Conservation Services Programme Annual Research Summary 2014-15

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Table of Contents

Table of Contents

1. Introduction

1.1 Purpose

This report outlines the research carried out through the Conservation Services Programme Annual Plan2014/15, and provides updates on multi-year projects started in previous years.

1.2 Background

The Department of Conservation has the statutory duty to protect certain marine animals as defined in the Wildlife Act 1953 and the Marine Mammals Protection Act 1978. While the sustainable management of fishery resources is the statutory responsibility of the Minister of Fisheries (Fisheries Act 1996), the protection and conservation of seabirds, marine mammals and other protected species is the responsibility of the Minister of Conservation.

Since 1995, the New Zealand government has been implementing a scheme to recover from the domestic commercial fishing industry a proportion of funding required to investigate and mitigate the impacts of fishing on protected species of marine wildlife (Conservation Services). Conservation Services are defined in the Fisheries Act 1996 (as amended in 1999) as being outputs produced in relation to the adverse effects of commercial fishing on protected species, as agreed between the minister responsible for administering the Conservation Act 1987 and the Director-General of the Department of Conservation.

1.3. CSP Vision and Objectives

The Conservation Services Programme (CSP) vision is that:

> "Commercial fishing is undertaken in a manner that does not compromise the protection and recovery of protected species in New Zealand fisheries waters".

The suite of research and other conservation services delivered as part of the CSP falls into three categories:

1. Understanding the nature and extent of adverse effects on protected species from commercial fishing activities in New Zealand fisheries waters.
2. Developing effective solutions to mitigate adverse effects of commercial fishing on protected species in New Zealand fisheries waters.
3. Developing population management plans, where appropriate.

Detailed outcome-based objectives for CSP are provided in the Conservation Services Programme Strategic Statement 2015[1].

1.4 Development of the Annual Plan

The Conservation Services Programme Annual Plan 2014/15[2] described the conservation services to be delivered as Conservation, and subject to cost recovery from the commercial fishing industry. As

[1] Available to download from http://www.doc.govt.nz/csp-strategic-statement-2015

such, this Annual Plan formed the basis for levying the commercial fishing industry under the Fisheries Act 1996. For further background information on CSP, including extracts of relevant legislation, refer to the Conservation Services Programme Strategic Statement. In the development of this Annual Plan a series of discussions were held with Ministry for Primary Industries (MPI) staff to harmonize the CSP and MPI research programmes for 2014/15 and to ensure there was no duplication. A formal consultation process was also used as described on the next page.

1.5 Consultation process

The Annual Plan took account of feedback from stakeholders, and was approved, along with the final costs to be levied, by the Minister of Conservation.

The collaborative processes used to develop the 2014/15 Annual Plan are as follows:

Inshore observer coverage is based on a continuation of delivering objectives identified by a process conducted in preparation for the CSP Annual Plan 2014/15. This process was developed jointly by the CSP team at the DOC and the Inshore Fisheries team at MPI.

Deepwater observer coverage was developed jointly by the CSP team at DOC and the deepwater fisheries team at MPI.

Key stages for stakeholder input, including formal consultation on this plan, were as follows:

3 December 2013	Initial CSP RAG meeting – review and advice on planning process
Feb-March 2014	Draft medium term research plans and initial CSP research proposals for 2014/15 circulated to stakeholders
11 March 2014	Joint CSP RAG-MPI presentation of initial research proposals to stakeholders
25 March 2014	Close of comments on initial CSP research proposals
1 April 2014	Draft Conservation Services Programme Annual Plan 2014/15 released for public consultation
22 April 2014	Public consultation period closes
May 2014	Summary of public submissions and response to comments completed
12 July 2014	Director-General of Conservation conveys the Conservation Services Programme Annual Plan 2014/15, amended in accordance with public submissions, to the Minister of Conservation for agreement

1.6 Explanation of reporting structure

This report first describes the objectives and rationale for each project, then provides an update on project status and a summary of the key results and recommendations from the projects. A project

[2] Available to download from http://www.doc.govt.nz/conservation/marine-and-coastal/conservation-services-programme/csp-plans/csp-annual-plan-2014-15/

logistics summary statement is included detailing the service provider, the project budget (excluding administration costs), identification of the relevant provisions within the Fisheries (Cost Recovery) Rules 2001 that determine cost allocation and review milestones. Finally, a citation and weblink are provided to enable ease of access to the final research reports.

Conservation Services Programme activities in 2014/15 were divided into three main areas:

1. Fisheries interactions projects
2. Population studies
3. Mitigation projects

2. Interaction Projects

2.1 INT2014-01 Observing commercial fisheries

Overall objective

To understand the nature and extent of protected species interactions with New Zealand commercial fishing activities.

Specific objectives

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 information relevant to identifying levels of cryptic mortality of protected species resulting from interactions with commercial fisheries
4. To collect other relevant information on protected species interactions that will assist in assessing, developing and improving mitigation measures

Rationale

Understanding the nature and extent of interactions between commercial fisheries and protected species can identify where the most significant interactions are occurring and can be used to inform development of ways to mitigate those interactions and adverse effects. Such data contribute to assessments of the risks posed to protected species by commercial fishing and whether mitigation strategies employed by fishing fleets are effective at reducing protected species captures.

The CSP Observer Programme continued to purchase baseline services for “offshore” fisheries from MPI Observer Services, given the scale of their operation, which allowed observers to be placed strategically across New Zealand Fisheries. For the purposes of providing costings, the rate provided by MPI Observer Services has been used.

Project status

Complete (except reporting on Charter Tuna).

Summary of the methods and key findings

One of the tools to gain a better understanding of the nature and extent of interactions between commercial fisheries and protected species is the placement of Government observers onboard commercial fishing vessels operating within the New Zealand Exclusive Economic Zone (EEZ). The observers collect both quantitative and qualitative information on interactions, both of which can and have been used to identify key areas of importance. The observations can also help in the

development and assessment of mitigation strategies aimed at reducing the impact of commercial fisheries on protected species.

Observer coverage is, where possible, planned jointly with the Ministry for Primary Industries to ensure that coverage objectives are aligned. For the purposes of planning observer coverage, fisheries are divided into two broad categories: firstly, those fisheries that are poorly known and generally characterised by small vessel, owner operated fleets operating in the inshore, the second; better understood deepwater fisheries which have been subject to long-term monitoring.

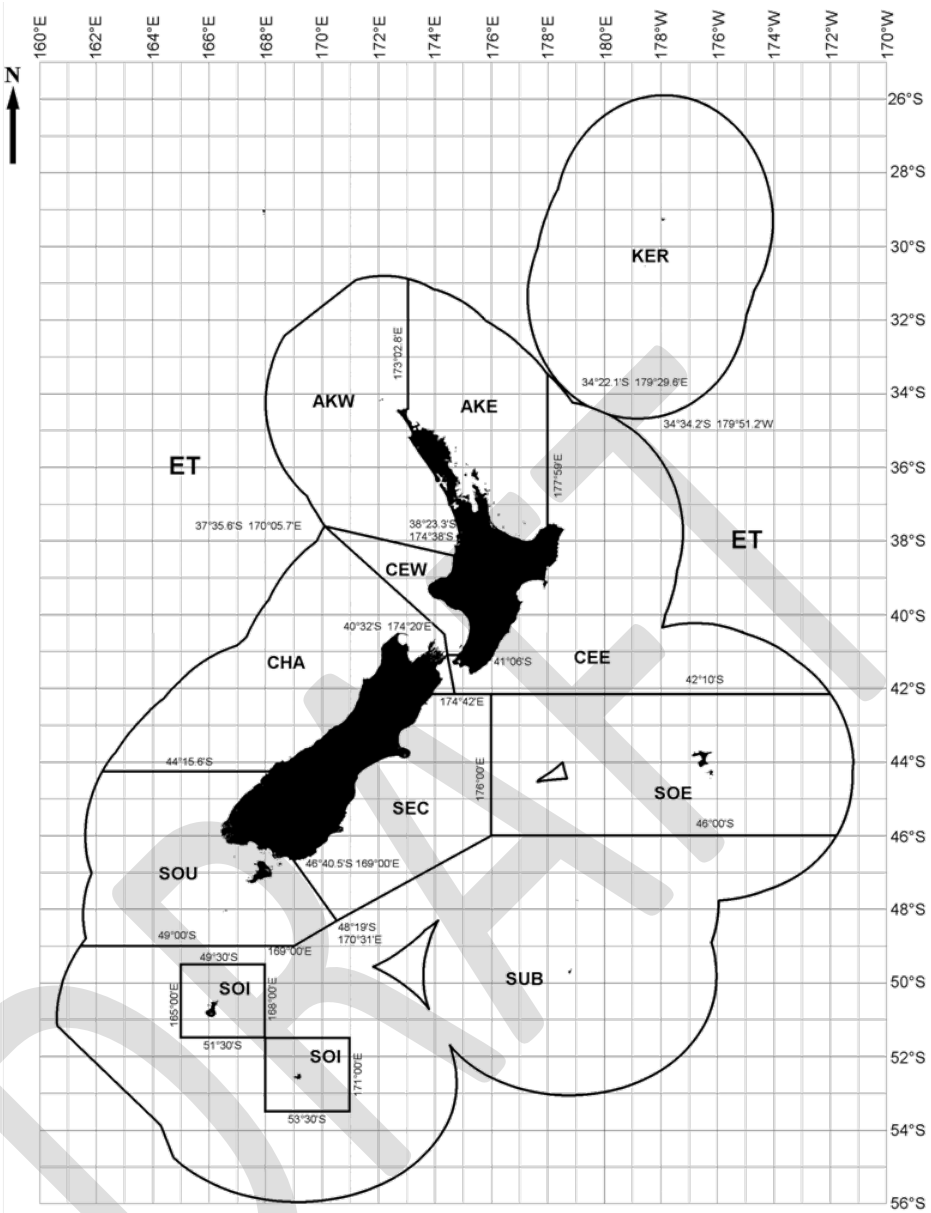
While the majority of the 'poorly understood' fisheries operate in the inshore area (i.e. to around 200 m depth), some small vessels, particularly bottom longline vessels under 36 m, will operate in deeper waters such as the Chatham Rise. Details of the approach used to set days in these fisheries are described in the Joint Department of Conservation/Ministry of Fisheries Inshore Observer Programme 2011/12 plan. In general, coverage in these fisheries was aimed at reducing uncertainty around the risk to particular protected species identified in both the level 1 and level 2 risk assessments and assessing mitigation options for interactions identified.

For better observed fisheries long-term datasets exist which allow for ongoing monitoring to detect whether changes are occurring in the nature and extent of captures. In these offshore fisheries where higher levels of coverage are already undertaken CSP purchases a portion of existing observer time to allow data collection to be spread strategically over the fishing fleet.

The observer coverage presented in this report extends work conducted in previous years.

The remainder of this project report 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 (Figure 1). Protected species interactions are then broken down by fate of the animal (live or dead) and method of interaction.

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



Key:

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

Middle Depth Trawl Fisheries

Hoki, Hake, Ling and Warehou species

The hoki, hake, ling, warehou trawl complex spans all months, FMAs and vessel sizes. Within the fishery complex there is a distinct subset targeting the hoki spawn in the Cook Strait. This occurs between June and September and is fished only by vessels under 42m, in an area straddling the CHA and CEE FMAs. The remaining fishing effort occurs during the other months with hoki, hake, ling and warehou targeted largely in SEC, SUB, SOE and partly SOU areas. All vessels over 28m in this fishery are required to used one of the three permissible forms of regulated bird scaring equipment and offal management. Industry defined codes of practice can also apply.

Table 1 presents a summary of commercial fishing effort, observer effort and protected species captures in this fishery during the 2014/15 observer year. There has been a gradual increase in observer coverage in this fishery over the recent years. However, the observer coverage in the 2014/15 year decreased by 11% from the previous year (2013/14) (Clemens-Seely & Hjorvarsdottir, 2016). The highest rate of observer coverage occurred in the SOU and CHA FMAs, with the greatest number of observed tows recorded in the CHA FMA.

The seabird capture rate decreased by 30% from the previous observer year (Clemens-Seely & Hjorvarsdottir, 2016) with a total of 207 seabird interactions observed in this fishery, over half of them occurring in the SEC and SOU FMAs. There were 55 mammal interactions observed, with 80% of them occurring in the CHA FMA. Five protected fish captures were also observed, all of them basking sharks. In comparison to the previous year (2013/14), the rate of coral catch increased greatly, from 13 kg of coral per 100 tows in 2013/14 to 155 kg per 100 tows this year. A large portion (89%) of the coral catch was caught by one vessel in the SEC and SOE FMAs. 99% of the coral catch was soft coral which is not protected under the Wildlife Act 1953.

In summary, 127 trips were conducted onboard 33 vessels, with protected species captures occurring on 70 trips onboard 24 vessels.

Table 1. Summary of commercial effort, observer effort and protected species captures in the hoki, hake, ling and warehou middle depth trawl fisheries during the 2014/15 observer year.

FMA	Effort tows	Observed tows	Coverage (%)	Seabird captures *	Seabirds per 100 tows	Mammal captures	Mammals per 100 tows	Protected fish captures	Protected fish per 100 tows	Coral catch (kg)	Coral catch per 100 tows
1. AKE	228	30	13.16	1	3.33	0	0.00	0	0.00	0.00	0.00
2. CEE	1,924	565	29.37	5	0.88	5	0.88	0	0.00	12.90	2.28
3. SEC	3,600	624	17.33	63	10.10	1	0.16	1	0.16	3,439.80	551.25
4. SOE	2,192	289	13.18	21	7.27	0	0.00	0	0.00	1,778.01	615.23
5. SOU	1,826	673	36.86	58	8.62	2	0.30	2	0.30	17.20	2.56
6. SUB	1,099	315	28.66	12	3.81	3	0.95	1	0.32	167.80	53.27
7. CHA	6,479	2,556	39.45	47	1.84	44	1.72	1	0.04	406.10	15.89
8. CEW	16	0	0.00	-	-	-	-	-	-	-	-
9. AKW	23	0	0.00	-	-	-	-	-	-	-	-
Total	**17,387**	**5,052**	**29.06**	**207**	**4.10**	**55**	**1.09**	**5**	**0.10**	**5,821.81**	**115.24**

Table 2 reports the numbers of interactions by species and fate immediately post interaction. The most commonly caught seabird species were white-chinned petrel, sooty shearwater and Salvin's albatross. The incident of seabird captures varied between months, with the greatest number of seabirds caught in December 2014 and January 2015.

Similar to previous observer years, marine mammal captures were dominated by New Zealand fur seals. In addition, one common dolphin and one baleen whale were captured. 85% of the marine mammal captures resulted in mortalities.

Table 2. Protected species interactions in the hake, hoki, ling and warehou middle depth trawl fisheries during the 2014/15 observer year.

Species name	Alive	Dead	Decomposing	Unknown	Total
Birds					
Albatrosses (unidentified)	1	2			3
Black petrel	1				1
Buller's albatross	2	11	1	1	15
Buller's and pacific albatross	1				1
Cape petrel		1			1
Common diving petrel	3			1	4
Fairy prion	2				2
Flesh-footed shearwater	1				1
Giant petrels (unidentified)	4				4
Northern giant petrel	2				2
Petrel (unidentified)	4				4
Petrels, prions and shearwaters	1				1
Prions (unidentified)	9	1			10
Procellaria petrels	1				1
Salvin's albatross	10	18	1	1	30
Shearwaters	2				2
Smaller albatrosses	1	2		1	4
Sooty shearwater	18	21			39
Storm petrels	1				1
Wandering albatross (unidentified)	1				1
Westland petrel	4	5			9
White-capped albatross	8	11		1	20
White-chinned petrel	18	32		1	51
Birds total	**95**	**104**	**2**	**6**	**207**
Marine mammals					
Baleen whales			1		1
Common dolphin		1			1
New Zealand fur seal	5	46	1	1	53
Marine mammals total	**5**	**47**	**2**	**1**	**55**
Protected fish					
Basking shark	2	3			5
Protected fish total	**2**	**3**			**5**
Grand total	**102**	**154**	**4**	**7**	**267**

Tables 3a, b, c & d detail the broad method of interaction for each species. Net capture was the most prevalent form of interaction overall, with over 60% resulting in mortalities. There were four captures of decomposing protected species observed, including one minke whale carcass.

Table 3. Method of interaction for a) Protected species, b) dead protected species, c) decomposing protected species and d) protected species with unknown fate observed in the hake, hoki, ling and warehou middle depth trawl fisheries during the 2014/15 observer year.

a) Protected species released alive

Species name	Caught in net	Impact against vessel	Tangled in line	Other	Unknown	Grand total
Birds						
Albatrosses (unidentified)	1					1
Black petrel	1					1
Buller's albatross	2					2
Buller's and pacific albatross	1					1
Common diving petrel	1			1	1	3
Fairy prion		2				2
Flesh-footed shearwater	1					1
Giant petrels (unidentified)	2	1		1		4
Northern giant petrel				2		2
Petrel (unidentified)	3	1				4
Petrels, prions and shearwaters	1					1
Prions (unidentified)		7		2		9
Procellaria petrels	1					1
Salvin's albatross	8		1	1		10
Shearwaters	2					2
Smaller albatrosses	1					1
Sooty shearwater	17	1				18
Storm petrels		1				1
Wandering albatross (unidentified)		1				1
Westland petrel				4		4
White-capped albatross	7	1				8
White-chinned petrel	17	1				18
Birds total	**66**	**16**	**1**	**11**	**1**	**95**
Marine mammals						
New Zealand fur seal	5					5
Marine mammals total	**5**					**5**
Protected fish						
Basking shark	2					2
Protected fish total	**2**					**2**
Grand total	**73**	**16**	**1**	**11**	**1**	**102**

b) Dead protected species

Species name	Caught in net	Caught on warp or door	Impact against vessel	Tangled in line	Other	Unknown	Grand total
Birds							
Albatrosses (unidentified)		2					2
Buller's albatross	7	4					11
Cape petrel					1		1
Prions (unidentified)			1				1
Salvin's albatross	8	9		1			18
Smaller albatrosses	2						2
Sooty shearwater	21						21
Westland petrel	4	1					5
White-capped albatross	4	7					11
White-chinned petrel	29					3	32
Birds total	**75**	**23**	**1**	**1**	**1**	**3**	**104**
Marine mammals							
Common dolphin	1						1
New Zealand fur seal	46						46
Marine mammals Total	**47**	**0**	**0**	**0**	**0**	**0**	**47**
Protected fish							
Basking shark	3						3
Protected fish total	**3**						**3**
Grand total	**125**	**23**	**1**	**1**	**1**	**3**	**154**

c) Decomposing protected species

Species name	Caught in net	Grand total
Birds		
Buller's albatross	1	1
Salvin's albatross	1	1
Birds total	**2**	**2**
Marine mammals		
Baleen whales	1	1
New Zealand fur seal	1	1
Marine mammals total	**2**	**2**
Grand total	**4**	**4**

d) Protected species with unknown fate

Species name	Caught in net	Caught on warp door	Unknown	Grand total
Birds				
Buller's albatross			1	1
Common diving petrel			1	1
Salvin's albatross			1	1
Smaller albatrosses	1			1
White-capped albatross		1		1
White-chinned petrel			1	1
Birds total	**1**	**1**	**4**	**6**
Marine mammals				
New Zealand fur seal	1			1
Marine mammals total	**1**			**1**
Grand total	**2**	**1**	**4**	**7**

Southern Blue Whiting

The southern blue whiting fishery is both spatially and temporally distinct from other middle depth trawl fisheries. The location of fishing effort is variable and dependent of the presence of spawning aggregations of southern blue whiting. Most effort occurs in the waters around Campbell Island. Unlike other middle depth trawl fisheries, protected species interactions tend to be dominated by marine mammal captures, specifically fur seals. Sea lion captures, however, have occurred in most years at variable levels (up to 14) (Rowe 2009, Rowe 2010, Ramm 2010, Ramm 2012a, Ramm 2012b, and Clemens-Seely et al. 2014).

Historically, the southern blue whiting fishery is one of the most highly observed fisheries (Clemens-Seely et al. 2014). In the 2014/15 observer year the observer coverage achieved was 100%, with all of the tows recorded in the SUB FMA. The data showed an anomaly in the number of tows reported by observers versus vessels, with one additional tow reported by the observers.

As compared to the previous observer season (2013/14), the rate of seabird captures decreased by 14 %. However, the rate of mammal captures increased by 109% (Clemens-Seely & Hjorvarsdottir, 2016), with 98 mammal interactions observed this year. Nearly all of the interactions occurred in August and September, with one seabird capture observed in February

In summary, 20 trips were conducted onboard ten vessels, with protected species captures occurring on 16 trips onboard all ten vessels.

Table 4. Summary of commercial effort, observer effort and protected species captures in ther southern blue whiting fishery during the 2014/15 observer year.

FMA	Effort tows	Observed tows	Coverage (%)	Seabird captures*	Seabirds per 100 tows	Mammal captures	Mammals per 100 tows	Coral catch (kg)	Coral catch per 100 tows (kg)
1. AKE	-	-	-	-	-	-	-	-	-
2. CEE	-	-	-	-	-	-	-	-	-
3. SEC	-	-	-	-	-	-	-	-	-
4. SOE	-	-	-	-	-	-	-	-	-
5. SOU	-	-	-	-	-	-	-	-	-
6. SUB	780	781	100.1	25	3.20	98	12.55	17.00	2.18
7. CHA	-	-	-	-	-	-	-	-	-
8. CEW	-	-	-	-	-	-	-	-	-
9. AKW	-	-	-	-	-	-	-	-	-
Total	**780**	**781**	**100.1**	**25**	**3.20**	**98**	**12.55**	**17.00**	**2.18**

In table 5, protected species interactions are broken down by species and fate immediately post interaction. Sixty-four percent of the seabird interactions and 99% of the marine mammal interactions resulted in mortalities. Of the 95 New Zealand fur seals captures, 37 of them were captured by a single vessel during a single trip in the month of August.

Table 5. Protected species interactions in the southern blue whiting fishery during the 2014/15 observer year.

Species Name	Alive	Dead	Decomposing	Unknown	Grand total
Birds					
Black-browed albatross (unidentified)	1				1
Great albatrosses	1				1
Grey petrel	4	9		1	14
Grey-backed storm petrel	1	2			3
Salvin's albatross		5			5
Storm petrels	1				1
Birds total	**8**	**16**	**0**	**1**	**25**
Marine mammals					
New Zealand fur seal		95	1		96
New Zealand sea lion		2			2
Marine mammals total	**0**	**97**	**1**	**0**	**98**
Grand total	**8**	**113**	**1**	**1**	**123**

Tables 6a, b, c and d detail the broad method of interactions by species. Net capture was the most prevalent form of interaction and almost exclusively resulted in mortalities. Protected species interactions that resulted in mortality occurred on nine vessels, with a single vessel accounting for over 30% of the mortalities, most of which were New Zealand fur seal. One decomposing New Zealand fur seal was observed as well as one grey petrel with unknown fate, however, there were no further remarks noted in the observer report on those captures.

Table 6. Method of interaction for a) protected species released alive, b) dead protected species, c) decomposing protected species and d) protected species with unknown fate observed in the southern blue whiting fishery during the 2014/15 observer year.

a) Protected species released alive

Species name	Impact against vessel	Other	Grand total
Birds			
Black-browed albatross (unidentified)	1		1
Great albatrosses	1		1
Grey petrel	2	2	4
Grey-backed storm petrel	1		1
Storm petrels	1		1

Birds total	**6**	**2**	**8**
Grand total	**6**	**2**	**8**

b) Dead protected species

Species name	Caught in net	Caught on warp or door	Tangled in line	Unknown	Grand total
Birds					
Grey petrel	4		5		9
Grey-backed storm petrel	1			1	2
Salvin's albatross	1	4			5
Birds total	**6**	**4**	**5**	**1**	**16**
Marine mammals					
New Zealand fur seal	94	1			95
New Zealand sea lion	2				2
Marine mammals total	**96**	**1**	**0**	**0**	**97**
Grand total	**102**	**5**	**5**	**1**	**113**

c) Decomposing protected species

Species name	Caught in net	Grand total
Marine mammals		
New Zealand fur seal	1	1
Marine mammals total	**1**	**1**
Grand total	**1**	**1**

d) Protected species with unknown fate

Species name	Unknown	Grand total
Birds		
Grey petrel	1	1
Birds total	**1**	**1**
Grand total	**1**	**1**

Scampi

Observations in the scampi fishery are undertaken primarily to monitor interactions with seabirds and New Zealand sea lions. Historically, captures of seabirds by this fishery have been recorded in most areas, with known captures of black petrels in AKE, along with captures of New Zealand sea lions in the SUB FMA.

After a significant decrease in the observer coverage in the 2013/14 observer year, the coverage kept decreasing in the 2014/15 year, with only 4.7% observer coverage. Nearly all of the observed tows were conducted in the SOE FMA, with only three tows observed in the SEC FMA. The rate of seabird captures decreased by 36% in comparison to the 2013/14 observer year, with 13 interactions observed (Clemens-Seely & Hjorvarsdottir, 2016). No mammal captures were observed in the fishery in the 2014/15 year. 29.5 kg of coral catch was observed this year which was all caught in the SOE FMA.

In summary, three trips were conducted onboard two vessels. Protected species captures occurred on two of the trips onboard both vessels.

Table 7. Summary of the commercial effort, observer effort and protected species captures in the scampi fishery during the 2014/15 observer year.

FMA	Effort tows	Observed tows	Coverage (%)	Seabird captures*	Seabirds per 100 tows	Coral catch (kg)	Coral catch per 100 tows (kg)
1. AKE	794	0	0.00	-	-	-	-
2. CEE	412	0	0.00	-	-	-	-
3. SEC	12	3	25.00	0	0.00	0.00	0.00
4. SOE	2,508	197	7.85	13	6.60	29.50	14.97
5. SOU	463	0	0.00	-	-	-	-
6. SUB	26	0	0.00	-	-	-	-
7. CHA	-	-	-	-	-	-	-
8. CEW	-	-	-	-	-	-	-
9. AKW	-	-	-	-	-	-	-
Total	**4,215**	**200**	**4.74**	**13**	**6.50**	**29.50**	**14.75**

Table 8 reports the number of interactions by species and fate immediately post interaction. Nearly all of the interacting seabirds were released alive, with only three interactions that resulted in mortality. Albatross species made up the majority of interactions, with Salvin's albatross being the most commonly caught species, with six observed captures.

Table 8. Protected species interactions in the scampi fishery during the 2014/15 observer year.

Species name	Alive	Dead	Grand total
Birds			
Buller's albatross	1	1	2
Prions (unidentified)	2		2
Salvin's albatross	5	1	6
Smaller albatrosses		1	1
Storm petrels	1		1
White-faced storm petrel	1		1
Birds total	**10**	**3**	**13**
Grand total	**10**	**3**	**13**

Tables 9a and b detail the broad method of interaction for each species. Warp or door captures was the only interaction method observed that resulted in mortalities. Three observations of seabird interactions that resulted in the release of the animals involved were recorded as other; two of the interactions were seabirds that landed on deck and were assisted off the vessel and one was a seabird which was disorientated by lights at night.

Table 9. Method of interaction for a) protected species released alive and b) dead protected species observed in the scampi fishery during the 2014/15 observer year.

a) Protected species released alive

Species name	Impact against vessel	Tangled in line	Other	Grand total
Birds				
Buller's albatross	1			1
Prions (unidentified)	2			2
Salvin's albatross		3	2	5
Storm petrels			1	1
White-faced storm petrel	1			1
Birds total	**4**	**3**	**3**	**10**
Grand total				

b) Dead protected species

Species name	Caught on warp or door	Grand total
Birds		

Buller's albatross	1	1
Salvin's albatross	1	1
Smaller albatrosses	1	1
Birds total	**3**	**3**
Grand total	**3**	**3**

Squid

Observer coverage in the squid fishery is often higher than other trawl fisheries due to previous high rates of bycatch of New Zealand sea lions and seabirds. The bulk of these captures have included white-capped albatross, sooty shearwaters and white-chinned petrels and this trend continues into the current year (79% of observed seabird captures). Being over 28m in length, all vessels in this fishery are required to deploy one of the three permitted types of seabird mitigation devices (tori line, warp scarer, or bird baffler), industry defined codes of practice also apply and are monitored against by observers. Offal has been identified as a key issue leading to warp captures in this fishery. Vessel Management Plans have been developed to ensure each vessel has a specific plan to manage discharge of offal during fishing activity.

Particularly in the SQU6T area around the Auckland Islands, the observer coverage is focused on recording New Zealand sea lion captures. Sea Lion Exclusion Devices (SLEDs) are used by all vessels operating in the SQU6T fishery. The majority of observer coverage in the squid fishery has been targeted at the SQU6T fishery, with high levels of coverage also being achieved in SOU as the vessels trawl enroute to and from SQU6T.

Seabird captures in this fishery tend to vary between years dependent upon the spatial and temporal activity of vessels and its overlap with breeding seabirds, in particular white-chinned petrels and sooty shearwaters. The rate of seabird captures in the 2014/15 observer year almost doubled from the previous year (Clemens-Seely & Hjorvarsdottir, 2016), with 400 seabird interactions observed. Nearly all of the seabird interactions occurred in the SOU and SUB FMAs between the months of January and May. The rate of mammal captures increased by 66% from the previous year, with a total of 21 observed interactions. Mammal captures occurred in all observed FMAs between the months of February and May. The rate of protected fish captures in this fishery is known to be highly variable and in 2014/15 only one basking shark was caught.

In summary, 53 trips were conducted onboard 18 vessels. Protected species captures occurred on 44 trips onboard all 18 vessels.

Table 10. Summary of commercial effort, observer effort and protected species captures in the squid fishery during the 2014/15 observer year.

FMA	Effort tows	Observed tows	Coverage (%)	Seabird captures*	Seabirds per 100 tows	Mammal captures	Mammals per 100 tows	Protected fish	Protected fish per 100 tows	Coral catch (kg)	Coral catch per 100 tows (kg)
1. AKE	-	1	-	-	-	-	-	-	-	-	-
2. CEE	-	-	-	-	-	-	-	-	-	-	-
3. SEC	247	174	70.45	35	20.11	7	4.02	0	0.00	109.30	62.82
4. SOE	23	23	100.00	0	0.00	3	13.04	0	0.00	0.60	2.61
5. SOU	1,021	942	92.26	258	27.39	10	1.06	1	0.11	7.90	0.84

6. SUB	631	560	88.75	107	19.11	1	0.18	0	0.00	0.10	0.02
7. CHA	16	0	-	-	-	-	-	-	-	-	-
8. CEW	-	-	-	-	-	-	-	-	-	-	-
9. AKW	-	-	-	-	-	-	-	-	-	-	-
Total	**1,938**	**1,700**	**87.72**	**400**	**23.53**	**21**	**1.24**	**1**	**0.06**	**117.90**	**6.94**

Table 11 reports the numbers of interactions by species and fate immediately post interactions. Similar to previous years, white-chinned petrel, sooty shearwater and white-capped albatross accounted for a large part of the seabird interactions. However, there was a significant increase in the numbers of white-chinned petrel interactions, with 194 birds caught in the 2014/15 observer year. Similar to the previous year, there was a large number of unidentified petrels reported in this fishing year, which were released without being photographed so further identification was not possible. The numbers of New Zealand fur seal interaction doubled from the previous year, with 18 of the interactions resulting in mortality.

Table 11. Protected species interactions in the squid fishery during the 2014/15 observer year.

Species name	Alive	Dead	Unknown	Grand total
Birds				
Albatrosses (unidentified)	4			4
Buller's albatross	2	3		5
Buller's and pacific albatross	2			2
Common diving petrel	4	1		5
Fairy prion	1			1
Giant petrels (unidentified)	3		1	4
Mid-sized petrels & shearwaters	6			6
Petrel (unidentified)	39			39
Procellaria petrels	5	1		6
Salvin's albatross	3	1		4
Shearwaters	2	1		3
Shy albatross	1			1
Smaller albatrosses	1			1
Sooty shearwater	34	39	1	74
Storm petrels	1			1
Wandering albatross (unidentified)		1		1
White-capped albatross	27	20	2	49
White-chinned petrel	94	97	3	194
Birds total	**229**	**164**	**7**	**400**
Marine mammals				
New Zealand fur seal	1	18		19
New Zealand sea lion		2		2
Marine mammals total	**1**	**20**	**0**	**21**
Protected fish				
Basking shark		1		1
Protected fish total		1		**1**

Grand total	**230**	**185**	**7**	**422**

Tables 12a, b & c detail the broad method of interaction for each species. Net capture was the most prevalent form of interaction overall, and was responsible for 93% of all species interactions and 94% of all mortalities. Petrels and shearwater species were caught almost exclusively in the net, as well as nearly all of the marine mammals, except from one sea lion which was found dead in the Sea Lion Exclusion Device. Seven seabird interactions were recorded with unknown fate, with no further observations noted by the observers.

Table 12. Method of interaction for a) protected species released alive, b) dead protected species and c) protected species with unknown fate observed in the squid fishery during the 2014/15 observer year.

a) Protected species released alive

Species name	Caught in net	Caught on warp or door	Impact against vessel	Tangled in line	Other	Grand total
Birds						
Albatrosses (unidentified)	4					4
Buller's albatross	1				1	2
Buller's and pacific albatross	2					2
Common diving petrel	1		3			4
Fairy prion			1			1
Giant petrels (unidentified)	3					3
Mid-sized petrels & shearwaters	6					6
Petrel (unidentified)	39					39
Procellaria petrels	5					5
Salvin's albatross	3					3
Shearwaters	2					2
Shy albatross	1					1
Smaller albatrosses	1					1
Sooty shearwater	32		1	1		34
Storm petrels			1			1
White-capped albatross	25	1	1			27
White-chinned petrel	94					94
Birds total	**219**	**1**	**7**	**1**	**1**	**229**
Marine mammals						
New Zealand fur seal	1					1
Marine mammals total	**1**					**1**
Grand total	**220**	**1**	**7**	**1**	**1**	**230**

b) Dead protected species

Species name	Caught in net	Caught on warp or door	Tangled in line	Other	Grand total
Birds					
Buller's albatross	2			1	3
Common diving petrel	1				1
Procellaria petrels	1				1
Salvin's albatross		1			1
Shearwaters	1				1
Sooty shearwater	38			1	39
Wandering albatross (unidentified)				1	1
White-capped albatross	15	4	1		20
White-chinned petrel	96			1	97
Birds total	**154**	**5**	**1**	**4**	**164**
Marine mammals					
New Zealand fur seal	18				18
New Zealand sea lion	1			1	2
Marine mammals total	**19**	**0**	**0**	**1**	**20**
Protected fish					
Basking shark	1				1
Protected fish total	**1**				**1**
Grand total	**174**	**5**	**1**	**5**	**185**

c) Protected species with unknown fate

Species name	Unknown	Grand total
Birds		
Giant petrels (unidentified)	1	1
Sooty shearwater	1	1
White-capped albatross	2	2
White-chinned petrel	3	3
Birds total	**7**	**7**
Grand total	**7**	**7**

Pelagic Trawl Fisheries

Jack Mackerel and Barracouta

In previous years, common dolphins have been captured in the pelagic trawl fishery and in some instances multiple capture events have occurred. A Marine Mammal Operating Procedure (MMOP) has been developed by industry to reduce dolphin captures. These practices include not setting or hauling at certain times of the day in certain areas, a watch being kept for dolphins in the vicinity of fishing operations, trawl doors being hauled partially on deck whilst turning (in order to close off the mouth of the net) and not setting while dolphins are present close to the vessel. As all the vessels in this fishery are larger than 28m and are required by law to deploy bird capture mitigation devices.

The observer coverage levels in this fishery have been increasing for the past years, with this year's coverage levels reaching 57%, the highest percentage since 2004/05 (Rowe 2009, Rowe 2010, Ramm 2010, Ramm 2012a, Ramm 2012b, Clemens-Seely *et al.* 2014 and Clemens-Seely & Hjorvarsdottir 2016). The highest numbers of observed tows were reported from the CHA, CEW and SEC FMAs, which also had the highest fishing efforts. Differences between observed and commercially reported tows are apparent in the data; this may be due to differences in reported target species or FMA.

As compared to the previous observer season (2013/14), the rate of seabird captures increased by 126% (Clemens-Seely & Hjorvarsdottir, 2016), with 59 seabird interactions observed in 2014/15. The highest rate of seabird interactions was reported from the SOU FMA. The rate of mammal captures increased by 17% from the previous observer year (2013/14) (Clemens-Seely & Hjorvarsdottir, 2016), with the highest rate observed in the AKW FMA where 16 interactions were recorded.

In summary, 63 trips were conducted onboard 15 vessels. Protected species captures occurred in 35 trips onboard 12 vessels.

Table 13. Summary of commercial effort, observer effort and protected species captures in the jack mackerel and barracouta pelagic trawl fisheries during the 2014/15 observer year.

FMA	Effort tows	Observed tows	Coverage (%)	Seabird captures*	Seabirds per 100 tows	Mammal captures	Mammals per 100 tows	Coral catch (kg)	Coral catch per 100 tows (kg)
1. AKE	20	5	25.00	0	0.00	0	0.00	0	0.00
2. CEE	37	0	-	-	-	-	-	-	-
3. SEC	1,529	332	21.71	10	3.01	5	1.51	0.00	0.00
4. SOE	219	222	101.37	10	4.50	0	0.00	10.80	4.86

5. SOU	267	223	83.52	23	10.31	0	0.00	0.00	0.00
6. SUB	3	0	-	-	-	-	-	-	-
7. CHA	1,323	800	60.47	11	1.38	5	0.63	0.40	0.05
8. CEW	751	610	81.23	4	0.66	4	0.66	0.70	0.11
9. AKW	231	300	129.87	1	0.33	16	5.33	0.00	0.00
Total	**4,380**	**2,492**	**56.89**	**59**	**2.37**	**30**	**1.20**	**11.90**	**0.48**

Table 14 reports the numbers of interactions by species and fate immediately post interaction. The common dolphin accounted for 67% of the marine mammal interactions, which is comparable to the previous years (Clemens-Seely et al. 2014; Clemens-Seely & Hjorvarsdottir, 2016). 75% of the seabird interactions and all of the marine mammal interactions in this fishery resulted in mortalities.

Table 14. Protected species interactions in the jack mackerel and barracouta pelagic trawl fisheries during the 2014/15 observer year.

Species name	Alive	Dead	Unknown	Grand total
Birds				
Albatrosses (unidentified)	1			1
Buller's albatross	1	7		8
Cape petrels	2			2
Chatham Island albatross	1			1
Common diving petrel	1			1
Fairy prion	2		8	10
Petrel (unidentified)	2			2
Prions (unidentified)	2			2
Salvin's albatross		6		6
Seabird - Small	1			1
Snares Cape petrel	1			1
Sooty shearwater		3		3
Storm petrels		1		1
White-capped albatross	2	6		8
White-chinned petrel	1	7	1	9
White-faced storm petrel	1	1	1	3
Birds total	**18**	**31**	**10**	**59**
Marine mammals				
Common dolphin		20		20
Dusky dolphin		2		2
New Zealand fur seal		8		8
Marine mammals total		**30**		**30**
Grand total	**18**	**60**	**11**	**89**

Tables 15a, b & c detail the broad method of interaction for each species. Net capture was by far the most prevalent form of interaction overall, and was responsible for 90% of the interactions that resulted in mortalities. Ten seabird interactions were recorded as having unknown fate; the records for these interactions had no further notes on the method of interaction.

Table 15. Method of interaction for a) protected species released alive b) dead protected species and c) protected species with unknown fate observed in the jack mackerel and barracouta pelagic trawl fisheries during the 2014/15 observer year.

a) Protected species released alive

Species name	Caught in net	Impact against vessel	Other	Grand total
Birds				
Albatrosses (unidentified)	1			1
Buller's albatross	1			1
Cape petrels		2		2
Chatham Island albatross	1			1
Common diving petrel		1		1
Fairy prion			2	2
Petrel (unidentified)	1		1	2
Prions (unidentified)		1	1	2
Seabird - small			1	1
Snares Cape petrel	1			1
White-capped albatross			2	2
White-chinned petrel			1	1
White-faced storm petrel			1	1
Birds total	**5**	**4**	**9**	**18**
Grand total	**5**	**4**	**9**	**18**

b) Dead protected species

Species name	Caught in net	Caught on warp or door	Impact against vessel	Tangled in line	Unknown	Grand total
Birds						
Buller's albatross	5	1			1	7
Salvin's albatross	6					6
Sooty shearwater	3					3
Storm petrels			1			1
White-capped albatross	5			1		6
White-chinned petrel	6				1	7
White-faced storm petrel					1	1
Birds total	**25**	**1**	**1**	**1**	**3**	**31**
Marine mammals						

Common dolphin	20					20
Dusky dolphin	2					2
New Zealand fur seal	8					8
Marine mammals total	**30**					**30**
Grand total	**55**	**1**	**1**	**1**	**3**	**61**

c) Protected species with unknown fate

Species name	Unknown	Grand total
Birds		
Fairy prion	8	8
White-chinned petrel	1	1
White-faced storm petrel	1	1
Birds total	**10**	**10**
Grand total	**10**	**10**

Deep Water Bottom Trawl Fisheries

Orange Roughy, Cardinal, and Oreo species

In deep water bottom trawl fisheries, a main focus of the observer coverage is to describe the impact of the trawls on benthic communities, in particular protected corals, particularly on the Chatham rise. Seabird behaviour and abundance is also monitored around the vessels in this fishery. Discard, offal and management, as well as the mandatory use of bird scaring devices are employed by the fleet to mitigate seabird interactions.

As compared to the previous reporting year, the observer coverage tripled, with an overall 24% observer coverage reached. Observations were conducted in all FMAs, with the highest coverage in the AKW and CEW FMAs.

The rate of seabird captures went down to 0.3% with only three seabird interactions observed and there were no mammal captures recorded.

Due to the nature of the fishery, coral bycatch has historically been significantly higher than for other fisheries, but has been decreasing for the previous years. In comparison to the previous year, the rate of coral catch significantly decreased from 140 kg per 100 tows down to 28 kg per 100 tows. 39% of the coral catch was bubblegum coral and 53% was stony coral, which are both protected under the Wildlife Act 1953.

In summary, 24 trips were conducted onboard ten vessels. Other than coral catch, protected species interactions were isolated to two of the trips onboard one vessel.

Table 16. Summary of commercial effort, observer effort and protected species captures in the orange roughy, cardinal and oreo deep water bottom trawl fisheries during the 2014/15 observer year.

FMA	Effort tows	Observed tows	Coverage (%)	Seabird captures*	Seabirds per 100 tows	Mammal captures	Mammals per 100 tows	Coral catch (kg)	Coral catch per 100 tows (kg)
1. AKE	342	32	9.36	0	0.00	0	0.00	0.00	0.00
2. CEE	665	208	31.28	0	0.00	0	0.00	14.10	6.78
3. SEC	699	133	19.03	0	0.00	0	0.00	0.00	0.00
4. SOE	1,980	475	23.99	2	0.42	0	0.00	181.10	38.13
5. SOU	8	4	50.00	0	0.00	0	0.00	50.00	1,250.00
6. SUB	119	53	44.54	1	1.89	0	0.00	28.20	53.21
7. CHA	688	55	7.99	0	0.00	0	0.00	11.50	20.91

8. CEW	5	3	60.00	0	0.00	0	0.00	20.00	666.67
9. AKW	261	170	65.13	0	0.00	0	0.00	7.60	4.47
Total	**4,767**	**1,133**	**23.77**	**3**	**0.26**	**0**	**0.00**	**312.50**	**27.58**

Table 17 reports the number of interactions by species and fate immediately post interaction. All of the interactions observed were seabirds that were released alive.

Table 17. Protected species interactions in the orange roughy, cardinal and oreo deep water bottom trawl fisheries during the 2014/15 observer year.

Species name	Alive	Grand total
Birds		
Cape petrels	1	1
Petrels, prions and shearwaters	1	1
White-capped albatross	1	1
Birds total	**3**	**3**
Grand total	**3**	**3**

Table 18 detail the method of interaction for each species. Impact against vessel was the only observed method of interaction.

Table 18. Method of interaction for protected species released alive observed in the orange roughy, cardinal and oreo deep water bottom trawl fisheries during the 2014/15 observer year.

Species name	Impact against vessel	Grand total
Birds		
Cape petrels	1	1
Petrels, prions and shearwaters	1	1
White-capped albatross	1	1
Birds total	**3**	**3**
Grand total	**3**	**3**

Inshore Fisheries

Inshore Trawl

Inshore fishing within the New Zealand EEZ is an immensely diverse activity, with large amounts of variation in individual practice and effort. Particularly in the case of trawl and bottom longline, it becomes difficult to draw a simple distinction between the inshore and offshore sectors, as a number of vessels make seasonal shifts across this artificial boundary. Individual vessels can range in size from just two metres in length to over thirty metres. Equally, activity can range from 20 days per year to over 300 for each vessel. Overly simplified characterisation of the inshore sector is problematic and may lead to false conclusions about the fishery. Therefore it is critical when gathering information on the inshore fishing sector to get as broad and representative coverage as possible.

Observer coverage of inshore fisheries has historically been at very low levels due to the inherent difficulties of placing observers on small vessels in remote ports. Additionally, many of the fishers only operate part time, either seasonally or sporadically. As a result, observers often spend much of their time on shore or travelling between ports.

Observer coverage in the previous season increased substantially (Clemens-Seely & Hjorvarsdottir, 2016) and increased again this year by 30% from the previous year. Much of the increased coverage for the past years has occurred in the AKE snapper fishery. This was driven out of ministerial directives for high levels of coverage to monitor snapper discards.

The rate of seabird captures was slightly lower than in the previous year (Clemens-Seely & Hjorvarsdottir, 2016), with twenty-seven seabirds caught, nearly all of them in the AKE FMA. Three mammal captures were observed, which is similar to the previous year.

In summary, 42 trips were conducted onboard 22 vessels. Protected species captures occurred on 15 trips onboard 11 vessels.

Table 19. Summary of the commercial effort, observer effort and protected species captures in the inshore trawl fisheries during the 2014/15 observer year.

FMA	Effort tows	Observed tows	Coverage (%)	Seabird captures*	Seabirds per 100 tows	Mammal captures	Mammals per 100 tows	Coral catch (kg)	Coral catch per 100 tows (kg)
1. AKE	6,848	1,174	17.14	20	1.70	2	0.17	2.10	0.18
2. CEE	9,090	126	1.39	1	0.79	0	0.00	0.20	0.16
3. SEC	11,219	1	0.01	0	0.00	0	0.00	0.00	0.00
4. SOE	312	1	0.32	0	0.00	0	0.00	0.00	0.00
5. SOU	3,611	0	0.00	-	-	-	-	-	-
6. SUB	-	-	-	-	-	-	-	-	-
7. CHA	10,254	2	0.02	0	0.00	0	0.00	1.70	85.00
8. CEW	1,840	24	1.30	0	0.00	0	0.00	0.00	0.00

9. AKW	2,875	569	19.79	6	1.05	1	0.18	10.00	1.76
Total	**46,049**	**1,897**	**4.12**	**27**	**1.42**	**3**	**0.16**	**14.00**	**0.74**

Table 20 reports the number of interactions by species and fate immediately post interaction. While majority of the seabird interactions resulted in the live release of the animals, all of the mammal interactions resulted in mortalities.

Table 20. Protected species interactions in the inshore trawl fisheries during the 2014/15 observer year.

Species name	Alive	Dead	Unknown	Grand total
Birds				
Black petrel		1		1
Buller's shearwater	2			2
Cape petrels	1			1
Common diving petrel	5			5
Fairy prion			1	1
Flesh-footed shearwater	5			5
Great-winged (grey-faced) petrel	3	1		4
Mid-sized petrels & shearwaters	1			1
Shearwaters	1			1
Sooty shearwater	2	1		3
White-faced storm petrel	2			2
Cook's petrel	1			1
Birds total	**23**	**3**	**1**	**27**
Marine mammals				
Common dolphin		1		1
New Zealand fur seal		2		2
Marine mammals total		**3**		**3**
Grand total	**23**	**6**	**1**	**30**

Table 21a, b & c detail the broad method of interaction for each species. Net capture and impact against vessel were the most prevalent forms of interaction overall, accounting for 73% of the captures. One seabird had unknown fate after the release of the bird, however, there were no further notes on the interaction method noted by the observer.

Table 21. Method of interaction for a) protected species released alive, b) dead protected species and c) protected species with unknown fate observed in the inshore trawl fisheries during the 2014/15 observer year.

a) Protected species released alive

Species name	Caught in net	Impact against vessel	Other	Unknown	Grand total
Birds					
Buller's shearwater		2			2
Cape petrels		1			1
Common diving petrel		3		2	5
Flesh-footed shearwater	4	1			5
Great-winged (grey-faced) petrel			3		3
Mid-sized petrels & shearwaters		1			1
Shearwaters	1				1
Sooty shearwater	2				2

White-faced storm petrel		1	1		2
Cook's petrel		1			1
Birds total	**7**	**10**	**4**	**2**	**23**
Grand total	**7**	**10**	**4**	**2**	**23**

b) Dead protected species

Species Name	Caught in net	Other	Grand total
Birds			
Black petrel	1		1
Great-winged (grey-faced) petrel		1	1
Sooty shearwater	1		1
Birds total	**2**	**1**	**3**
Marine mammals			
Common dolphin	1		1
New Zealand fur seal	2		2
Marine mammals total	**3**		**3**
Grand total	**5**	**1**	**6**

c) Protected species with unknown fate

Species name	Unknown	Grand total
Birds		
Fairy prion	1	1
Birds total	**1**	**1**
Grand total	**1**	**1**

Inshore bottom longline – Ling, Bluenose, Häpuku, and Bass

As with other inshore fishing methods, observer coverage in the inshore bottom longline fishery has been generally limited. In the past coverage has been focused at certain time periods in selected ports or regions. Mitigation techniques used and tested (to varying extents) in this fishery include; weighting regimes, night setting, use of tori lines and use of fish oil to deter birds. In April 2008, regulations on mitigation were introduced for all bottom longline vessels, covering night setting or line weighting, tori line, and offal/discard management.

Bottom longline vessels targeting the species assemblage of ling, bluenose, häpuku and bass tend to fish over wide areas with fishing occurring in all FMAs and ranging from 'inshore' to the Chatham rise. These fishing grounds overlap with a number of protected species' ranges, including a number of petrel and albatross.

Over the past eight years, observer coverage has greatly fluctuated between nearly zero and three percent. As compared to the previous year (2013/14) the observer coverage increased by 387% (Clemens-Seely & Hjorvarsdottir, 2016). This increase was driven largely by a decrease in the total fishing effort as well as an increase in total observed lines. The greatest fishing effort was reported in the AKE and CEE FMAs, however, there was only 2.4% observer coverage in AKE and none in CEE.

As in the past years, the rate of seabird captures was low, with only three seabird captures observed in the AKE and CEW FMAs.

In summary, six trips were conducted onboard five vessels. Protected species captures occurred on three trips onboard all five vessels.

Table 22. Summary of commercial effort, observer effort and protected species captures in the inshore bottom longline fisheries during the 2014/15 observer year.

FMA	Effort lines	Observed lines	Coverage (%)	Number of hooks observed	Seabird captures*	Seabirds per 1000 hooks	Mammal captures	Mammals per 1000 hooks	Coral catch (kg)	Coral catch per 1000 hooks
1. AKE	1,081	26	2.41	26,160	2	0.076	0	0.00	0.00	0.0000
2. CEE	989	0	0.00	-	-	-	-	-	-	-
3. SEC	266	0	0.00	-	-	-	-	-	-	-
4. SOE	798	0	0.00	-	-	-	-	-	-	-
5. SOU	68	0	0.00	-	-	-	-	-	-	-
6. SUB	-	-	-	-	-	-	-	-	-	-
7. CHA	568	0	0.00	-	-	-	-	-	-	-
8. CEW	683	182	26.65	164,350	1	0.006	0	0.00	0.0	0.0000
9. AKW	404	27	6.68	16,488	0	0.000	0	0.00	0.0	0.0000
Total	**4,857**	**235**	**4.84**	**206,998**	**3**	**0.014**	**0**	**0.00**	**0.00**	**0.0000**

Table 23 reports the number of interactions by species and fate immediately post interaction. Table 24a & b detail the method of interaction for each species. Hook capture and line entanglement were the only forms of interaction reported.

Table 22. Protected species interactions in the inshore bottom longline fisheries during the 2014/15 observer year.

Species name	Alive	Dead	Grand total
Birds			
Black petrel	2		2
Flesh-footed shearwater		1	1
Birds total	**2**	**1**	**3**
Grand total	**2**	**1**	**3**

Table 23. Method of interaction for a) protected species released alive and b) dead protected species in the inshore bottom longline fisheries during the 2014/15 observer year.

a) Protected species released alive

Species name	Caught on hook	Tangled in line	Grand total
Birds			
Black petrel	1	1	2
Birds total	1	1	**2**
Grand total	**1**	**1**	**2**

b) Dead protected species

Species name	Caught on hook	Grand total
Birds		
Flesh-footed shearwater	1	1
Birds total	**1**	**1**
Grand total	**1**	**1**

Inshore Setnet

Setnet fisheries have received low levels of observer coverage due to the difficulty of placing observers onboard these generally very small vessels however in recent years increased monitoring has occurred in some areas; driven by Threat Management Plans for Hector's and Māui dolphins. Captures of a number of protected species have been reported in the past, including Hector's dolphins, yellow-eyed penguins, shags, sooty shearwaters and Westland petrels. Setnet is one of the few fisheries, like inshore trawl by vessels under 28m, which does not have any regulated mitigation device requirements. As with inshore trawl spatial closures have been put in place to reduce the risk of interaction with Hector's and Maui's dolphins.

Observer coverage was initially low in this fishery but increased in 2008/09 due to concerns about Hector's dolphin bycatch. As compared to the 2013/14 observer year, the observer coverage for this year increased by 40% (Clemens-Seely & Hjorvarsdottir, 2016), and was executed in the CEW, SOU, SEC, AKW and CEE FMAs.

Ten seabird interactions were reported for this year from the CEW, SEC and SOU FMAs. In comparison to the previous year, the rate of mammal capture increased by 47% (Clemens-Seely & Hjorvarsdottir. 2016), with 15 mammal interactions observed this year. One protected fish capture was recorded, which was a white pointer shark captured in the CEW FMA.

In summary, 17 trips were conducted onboard 12 vessels. Protected species captures occurred on ten of the trips onboard seven vessels.

Table 24. Summary of commercial effort, observer effort and protected species captures in the inshore setnet fishery during the 2014/15 observer year.

FMA	Effort tows	Observed tows	Coverage (%)	Seabird captures*	Seabirds per 100 nets	Mammal captures	Mammals per 100 nets	Protected fish captures	Protected fish per 100 nets
1. AKE	6,636	0	0.00	-	-	-	-	-	-
2. CEE	1,099	2	0.18	0	0.0	0	0.00	0	0.00
3. SEC	3,840	82	2.14	3	3.7	5	6.10	0	0.00
4. SOE	5	0	0.00	-	-	-	-	-	-
5. SOU	644	237	36.80	1	0.4	9	3.80	0	0.00
6. SUB	2	0	0.00	-	-	-	-	-	-
7. CHA	982	0	0.00	-	-	-	-	-	-
8. CEW	1,452	387	26.65	6	1.6	1	0.26	1	0.26
9. AKW	6,655	8	0.12	0	0.0	0	0.00	0	0.00
Total	**21,315**	**716**	**3.36**	**10**	**1.4**	**15**	**2.09**	**1**	**0.14**

Table 26 reports the number of interactions by species and fate immediately post interaction. Of the 15 mammal interactions observed, 14 resulted in mortality of the animals involved. Five flesh-footed shearwaters were recorded with unknown fate with no further details recorded by the observers.

Table 25. Protected species interactions in the inshore setnet fishery during the 2014/15 observer year.

Species name	Alive	Dead	Unknown	Grand total
Birds				
Cape petrel	1	1		2
Flesh-footed shearwater			5	5
Fluttering shearwater	1			1
Shags		1		1
Sooty shearwater	1			1
Birds total	**3**	**2**	**5**	**10**
Marine mammals				
Common dolphin		2		2
New Zealand fur seal	1	12		13
Marine mammals total	**1**	**14**		**15**
Protected fish				
White pointer shark		1		1
Protected fish total		**1**		**1**
Grand total	**2**	**17**	**5**	**26**

Tables 27a, b & c detail the broad method of interaction for each species. Net capture was the only method of interaction observed. The captures of flesh-footed shearwaters with unknown fate did not have a specified form of interaction.

Table 26. Method of interaction for a) protected species released alive, b) dead protected species and c) protected species with unknown fate observed in the inshore setnet fishery during the 2014/15 observer year.

a) Protected species released alive

Species name	Caught in net	Grand total
Birds		
Cape petrels	1	1
Fluttering shearwater	1	1
Sooty shearwater	1	1
Birds total	**3**	**3**
Marine mammals		
New Zealand fur seal	**1**	1
Marine mammals total	**1**	**1**
Grand total	**4**	**4**

b) Dead protected species

Species name	Caught in net	Grand total
Birds		
Cape petrels	1	1
Shags	1	1
Birds total	**2**	**2**
Marine mammals		
Common dolphin	2	2
New Zealand fur seal	**12**	12
Marine mammals total	**14**	**14**
Protected fish		
White pointer shark	1	1
Protected fish total	**1**	**1**
Grand total	**17**	**17**

c) Protected species with unknown fate

Species name	Unknown	Grand total
Birds		
Flesh-footed shearwater	5	5
Birds total	**5**	**5**
Grand total	**5**	**5**

Surface Longline Fisheries

Charter Tuna

Currently data is unavailable for the observer effort and bycatch in the surface longline charter tuna fleet. This will be added in a future revision of the report once the data becomes available.

Domestic Tuna and Swordfish

The domestic tuna and swordfish fishery (targeting bigeye, southern bluefin and swordfish) has historically had low observer coverage. This is primarily due to inherent difficulties in placing observers on these small vessels, which generally work irregular patterns. Consequently, data on this fleet's interactions with protected species are poor. Southern bluefin tuna, bigeye tuna and swordfish were introduced into the quota system at the start of the 2004/05 fishing year. After a large capture event in November 2006, regulations were put in place requiring departure notices and seabird mitigation use (deployment of a streamer line and either line weighting or night setting). CSP has also distributed turtle dehookers to aid in the quick and efficient release of not only turtles but also fur seals and a number of shark species.

Observer coverage in domestic tuna and swordfish has remained fairly constant over the past seven years, fluctuating around six to eight percent coverage (Rowe 2010, Ramm 2010, Ramm 2012a, Ramm 2012b, and Clemens-Seely *et al.* 2014). However, the observer coverage decreased by 35% from the previous observer year (2013/14) (Clemens-Seely & Hjorvarsdottir, 2016), with only 106 lines and 87,636 hooks observed this year.

In comparison to the previous observer season (2013/14), the rate of seabird capture decreased by 27%, with a total of ten seabird captures observed in the AKE, CEE and CHA FMAs. The rate of mammal captures increased substantially from the previous season when only three captures were observed in comparison to seven captures this year. In addition, one marine turtle interaction was recorded this year.

In summary, ten trips were conducted onboard seven vessels. Protected species captures occurred on seven of the trips onboard four vessels.

Table 27. Summary of commercial effort, observer effort and protected species captures in the domestic tuna and swordfish fishery during the 2014/15 observer year.

FMA	Effort lines	Observed lines	Coverage (%)	Number of observed hooks	Seabird captures*	Seabirds per 1000 hooks	Mammal captures	Mammals per 1000 hooks	Marine turtles captures	Marine turtles per 1000 hooks
1. AKE	843	85	10.08	69,486	4	0.06	7	0.10	1	0.01
2. CEE	433	10	2.31	8,800	1	0.11	-	-	-	-
3. SEC	-	-	-	-	-	-	-	-	-	-
4. SOE	-	-	-	-	-	-	-	-	-	-
5. SOU	21	0	0.00	-	-	-	-	-	-	-
6. SUB	-	-	-	-	-	-	-	-	-	-
7. CHA	596	7	1.17	5,900	5	0.85	0	0.00	0	0.00

8. CEW	4	0	0.00	-	-	-	-	-	-	-
9. AKW	243	4	1.65	3,450	0.00	0	0	0	0	0.00
Total	**2,140**	**106**	**4.95**	**87,636**	**10**	**0.11**	**7**	**0.08**	**1**	**0.01**

Table 29 reports the number of interactions by species and fate immediately post interaction. Of the eighteen interactions observed, seven of them resulted in mortalities, with over half of them occurring on a single vessel in a single FMA. 86% of the marine mammal interactions occurred in August 2014 in the AKE FMA. One leatherback turtle was caught in the month of April in the AKE FMA and was released alive.

Table 28. Protected species interactions in the domestic tuna and swordfish fishery during the 2014/15 observer year.

Species name	Alive	Dead	Unknown	Grand total
Birds				
Black petrel	1			1
Flesh-footed shearwater		1		1
Gibson's albatross		1		1
Petrel (unidentified)	1			1
Wandering (snowy) albatross	1			1
White-capped albatross		2	1	3
White-chinned petrel		2		2
Birds total	**3**	**6**	**1**	**10**
Marine mammals				
Common dolphin	1			1
New Zealand fur seal	5	1		6
Marine mammals total	**6**	**1**		**7**
Marine turtles				
Leatherback turtle	1			1
Marine turtles total	**1**			**1**
Grand total	**10**	**7**	**1**	**18**

Tables 30a, b & c detail the broad method of interaction for each species. Hook capture was the most prevalent form of interaction overall. One white-capped albatross was recorded with unknown fate and no further details recorded by the observer.

Table 29. Method of interaction for a) protected species released alive, b) dead protected species and c) protected species with unknown fate observed in the domestic tuna and swordfish fishery during the 2014/15 observer year.

a) Protected species released alive

Species name	Caught on hook	Impact against vessel	Tangled in line	Other	Grand total
Birds					
Black petrel				1	1
Petrel (unidentified)		1			1
Wandering (snowy) albatross)	1				1
Birds total	**1**	**1**		**1**	**3**
Marine mammals					
Common dolphin			1		1
New Zealand fur seal	5				5
Marine mammals total	**5**		**1**		**6**
Marine turtles					
Leatherback turtle	1				1
Marine turtles total	**1**				**1**
Grand total	**7**	**1**	**1**	**1**	**10**

b) Dead protected species

Species name	Caught on hook	Tangled in line	Grand total
Birds			
Flesh-footed shearwater		1	1
Gibson's albatross	1		1
White-capped albatross	2		2
White-chinned petrel	2		2
Birds total	**5**	**1**	**6**
Marine mammals			
New Zealand fur seal	1		1
Marine mammals total	**1**		**1**
Grand total	**6**	**1**	**7**

c) Protected species with unknown fate

Species name	Unknown	Grand total
Birds		
White-capped albatross	1	1
Birds total	**1**	**1**

Grand total	1	1

Bottom Longline Fishery

Deep-sea Ling

The deep-sea bottom longline fishery is observed to monitor seabird and marine mammal interactions. A relatively small fleet conducts a large amount of fishing effort in terms of hook set, mainly in the areas of SEC, SOE and CEE. Regulations on this fishery require the use of tori lines and either night-setting or line weighting. Other industry applied mitigation techniques include gas cannons and offal and bait discard management.

In comparison to the previous observer year (2013/14), the observer coverage decreased by 47% (Clemens-Seely & Hjorvarsdottir, 2016). This decrease was driven largely by an increase in the total fishing effort in the fishery, as the observed lines were similar to the observed lines in the previous year.

The rate of seabird captures was similar to the previous year (Clemens-Seely & Hjorvarsdottir, 2016), with 24 seabird captures observed. No mammal captures were observed for the fishery this year.

In summary, five trips were conducted onboard four vessels. Protected species interactions occurred on three of the trips onboard two vessels.

Table 30. Summary of commercial effort, observer effort and protected species captures in the deep-sea bottom longline fishery during the 2014/15 observer year.

FMA	Effort lines	Observed lines	Coverage (%)	Number of hooks observed	Seabird captures*	Seabirds per 1000 hooks	Coral catch (kg)	Coral catch per 1000 hooks (kg)
1. AKE	221	0	0.00	-	-	-	-	-
2. CEE	1442	2	0.14	3,500	0	0.00	0.0	0.0000
3. SEC	488	112	22.95	114,302	2	0.02	0.0	0.0000
4. SOE	1645	101	6.14	661,954	13	0.02	0.3	0.0005
5. SOU	364	21	5.77	25,893	7	0.27	3.0	0.1159
6. SUB	539	0	0.00	-	-	-	-	-
7. CHA	505	59.00	11.68	68,210	2	0.03	0.0	0.0000
8. CEW	49	0	0.00	-	-	-	-	-
9. AKW	165	0	0.00	-	-	-	-	-
Total	**5,418**	**295**	**5.44**	**873,859**	**24**	**0.03**	**3.3**	**0.0038**

Table 32 reports the numbers of interactions by species and fate immediately post interaction. Over half of the interactions occurred on a single vessel, and all of those interactions resulted in mortality. White-chinned petrel was the most commonly caught species, with all birds caught on a single trip in the month of October.

Table 31. Protected species interactions in the deep-sea bottom longline fishery during the 2014/15 observer year.

Species name	Alive	Dead	Grand total
Birds			
Buller's albatross	2		2
Fairy prion	5		5
Grey petrel		1	1
Salvin's albatross		1	1
Southern royal albatross		1	1
Westland petrel		1	1
White-capped albatross	1		1
White-chinned petrel		12	12
Birds total	**8**	**16**	**24**
Grand total	**8**	**16**	**24**

Tables 33a & b detail the broad method of interaction for each species. Hook capture was the most prevalent form of interaction and resulted in mortality in 89% of the captures. Impact against vessel was the only other method recorded and resulted in the live release of the animals involved in all cases.

Table 32. Method of interaction for a) protected species released alive and b) dead protected species observed in the deep-sea bottom longline fishery during the 2014/15 observer year.

a) Protected species released alive

Species name	Caught on hook	Impact against vessel	Grand total
Birds			
Buller's albatross	1	1	2
Fairy prion		5	5
White-capped albatross	1		1
Birds total	**2**	**6**	**8**
Grand total	**2**	**6**	**8**

b) Dead protected species

Species name	Caught on hook	Grand total
Birds		
Grey petrel	1	1
Salvin's albatross	1	1
Southern royal albatross	1	1
Westland petrel	1	1
White-chinned petrel	12	12
Birds total	**16**	**16**
Grand total	**16**	**16**

Purse Seine Fisheries

Skipjack Tuna

In July 2011, the spinetail devil ray (*Mobula japanica*) and manta ray (*Manta birostris*) became fully protected under Schedule 7A of the Wildlife Act (1953). Since these two species of rays are caught in purse seine fisheries for tuna in New Zealand and worldwide, CSP observer coverage of the purse seine fishery began in the 2011/12 observer year. This season marks the fourth year of reported coverage of the purse seine fishery.

The observer coverage this year was similar to the previous year (2013/14), with 102 observed sets in total in the AKE, CHA, CEW and AKW FMAs. There have been no observations of seabird or mammal captures in this fishery for the previous years (Clemens-Seely et al. 2014; Clemens-Seely & Hjorvarsdottir, 2016). However, two seabird captures were observed this year, both in the AKW FMA. The rate of protected fish captures increased significantly from the previous observer year (Clemens-Seely & Hjorvarsdottir, 2016), with 24 captures in total observed this year in the AKE and AKW FMAs in comparison to a single interaction in the last observer season.

The Conservation Services Programme continues to investigate the factors effecting post release survival of spine-tailed devil rays in this fishery through the use of pop-off survival tags.

In summary, three trips were conducted onboard three vessels. Protected species interactions occurred on two trips onboard two vessels.

Table 33. Summary of commercial effort, observer effort and protected species captures in the purse seine fishery during the 2014/15 observer year.

FMA	Effort sets	Observed sets	Coverage (%)	Seabird captures*	Seabirds per 100 sets	Protected fish captures	Protected fish per 100 sets
1. AKE	379	66	17.41	0	0.00	11	16.67
2. CEE	-	-	-	-	-	-	-
3. SEC	-	-	-	-	-	-	-
4. SOE	-	-	-	-	-	-	-
5. SOU	-	-	-	-	-	-	-
6. SUB	-	-	-	-	-	-	-
7. CHA	20	7	35.00	0	0.00	0	0.00
8. CEW	34	1	2.94	0	0.00	0	0.00
9. AKW	60	28	46.67	2	7.14	13	46.43
Total	**493**	**102**	**20.69**	**2**	**1.96**	**24**	**23.53**

Table 35 reports the numbers of interactions by species and fate immediately post interaction. 81% of the total interactions resulted in the live release of the animals involved, however, investigations have shown that post release mortality of these animals is common. Two spine-tailed devil rays were recorded with unknown fate and no further remarks were noted by the observer.

Table 34. Protected species interactions in the purse seine fishery during the 2014/15 observer year.

Species name	Alive	Dead	Unknown	Grand total
Birds				
Buller's shearwater	1			1
White-faced storm petrel	1			1
Birds total	**2**			**2**
Protected fish				
Spine-tailed devil ray	19	3	2	24
Protected fish total	**19**	3	**2**	**24**
Grand total	**21**	**3**	**2**	**26**

Tables 36a, b & c detail the broad method of interaction recorded for the protected species interactions in the purse seine fishery. Nearly all of the interactions were in the form of net capture, with an exception of one impact against vessel interaction.

Table 35. Method of interaction for a) protected species released alive, b) dead protected species and c) protected species with unknown fate observed in the purse seine fishery during the 2014/15 observer year.

a) Protected species released alive

Species name	Caught in net	Impact against vessel	Grand total
Birds			
Buller's shearwater		1	1
White-faced storm petrel	1		1
Birds total	**1**	**1**	**2**
Protected fish			
Spine-tailed devil ray	19		19
Protected fish total	**19**		**19**
Grand total	**20**	**1**	**21**

b) Dead protected species

Species name	Caught in net	Grand total
Protected fish		
Spine-tailed devil ray	3	3
Protected fish total	**3**	**3**
Grand total	**3**	**3**

c) Protected species with unknown fate

Species name	Caught in net	Grand total
Protected fish		
Spine-tailed devil ray	2	2
Protected fish total	**2**	**2**
Grand total	**2**	**2**

Mackerel & Other

The purse seine fishery targeting English mackerel, jack mackerel, kahawai, pilchard, snapper, trevally and other minor species is observed independently from the purse seine fishery targeting skipjack tuna because of temporal differences in fishing seasons as well as some differences in fishing practices and net construction.

The commercial fishing effort of the fishery is mainly carried out in the AKE FMA, although some effort was conducted in CEE and AKW. Observer coverage for this year was only carried out in the AKE FMA, with nine sets observed. No bycatch of protected species was observed this year.

Table 36. Summary of commercial effort, observer effort and protected species captures in the purse seine mackerel fishery during the 2014/15 observer year.

FMA	Effort sets	Observed sets	Coverage (%)	Seabird captures*	Seabirds per 100 sets
1. AKE	473	9	1.90	0	0.00
2. CEE	14	0	0.00	-	-
3. SEC	-	-	-	-	-
4. SOE	-	-	-	-	-
5. SOU	-	-	-	-	-
6. SUB	-	-	-	-	-
7. CHA	-	-	-	-	-
8. CEW	-	-	-	-	-
9. AKW	3	0	0.00	-	-
Total	**490**	**9**	**1.84**	**0**	**0.00**

Danish seine

Observer coverage in the Danish seine fishery began in the 2013/14 observer year for fisheries management purposes, largely in relations to monitoring size composition of snapper catch. The fishing effort this year was carried out in the AKE, CEE, CHA, CEW and AKW FMAs, with observer coverage only carried out in the AKE FMA, which also had the highest commercial fishing effort.

In comparison to the previous year (2013/14), the number of observed sets increased substantially, from 19 observed sets in 2013/14 to 83 in 2014/15. 0.2 kg of crested cup coral, which is protected under the Wildlife Act 1953, was the only protected species bycatch observed in the fishery this year.

In summary, three trips were conducted onboard three vessels, with no protected species captures observed.

Table 37. Summary of commercial effort, observer effort and protected species captures in the Danish seine fishery during the 2014/15 observer year.

FMA	Effort sets	Observed sets	Coverage (%)	Seabird captures*	seabirds per 100 sets	Coral catch (kg)	Coral catch per 100 sets (kg)
1. AKE	416	83	19.95	0	0.000	0.20	0.24
2. CEE	114	0	0.00	-	-	-	-
3. SEC	-	-	-	-	-	-	-
4. SOE	-	-	-	-	-	-	-
5. SOU	-	-	-	-	-	-	-
6. SUB	-	-	-	-	-	-	-
7. CHA	28	0	0.00	-	-	-	-
8. CEW	1	0	0.00	-	-	-	-
9. AKW	21	0	0.00	-	-	-	-
Total	**580**	**83**	**14.31**	**0.00**	**0.000**	**0.20**	**0.24**

Project logistics summary statement

This project was 100% funded via Conservation Service Levies on the fishing industry. The planned cost for the project was $1,016,687. Services were provided by the Ministry for Primary Industries Observer Services.

2.2 INT2013-02 Identification of seabirds captured in New Zealand fisheries

Overall objective

To determine which seabird species are captured in fisheries and the mode of their capture.

Specific objectives

1. To determine, through examination of returned seabird specimens, the taxon, sex, and where possible age-class and provenance of seabirds killed in New Zealand fisheries (for returned dead specimens)
2. To detail the injuries, body condition and stomach contents and, where possible, the likely cause of mortality (for returned dead specimens)
3. To report any changes in the protocol used for the necropsy of seabirds (for returned dead specimens)
4. To determine, through examination of photographs, the taxon and, where possible, sex, age-class and provenance of seabirds captured in New Zealand fisheries (for live captures or dead specimens discarded at sea)

Rationale

Large numbers of seabirds frequent New Zealand commercial fishing waters. Birds with significant differences in conservation status can appear morphologically similar. The accurate determination of the taxon of seabirds captured in New Zealand fisheries is vital for examining the potential threat to population viability posed by incidental fisheries captures. Observers on commercial vessels are not always able to identify seabirds at sea with high precision and the assessment of the age-class, sex and provenance of captured individuals requires autopsy in the majority of cases. Historically all dead seabird specimens collected by observers have been returned for necropsy where possible. However, in many cases, the taxon can be confirmed through expert examination of photographs taken by observers, and this can be achieved at lower cost than returning carcases and performing necropsy. In order to maximise cost efficiencies, and in recognition of increased observer coverage levels in the offshore Foreign Charter Vessel fleet, a new protocol has been developed to determine which specimens are returned for full necropsy. This protocol aims to strike a balance between returning birds for full necropsy (for rarer species and in less observed fisheries) and photographing birds for determination of taxon (for commonly caught species in well observed fisheries).

Examining the causes of mortality and types of injuries incurred by individual seabirds returned from fisheries is necessary to help reduce future seabird captures in New Zealand fisheries by identifying gear risks. Linking this information to species, age- and sex-class, and breeding status, helps identify if different groups of seabirds are vulnerable to different risks in fishing interactions.

Information gained through this project will link to Ministry for Primary Industries databases, seabird bycatch estimates, and will inform ongoing risk assessment, research and modelling of the effects of fisheries bycatch on seabird populations. Further, the mode of capture and associated information

will enable robust analyses to be made of the factors contributing to seabird capture events and inform the development of appropriate mitigation strategies.

Project status

This is a multi-year project that is due for completion in December 2016. The reporting for 2013-14 is now complete.

Summary of the methods and key findings

New Zealand waters support a diverse range of seabird species, but much of the commercial fishing activity in the region overlaps with their ranges. The accurate identification of seabirds captured in New Zealand fisheries is vital for determining the potential impact of fisheries on these populations. Between 1 July 2014 and 30 June 2015 a total of 352 seabirds comprising 20 taxa were incidentally killed as bycatch and returned for autopsy by on-board New Zealand Government observers. Birds were returned from longline (n = 39) and trawl (n = 312) vessels and one from a set net vessel, and were dominated numerically by five species (white-chinned petrel *Procellaria aequinoctialis*, sooty shearwater *Puffinus griseus*, New Zealand white-capped albatross *Thalassarche steadi*, Salvin's albatross *Thalassarche salvini* and Buller's albatross *Thalassarche bulleri bulleri*).

All birds returned from longline fisheries had injuries consistent with being hooked or entangled in the bill or throat. In contrast, most birds (88.8%) returned from trawl fisheries were killed through entanglement in the net or cod-end, with the remaining 10.3% likely to have been killed by warp interaction or entanglement. Three birds were killed by striking the deck. Birds had higher mean fat scores as in the previous fishing year, and discards, including offal, appear to continue to be an attractant for many seabirds. Out of 284 records of seabird interactions on fishing vessels, photographs were taken of 35 seabirds consisting of 11 taxa. Of these 35 images, only 23 had corresponding information recorded in the COD extract. Image quality varied widely, with poor images being particularly common for birds that were alive and seen on-board for short periods.

Recommendations

- Autopsy: It is important that all data fields are completed and all paper work is returned with catch specimen to enable linking of specimens to events.

- Photo: To improve photo-identifications in the future, wherever possible, all interactions should be photographed and recorded with haul/sample information included in the image. Images (with scale if possible) should include the head and bill from the side and above, body (full body and side shots), wings (above and below) and shots of the feet whenever possible; this is particularly important for dead birds. Photo logs should be completed for all images (which can be correlated to camera date and time stamps) with descriptions to help with the identification and matching of images. Photograph numbers should be recorded on the observer non-fish bycatch form. Photographs (and extracts from the observer log books) should be provided regularly throughout the fishing year for photo-identification.

Project logistics summary statement

This project was 100% funded via Conservation Service Levies on the fishing industry. The planned cost for the project was $80,000 per annum. Services were provided by Wildlife Management International Ltd.

Review milestones:

- Presentation of yearly results at the CSP TWG meeting on 4 May 2015
- Draft final report published on the CSP site in October 2015

Citation

Bell, E. A.; Mishcler, C. P. 2015. INT2013/02 Identification of seabirds caught in New Zealand fisheries: 1 July 2014 - 30 June 2015. Report prepared by Wildlife Management International Ltd for the New Zealand Department of Conservation, Wellington. 22p.

Weblink

http://www.doc.govt.nz/our-work/conservation-services-programme/csp-reports/2014-15/identification-of-seabirds-captured-in-nz-fisheries-2014-15/

2.3 INT2013-03 Identification of marine mammals, turtles and protected fish captured in New Zealand fisheries

Overall objective

To determine which marine mammal, turtle and protected fish species are captured in fisheries and their mode of capture.

Specific objectives

1. To determine, primarily through examination of photographs, the taxon and, where possible, sex, age-class and provenance of marine mammals, turtles and protected fish captured in New Zealand fisheries (for live captures and dead specimens discarded at sea)

Rationale

The accurate determination of the taxon of marine mammals, turtles and protected fish captured in New Zealand fisheries is vital for examining the potential threat to population viability posed by incidental fisheries captures. Observers on commercial vessels are not always able to identify marine mammals, turtles and protected fish at sea with high precision, and the assessment of the age-class may require expert knowledge. Information gained through this project will link to Ministry for Primary Industry databases and will inform ongoing bycatch estimation, risk assessment, research and modelling of the effects of fisheries bycatch on marine mammals, turtles and protected fish populations.

This is the second year of a two year project and is designed to complement the seabird identification project. Observers routinely collect samples of genetic material from these taxa, and these can be used to resolve uncertain identification determinations from photographs.

Project status

In progress.

Project logistics summary statement

This project was 100% funded via Conservation Service Levies on the fishing industry. The planned cost for the project was $15,000 per annum. Services were provided by Anton van Helden, Marine Mammal Consultant.

3. Population Projects

3.1 POP2014-01 New Zealand sea lion population project (Auckland Islands)

Overall objectives

To estimate New Zealand sea lion pup production in the Auckland Islands and collect data to allow the estimation of key demographic parameters.

Specific objectives

1. To estimate New Zealand sea lion pup production at Enderby, Figure of 8 and Dundas Islands
2. To mark New Zealand sea lion pups at Enderby and Dundas Islands following established techniques
3. To conduct a three to five week period of resighting previously marked animals at Enderby Island
4. To update the New Zealand sea lion database

Rationale

New Zealand sea lions are classified as Nationally Critical (Baker *et al* 2010), and are incidentally killed each year in southern commercial trawl fishing operations targeting species including squid, scampi and southern blue whiting. The foraging areas of New Zealand sea lions at the Auckland Islands have been shown to overlap with commercial trawl fishing activity, particularly SQU6T and SCI6A. Approximately 7o% of New Zealand sea lions breed at the Auckland Islands where population data have been collected since the mid-1990s, including estimates of pup production and resighting of marked animals. Since 2001 there has been a considerable decline in pup production at the Auckland Islands. A literature review to identify potential indirect effects of commercial fishing on the Auckland Islands population as part of CSP project POP2010-01 has recently been completed (Bowen 2012). The review highlighted a number of key information gaps that currently prevent a full understanding of any such potential indirect effects.

In order to manage the commercial fisheries impacts on New Zealand sea lions at the Auckland Islands it is critical to understand the population level and key demographic factors driving trends in the population. CSP project POP2012-02 is currently analysing population data collected during previous years in order to determine the key demographic factors driving the observed population decline of New Zealand sea lions at the Auckland Islands, and is due to complete in mid-2014. This project will extend the time series of population data available for further analyses.

In response to the continued decline at the Auckland Islands, the Ministers of Conservation and Primary Industries announced that a Threat Management Plan (TMP) for New Zealand sea lions would be developed. This research project is scoped to collect key information required to understand the impact of commercial fishing on the Auckland Islands population, in line with CSP

Objective E. It is envisaged that other research, and/or management actions, will be progressed as part of the TMP, and may be delivered alongside the research programme proposed here.

Project status

Complete.

Summary of the methods and key findings

Pup production was estimated for NZSL colonies at Sandy Bay (n=286), Dundas Island (n=1,230), Figure of Eight Island (n=60) and South East Point (n=0); with total pup production for the Auckland Islands in 2014/15 estimated as 1,576. This total represents an increase of one pup from the 2013/14 estimate from last season, and is the fourth lowest total pup production recorded for the Auckland Islands.

With the exception of the Figure of Eight colony, estimates of pup mortality to the date of the pup production estimate are broadly comparable to previous 'non-epidemic' years. However, these figures do not represent full season surveys and are not directly comparable to data collected prior to 2012/13, and so should be viewed as a minimum. Pup mortality estimates are: Sandy Bay 2%, Dundas Island 5% and Figure of Eight Island 22%. This is the highest ever level of pup mortality recorded at Figure of Eight Island and is considerably higher than the long-term average annual mortality level of 9%.

Mean pup weights at Sandy Bay were 4% and 5% lower than 2013/14 for males and females respectively. Mean pup weights at Dundas Island were 6% and 12% higher than 2013/14 for males and females respectively. Pup weights were undertaken at Figure of Eight Island for the first time and were very similar to those at Sandy Bay.

Seven hundred and twenty nine pups were marked at the Auckland Islands including: Sandy Bay – 147 flipper tagged and microchipped, and 140 microchipped only (Note that this was a new protocol implemented in 2014/15 with only approximately 50% rather than 100% of pups being tagged at Sandy Bay); Dundas Island – 391 flipper tagged only; and Figure of Eight Island – 40 flipper tagged only.

Of the 63 dead pups recovered at Sandy Bay, 59 were in sufficient state for necropsy. Preliminary provisional diagnosis for cause of death includes 61% bacterial infection (suspected with Klebsiella pneumoniae), 17% open diagnosis (decomposed, scavenged or no significant findings), 15% starvation, 3% trauma, 2% hookworm and 2% stillbirth/peripartum death.

In response to previous examples of pup mortality in holes at Sandy Bay, 12 wooden ramps were installed on streams and mud holes in order to allow pups to climb out of places where they otherwise would not be able to. A total of two pups were found dead in mud holes, however 65 were physically rescued by the NZSL team prior to ramp installation and 45 were seen exiting on ramps on review of GoPro and trail camera photos. This work was funded separately by DOC and WWF rather than by CSP, however, it did share resources with the CSP funded programme.

Recommendations

- Understanding the causes of mortality to the decline in pup production is important and autopsies should be included into the existing project;
- Consideration should be given to prior approval for vets to use injectable humane euthanasia of moribund pups.
- Flipper tagging 50% pups at Sandy Bay should be reviewed.
- It would be useful to develop a standardised method for the estimation of confidence intervals for pup production
- Pup and adult body condition have been implicated in the decline of pup production at the Auckland Islands. It would be useful to assess how this information could be collected in future.
- Some sources of pup mortality could be mitigated through active management and should be explored further
- Surveys at other Auckland Island locations for NZSL

Project logistics summary statement

This project was 90% funded via Conservation Service Levies on the fishing industry. The planned cost for the project was $200,000. Services were provided by the Blue Planet Marine.

Review milestones:

- Research planning presented at CSP TWG on the 22 July 2015
- Initial results presented at CSP TWG meeting on 18 March 2015
- Draft final report presented at the CSP TWG meeting on 17 June 2015

Citation

Childerhouse, S., Michael, S., Adams, L., Burns, T., Cockburn, S., Hamer, D., Maloney, A., and Pugsley, C. 2015. Final report: New Zealand sea lion research at the Auckland Islands 2014/15. Report prepared by Blue Planet Marine for the New Zealand Department of Conservation, Wellington. 50p.

Weblink

http://www.doc.govt.nz/our-work/conservation-services-programme/csp-reports/2014-15/final-report-new-zealand-sea-lion-research-at-the-auckland-islands-2014-15/

3.2 POP2014-02 Seabird population research 2014-15

Overall objective

To collect information on key aspects of the biology of selected at-risk seabird species in order to reduce uncertainty or bias in estimates of risk from commercial fishing.

Rationale

The Draft Conservation Services Programme Seabird medium term research plan 2014 (Draft CSP seabird plan)[3] outlines a five year research programme to deliver on the seabird population research component of CSP (the Draft CSP seabird plan was revised and finalised in January 2015[4] and will be reviewed and updated annually or as required). It is targeted at addressing relevant CSP Objectives (as described in the CSP Strategic Statement) and National Plan of Action – Seabirds [5]Objectives. It was developed as part of the work of the CSP Research Advisory Group. For the purposes of this CSP Annual Plan 2014/15, key components of research described in the draft CSP seabird plan have been identified for inclusion in this project, with consideration of the recommendations made by a review of the risk assessment[6] and considerations to maximise logistical synergies with other work in order to deliver cost efficiencies. In particular, the multiple CSP research objectives at the Auckland Islands will be delivered by a programme of research that maximises cost efficiencies, for example in transport logistics and through collaboration with other researchers.

[3] Available for download at http://www.doc.govt.nz/conservation/marine-and-coastal/conservation-services-programme/meetings-and-project-updates/11-march-2014/

[4] Available for download at http://www.doc.govt.nz/our-work/conservation-services-programme/csp-research-advisory-group-resources/

[5] National Plan of Action – 2013to reduce the incidental catch of seabirds in New Zealand Fisheries. Available for download at: http://www.mpi.govt.nz/

[6] Walker, N.; Smith, N.; Sharp, B.; Cryer, M. (2015). A qualitative review of New Zealand's 2013 level two risk assessment for seabirds. New Zealand Fisheries Science Review 2015/1. 53 p.

Black petrel

Specific objectives

1. To estimate the black petrel population size at Aotea/Great Barrier Island and Hauturu/Little Barrier Island.
2. To describe key demographic parameters, primarily juvenile and adult survival at Aotea/Great Barrier Island.

Project status

Complete.

Summary of the methods and key findings

The research comprised of two components:

Part 1: Great Barrier Island/Aotea

This report is part of the ongoing study of the black petrel, *Procellaria parkinsoni*, on Great Barrier Island (Aotea Island) that was begun in the 1995/96 breeding season. During the 2014/15 breeding season, 422 study burrows within the 35-ha study area near Mount Hobson/Hirakimata were checked and intensively monitored. Of these, 283 were used by breeding pairs, 100 by non-breeding adults and the remaining 39 burrows were unoccupied.

By 28 April 2015, 199 chicks were still present in the study burrows, corresponding to a breeding success of 70.3%. Nine census grids were monitored within the study area and accounted for 159 of the inspected burrows, with 97 burrows being used for breeding. Eighty-nine chicks from earlier breeding seasons were recaptured within the Mount Hobson colony area this season (a total of 194 'returned chicks' have been caught since the 1999/2000 season).

Analysis of the stratified census grid and mean transect data estimated that there were 2296 to 2606 birds present in the 35-ha area around Mount Hobson (Hirakimata).

Recommendations

- To continue monitoring of the black petrel population using the study burrows up to the 2024/25 season
- That 30 breeding adults carry TDR and GPS devices to obtain foraging information in NZ waters
- That 30 breeding adults carry geolight loggers to obtain information on migration to South America
- That further random transects are undertaken every five years throughout the 35-ha study area around Mount Hobson to increase the likelihood of adult and juvenile recaptures (to improve survival and immigration estimates) and to compare with earlier transect surveys to determine population trends
- That cat trapping continues on and around Hirakimata prior to the breeding season
- Future analysis of the resighting data is completed

Part 2: Hauturu-o-Toi/Little Barrier Island

This report covers the preliminary survey and population monitoring of black petrels, *Procellaria parkinsoni*, on Hauturu-o-Toi/Little Barrier Island. On Hauturu-o-Toi/Little Barrier Island, 123 study burrows were monitored, of which 90 were original study burrows established in 1997 by Mike Imber. There was 55% being used by breeding brids, but of the original Mike Imber burrows only 34% of these burrows were being used by breeding birds indicating a decline of 5% over the past 8 years. Twenty-seven automated acoustic devices were placed out across Hauturu-o-Toi/Little Barrier Island in December 2014 and were retrieved in May 2015. Black petrel calls were recorded at four locations: Track 7, Track 3, the Thumb (on both recording devices) and along Track 8. Three surveys methods using random transects, census grids or seabird-detector dogs were trialled to determine the best method for an island-wide survey to determine the population density and range of black petrels on Hauturu-o-Toi/Little Barrier Island.

Recommendations

- To continue monitoring of the black petrel population using the study burrows up to the 2024/25 season
- That 30 breeding adults carry TDR and GPS devices to obtain foraging information in NZ waters
- That 30 breeding adults carry geolight loggers to obtain information on migration to South America
- That further random transects are undertaken to increase the likelihood of adult and juvenile recaptures (to improve survival and immigration estimates) and to provide a population estimate
- The exact limits of the Hauturu-o-Toi/Little Barrier Island black petrel colony or habitat should be established and the area calculated by a ground truth survey

Project logistics summary statement

This project was funded via a mixed model whereby $40,000 was contributed via Conservation Service Levies on the fishing industry $40,000 was contributed by DOC through crown funding and $70,000 was contributed by MPI. The planned cost for the project was $150,000. Services were provided by Wildlife Management International Ltd.

Review milestones:

- Presentation of methodology at the CSP TWG meeting on 21 November 2013;
- Presentation of draft final report at the CSP TWG meeting on 12 December 2014.

Citations

Bell, E. A., Mischler, C., Sim, J. L., & Scofield, P. 2015. Population parameters of the black petrels (*Procellaria parkinsoni*) on Great Barrier Island (Aotea Island), 2014/15. Report prepared by Wildlife Management International for the New Zealand Department of Conservation, Wellington. 49p.

Bell, E. A., Mischler, C., & Sim, J. L. 2015. Preliminary survey and population monitoring of black petrels (*Procellaria parkinsoni*) on Hauturu-o-Toi/Little Barrier Island, 2014/15. Report prepared by Wildlife Management International for the New Zealand Department of Conservation, Wellington. 16p.

Weblink

http://www.doc.govt.nz/our-work/conservation-services-programme/csp-reports/2014-15/black-petrels-on-great-and-little-barrier-islands-2014-15/

Salvin's albatross

Specific objectives

1. To estimate the Salvin's albatross population size at The Snares.
2. To describe key demographic parameters, primarily adult survival, at The Snares.

Project status

Complete.

Summary of the methods and key findings

The research comprised of two components:

1. Ground count

This report presents a summary of the results of whole-island counts of Salvin's albatrosses *(Thalassarche salvini*) breeding at the Snares Western Chain on 17 September 2014 and compares these results with those obtained using similar methods during 2008 and 2009. In addition, the results of ground-truthing of an aerial survey and a survival analysis based on the recapture of banded birds are presented.

The whole-island surveys used the same methods as those in 2008 and 2009. The survey of Toru and Rima islets and a rock stack just east of Toru resulted in an estimate of 1213 breeding pairs, which was very similar to the 1195 and 1116 breeding pairs estimated in 2008 and 2009, respectively, indicating that the population has remained stable over the intervening period.

Counts along transects immediately after the aerial survey showed that of 171 birds ashore, 100 (58.5%) were incubating, 14 (8.2 %) were on empty nests, and 57 (33.3 %) were loafing. The relatively high proportion of loafing birds may be a result of breeding failure as a consequence of habitat and disturbance by other birds prior to the survey.

On Toru Islet, a total of 67 birds that had been banded previously as chicks on the nest (in 1986) or breeding adults of unknown age (in 1995, and annually 2008-2010) were recaptured. Analysis of these data in a mark-recapture model resulted in an estimated survival probability of 0.951. This remains among the highest estimated survival of any population of annual breeding albatrosses.

2. Aerial survey

In September 2014 an aerial survey of the Western Chain, The Snares, was completed and all albatross colonies observed were photographed. Salvin's albatross was breeding on two (Rima and Toru) of the five islets in the Western Chain archipelago. The photographs were used to compile photo-montages of each colony, and these images were used to count birds on each islet. Ground counts of nesting Salvin's albatrosses were also undertaken on Toru Islet on the day that aerial photography was undertaken.

The total number of Salvin's albatrosses was estimated ashore in the Western Chain in 17 September 2014 to be 2,307 (95% CI 2,211 — 2,403. Of these, 675 (CI 623 — 727) were on Rima

Islet, and 1,632 (CI 1,551 — 1,713) were on Toru Islet. Ground counts at Toru Islet showed that of 171 birds ashore, 100 (58.5%) were incubating, 14 (8.2 %) were on empty nests, and 57 (33.3 %) were loafing. 'Close up' photographs taken using a large telephoto lens to assess the proportion of breeding and loafing birds were not useful for this purpose because we were unable to determine if most of the birds visible were clearly associated with a nest. Raw counts of birds ashore were adjusted to account for the presence of loafers. This provided an estimate of 1,486 (95% CI 1,409 — 1,563) annual breeding pairs in 2014/15, which was 32% higher than the ground counts undertaken on the same day of the aerial survey.

Aerial surveys proved to be an effective method of rapidly assessing the population size of Salvin's albatross in the Western Chain, The Snares. Despite the difference between the aerial and ground counts, it should not be assumed at this stage that one survey methodology is more accurate than the other, as there is potential for error using both methods.

The use of close up aerial photographs has proven useful in correcting raw counts to estimate the number of annual nesting pairs at other albatross colonies, but their utility for this purpose at the Western Chain, would appear to be limited. Ground counts indicated the proportion of loafing birds in colonies (33.3%) was high, but consistent with that observed at the Bounty Islands (25.8%) in 2013. These values exceed those previously recorded for other *Thalassarche* albatrosses during the early to mid-incubation period, but may be normal for Salvin's albatross because of the nature of their nesting sites where egg loss appears to be very high. The cause of many nest failures appeared to be a combination of the lack of substrate with which to construct a nest, and interference from birds attending the colony.

Recommendations

- If population size (annual breeding pairs) is to be regularly estimated using aerial photography, it would appear more appropriate to use the correction factor derived by the 2014 ground count to adjust raw counts each year, noting that this correction factor will likely be dependent on the time of the breeding season that the count is undertaken. Further ground-truthing undertaken concurrently with aerial photography would be of use to refine the correction factor. Alternatively, aerial photography could be used to simply assess the number of birds ashore and use this as an index of abundance to assess population trend over time

Project logistics summary statement

This project was 50% funded via Conservation Service Levies on the fishing industry. The planned cost for the project was $65,000. Services were provided by NIWA and Latitude 42.

Review milestones:

- Ground survey; draft final report presented at the CSP TWG on the 12 December 2014
- Aerial survey; draft final report presented at the CSP TWG on the 12 December 2014

Citation

Sagar, P., Charteris, M., Scofield, P. 2015. Salvin's albatross population size and survival at the Snares Western Chain. Final report prepared by NIWA for the New Zealand Department of Conservation, Wellington. 17p.

Baker, G.B., Jensz, K., Sagar, P. 2015. 2014 Aerial survey of Salvin's albatross at The Snares, Western Chain. Project Final report prepared by Latitude 42 for the New Zealand Department of Conservation, Wellington. 9p.

Weblink

http://www.doc.govt.nz/our-work/conservation-services-programme/csp-reports/2014-15/2014-aerial-survey-of-salvins-albatross-at-the-snares-western-chain1/

http://www.doc.govt.nz/our-work/conservation-services-programme/csp-reports/2014-15/salvins-albatross-population-size-and-survival-at-the-snares-western-chain/

White-capped albatross

Specific objectives

1. To estimate the population size of white-capped albatross at the Auckland Islands.
2. To describe key demographic parameters, primarily adult survival, at The Snares.
3. To ground truth aerial survey methods on Disappointment Island, Auckland Islands.

Project status

Complete.

Summary of the methods and key findings

The research comprised of two components:

1. Aerial photographic census of white-capped albatross at the Auckland Islands to estimate the total number of breeding pairs.

Between 2006/07 and 2014/15 (hereinafter 2006 and 2014, respectively) a study was undertaken of a repeated population censuses of the white-capped albatrosses breeding in the Auckland Islands using aerial photography. These population censuses were carried out in either December or January each year to estimate population size and track population trends. Measure of population size was 'Annual breeding pairs', defined as any pair of albatrosses that lays an egg in the breeding season of interest. All other birds in colonies were assessed as 'Loafers', defined as birds present in a colony but which do not appear to be associated with an active nest at the time of observation.

In 2014 it was estimated that there were 96,864 (95%CI 96,242 — 97,486), 4,741 (4,603 — 4,879) and 193 (165— 221) annual breeding pairs at Disappointment Island, South West Cape and Adams Island, respectively, in 2014, based on the raw counts, giving a total for these sites of 101,798 (101,160 — 102,436) breeding pairs. Based on an assessment of 15 aerial close-up photos, 5.8% of birds in the colonies were loafers. After adjusting the raw counts to account for loafing birds, it was estimated that there were 95,894 annual breeding pairs in the Auckland Islands in 2014. Previous annual counts have ranged from 73,838 to 116,025 annual breeding pairs (mean 90,781 annual breeding pairs).

Ground counts undertaken by Thompson et al. (2015) a few days before the 2014 aerial counts were undertaken, showed that of 1,127 birds sitting on nests, 909 (81%) were incubating eggs and 218 birds (19%) were sitting on empty nests. These data can be compared with ground counts of nests taken earlier in the breeding season (December) in 2008 that showed that 93.5% contained eggs and only 6.5% were empty. Aerial counts undertaken earlier in the breeding season are likely to provide a more accurate estimate of annual breeding pairs as nest failures occur progressively throughout the breeding season once egg laying has been completed. Ground-truthing data assessing the proportion of birds sitting on empty nests will not reliably provide a correction factor relevant to determining annual breeding pairs, as a bird sitting on an empty nest may have laid and subsequently lost its egg, may be yet to lay, or simply be a non-breeding loafer.

The count data over nine years show strong inter-annual fluctuations. Trend analysis of nine years of counts using regression splines showed no clear evidence for systematic increase or decline over the nine years of the study. Given this we do not have sufficient evidence to reject the null hypothesis of no systematic trend in the total population. The trend should be considered to be uncertain; however, the null hypothesis of a stable population remains tenable and is probably a reasonable interpretation.

2. Simulation modelling of mark-recapture sample size effects on demographic rate estimation.

This study assessed the effect of alternative mark-recapture sampling approaches to a potential mark-resighting study of white-capped albatross on the estimation of demographic rates.

A data simulator was used to create dummy mark-resighting observations for a single banding year with alternative scenarios of: banded sample size (150, 300 or 600 breeding individuals); number of subsequent consecutive resighting years (2, 3, 4, 5 or 10 years); and resighting probability of breeders (0.6 or 0.4) and non-breeders (0.0 or 0.1).

The SeaBird demographic modelling software was then used to determine variability in the estimates of survival and breeding rate using the dummy mark-resighting observations. This assessment assumed that demographic rates were constant with respect to year and age and variability of demographic rates of wild populations are likely to be greater than those obtained by this assessment.

Increasing the banded sample size from 150 to 600 individuals led to an increase in the precision (c.v.) of annual survival breeding rate estimates. With an input survival rate of 0.95 and a banded population of 150 individuals, the range of survival estimates was wide with 5 years of resighting effort (range from 0.91-0.99, $\bar{x}$ = 0.95), though was much narrower with 10 years of resighting effort (0.93-0.96, $\bar{x}$ = 0.95). With a banded sample size of 600 individuals, the range of survival estimates was narrow with 5 years of resighting effort (0.93-0.97, $\bar{x}$ = 0.95).

The precision of demographic rate estimates was not greatly affected by reducing the resighting probability of breeders from 0.6 to 0.4, though reducing the resighting probability of non-breeders from 0.10 to 0.00 produced imprecise estimates that were for some samples very different from input values.

Recommendations

- Further annual photographic counts are recommended until population trends can be estimated with certainty.
- To produce estimates of demographic rates that would be suitably precise for risk assessment purposes. This data simulation approach indicates that resighting effort over 5-10 years would be required subsequent to banding of a population between 150-600 individuals.
- In a wild population, demographic rates are likely to change through time. This and other population processes not considered in this assessment (e.g. permanent migration out of the

study area) may decrease the precision of estimates, such that greater sampling effort (in terms of banded individuals, number of resighting years or even resighting effort) may be required to obtain the same level of precision for a given sampling regime.

Project logistics summary statement

This project was 50% funded via Conservation Service Levies on the fishing industry. The planned cost for the project was $65,000. Services were provided by NIWA & Latitude 42.

Review milestones:

- Aerial survey; proposed methodology presented at the CSP TWG on the 12 December 2014.
- Aerial survey; draft final report presented at the CSP TWG on the 4 May 2015.
- Draft final report of mark-recapture feasibility study presented at the CSP TWG on the 17 June 2015.

Citation

Baker, G.B., Jensz, K. And Cunningham, R. 2014. White-capped albatross aerial survey 2014. Report prepared by Latitude 42 for the New Zealand Department of Conservation, Wellington. 21p.

Roberts, J., Doonan, I. and Thompson, D. 2015. Mark-recapture sample size effects on demographic rate estimation of white-capped albatross. Report prepared by NIWA for the New Zealand Department of Conservation, Wellington. 12p.

Weblink

http://www.doc.govt.nz/our-work/conservation-services-programme/csp-reports/2014-15/white-capped-albatross-mark-recapture-sample-size-analysis/

http://www.doc.govt.nz/our-work/conservation-services-programme/csp-reports/2014-15/white-capped-albatross-aerial-survey-2015/

Southern Buller's albatross

Specific objectives

1. To estimate the population size of Southern Buller's albatross at the Solander Islands.
2. To describe key demographic parameters, primarily adult survival, at The Snares.

Project status

One component complete, one component underway.

Summary of the methods and key findings

The research comprised of two components:

1. Estimate the population size of Southern Buller's albatross at the Solander Islands.

In progress. Results will be included in the 2015/16 Annual Research Summary.

2. Collection of data to describe key demographic parameters, primarily adult survival, at The Snares.

This report presents a summary of the results of the collection of demographic data at three study colonies of Southern Buller's Albatross (*Thalassarche bulleri bulleri*) breeding at The Snares from 23-29 March 2015.

All of the three study colonies (Mollymawk Bay, Lower Punui Bay and Upper Punui Bay) were visited; Upper and Lower Punui Bay on 24, 26, 27 and 29 March, and Mollymawk Bay on 23, 25 and 28 March 2015. On the first visit to each colony all nests were inspected and the contents recorded. Band numbers of all adult birds associated with these nests were recorded, and any unbanded birds incubating or guarding a chick were captured and fitted with a uniquely numbered stainless steel leg band. All adult birds recorded on this first visit were marked with blue raddle (a temporary stock marker) so that they were not recaptured on the subsequent visits. The large majority of the partners of the birds recaptured on this first visit were at sea, and so subsequent visits were made to allow time for these birds to have returned to the colony and taken over incubation or chick-guarding duties. On these subsequent visits to each colony, all nests were checked again and any birds not marked with raddle were captured and band numbers recorded or leg bands applied, as appropriate. In addition, on each visit an attempt was made to recapture as many as possible of the banded non-breeding birds that were loafing in the colonies.

Demographic studies at the three study colonies have been undertaken annually since 1992, and so this report incorporates some of these data in the current analysis. Estimates of the numbers of breeding pairs, made by recording the contents of each nest mound, showed slight decreases in all three colonies over the numbers recorded during 2014. With the assumption that the combined total number of breeding pairs in the three study colonies was representative of North East Island as

a whole then the breeding population probably peaked in 2005-2006 and has since undergone marked annual variations.

A total of 295 birds that had been banded previously in the study colonies as breeding adults of unknown age were recaptured. A further 26 breeding birds were banded in the study colonies - these are presumed to be first-time breeders. During the period 1992-2004 all chicks that survived to near-fledging in the study colonies were banded and their survival to return to the study colonies in subsequent years has been monitored. This year 134 of these birds were recaptured, with birds from cohorts banded from 1999 to 2004 being recaptured for the first time, and so showing the long-term monitoring required to obtain reliable estimates of survival of such known-age birds. A further 36 known-age birds, from cohorts banded 1996-2004, were found breeding for the first time, and so were recorded as being recruited to the breeding population.

Recommendations

- A continuation of at least annual checks of the three established study colonies to maintain information on population size and trend, adult survival and recruitment rate of known-age birds.

Project logistics summary statement

This project was 50% funded via Conservation Service Levies on the fishing industry. The planned cost for the project was $40,000. Services were provided by NIWA and Latitude 42.

Review milestones:

- Draft final report (The Snares) tabled at the CSP TWG on the 17 June 2015.

Citation

Sagar, P. 2015. Population study of Southern Buller's Albatross on The Snares. Report prepared by the National Institute of Water & Atmospheric Research Ltd. for the New Zealand Department of Conservation, Wellington. 11p.

Weblink

http://www.doc.govt.nz/our-work/conservation-services-programme/csp-reports/2014-15/population-study-of-southern-bullers-albatrosses-on-the-snares/

Gibson's albatross

Specific objectives

1. To estimate the population size of Gibson's albatross at the Auckland Islands.
2. To describe key demographic parameters, primarily adult survival, at Adams Island, Auckland Islands.

Project status

Complete.

Summary of the methods and key findings

The research comprised of two components:

1. Methods to estimate the total population size at Adams Island, Auckland Islands.

Two reports were produced that aim to provide recommendations for robustly estimating the total population size of Gibson's albatross at Adams Island. They identify and review the range of feasible options for conducting aerial survey techniques at Adams Island.

2. Collection of data to describe key demographic parameters, primarily adult survival, at Adams Island, Auckland Islands.

The size and trend of the Gibson's albatross population was estimated by a count of active nests in 3 representative parts of their main breeding grounds on Adams Island, and by mark-recapture estimate of the size of the population in a 61 ha intensively monitored study area. Survivorship was estimated by mark-recapture analysis of the data collected from banded birds in the study area, along with productivity and recruitment estimates.

The suitability of aerial counts as a census technique was investigated by (1) undertaking a series of ground counts which estimated the ratio between the number of birds that looked like they were nesting and the number actually nesting (2) overlaying low resolution aerial images taken of the study area nests on 18/1/15 with the number and distribution of nests recorded on the ground (3) identification of the equipment and its cost required to obtain high resolution, geo-referenced, ortho-corrected images of Adams Island.

Signs of a gradual recovery in 2013 have disappeared, with falling attendance, productivity and recruitment in 2014-15. Survival estimates and the mark/recapture estimate of the size of the study population lags productivity and recruitment estimates by 2 years, and are still reflecting the small improvement seen in 2013. Census data collected annually since 1998 indicates a marked change since the 2005 population crash; in 1998- 2005 about 65% of birds on Adams Island about the end of January were incubating eggs while about 35% were without eggs. Since 2005, at best only 50% of the birds on the breeding grounds are incubating eggs while 50% are not breeding. The large decline

in the ratio of breeders to non-breeders is the result of a sex imbalance caused by high female mortality since 2005-06.

Aerial counts showed that there was considerable variability in the ratio of actual nesters to apparent nesters. Low resolution oblique aerial images taken manually missed a significant proportion of the study area, were very time-consuming to stitch together and were not clear enough to differentiate birds. High resolution geo-referenced ortho-corrected images taken automatically from a vertically-mounted camera are possible but untested.

Monitoring the population structure as well as trends of Gibson's albatrosses remains an important conservation priority as the population is still declining, and simple numbers of birds on the breeding grounds does not accurately reflect the conservation status of the species.

Low resolution oblique images taken manually are not an appropriate method for aerial census of Adams Island. High resolution vertical aerial images across all the island's albatross colonies may be possible. Any aerial count will provide only a very imprecise estimate of breeding population size, due to the highly variable number of non-breeding birds and the difficulty of obtaining meaningful correction factors for each colony.

Recommendations

- Population size and trend and adult survival should continue to be estimated at regular intervals until the population substantially increases. A detailed modelling exercise such as the one carried out by Francis et al in 2012 would give a better indication of the trajectory of the whole population and should be undertaken within the next five years.
- None of the potential methods for making a new estimate of total population size would give a result which could be directly compared with estimates made in the 1990's, and all would include some degree of error. Given the quality of the existing estimate, a new whole island ground or aerial count is not considered warranted.

Review milestones:

- Proposed methodology (ground survey) presented at the CSP TWG on the 12 December 2014
- Draft final report (ground survey) presented at the CSP TWG on the 4 May 2015
- Draft final reports (aerial survey methods) presented at the CSP TWG on 25 August 2015

Project logistics summary statement

This project was 50% funded via Conservation Service Levies on the fishing industry. The planned cost for the project was $65,000. Services were provided by Albatross Research and Latitude 42.

Citation

Baker, B., Jensz, K., and Hamilton, S. 2015. Assessment of aerial census techniques to robustly estimate the total population size of Gibson's albatross on Adams Island. Report prepared by Latitude 42 for the New Zealand Department of Conservation, Wellington. 18p.

Walker, K., Elliott, G. 2015. Gibson's wandering albatross population study 2014/15. Report prepared by Albatross Research for the New Zealand Department of Conservation, Wellington. 16p.

Walker, K, and Elliot, G. 2015. Gibson's wandering albstross: analysis of census techniques. Report prepared by Albatross Research for the New Zealand Department of Conservation, Wellington. 10p.

Weblink

http://www.doc.govt.nz/our-work/conservation-services-programme/csp-reports/2014-15/gibsons-wandering-albatross-population-study-2014-15/

http://www.doc.govt.nz/our-work/conservation-services-programme/csp-reports/2014-15/gibsons-wandering-albatross-methods-to-estimate-population-size/

White-chinned petrel

Specific objectives

1. To Investigate logistics of establishing a mark-recapture study to investigate adult survival and other demographic parameters of the white-chinned petrel population at Auckland Islands.
2. To investigate a methodology to estimate the population size of white-chinned petrel on Adams Island, Auckland Islands.

Project status

In progress.

Summary of the methods and key findings

Research to address the specific objectives will be reported in 2015/16. The following summary is from research to estimate the population size on Disappointment Island (primarily ACAP funded).
Population size of white-chinned petrels on Disappointment Island, thought to be a key breeding site in the Auckland Islands, was estimated taking into account the detection probability of burrows via distance sampling and burrow occupancy. Eighty line transects were distributed over the island, with a total line length of 1 600 m. White-chinned petrel burrows occurred at a density of 644 (95% confidence intervals: 487–850) burrows/ha, with an overall burrow detection probability of 0.33 ± 0.03. We document an estimated total of 153 100 (115 900–202 200) breeding pairs of white-chinned petrels on Disappointment Island in mid incubation.

Recommendations

These recommendations are from research to estimate population size on Disappointment Island.

- Disappointment Island is a key breeding site for white-chinned petrels globally, with burrow density an order of magnitude higher than most island-wide estimates and very high burrow occupancy. It is therefore an important site to revisit in order to monitor population trends.
- This estimate was influenced to an unknown extent by breeding failures prior to survey, which took place in mid-incubation. This timing bias should be addressed in future burrowing petrel surveys by timing surveys to take place just after egg-laying has finished.
- Adams Island is the only Auckland Islands site where white-chinned petrels are known to be numerous. An estimate of the population size there is required to complete an overall Auckland Islands population estimate.

Project logistics summary statement

This project was 50% funded via Conservation Service Levies on the fishing industry. The planned cost for the project was $25,000. Services were provided by NIWA & Otago University. Additional funding was obtained primarily from ACAP funding for Disappointment Island.

Review milestones:

- Project updated presented to the CSP TWG on the 17 June 2015

Citation

Rexer-Huber, K., Parker, G.C., Sagar, P., & Thompson, D. 2015. White-chinned petrel population estimate, Disappointment Island (Auckland Islands). Report prepared by Parker Conservation for the Agreement for the Conservation of Albatross and Petrels. 14p.

Weblink

http://www.doc.govt.nz/our-work/conservation-services-programme/csp-reports/2014-15/white-chinned-petrel-population-estimate-disappointment-island/

Burrowing petrels

Specific objectives

1. To review survey methods to describe areas of uncertainty in relation to estimating population sizes of burrowing petrels.

Project status

Complete.

Summary of the methods and key findings

Robust population estimates are needed for conservation management of burrowing petrel populations. Estimates of population size for burrowing petrels are often obtained by extrapolation of burrow surveys to a population- or island-wide scale. However, extrapolation will also extrapolate bias or error, giving rise to potentially large error bounds reflecting imprecise estimates of population size. This hinders species risk assessment and limits the ability to detect trends in population size over time. We review methods for estimating the breeding population size of burrowing petrels by extrapolation from surveys, focusing in particular on the error associated with population estimates of the larger *Procellaria* petrels.

Sources of error in extrapolation of survey data are divided into five key areas: (1) uncertainty of burrow contents, (2) timing, (3) burrow detection probability, (4) availability bias, and (5) observer bias. We reviewed 87 relevant studies. Of these, 45 published and unpublished studies deal specifically with quantitative surveys of burrowing petrels.

The review highlights that there is no single-best method for minimising error levels in population estimates. Rather, the most accurate and precise studies are those designed according to the specifics of the study resources, species and site, and we discuss a range of the factors that are important to consider.

To produce an accurate and precise population estimate from burrow counts, it is important to determine burrow contents, and to distinguish between breeding and non-breeding birds in burrows. If a proportion of occupants is missed, further error is introduced to the population estimate, so it can be valuable to check occupant detection probability. The timing of burrow occupancy checks can help avoid assumptions about what proportion of breeding birds has not yet laid or has already failed. Extrapolation errors occur when the area sampled is not representative of the area that the samples are extrapolated to. If sampling sites are not representative, or if some part of a petrel's burrowing range is not accessible, this availability bias can affect extrapolation. Burrow detection rates can also affect the accuracy of extrapolation, so the assumption that every burrow in the sampled area was detected should be checked. Whether planar map area or true surface area is used for extrapolation can be a further source of error. Observers may differ in their ability to detect burrows or burrow contents and this observer bias should be tested for.

Recommendations

- To produce an accurate and precise population estimate from burrow counts, it is important to determine burrow contents, and to distinguish between breeding and non-breeding birds in burrows. If a proportion of occupants are missed, further error is introduced to the population estimate, so it can be valuable to check occupant detection probability. The timing of burrow occupancy checks can help avoid assumptions about what proportion of breeding birds has not yet laid or has already failed.
- Several points are relevant to all studies: the need for a good pilot study to minimise error sources in the main survey; sufficient time to cover enough ground, while including contingency for weather; and the need to document burrowing petrel survey methods in enough depth to be repeatable.

Project logistics summary statement

This project was 50% funded via Conservation Service Levies on the fishing industry. The planned cost for the project was $10,000. Services were provided by Parker Conservation.

Review milestones:

- Draft final report presented at the CSP TWG on the 17 June 2015

Citation

Parker, G.C. and Rexer-Huber, K. 2015. Literature review of methods for estimating population size of burrowing petrels based on extrapolations from surveys. Report prepared by Parker Conservation for the Department of Conservation, Wellington. 25p.

Weblink

http://www.doc.govt.nz/our-work/conservation-services-programme/csp-reports/2014-15/literature-review-on-estimating-population-size-of-burrowing-petrels/

3.3 POP2014-03 Protected fish population research

Overall objective

To progress research on key information gaps in protected fish population information.

Rationale

The National plan of Action for Shark 2013 (NPOA-Sharks) calls for a risk based approach to shark research and contains within it an objective to complete a risk assessment of all shark species by December 2014. This risk assessment will highlight both risk and areas of uncertainty in population parameters for shark species. Once gaps are highlighted it will be important to begin addressing those gaps immediately in order to improve risk estimates and better inform management action. This will be developed in the CSP protected fish medium term research plan, which will be finalised following completion of risk assessment.

This project will use Crown funding to initiate the first tranche of research identified in the Draft CSP protected fish medium term research plan[7] , to address knowledge gaps for protected fish species. Possible synergies will be identified to allow leverage off research being undertaken by other organisations, and progress research in a collaborative manner.

Project status

In progress.

Summary of the methods and key findings

Project MIT2011-01 used MiniPAT tags to identify a number of key factors affecting the survival of live released spine-tailed devil rays (*Mobula japanica*) in purse seine fisheries. The results of this project highlighted the need for further investigation in order to better quantify post-release survival. Crown funding from project POP2014-03 has been used to expand this study. Further tags will be deployed during the 2015/16 skipjack purse seine season.

Project logistics summary statement

This project was 100% Crown funded. The planned cost for the project was $25,000. Services were provided jointly by NIWA and the Ministry for Primary Industries.

[7] Available to download from http://www.doc.govt.nz/Documents/conservation/marine-and-coastal/marine-conservation-services/meetings/csp-fish-plan-2014.pdf

4. Mitigation Projects

4.1 MIT2014-01 Protected species bycatch newsletter

Overall objective

To produce a newsletter to communicate protected species-related information to trawl and longline fishermen.

Rationale

Reducing the impacts of commercial fishing on protected species relies on individual fishermen actively applying best practice mitigation methods to their fishing activity. Applying and developing mitigation methods in specific circumstances requires an understanding of the protected species that may be impacted, and the nature with which they interact with fishing activity. A range of relevant information exists, often the result of research projects, and the newsletter will serve as a vehicle for communication to fishermen, fishing companies, and other interested parties. An evaluation of previous examples of this work by Pierre (2012) indicates that this format shows promise in reaching a broad sector of the fishing community and wider stake holders, and provides recommendations for further development.

Project status

Due for completion in June 2016.

Summary of the Methods and Key Findings

The objective of Conservation Services Programme project MIT2014-01 is to produce a bimonthly newsletter to communicate protected species-related information to commercial fishermen.

This project is now halfway through its term, with six issues of the newsletter 'Bycatch Bylines' produced to date. Articles cover best practice mitigation methods, new and emerging mitigation measures, work underway to develop bycatch reduction approaches, current events of relevance to fishers, and other protected species information relevant to commercial fishing.

Key references are also provided, to facilitate reader access to additional information. The target audience for the newsletter comprises commercial fishers and others involved in the fishing industry. Recipients include holders of fishing quota and annual catch entitlement, seafood company representatives, Seafood New Zealand's Sector Representative Entities and Commercial Stakeholder Organisations, Ministry for Primary Industries regional office staff, the New Zealand Federation of Commercial Fishermen, and individuals working in the fishing industry or on fisheries bycatch issues.

Currently, the newsletter is circulated to around 1,500 recipients. It is distributed in three forms, as an html newsletter delivered via email, an A4 2-page pdf file distributed electronically, or a hard copy newsletter mailed to recipients who have indicated a preference for this medium, or who do

not have an electronic point of contact. The second year of the project provides for the development and circulation of another 6 newsletters. At the end of the project, a final report will be produced.

Project logistics summary statement

This project was 100% funded via Conservation Service Levies on the fishing industry. The planned cost for the project was $20,000. Services were provided by Johanna Pierre Environmental Consulting Ltd.

Review milestones:

- 2014/15 annual review presented at the CSP TWG meeting on 17 of June 2015

Citation

Pierre, P. 2015. Protected species bycatch newsletter. Annual progress report. Report prepared by Johanna Pierre Environmental Consulting Ltd. for the New Zealand Department of Conservation, Wellington. 9p.

Weblink

http://www.doc.govt.nz/our-work/conservation-services-programme/csp-reports/2014-15/protected-species-bycatch-newsletter-annual-progress-report/

Newsletters available at:
http://www.doc.govt.nz/our-work/conservation-services-programme/bycatch-bylines-newsletter/

4.2 MIT2014-02 Improvement of tori line performance in small vessel longline fisheries

Overall objective

To develop improved tori lines which are specifically optimised for safe and effective use in small longline vessels.

Rationale

Tori line (bird scaring line) use in small vessel longline fisheries (both surface and demersal) is a regulatory requirement. Despite this there is significant reluctance within the fishing industry to deploying tori lines. Concerns generally centre around issues of crew safety and loss of gear due to tangles. The difficulty of achieving a suitable attachment point and sufficient aerial extent are also cited as limitations to the use of tori lines on smaller vessels. Development of mitigation suitable for smaller vessels is recognised as an international research priority (ACAP 2013[8]). As has been seen in other fisheries, including offshore trawl, improvements to tori line construction, including streamer material and drag weight can lead to increased performance.

Both these small vessel longline fisheries have been shown to pose relatively high risk to seabirds (Richard & Abraham 2013[9]), and historically high capture rates of several seabird species have been observed.

Project status

Due for completion May 2016

Summary of the methods and key findings

This project is still underway.

To date, key activities have included:

- a literature review evaluating tori line designs, construction materials, and performance
- an expert workshop to develop the project approach
- a Technical Working Group review of the methods proposed
- on-land testing of a series of design and construction materials, and the amount of drag required to achieve tori line aerial extents from 40 - 80 m
- a project plan defining next steps (summarised below)

[8] Agreement for the Conservation of Albatrosses and Petrels. 2013. Report of Seabird Bycatch Working Group. AC7 DOC 14 Rev 1 SBWG5. Seventh Meeting of the Advisory Committee, La Rochelle, France, 6-10 May 2013.

[9] Richard, Y., Abraham, E.R. 2013. Risk of commercial fisheries to New Zealand seabird populations. New Zealand Aquatic Environment and Biodiversity Report NO. 109. Ministry for Primary Industries, Wellington.

The next step for this project is testing tori line designs at sea on a vessel targeting snapper. Subsequently, designs will be tested on small vessels in other longline fisheries (e.g., bluenose bottom longline and tuna pelagic longline).

Project logistics summary statement

This project was 100% funded via Conservation Service Levies on the fishing industry. The planned cost for the project was $60,000. Services were provided by Johanna Pierre Environmental Consulting Ltd.

Review milestones:

- Presentation on the Tori line development for small vessel longline at the CSP TWG meeting on 17 June 2015

4.3 MIT2014-03 Seabird liaison officers

Overall objective

To provide one or more liaison officers to the inshore fishing fleet who will be tasked to assist those fleets in reducing their risk to seabirds.

Rationale

To effectively reduce the risk of interactions with seabirds it is important for vessels to take the latest developments in mitigation technology and be able to adapt them to their specific operations. Translating the latest scientific research and fishing regulations into operational parameters is not always a straight forward process.

Equally an adequate working understanding of seabird biology, taxonomy and behaviour assist in understanding the risk posed in each area and season. By employing liaison officers who have operational experience in fishing fleets along with an understanding of best practice mitigation and seabird characteristics it is possible to spread information over the fishing fleet in a collaborative and practical manner. These officers should also be equipped with fact sheet/ resources and mitigation material to assist in the dissemination of this knowledge.

This work has been trialled in the snapper longline fleet around the Hauraki Gulf in 2013/14 and has shown initial positive results. However there is significant scope for expanding this work to a wider area and over a broader range of seasons. Notably the bluenose/hapuku fleet along with the domestic surface longline fleet are known to pose relatively high risk to, and have interactions observed with, seabird species of concern such as black petrels and flesh-footed shearwaters.

Implementation approach

Employ one or more liaison officers to travel to key ports before, during and immediately after high risk months in order to share information on seabird behaviour and mitigation options. Officers should actively encourage development of vessel specific mitigation practices and where appropriate vessel management plans. Part of the role will include sea time on vessels to help understand individual vessels' operations and therefore tailor the most appropriate mitigation solutions. The officers should also operate as a conduit for communication between fishers and government by directing fishers concerns or questions to the right people.

Complementary to this, there is scope for expanding the work of the liaison officers into the recreational fishing sector through mediums such as boat ramp meetings, liaison with charter vessel operators and fishing competitions. Note: This work would not be levied, and by operating synergistically with the commercial vessel liaison cost savings would be achieved.

Project status

Complete.

Summary of the methods and key findings

Two individuals undertook the liaison officer role and conducted a series of port visits. Over the period of October 2014 to May 2015, 55 boats were contacted and 45 SMPs were drawn up or amended.

When talking to skippers, liaison officers initially relayed information about bird population parameters and behaviour, particularly for black petrels and flesh-footed shearwaters.

Liaison officers continued to encourage a responsible and reactive approach be taken by skippers. To foster the need for skippers to assess risk and react accordingly; the SMPs describe the vessel's approach to mitigation in three levels:

1. The basic 'every set' mitigation standard (e.g. a tori line and line weighting)
2. The precautionary measures taken (e.g. secondary tori lines in 'birdy' areas)
3. Reactive mitigation (e.g. adding more weight in response to foraging behaviour)

Most skippers in the snapper fleet committed to working a tori line for all sets but some still have safety concerns and did not feel that they worked or were necessary at night. However all snapper vessels will work tori lines during daylight or full moon sets. Based on increased awareness of the at risk species, and improvements to mitigation, SMPs appear to be working. Some vessels had not changed their mitigation approach since the previous year, as they felt it was working well, whereas others had improved their mitigation. Changes noted included improved tori lines and more weight, especially in response to foraging behaviour of birds.

Skippers in the bluenose fleet were less aware of the different bird species they interact with than the snapper fleet, but they were all interested and keen to learn, and when contacted for a second time would happily report a summary of bird abundance, by species, around their vessel. Bluenose lines are usually deployed with separate down lines such that the vessel stops at the beginning and end of the hook section to attach the down line. With hook spacing usually being closer, bluenose lines are set slower and skippers may split the gear into several shorter lines when fishing distinct seabed features. All of these factors, plus potentially working in poorer weather, make it harder to work tori lines successfully. That said, one vessel successfully worked a tori line for nearly all sets, through a combination of perseverance, patience and by retrieving it mechanically.

Liaison officers generally received a good reception from the surface line fleet. Skippers liked the individual approach and were keen on working collaboratively towards the best mitigation solutions for the New Zealand fleet.

Recommendations

- Define the liaison role to provide some terms of reference
- Refine management of the liaison officer role

- Gradually undertake sea-time on all vessels in the fleet to be better placed to offer suggestions for improvement
- Collate all seabird, mitigation and vessel specific information collected on the fleet to date, and have this available electronically
- Foster and develop an information sharing approach between (particularly) the fishing industry and DOC / MPI
- Clarify the role of seabird management plans, particularly with respect to legislation and / or action plans
- Audit SMPs
- Review observer tasking
- Investigate the possibility of assisting fishers financially to develop and improve mitigation

Project logistics summary statement

This project was collaboratively funded with $40,000 contributed via Conservation Service Levies on the fishing industry and $40,000 by MPI. The planned cost for the project was $80,000. Services were provided by Vita Maris.

Review milestones:

- Presentation of progress report and recommendations at the CSP TWG meeting on 17 June 2015

Citation

Goad, D., and Williamson, J. 2015. Improving and documenting seabird bycatch mitigation practices in the North Eastern New Zealand longline fishery. Report prepared by Vita Maris for the New Zealand Department of Conservation, Wellington. 28p.

Weblink

http://www.doc.govt.nz/our-work/conservation-services-programme/csp-reports/2014-15/improving-and-documenting-seabird-bycatch-mitigation-practices-in-the-north-eastern-new-zealand-longline-fishery/