					1																1	
Buller's albatross									5	4	1		2		1		7	4			16	8
Black petrel	2															2					2	2
Buller's shearwater		4																				4
Cape petrel					1	1				2											1	3
Chatham albatross													2								2	
Campbell albatross					7				2												9	
Cape petrels						2			1	8		1		1		1	1	1			2	14
Common diving petrel						3										6	5	4			5	13
Fairy prion							1	1													1	1
Flesh-footed shearwater	8					4															8	4
Black-bellied storm petrel																		2				2
Grey-back storm petrel																	1				1	
Grey petrel					8													1	1	1	9	2
Black-browed albatross (unidentified)	1				2																3	
Pacific albatross					1																1	
Northern giant petrel																		2				2
Petrel (unidentified)	1	6															2	2			3	8
Prion (unidentified)						1				1								2				4
Spotted shag																					2	
Broad-billed prion																	1				1	
Southern royal albatross																	1	1			1	1

	AKE		AKW		CEE		CEW		CHA		SEC		SOE		SOI		SOU		SUB		Total	
Species	D	A	D	A	D	A	D	A	D	A	D	A	D	A	D	A	D	A	D	A	D	A
Salvin's albatross					3	1					3		2		1			1	1		10	2
Seabird (unspecified)																				2		2
Sooty shearwater						2				1	79	5			9	3	49	21			137	32
Seabird - large																	4				4	
Southern giant petrel					2													1			2	1
Storm petrels		10												4				1				15
Shy albatross											1				1		1			1	3	1
Giant petrels (unidentified)																		1				1
Wandering albatross (unidentified)						4								1								5
White-chinned petrel						1					2	2	10	2	27	23	15	1			54	30
White-faced storm petrel													1								1	
White-headed petrel																1						1
White-capped albatross									2	1	6				33	3	36	7	2	1	79	12
Total	13	21	2		45	29	3	1	94	27	100	11	18	8	91	40	139	54	38	6	548	198

c) 1 July 2006 to 30 June 2007

	AKE		AKW		CEE		CEW		CHA		KER		SEC		SOE		SOI		SOU		SUB		Total	
Species	D	A	D	A	D	A	D	A	D	A	D	A	D	A	D	A	D	A	D	A	D	A	D	A
Common dolphin			3						5														8	
Dusky dolphin													1										1	
Fur seal			1		7	3	4		41	8			13	7			1		15	2	60		142	21
Hector's dolphin													1										1	
NZ sea lion																	11		1				12	
Leatherback turtle						1					1	2											1	3
Whale (unidentified)									1														1	
Albatross (unidentified)						1					32	1			1				1				34	2
Antipodean albatross					1																		1	
Buller's albatross					1				19	5					2		1		16	10			39	15
Black petrel	1	4																					1	4
Campbell albatross					1																		1	
Cape petrels						2			1	2				3		2		1	1				2	10
Common diving petrel																			1				1	
Flesh-footed shearwater	5	1				3																	5	4
Black-bellied storm petrel																						2		2
Grey-backed storm petrel										1														1
Grey-faced petrel											1												1	
Grey-headed albatross																			1				1	
Grey petrel					1						2										1	2	4	2
Black-browed albatross (unidentified)											2			1		1				1			2	3
Pacific albatross																1								1
Petrel (unidentified)	3				1					2	1					1		1	2				7	10
Prion (unidentified)																		2	1				1	2
Broad-billed prion																								1
Southern royal albatross															1								1	
Salvin's albatross					1								7	2	1	1						1	9	4

	AKE		AKW		CEE		CEW		CHA		KER		SEC		SOE		SOI		SOU		SUB		Total	
Species	D	A	D	A	D	A	D	A	D	A	D	A	D	A	D	A	D	A	D	A	D	A	D	A
Seagull														1										1
Sooty shearwater	1										1		13	3	1	3	18		38	11			72	17
Seabird - large	2				1						3												6	
Southern giant petrel																								4
Seabird - small	1	1																					1	1
Storm petrels		1														1								2
Shy albatross					1				2								2	1	6				11	1
Giant petrels (unidentified)		1															1						1	1
Wandering albatross (unidentified)	5				1						1	17							1				8	17
White-chinned petrel		1							1		2		1	2			9	12	24	2		2	37	19
White-capped albatross					2				8								16	1	40	4			66	5
Yellow-eyed penguin																			2				2	
Total	18	9	4		18	10	4		78	18	46	20	36	19	6	10	59	18	150	30	61	7	480	153

Appendix 3

Scientific names of protected species mentioned in this report

Common name	Scientific name	Common name	Scientific name
Antipodean albatross	*Diomedea antipodensis antipodensis*	Leopard seal	*Hydruga leptonyx*
Australasian gannet	*Morus serrator*	Maui's dolphin	*Cephalorhynchus hectori maui*
Black petrel	*Procellaria parkinsoni*	New Zealand fur seal	*Arctocephalus forsteri*
Black-bellied storm petrel	*Fregetta tropica*	New Zealand sea lion	*Phocarctos hookeri*
Bottlenose dolphin	*Tursiops truncatus*	New Zealand white capped albatross	*Thalassarche steadi*
Broad-billed prion	*Pachyptila vittata*	Northern giant petrel	*Macronectes halli*
Buller's albatross	*Thalassarche bulleri bulleri*	Northern royal albatross	*Diomedea sanfordi*
Buller's shearwater	*Puffinus bulleri*	Pacific albatross	*Thalassarche bulleri platei*
Campbell albatross	*Thalassarche impavida*	Pied shag	*Phalacrocorax varius*
Cape petrel	*Daption capense*	Pilot whale	*Globicephala melas*
Chatham Island albatross	*Thalassarche eremita*	Salvin's albatross	*Thalassarche salvini*
Common diving petrel	*Pelecanoides urinatrix*	Shy albatross	*Thalassarche cauta*
Common dolphin	*Delphinus delphis*	Snares Cape petrel	*Daption capense australe*
Dusky dolphin	*Lagenorhynchus obscurus*	Sooty shearwater	*Puffinus griseus*
Fairy prion	*Pachyptila turtur*	Southern black-browed albatross	*Thalassarche melanophris*
Flesh-footed shearwater	*Puffinus carneipes*	Southern giant petrel	*Macronectes giganteus*
Fluttering shearwater	*Puffinus gavia*	Southern royal albatross	*Diomedea epomophora*
Gibson's albatross	*Diomedea antipodensis gibsoni*	Spotted shag	*Phalacrocorax punctatus*
Green turtle	*Chelonia mydas*	Wandering albatross (Unidentified)	*Diomedea exulans spp.*
Grey petrel	*Procellaria cinerea*	Westland petrel	*Procellaria westlandica*
Grey-backed storm petrel	*Garrodia nereis*	White-chinned petrel	*Procellaria aequinoctialis*
Grey-faced petrel (Great winged)	*Pterodroma macroptera*	White-faced storm petrel	*Pelagodroma marina*
Hector's dolphin	*Cephalorhynchus hectori*	White-headed petrel	*Pterodroma lessonii*
Leatherback turtle	*Dermochelys coriacea*	Yellow-eyed penguin	*Megadytes antipodes*

Appendix 4

Weight (kg) of coral landed aboard observed vessels by taxa and target species

a) 1 July 2004 to 30 June 2005

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

b) 1 July 2005 to 30 June 2006

	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 (unidentified)	12	9	84	1	119	4782	5		171		5183
Coral rubble					3	572		482	30		1087
Crested cup coral			1			14					15
Deepwater 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
Total	62	15	93	28	632	5720	40	483	521	2	7596

c) 1 July 2006 to 30 June 2007

	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 (unidentified)		2	10				485	298		130			18		3		946
Coral rubble	30	1		2			13	11151		500			2017				13714
Crested cup coral							2	4					11				17
Deepwater 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
Total	30	78	23	7	12	5	776	12381	1	855	1	855	4659	2	3	12	19700

Appendix 5

Weight (kg) of coral landed aboard observed vessels by Fisheries Management Area (FMA) and target species

a) 1 July 2004 to 30 June 2005

	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

b) 1 July 2005 to 30 June 2006

	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

c) 1 July 2006 to 30 June 2007

	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