

Conservation Services Programme Annual Plan 2012/13

Conservation Services Programme
Department of Conservation
PO Box 10 420
Wellington
www.doc.govt.nz/mcs

June 2012

Statement on Conservation Services

Ensuring viable populations of New Zealand's marine protected species is important both for our economy and for our biodiversity. Significant numbers of people visit our shores each year to experience our unique species. Whether they participate in whale watching, swimming with dolphins or seabird trips, they make a very significant contribution to our economy. These species also contribute to New Zealand's biodiversity and unique ecosystems. Biodiversity loss, both here and overseas, has increased alarmingly in recent years. Protecting these species is of national and international importance.

The commercial fishing industry also contributes to New Zealander's wellbeing and to our economy. Ensuring a reliable supply of fresh fish for domestic consumption helps promote good health. Fish exports also contribute significantly to the economy. The challenge is to optimise the benefits from protecting our unique marine species and from commercial fishing. There have been a number of interactions this year which have not benefitted the industry and have impacted on our marine protected species. It is critical that these interactions be minimised.

This Conservation Services Programme Annual Plan contains a number of projects designed to understand the interactions between protected species and commercial fishing. It also seeks the development of pragmatic mitigation techniques to minimise known interactions. Projects continue research in areas in which commercial fishing and marine species with declining populations co-exist.

This year continues an emphasis on developing mitigation practices and techniques that can be employed to avoid capture of protected species while not impacting commercial fishing efficiencies. Emphasis is also placed on disseminating the lessons from this research into practice.

The Fisheries Act 1996 provides for cost recovery of conservation services which are defined as "outputs produced in relation to the adverse effects of commercial fishing on protected species." These outputs include:

- Research relating to the effects of commercial fishing on protected species;
- Research on measures to mitigate these effects; and
- The development of population management plans developed under the Wildlife Act 1953 and the Marine Mammals Protection Act 1978.

The Fisheries Act 1996 further provides that there be agreement between me and the Director General of the Department of Conservation on activities that constitute marine conservation services. In accordance with the definition contained in sections 2 and 262 of the Fisheries Act 1996, I am satisfied that the outputs described in the following pages to be delivered in 2012 - 2013 are conservation services.



Hon Kate Wilkinson
Minister of Conservation

Director-General's Introduction

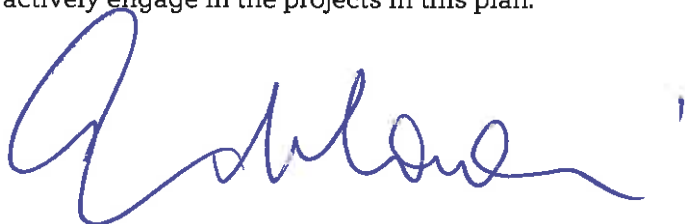
Last year I signalled that the way conservation in New Zealand is delivered would change. DOC can no longer be seen as the sole provider of conservation for this country. All New Zealanders must have a stake in maintaining our biodiversity and in protecting our vulnerable marine protected species.

Many in the commercial fishing industry share this vision. They understand that there are market benefits from maintaining a clean environment and in ensuring healthy marine ecosystems. The market benefit of sustainable and well managed fisheries, which minimises adverse effects on our protected species, accrues to all in the industry. Failing to do this not only adversely impacts the fishing industry; it also impacts New Zealanders who rely on healthy marine species populations for their livelihoods.

The challenge for 2012-2013 and beyond is for us to work together to promote a sustainable and vibrant commercial fishing sector and to afford the protection to our iconic species that they and all New Zealanders deserve. It is critical that the industry avoid and mitigate the capture of marine protected species.

The research contained in this plan will materially assist in achieving this. It will further our understanding of the interaction of commercial fishing with protected species and of the impacts of commercial fishing on declining marine protected species populations. It is equally important that we move forward aggressively on developing avoidance and mitigation techniques and devices. This plan places emphasis on this latter aspect.

The projects in this Plan will generate knowledge that will contribute to reductions in the environmental impacts of commercial fishing. I urge fishing industry representatives, nongovernmental organisations, research providers and Government agencies to actively engage in the projects in this plan.



Al Morrison
Director-General of Conservation

Table of Contents

1. Overview.....	5
1.1 Introduction.....	5
1.2 Format.....	6
1.3 Alignment with MPI research.....	6
1.4 Consultation.....	6
1.5 Administrative costs.....	6
2. Interaction Projects	8
2.1 Observing commercial fisheries	8
2.2 Identification of seabirds captured in New Zealand fisheries	28
3. Population Projects.....	31
3.1 Flesh-footed shearwater - population study trial and at-sea distribution	31
3.2 New Zealand sea lions - Auckland Islands population study	34
3.3 New Zealand sea lions - demographic assessment of the cause of decline at the Auckland Islands.....	37
3.4 Black petrel - at-sea distribution and population estimate.....	40
3.5 Campbell Island and grey-headed albatrosses - population estimates.....	42
3.6 White-capped albatross - population estimate.....	44
3.7 Salvin’s albatross - population estimate and at-sea distribution.....	46
3.8 Gibson’s albatross - population estimate	48
3.9 Pitt Island shags - foraging ecology.....	50
4. Mitigation Projects	52
4.1 Inshore bottom longline seabird mitigation - design and analysis	52
4.2 Inshore trawl warp-strike mitigation- analysis of effectiveness	54
4.3 Review of mitigation techniques in setnet fisheries	56
4.4 Surface Longline Seabird Mitigation	58
Non-research mitigation project proposals	60
4.5 Protected species bycatch newsletter.....	60
4.6 Protected species mitigation training for commercial fishing vessel crew.....	62
Appendix 1: Cost Allocation Tables.....	63

1. Overview

1.1 Introduction

The Conservation Services Programme Annual Plan 2012/13 (“Annual Plan”) includes the conservation services to be delivered as the Conservation Services Programme (“CSP”), and subject to cost recovery from the commercial fishing industry. As such, this Annual Plan forms the basis for levying the commercial fishing industry under the Fisheries Act 1996. For a summary of the legal basis of levied work described in this Annual Plan, refer to the Conservation Services Strategic Plan 2005-2010¹ (“Strategic Plan”). Note also that this Annual Plan includes projects directly relevant to commercial fishing-protected species interactions but not considered within the levy framework for 2012/13. However, these do have allocated (crown-funded) administration components, to reflect staff time involved in delivery.

Following public consultation on a draft Conservation Services Programme strategic and research plan: 2012-17, a collaborative process is currently in development to further develop and finalise the longer term plan for CSP². In the absence of an updated strategic and research plan, this Annual Plan uses the guiding principles and policies from the 2005-10 Strategic Plan, to the extent that they remain relevant, as well as the prioritisation processes described in the draft plan for 2012-17. In particular, recent risk assessment work for seabirds³ was used to identify priority research gaps for these taxa.

The Conservation Services Programme’s objectives, as described in the Strategic Plan, are:

1. To understand the nature and extent of adverse effects from commercial fishing activities on protected species in NZ fisheries waters.
2. To develop effective solutions to mitigate adverse effects of commercial fishing on protected species in NZ fisheries waters.

Note that research into effects can include:

- i. Research into fishing interactions (direct and indirect impacts) on protected species; and
- ii. Research into the adverse effects of commercial fishing on protected species populations.

¹ Available to download from <http://www.doc.govt.nz/publications/conservation/marine-and-coastal/marine-conservation-services/csp-plans/approved-csp-strategic-plan-2005-2010/>

² For further details and to download a copy of the draft 2012-17 plan see <http://www.doc.govt.nz/getting-involved/consultations/closed/draft-conservation-services-programme-strategic-and-research-plan-2012-17/>

³ Rowe, S. 2010 Level 1 Risk Assessment for incidental seabird mortality associated with New Zealand fisheries in the NZ-EEZ. Marine Conservation Services, Department of Conservation, Wellington. 75 p. Available for download from <http://www.doc.govt.nz/mcs>
Richard, Y.; Abraham, E.R.; Filippi, D. 2011 Assessment of the risk to seabird populations from New Zealand commercial fisheries. Final Research Report for projects IPA2009/19 and IPA2009/20 and draft Aquatic Environment and Biodiversity Report. Ministry of Fisheries, Wellington.

Research and development of measures to mitigate the adverse effects of commercial fishing on protected species includes:

- i. Research into, and development of, mitigation methods;
- ii. Development of population management plans.

1.2 Format

The format used to specify the conservation services in this Annual Plan includes an outline of the objectives and rationale for each project, and the outputs that are anticipated to be produced. The project specifications indicate cost recovery information, i.e. project costings (excluding administration costs) and identification of the relevant provisions within the Fisheries (Cost Recovery) Rules 2001 that determine cost allocation. Costs are summarised in Appendix 1. All financial amounts appearing in this document are exclusive of GST.

1.3 Alignment with MPI research

In the development of this Annual Plan a series of discussions were held with Ministry of Primary Industry (MPI) staff to harmonize the CSP and MPI research programmes for 2012/13 and to ensure there was no duplication.

1.4 Consultation

The collaborative processes used to develop this 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 2011/12. This process was developed jointly by the Marine Conservations Services team at the Department of Conservation (DOC) and the Inshore Fisheries team at MPI in consultation with the Seafood Industry Council and the Federation of Commercial Fishermen.

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

The public consultation process on the entire plan was as follows:

- | | |
|---------------|---|
| 23 April 2011 | Draft Conservation Services Programme Annual Plan 2012/13 released for public comments. |
| 5 June 2011 | Public comment period closes. |
| 18 June 2011 | Summary of public submissions and response to comments completed. |
| 20 June 2011 | Director-General of Conservation conveys the Conservation Services Programme Annual Plan 2012/13 as amended in accordance with public comments to the Minister of Conservation. |

1.5 Administrative costs

Administration costs have always been a contentious matter relating to the delivery of conservation services. Administration requirements of each project differ, as does the time required to address these. Currently, administration charges are distributed in a pro-rated fashion across projects, in accordance with the cost of the project. This approach is broadly appropriate, for example, the most costly project (e.g. INT2012/01 Observing commercial fisheries in 2012/13) incurs the majority of administration expenses. For that project, administration includes observer training programmes and training materials,

the development and implementation of data collection protocols and forms, data management, briefing and debriefing, liaison at sea and with other agencies when necessary, and reporting. For other projects, the administration burden may be significantly less. Administration also includes charges for the use of Departmental facilities and services.

DOC is continually striving to maximise efficiencies, and the administration costs for delivering conservation services dropped by \$15,000 between 2008/09 and 2009/10, and subsequently dropped again by \$13,000 for 2011/12. We welcome stakeholder views on different ways to attribute administration costs across projects.

2. Interaction Projects

2.1 Observing commercial fisheries

Project code: INT2012-01

Start Date: 1 July 2012

Completion Date: 30 June 2013

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 other relevant information on protected species interactions that will assist in assessing, developing and improving mitigation measures.

Rationale

The management approach

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 will continue to purchase baseline services for “offshore” fisheries from MPI Observer Services, given the scale of their operation, which allows observers to be placed strategically across New Zealand Fisheries. Where data collection involves using techniques beyond observation and recording, providers with specific expertise and/or equipment will be considered. For the purposes of providing costings, the rate provided by MPI Observer Services has been used. As such, for the purposes of planning, costings for observer coverage are based on those provided by the MPI Observer Services to provided a best estimate .

Research Approach

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

The allocation of observer coverage across fisheries will be made in relation to:

- Historic mortality of protected species.
- Fishing effort.
- Past observer coverage.
- The status of particular threatened protected species.

- Current level of information.
- Risk assessment work which has been undertaken (e.g. Rowe 2010, Richards et. al. 2011).
- Information needs identified for newly introduced protected species.

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

- Monitoring and recording the interactions of protected species with fishing operations.
- Reporting on the efforts made to mitigate the adverse effects of commercial fishing on protected species.
- Recording, photographing and tagging all protected species bycatch.
- Recovering and returning the bodies of dead protected species for identification and autopsy .
- Recording at least on a daily basis the numbers, and the behaviour of, marine mammal and seabird species seen around the fishing vessel.
- Carrying out other tasks (e.g. making observations on discard and offal discharge) as required.

In addition to the duties discussed above, CSP will occasionally use observers to collect data for specific mitigation or information acquisition projects. Examples of past projects include fish waste trials, observations of warp interactions on inshore trawl vessels and blue-dyed bait trials.

Information collected includes:

- Environmental conditions (e.g. sea state).
- Fishing methods (including a description of gear employed) and operations.
- Processing waste management practices.
- Abundance and behaviour of protected species in vicinity of vessel.
- Mitigation practices adopted.
- Knowledge and approach of crew.
- Interactions between protected species and fishing gear.

It is important to note that observer programmes typically have high spatial and temporal variation, as well as multiple priorities for information collection, which can make the data challenging to interpret and extrapolate to estimate actual bycatch rates by fishery, location, or other desired variables. Data accuracy and relevance can be affected by inter-observer variability, weather conditions and access to vessels, while precision is affected by the observer sampling design. Data quality may also be biased by the opportunistic allocation of observers to vessels, as it is not always possible to place observers on vessels randomly or representatively. Nevertheless, the use of fisheries observers is currently considered to be the most reliable and flexible means of acquiring data on protected species interactions.

Application of observer coverage by fishery in 2012/13:

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 (see 2.1.1). While the majority of these vessels 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 is described in the Joint Department of Conservation/Ministry of Fisheries Inshore Observer Programme 2011/12 plan⁴. In general, coverage in these fisheries was aimed at reducing uncertainty around the risk to particular protected species which was identified in both the level 1 and level 2 risk assessments (Rowe 2010, Richards et. al. 2011), and assessing mitigation options for interactions identified..

The second group of fisheries can be considered 'better known' and have generally had some level of ongoing observer coverage over the last ten years (see 2.1.2). Most of these fisheries are characterised by large vessels operating further offshore and are termed 'offshore' fisheries. Observers working in these fisheries generally have multiple priorities including stock assessment, compliance and protected species interactions. DOC contributes to a portion of observer time in these fisheries and, as such, days are planned differently to the poorly known fisheries. In order to set observer days for the period 1 July 2012 – 30 June 2013, effort data from previous years was examined, in conjunction with MPI, to ensure that desired coverage levels are achievable with the days planned and that these coverage levels would meet the data requirements of both agencies. All time periods are based on 1 July - 30 June in line with the period that observer coverage runs (i.e. not the fishing year).

Protected species interaction data for the period 1 July 2004 to 30 June 2010 are available online in the following reports:

Rowe, S.J. 2009: Conservation Services Programme observer report: 01 July 2004 to 30 June 2007. *DOC Marine Conservation Services Series 1*. Department of Conservation, Wellington. 93p.⁵

Rowe, S.J. 2010: Conservation Services Programme observer report: 01 July 2007 to 30 June 2008. *DOC Marine Conservation Services Series 4*. Department of Conservation, Wellington. 97p.⁶

Ramm, K. 2010: Conservation Services Programme observer report: 01 July 2008 to 30 June 2009. Final research report. Department of Conservation, Wellington.⁷

Ramm, K. 2012: Conservation Services Programme observer report: 01 July 2009 to 30 June 2010. Final research report. Department of Conservation, Wellington.⁸

⁴ For further details see the Marine Conservation Services Annual Plan 2011/12 available for download from <http://www.doc.govt.nz/publications/conservation/marine-and-coastal/marine-conservation-services/csp-plans/mcs-annual-plan-2011-12/>

⁵ Available for download from <http://www.doc.govt.nz/publications/conservation/marine-and-coastal/marine-conservation-services/csp-reports/csp-observer-report-01-july-2004-to-30-june-2007/>

⁶ Available for download from <http://www.doc.govt.nz/upload/documents/science-and-technical/dmcs4entire.pdf>

⁷ Available for download from <http://www.doc.govt.nz/upload/documents/science-and-technical/2008-09-csp-observer-report.pdf>

⁸ Available for download from <http://www.doc.govt.nz/upload/documents/conservation/marine-and-coastal/fishing/draft-csp-observer-report-2009-10.pdf>

Fisheries Management Areas are referred to by three letter codes as follows:

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

2.1.1 “Inshore” Fisheries: Joint DOC-MPI Inshore Observer Programme

Introduction

During the planning round for the 2011/12 observer programme a tiered approach was developed to prioritising areas of observer coverage. This planning process was described in detail in the Marine Conservation Services Programme Annual Plan 2011/12⁹. Under Tier 2, the objective to reduce uncertainty in the high risk flatfish trawl fishery (Objective A) was planned to continue in 2012/13, this is detailed below. Additionally, due to operational and timing issues, two of the objectives that fell under Tier 3 were not achieved during the 2011/12 year, although progress was made toward them. These objectives have been retained and will be completed during 2012/13. The objectives relate to testing alternative mitigation measures in inshore trawl (Objective B) and bottom longline (Objective C).

NOTE: No observer coverage of set net fisheries are to be delivered as Conservation Services. Observer coverage of set net fisheries will be delivered as Fisheries Services. MPI consulted on observer coverage for 2012/13 during May 2012.

TIER 2: KNOWN INTERACTIONS [NOT CURRENTLY MANAGED]: determine extent of risk

Objective A: Gather information to reduce uncertainty in estimates of seabird vulnerability to -- and overall mortality arising from -- high risk flatfish trawl fisheries.

High risk seabird species (e.g. black petrel, king shag, Westland petrel, Northern giant petrel, grey-headed albatross, Northern royal albatross, light-mantled albatross, Stewart Island shag, Campbell albatross, spotted shag) overlap with this fishery and the risk assessment¹⁰ illustrates potentially high fishing-related mortality levels. However, mortality estimates arising from flatfish trawl are subject to high levels of uncertainty as historically this is one of the least observed of the inshore fisheries, generally operating closer inshore, in shallower water and overlapping with a number of protected species. The lack of reporting by unobserved vessels maintains this as a monitoring priority for 2011/12-2012/13. This fishery also employs distinct trawl gear types and has different offal discard practices to inshore trawl vessels targeting other species.

⁹ Available for download from <http://www.doc.govt.nz/publications/conservation/marine-and-coastal/marine-conservation-services/csp-plans/mcs-annual-plan-2011-12/>

¹⁰ The Level 1 risk assessment (set net only) for seabirds provides an expert assessment of the risk to each species arising from interaction with set net fisheries. The observer planning process for set nets disaggregates this subjective risk level by statistical area for each species proportional to the spatial overlap between the distribution of seabirds and the distribution of set net fishing effort. A Level 2 risk assessment calculates species-level risk by comparing spatial overlap (i.e. between fishing effort and bird distributions) with observed capture rates to estimate species vulnerability, and then extrapolating in space to estimate capture rates for unobserved fishing effort. For the observer planning process, species-specific capture estimates are disaggregated by statistical area and observer priority for each area is calculated as a function of estimated captures, species-level risk, and uncertainty of the method-specific vulnerability estimate.

Under the risk assessment method, any reduction in uncertainty in estimates of vulnerability and overall mortality for a particular fishing method is useful as it informs more accurate estimates of risk and provides for better understanding of the effectiveness of mitigation options. Using the risk assessment model as a basis, managers will aim to reduce levels of risk in fisheries down to acceptable levels over time by applying mitigation measures (voluntary or mandatory) in those areas and fisheries identified as contributing significantly to overall risk, for species for which risk is unacceptably high. If uncertainty remains high for a particular fishery group it may not be possible to know with any accuracy the level of risk arising from that fishery, or the extent to which risk of mortality is reduced by application of mitigation measures, thereby creating ongoing uncertainty for fishers about whether additional management action will be required, and potentially higher costs if mitigation measures are imposed unnecessarily.

MPI and DOC expect that some of the mitigation measures and practices trialled under Objective B would be applied while coverage for this objective is delivered.

This objective's output would be numbers of observed captures and strikes. The outcome is to estimate method-specific vulnerability and species-specific overall mortality of seabirds in high risk flatfish trawl fisheries with a higher level of certainty, in the context of the Level 2 risk assessment. Likewise, this outcome would show whether mitigation measures and practices used are sufficient to reduce, avoid or mitigate adverse effects and reduce risk to acceptable levels. Observers will be making specific observations of mitigation device and/or methods used in this fishery and the effectiveness there them. Where applicable this will be used to inform mitigation advice to fishers more widely.

Observers will also document qualitative observations of seabird concentration to potentially identify high-risk areas.

Under the risk assessment method, any information gathered will reduce uncertainty bounds of existing estimates of method-specific vulnerability and species-specific mortality so long as the fishing behaviour observed is representative of normal situations (i.e. if we can assume that observer placement is not changing fishing behaviour). To minimise any potential bias, relatively high coverage as a percentage of effort by area/month is planned.

Due to a number of operational difficulties with observer placement not all coverage planned for 2011/12 was achieved under this objective. Therefore, days not achieved in 2011/12 have been transferred over to the 2012/13 year, in addition to the 97 day originally planned for 2012/13.

Planned coverage:

- Statistical areas O24, O26 and O34¹¹
- 20-30% of effort
- 160 observer days (continued from the 2011/12 planning process)

References: Richard et al (2011), Rowe (20010a)

¹¹ Statistical area O38 (Golden Bay) is also a priority for coverage for this objective. However, some level of coverage in this area has been achieved in recent years.

TIER 3: KNOWN INTERACTIONS: test alternative mitigation measures in terms of reducing risk

Objective B: Gather information to establish the effectiveness of alternative mitigation measures and fishing practices in reducing the extent of seabird strikes and captures in inshore trawl fisheries.

Seabird captures in the inshore trawl fishery have been identified by observer coverage and significant levels of risk from these fisheries to seabirds were identified by Richard et al. (2011). Very low levels of observer coverage have meant that quantification of rates of bycatch have been difficult. However, this observer coverage has pointed to key areas of investigation for mitigation. These fall into two categories, mitigation devices and offal management.

Previous years of observer coverage have identified that in inshore trawl fisheries, the incidence of warp-strikes is proportionally higher than in the offshore trawl fisheries where seabird scaring devices are regulated and used.

A number of seabird scaring devices are in use in the inshore fishery, though device use appears to be localised and highly varied among vessels, and their use is not mandatory. Developing localised mitigation use into a consistent national practice is crucial to reducing captures over the entire fishery. It is also crucial that the mitigation used by fishers is effective in reducing risk to seabirds, as well as being cost-effective and safe. Therefore it is proposed that trials will be conducted on a number of mitigation devices already in use in order to identify the most effective. Testing would be undertaken across multiple vessels in a scientifically robust manner to allow sound advice on 'best practice' to be given to fishers.

During the 2011/12 year a review of current mitigation measure was undertaken and a seabird Technical Advisory Group (TAG) was convened including participants from DOC, MPI, the fishing industry and researchers with experience in mitigation trial design and/or analysis. This group discussed mitigation devices and techniques in use and identified devices to assess. Current observer warp-strike protocols were also reviewed and adapted to better reflect the function of these devices. The outcome of this TAG was an experimental design and set of observer protocols which can be applied during the 2012/13 observer year. Results from trials will be analysed as part of project MIT2012-02 and reviewed via existing technical working groups.

It is proposed that testing will take place on vessels operating out of the East Coast of the South Island as large numbers of warp captures have been observed in this area during previous coverage and a number of vessels are already operating and developing bird scaring devices.

Observers will also document qualitative observations of seabird concentration to potentially identify high-risk areas.

Planned coverage: 150 observer days on the East Coast of the South Island.

Recently observed captures (includes general inshore trawl and flatfish trawl)

Species	2008/09		2009/10		
	Alive	Dead	Alive	Dead	Unknown
Albatross (Unidentified)	1	3		2	
Smaller albatrosses	1				
Salvin's albatross	1	9			
Gull or tern		2		5	5
Petrel (Unidentified)	1				
Sooty shearwater	2	9			
Fairy Prion	1				
Spotted shag		33			
White-chinned petrel	1				
New Zealand fur seal		1			
Coverage Level as a percentage of fishing effort (Nationally)	3.45%		1.76%		

References: Richard et al (2011), Rowe (2010a, 2010b), Ramm (2010, 2011)

Objective C: Gather information to establish the effectiveness of alternative mitigation measures (including current regulated measures) and fishing practices in reducing the extent of captures of seabirds in high-risk bottom longline fisheries.

Risk assessment and bycatch estimations have identified a significant risk to seabird species, in particular the black petrel by inshore bottom longline vessels targeting snapper, ling, bluenose and hāpuku. Level 2 risk assessments have identified that estimated captures far exceed PBR for black petrels. Despite uncertainty in the assessments, the industry acknowledges there are significant issues with seabird captures in this fishery. The planning group has determined that the most effective use of resources is investigation of improved mitigation measures.

Observer coverage has highlighted two key areas, line sink rate and offal management (particularly at hauling). CSP has been undertaking trials (CSP project MIT2010-01) to investigate the various factors affecting line sink rates in the inshore bottom longline fishery. CSP project MIT2010-01 has also been assisting in development of a line setting device (and CSP project MIT2011-04 aims to develop this novel device). Work on offal management techniques and its effect on risk to seabirds would complement mitigation device assessment work, allowing for a full suite of mitigation measures to be developed to reduce risk to protected seabird species.

Planning the design for this project began in 2011/12 with a TAG comprising DOC, MPI, the fishing industry and researchers with experience in mitigation trial design and/or analysis, which discussed current key mitigation measures for testing. The TAG also highlighted the strong seasonal nature of interactions due to seasonal shifts in seabird abundance. It was again highlighted that there was significant variation in fishing practice and mitigation technique in this fishery. Following on from this MPI is undertaking a further analysis to characterise captures in this fishery. This work, coupled with the experimental design work in project MIT2012-01 will help inform the robust design of the mitigation assessment. It is foreseen that another TAG will be convened to review the protocols and experimental design to ensure that they are robust. Results from trials would be reviewed via existing technical working groups.

The statistical areas where intensive fishing effort overlaps most strongly with known foraging areas (and historic captures) of black petrels and flesh footed shearwaters were chosen for this project. Nonetheless, observers will also document observations of seabird abundance, aiming to identify particularly high-risk areas.

Planned coverage: to be determined by TAG, but limited to 150 observer days, likely to be concentrated in statistical areas 005 to 008 (Hauraki Gulf/Coromandel).¹²

¹² Given the purpose is to evaluate mitigation measures and practices rather than to estimate mortality, suggested coverage is based on areas where the highest levels of interaction are expected, rather than based on the vulnerability of particular species within those areas.

Recently observed captures

Species	2008/09		2009/10		2010/11	
	Alive	Dead	Alive	Dead	Alive	Decomposing
Black-browed albatross (Unidentified)			1			
Southern royal albatross			1			
Petrels, Prions and Shearwaters (unid)	1					
Shearwaters			1			
Black petrel	3	8	31	13	2	
Grey petrel		4				
Common diving petrel	1					
Buller's shearwater	2	1	1			
Flesh-footed shearwater	12	4	9	7		
Fluttering shearwater		1	1			
Sooty shearwater				1		
Storm petrels			1			
White faced storm petrel			4			
Northern giant petrel			1			
White capped albatross						1
White-chinned petrel					1	
Coverage Levels as a percentage of fishing effort (Nationally)	4.81%		7.98%		2.38%	

References: Richard et al (2011), Goad (2010), Rowe (2010a, b), Ramm (2010, 2012).

References

- Goad, D.W. 2010: Development of mitigation strategies: Inshore fisheries. Draft report to the Department of Conservation. 62p. www.doc.govt.nz/publications/conservation/marine-and-coastal/marine-conservation-services/csp-reports/development-of-mitigation-strategies-for-inshore-fisheries/
- Ramm, K. 2010: Conservation Services Programme observer report: 01 July 2008 to 30 June 2009. Final research report. Department of Conservation, Wellington. <http://www.doc.govt.nz/upload/documents/science-and-technical/2008-09-csp-observer-report.pdf>
- Ramm, K. 2012: Conservation Services Programme observer report: 01 July 2009 to 30 June 2010. Final research report. Department of Conservation, Wellington. Available for download from <http://www.doc.govt.nz/upload/documents/conservation/marine-and-coastal/fishing/draft-csp-observer-report-2009-10.pdf>
- Richard, Y., Abraham, E.R., Filippi, D. 2011 Assessment of the risk to seabird populations from New Zealand commercial fisheries. Final Research Report for projects IPA2009/19 and IPA2009/20 and draft Aquatic Environment and Biodiversity Report. Ministry of Fisheries, Wellington.
- Rowe, S.J. 2010a. Level 1 Risk Assessment for Incidental Seabird Mortality Associated with New Zealand Fisheries in the NZ-EEZ. 75p. <http://www.doc.govt.nz/upload/documents/conservation/marine-and-coastal/marine-conservation-services/level1-seabird-risk-assessment.pdf>
- Rowe, S.J. 2010b. Conservation Services Programme Observer Report for the period 1 July 2007 to 30 June 2008. *DOC Marine Conservation Services Series 4*. Department of Conservation, Wellington. 97p

Objective	2012/13 observer days	Total target cost*	Stocks	Type of Service (for cost-recovery purposes only)
A: Gather information to reduce uncertainty in estimates of seabird vulnerability to - and overall mortality arising from - high risk flatfish trawl fisheries.	160	\$101,600	ELE3 ELE7, FLA3, FLA7, GUR3, GUR7, RCO3, RCO7 STA3 STA7 TAR7,	Conservation
B: Gather information to establish the effectiveness of alternative mitigation measures and fishing practices in reducing the extent of seabird strikes and captures in inshore trawl fisheries.	150	\$95,250	BAR1 BAR5, BAR7, ELE3, ELE5, ELE7, FLA3, FLA7, GSH3, GSH5, GSH7, GUR 2, GIR3, GUR7, LIN2, LIN3, LIN5, LIN7, RCO3 RCO7, SCH3, SNA1, SNA2, SPO3, SPO7, STA3, STA5, STA7 TAR3, TAR 5 TAR7	Conservation
C: Gather information to establish the effectiveness of alternative mitigation measures (including current regulated measures) and fishing practices in reducing the extent of captures of seabirds in high-risk bottom longline fisheries.	150	\$95,250	BNS1, BNS2, HPB1, HPB2, HPB3, HPB4, LIN1, LIN2, LIN3 LIN4, RSN1, RSN2, SCH1, SCH2, SNA1, SNA2, TAR1, TAR2	Conservation
Conservation Services Total	460	\$292,100		

*Costs are based on a target per day cost of \$635 for MPI inshore observer coverage

2.1.2 “Offshore” Fisheries

As for previous years, planning of observer days was conducted jointly with MPI in order to identify an overall amount of observer coverage which will meet both agencies goals. Costs were then apportioned to each agency on the basis of how much of the observers’ work in each fishery will be focused on Conservation Services. Typically this is around 15% of the total days, which reflects the time that observers are likely to spend on protected species tasks. These fisheries have generally received higher levels of observer coverage compared to the fisheries discussed in 2.1.1, with the exception of the surface longline domestic and scampi fisheries where observer coverage has remained below 10% in recent years. For middle depth trawl fisheries, in order to better reflect the fact that vessels will target multiple species over a single trip, they have been divided on an area basis to both assist in addressing information needs and observer planning.

Planned days for 2012/13 are summarised in the table below. These fisheries are monitored to track changes in protected species interactions and mitigation efficacy over time. Data is collected to allow estimation of capture levels and to better understand the nature of protected species interactions in order to develop mitigation solutions.

Summary of 2012/13 observer days planned in better known fisheries

Fishery	Fisheries covered	Total days	MPI CR %	MPI Days	DOC - CSP CR %	DOC - CSP Days
Deepwater trawl fisheries:						
ORH 1	ORH1	65	90	59	10	7
East Coast NI Deepwater	ORH2A, BYX2, CDL2	269	90	242	10	27
Chatham Rise Deepwater	ORH3B, OEO3A, OEO4, BYX3	310	90	279	10	31
Sub-Antarctic Deepwater	ORH3B, OEO1, OEO6	254	90	229	10	25
West Coast NI Deepwater	ORH7A	15	90	13	10	2
Hoki & Middle Depth trawl fisheries:						
West Coast SI (CHA)	HOK1, HAK7, LIN7, SWA1, JMA7, EMA7	971	85	825	15	146
Cook Strait	HOK1, HAK1, HAK7, LIN2, LIN7	250	85	212	15	38
Chatham Rise (SEC/SOE)	HOK1, HAK1, HAK4, LIN3, LIN4, SWA3, SWA4, JMA3, EMA3, SQU1T	961	85	817	15	144
Sub-Antarctic (SOU/SUB)	HOK1, HAK1, LIN5, LIN6, SBW6B, SBW6I, SBW6R, JMA3, EMA3, SQU1T	895	85	761	15	134
West Coast NI (CEE)	HOK1, LIN7, SWA1, JMA7, EMA7	230	85	195	15	35

Shellfish:						
Scampi	SCI1, SCI2, SCI3, SCI4A, SCI5, SCI6A, SCI6B, SCI7, SCI8, SCI9	450	80	360	20	90
Squid6T:						
Squid6T	SQU6T	700	80	560	20	140
Deepwater bottom longline fisheries:						
Bottom longline	LIN2, LIN3, LIN4, LIN5, LIN6, LIN7, PTO1	190	85	162	15	29
Surface longline fisheries:						
Surface longline - domestic (Bigeye tuna and swordfish)	STN1, BIG1, YFN1, SWO1	230	85	196	15	35
Surface longline - domestic Southern bluefin East Coast	STN1, BIG1, YFN1, SWO1	169	85	144	15	25
Surface longline - domestic Southern bluefin West Coast	STN1, BIG1, YFN1, SWO1	58	85	49	15	9
Surface longline - Charter	STN1, BIG1, YFN1, SWO1	350	85	298	15	53
Purse Seine fisheries:						
Domestic SKJ	SKJ1	70	85	59	15	11
Super seiner SKJ	SKJ1	30	85	25	15	5
	Total Days:	6467		5481		986

* NB: As these figures are based on a percentage split between CSP and MPI some rounding is involved to achieve integers of days for cost recovery purposes.

Further background to each of these fisheries and the allocation of observer days is provided below.

MIDDLE DEPTH TRAWL FISHERIES

Finfish

For the 2012/13 observer year the middle depth trawl fisheries, primarily targeting hoki, hake, ling, warehou, jack mackerel and southern blue whiting have been amalgamated for planning purposes; reflecting the fact that vessels will target multiple species in the same trip. This is subsequently divided on an area basis in order to best address information needs.

West Coast South Island

Coverage will largely targeted at the 'Hoki season' from July to September. Observers record information on which mitigation techniques are employed in this fishery.

Mitigation techniques employed include offal and discard management, and the use of bird scaring devices (legally required for larger vessels).

Fishery	Fisheries covered	Total days	MAF CR %	DOC - CSP CR %
West Coast SI (CHA)	HOK1, HAK7, LIN7, SWA1, JMA7, EMA7	971	85	15

Cook Strait

This fishery operates distinctly from other hoki targeting fisheries in that vessel size is limited to under 46m. A large number of vessels shift to this fishery from other areas with a short but intense period of fishing taking place. Trips are generally overnight with catch rates of hoki being high. This fishery has also been the site of some of the highest numbers of fur seal captures therefore observer coverage in this fishery has been increased. Observers record information on which mitigation techniques are employed in this fishery. Mitigation techniques employed include offal and discard management, and the use of bird scaring devices (legally required for larger vessels). Observer coverage from July to September will be focused in the Cook Strait. The allocation of days is below.

Fishery	Fisheries covered	Total days	MAF CR %	DOC - CSP CR %
Cook Strait	HOK1 HAK1, HAK7 LIN2, LIN7	250	85	15

Chatham Rise

The Chatham Rise middle depth trawl fishery operates in a spatially distinct area to the other middle depth trawl fisheries, and so encounters a different assemblage of protected species. This fishery is operated exclusively by larger vessels. Observers record information on which mitigation techniques are employed in this fishery. Mitigation techniques employed include offal and discard management, and the use of bird scaring devices (legally required for larger vessels). Observer coverage for the period October to May will be spread across SEC, SOE, SOU and SUB. The allocation of days is shown below.

Fishery	Fisheries covered	Total days	MPI CR %	DOC - CSP CR %
Chatham Rise (SEC/SOE)	HOK1, HAK1, HAK4, LIN3, LIN4 SWA3, SWA4, JMA3, EMA3, SQU1T	961	85	15

Sub-Antarctic

The Sub-Antarctic middle depth trawl fishery is largely dominated by tows targeting southern blue whiting around the Bounties and Campbell Islands where significant mammal captures have taken place. Observer time will be focussed on monitoring and recording interactions with fur seals and sea lions. Data is also collected on seabird interactions and behaviour due to the location of this fishery and its close vicinity to many seabird breeding islands. The landing of protected coral will also be recorded and sub-samples will be taken for identification.

Observers are tasked with recording information on which mitigation techniques are employed on vessels to better understand interactions between fishing gear and captures of protected species. Mitigation techniques employed in this fishery include offal and discard management and the use of bird scaring devices. Observer coverage for 2012/13 is spelled out below.

Fishery	Fisheries covered	Total days	MPI CR %	DOC - CSP CR %
Sub-Antarctic (SOU/SUB)	HOK1, HAK1 LIN5, LIN6, SBW6B, SBW6I, SBW6R, JMA3, EMA3, SQU1T	895	85	15

West Coast North Island

This fishery group is dominated by the jack mackerel trawl fishery. Observer time will be focussed on recording protected species interactions and the behaviour of cetaceans, pinnipeds and seabirds around the vessel. Observers will also record information on which mitigation and avoidance techniques are employed in this fishery. Vessels can employ several techniques aimed at reducing the likelihood of interacting with dolphins, including not fishing during hours of the day when dolphin interactions are more likely, not shooting nets when dolphins are sighted, avoiding a shallow headline depth, and avoiding targeting small mackerel, which appear to be the dolphins' target prey. During the 2012/13 observer year coverage is planned to target the period October to December and April to June to coincide with key jack mackerel fishing periods. Coverage for 2012/13 is detailed below.

Fishery	Fisheries covered	Total days	MPI CR %	DOC - CSP CR %
West Coast NI (CEW)	HOK1, LIN7, SWA1, JMA7, EMA7	230	85	15

Scampi

The priority for observers in southern areas will be to monitor interactions with seabirds New Zealand sea lions. The landing of protected coral will also be recorded and sub-samples will be taken for identification if required. Data is also collected on seabird interactions and behaviour around vessels. Observers record information on which mitigation techniques are employed in this fishery, including offal and discard retention and the use of bird scaring devices as well a specific gear configurations used. Coverage is shown in below.

Fishery	Fisheries covered	Total days	MPI CR %	DOC - CSP CR %
Scampi	SCI1, SCI2, SCI3, SCI4A, SCI5, SCI6A, SCI6B, SCI7, SCI8, SCI9	450	80	20

Squid6T

The CSP Observer Programme will form 20% of days planned for the squid 6T fishery to monitor interactions with protected species and measures to reduce those interactions. Particular areas of CSP interest in this fishery include offal and discard management and captures of seabirds in trawl nets. Observer placement in 2012/13 will be focussed to monitor interactions with NZ sea lions and seabirds from January to May.

Fishery	Fisheries covered	Total days	MPI CR %	DOC - CSP CR %
Squid	SQU6T	700	80	20

DEEP WATER BOTTOM TRAWL FISHERIES*Orange Roughy and Oreo*

Observer time will be focussed on assessing the extent of protected coral landed on vessels as well as monitoring and recording interactions with, and behaviours of, seabirds. Sub-samples of corals will be taken for identification when required. Mitigation techniques employed in this fishery include offal and discard management, the use of bird scaring devices and trawling known tracks to avoid catching deep sea invertebrates. Observer coverage is targeted as shown below:

Fishery	Fisheries covered	Total days	MPI CR %	DOC - CSP CR %
ORH 1		65	90	10
East Coast NI Deepwater	ORH2A, BYX2, CDL2	269	90	10
Chatham Rise Deepwater	ORH3B, OEO3A, OEO4, BYX3	310	90	10
Sub-Antarctic Deepwater	ORH3B, OEO1, OEO6	254	90	10
West Coast NI Deepwater	ORH7A	15	90	10

SURFACE LONGLINE FISHERIES*Domestic surface longline*

Monitoring priorities for 2012/13 will include collecting information on protected species interactions, mitigation techniques and offal/discard management practices employed in the fishery. Historic captures of protected ray species mean that increased observer focus will go into documenting of these captures and particularly the post release fate of the animals. Observer coverage will be in AKE, CEE, CHA and KER to monitor interactions with seabirds and turtles. Coverage will be throughout the year and divided through FMAs as shown below.

Fishery	Fisheries covered	Total days	MPI CR %	DOC - CSP CR %
Surface longline - domestic (Bigeye tuna and swordfish)	STN1, BIG1, YFN1, SWO1	230	85	15
Surface longline - domestic Southern bluefin East Coast	STN1, BIG1, YFN1, SWO1	169	85	15
Surface longline - domestic Southern bluefin West Coast	STN1, BIG1, YFN1, SWO1	58	85	15

Charter surface longline

Observer time will be focussed on monitoring and recording interactions with seabirds and sea turtles, including captures and behaviour of protected species around the vessel. Observers will record information on which mitigation techniques are employed in this fishery which can include the use of tori lines, night setting, weighted lines and offal and discard management. Observer coverage in 2012/13 will be dependent on where charter tuna vessels focus fishing effort, but coverage is tentatively planned below.

Fishery	Fisheries covered	Total days	MPI CR %	DOC - CSP CR %
Surface longline - Charter	STN1, BIG1, YFN1, SWO1	350	85	15

BOTTOM LONGLINE FISHERIES*Deep-sea ling*

Observer time will be focussed on monitoring and recording interactions with seabirds including captures and behaviour around the vessel. Observers record information on which mitigation techniques are employed in this fishery, including the use of tori lines and line weighting regimes. Observer coverage in 2012/13 will be focussed to monitor seabird interactions during September, October, May and June, as shown below:

Fishery	Fisheries covered	Total days	MPI CR %	DOC - CSP CR %
Bottom longline	LIN2, LIN3, LIN4, LIN5, LIN6, LIN7, PTO1	190	85	15

PURSE SEINE FISHERIES*Skipjack tuna*

Observer coverage has historically taken place in this fishery, though not for the purposes of protected species monitoring. Two ray species (*Manta birostris* and *Mobula japanica*) have historically been reported as bycatch in this fishery and therefore for the 2012/13 year CSP will be levying for coverage in this fishery in order to assess the nature and extent of protected fish captures in this fishery. Observer coverage is planned for AKE and AKW in both the domestic purse seine and super seine fisheries as shown below.

Fishery	Fisheries covered	Total days	MPI CR %	DOC - CSP CR %
Domestic SKJ	SKJ1	70	85	15
Super seiner SKJ	SKJ1	30	85	15

Outputs

- A descriptive report including observer data relating to protected species collected in offshore fisheries and inshore fisheries will be provided to stakeholders. Note that this will include information relating to protected species collected during the Joint DOC/MPI Inshore Observer Programme.
- Specific information can be requested from CSP at any time and will be delivered within a reasonable timeframe (usually within 10 working days).
- All seabirds are returned and/or photographed, where possible, for identification and autopsy (see project INT 2010/02: Identification of seabirds captured in NZ fisheries).
- Data will be available for other DOC and MPI projects including mitigation development/testing, bycatch estimation, risk management and other modelling projects.

References

Rowe, S. 2010: Level 1 Risk Assessment for incidental seabird mortality associated with New Zealand fisheries in the NZ-EEZ. Marine Conservation Services, Department of Conservation, Wellington. 75 p.

Richard, Y., Abraham, E.R., Filippi, D. 2011 Assessment of the risk to seabird populations from New Zealand commercial fisheries. Final Research Report for projects IPA2009/19 and IPA2009/20 and draft Aquatic Environment and Biodiversity Report. Ministry of Fisheries, Wellington.

Indicative Research Cost: See Appendix 1 for details

Cost Recovery: F(CR) Item 8 (100% Industry)

Fish Stocks: See Appendix 1 for details

2.2 Identification of seabirds captured in New Zealand fisheries

NOTE: This multi-year project (INT2010-02) was consulted on in 2010/11 and is included here for completeness

Project Code: INT 2010-02

Start Date: 1 October 2010

Completion Date: 31 May 2014¹³

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

The management approach

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. Government 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. To enable expert determination of taxon, sex, age-class, provenance and cause of mortality, government observers retain dead bird specimens (subject to any operational limitations), and photograph, where possible, bird captures either alive or dead.

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 of Fisheries' databases 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

¹³ This project is funded in annual terms. Continuation to 31 May 2014 is subject to annual review and Ministerial approval.

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

Research approach

Specific objectives 1-3

Dead birds returned by government observers will be delivered, suitably packaged and labelled, to the contractor. Observers make note of the circumstances of capture and provide a tentative identification. Seabirds returned will be examined to determine the following:

- Species identification and classification;
- Sex;
- Moulting and brood patch development as a partial indicator of breeding status;
- Age;
- Provenance (origin) (where possible);
- Subcutaneous fat score as an index of body condition;
- Stomach and gizzard contents; and
- General body condition including any signs of injury and cause of death (where possible).

These data will be reported by species and fishery stratum (fishing method, fishery area and target species). The methodologies used in examining the specimens and categorising them into different groups shall be fully described. Differences in research protocols compared to previous necropsy research on New Zealand seabirds returned from fisheries shall be fully detailed and the implications of any differences discussed.

Specific objective 4

Where government observers recorded an incidental bird capture and no specimen is retained (either live captures or discarded dead birds), all photographs obtained, per specimen, will be delivered to the contractor in electronic format. Details on the date, time, location and fishery of capture will also be provided. Photographs will be examined to determine the following:

- Identification and classification, to the lowest taxonomic level possible;
- Sex (where possible);
- Age (where possible); and
- Provenance (origin) (where possible).

These data will be reported by taxon and fishery stratum (fishing method, fishery area and target species). When a specimen is identified and separated from similar species, the identification features used shall be fully described.

Relevant CSP Strategic Plan policies include: 2, 24.

Outputs

- A summary of results will be reported, for circulation to stakeholders, on a six monthly basis.
- Information can be requested from CSP at any time, and is provided within a reasonable timeframe (usually 10 working days).

- Annual report(s) of confirmed identification, sex, age, provenance and all other data collected, of all specimens examined. To the extent possible, the final report will also identify potential interactions between seabirds and fishing gear, and identify factors that may have contributed to seabird mortality. Data will be reported by fishery stratum (fishing method, fishery area and where possible target species).
- Presentation of six monthly and annual reports to the CSP Technical Working Group.
- Provision of all data collected in electronic format, suitable for updating Ministry of Fisheries databases.

Note:

Based on current capture rates, it is estimated that between approximately 300 and 500 dead birds may be returned by government observers per annum during this project. The number of birds returned each year may vary considerably. It is expected that the annual cost of specific objectives 1-3 of this project will be based on the actual number of birds examined.

In 2007-08, photographs of approximately 35 birds captured and not returned were obtained by government observers. It is expected that the number of live bird captures photographed may increase in future years with extra training given to observers. The number of photographs obtained each year may vary considerably. It is expected that the annual cost of specific objective 4 of this project will be based on the actual number of photographed birds examined.

Indicative Research Cost: \$80,000

Cost Recovery: F(CR) Item 4 (100% Industry)

Fish stocks: BAR 1, 7, BCO 4, BIG 1, BNS1, 2, 3, 7, BUT5, 7, BWS 1, ELE3, 5, 7, EMA 1, 3, 7, FLA1, 2, 3, 7, GMU1, GSH 1, 3, 4, 7, 8, 9, GSP 1, 7, GUR 1, 2, 3, 7, 8, HAK 1, 4, 7, HOK 1, HPB 1, 2, 3, 4, 7, 8, JDO 1, 2, 3, 7, JMA 1, 3, 7, KIN 1, 7, 8, LEA 1, 2, 3, LIN 1, 2, 3, 4, 5, 6, 7, MAK 1, MOK 1, 3, 5, MOO 1, ORH 1, 2A, 2B, 3A, 3B, OEO 1, 3A, 4, 6, PAR 1, 9, POR 1, POS 1, RBM 1, RSN 1, 2, RIB 1, 2, RCO 1, 3, 7, RSK 1, 3, 7, 8, SBW 6A, 6R, 6I, 6B, SCH1, 2, 3, 4, 5, 7, SCI 1, 2, 4A, 6A, 6B, SKI 1, 3, 7, SNA 1, 2, 3, 7, 8, SPD 1, 3, 4, 5, 7, 8, SPE 1, 3, 4, 7, SPO1, 3, 7, 8, SQU1T, 6T, SSK 1, 3, 7, 8, STA 1, 3, 4, 5, 7, STN 1, SWA 1, 3, 4, SWO 1, TAR 1, 2, 3, 4, 5, 7, 8, TOR 1, TRE 1, 2, 7, TRU 3, 4, WAR 1, 2, 3, 7, 8, WWA 2, 3, 4, 5B, 7, YEM 1, 8, 9, YFN 1

3. Population Projects

3.1 Flesh-footed shearwater - population study trial and at-sea distribution

NOTE: This multi-year project (POP2011-02) was consulted on in 2011/12 and is included here for completeness

Project code: POP2011-02

Start Date: 1 July 2011

Completion Date: 30 June 2013¹⁴

Overall Objectives

- To assess the feasibility of gaining improved estimates of key flesh-footed shearwater population parameters
- To investigate the at-sea distribution of flesh-footed shearwaters

Specific Objectives

1. To develop a project design for a population monitoring programme suitable for estimating key demographic parameters of flesh-footed shearwaters
2. To provide recommendations on the extent of monitoring required to obtain robust estimates of key demographic parameters for flesh-footed shearwaters
3. To collect detailed data on the at-sea distribution and foraging behaviour of flesh-footed shearwaters in New Zealand waters
4. To identify areas where flesh-footed shearwaters are at highest risk of interactions with fishing gear by analysing data collected in Specific Objective 3 in relation to spatial and temporal fishing effort

Rationale

Flesh-footed shearwater is classified as At Risk (Declining) (Miskelly et al 2008), and in New Zealand breed predominantly on islands off northern North Island. A recent population estimate of approximately 8,600 pairs at eight key breeding sites (Baker et al 2010) is considerably lower than the previous estimate of 25,000-50,00 pairs (Taylor 2000). Flesh-footed shearwaters have been observed captured in a number of longline and trawl fisheries, particularly inshore bottom longline targeting snapper and scampi trawl. Quantitative risk assessment found this species to be at high risk to commercial fishing impacts (Richard et al 2011).

Information on population parameters relevant to assessing the susceptibility of this species to human induced impacts is poor. Sensitivity analysis performed as part of recent risk assessment found much of the uncertainty around estimated risk came from uncertainty around estimates of adult survival Richard et al (2011). Developing a project design for a population monitoring programme (Specific Objectives 1 and 2) would provide a mechanism for gathering information to better estimate adult survival, and other key population parameters relevant to managing fishing impacts on this species (e.g. fecundity, age of maturity, juvenile survival). Flesh-footed shearwaters are a

¹⁴ This project is planned to be funded in annual terms. Continuation to 30 June 2013 would be subject to annual review and Ministerial approval.

migratory species, and the extent of overlap of their foraging range with New Zealand commercial fishing activity is poorly understood. Collection and analysis of detailed at-sea distributional data (Specific Objectives 3 and 4) will allow a quantification of this overlap and inform both further risk analyses (as a tool for fisheries management) and identify fisheries and areas where management of commercial fishing impacts on this species may be required.

Research Approach

There are currently two small-scale flesh-footed shearwater population monitoring projects (G. Taylor, A. Booth, pers. comm.), but to date sufficient information to make robust estimates of key demographic parameters has not been collected. There are a number of inherent difficulties in such studies of flesh-footed shearwater, particularly around access to breeding areas, and access to nesting chambers of burrows (G. Taylor, pers. comm.). Addressing Specific Objectives 1 and 2 of this project will involve identifying suitable sites and methods to collect information on demographic parameters including adult survival, juvenile survival, fecundity and age of first reproduction. Different methods may be suitable for assessing different parameters. It is essential that methods and experience from current studies are considered during this project. Power analyses should be applied to any recommended methods in order to quantify the extent of monitoring (e.g. number of years, number of burrows monitored) required to estimate demographic parameters to acceptable certainty (Specific Objective 2).

There is currently work underway to collect geolocator tracking information from approximately 30 flesh-footed shearwaters at the two existing small-scale study sites (G. Taylor, pers. comm.). To adequately address Specific Objectives 3 and 4 it is envisaged that GPS loggers will be applied to birds to provide detailed spatial information to overlay on commercial fishing effort. Collection of this data must complement existing tracking programmes.

Outputs

1. A technical report (or reports) detailing the field and analytical methods used and results found for all work addressing Specific Objectives 1, 3 and 4.
2. Recommendations, including details on the methods used to reach those recommendations, on the methods and extent of monitoring required to obtain robust estimates of key demographic parameters for flesh-footed shearwaters.

References

- Baker, B., Hedley, G., Cunningham, R. 2010 Data collection of demographic, distributional and trophic information on the flesh-footed shearwater to allow estimation of effects of fishing on population viability: 2009-10 field season. Research Report for Ministry of Fisheries project PRO2006/01. Ministry of Fisheries, Wellington. 62 p
- Miskelly, C.M., Dowding, J.E., Elliott, G.P., Hitchmough, R.A., Powlesland, R.G., Robertson, H.A., Sagar, P.M., Scofield, R.P., Taylor, G.A. 2008 Conservation status of New Zealand birds, 2008. *Notornis* 55: 117-135.
- Richard, Y., Abraham, E.R., Filippi, D. 2011 Assessment of the risk to seabird populations from New Zealand commercial fisheries. Final Research Report for projects IPA2009/19 and IPA2009/20 and draft Aquatic Environment and Biodiversity Report. Ministry of Fisheries, Wellington.
- Taylor, G.A. 2000 Action Plan for Seabird Conservation in New Zealand. Part B Non-threatened Seabirds. Department of Conservation, Wellington.

Indicative Research Cost: \$90,000

Cost Recovery: F(CR) Item 3 (50% Industry 50% Crown)

Fish Stocks: BNS1, SCI1, SNA1

3.2 New Zealand sea lions - Auckland Islands population study

Project code: POP2012-01

Start Date: 1 July 2012

Completion Date: 30 June 2013

Overall Objective

To provide information on the population level and dynamics of the New Zealand sea lion at the Auckland Islands relevant to assessing the impacts of commercial fishing impacts on this population.

Specific Objectives

1. To estimate New Zealand sea lion pup production at Enderby and Dundas Islands using aerial survey techniques.
2. To conduct ground-based estimates of New Zealand sea lion pup production at Enderby and Dundas Islands using established techniques, timed in such a way as to ground truth aerial-based methods deployed in relation to Specific Objective 1.
3. To conduct a ground-based estimate of New Zealand sea lion pup production at Figure of 8 Island using established techniques.
4. To mark New Zealand sea lion pups at the Auckland Islands following established techniques, and conduct a three to five week period of resighting previously marked animals at Enderby Island.

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 (e.g. Chilvers 2008, 2010). Approximately 75% 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. Over the last decade there has been a considerable decline in pup production at the Auckland Islands (Chilvers 2010, 2011), and while disease events have occurred over this period (Castinel et al 2007), direct fishing bycatch is the major known anthropogenic impact on the population. In contrast, pup production appears to have increased on Campbell Island, the second major breeding location for the species (Maloney et al 2009). 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. This project collects those data required to form such an understanding. In addition, the project has a focus on recommending the most cost effective ways of collecting such data in future years.

Research Approach

The aerial methods to be used must build upon the methods initially trialled in early 2012 (Baker et al 2012), that indicated that for Sandy Bay on Enderby Island, and Dundas Island, this method was capable of closely matching the pup production estimate by the established methods of Chilvers (2010, 2011). It is expected that aerial and ground methods must be timed and coordinated in order allow for ground truthing of aerial results against those obtained by established ground-based methods.

Ground-based methods must build upon established methods described by Chilvers (2010, 2011) to ensure the consistency of time series data collected. In order to maximise cost efficiencies it is envisaged that the logistical aids offered by the aerial survey component of this project will be utilised, particularly in respect to accessing Dundas Island. It is also proposed that the resighting season be restricted to a three to five week period starting on approximately 12 January 2013. This is based on a review¹⁵ of historic resighting data commissioned by DOC. The review was included as Appendix 2 of Draft CSP Annual Plan 2012-13 released for public consultation.

See also related project POP2012-02.

Note: previous CSP projects on New Zealand sea lions include: POP2011-01, POP2010-01, POP2007-01, POP2006-01, POP2005-01, POP2004-01, MAM2002-1, MAM2001-1 and MAM2000-1. Outputs of these projects include DOC reports, published papers, and CSP Technical Working Group reports. See the Marine Conservation Services website (<http://www.doc.govt.nz/mcs>) for links to many of these publications.

Outputs

1. Data collected, in an electronic format suitable for upload into the New Zealand sea lion database¹⁶.
2. A technical report (or reports) detailing:
 - the methods used and a summary of data collected.
 - estimates of New Zealand sea lion pup production at the Auckland Islands based on both aerial and ground methods.
 - recommendations for cost effective field methods of estimating New Zealand sea lion pup production and population dynamics at the Auckland Islands.

References

- Baker, B., Jenz, K., Chilvers, L. 2012. Aerial survey of New Zealand sea lions. Draft report for Ministry of Agriculture & Forestry, Deepwater Group Limited and Department of Conservation, held by Department of Conservation, Wellington. Available for download from: <http://www.doc.govt.nz/upload/documents/conservation/marine-and-coastal/marine-conservation-services/nz-sea-lion-aerial-survey-2012-draft-report.pdf>
- Baker C.S., Chilvers B.L., Constantine R., DuFresne S., Mattlin R., van Helden A., Hitchmough R. (2010) Conservation status of New Zealand Marine Mammals (suborders Cetacea and Pinnipedia), 2009. *New Zealand Journal of Marine & Freshwater Research* 44:101-115.

¹⁵ MackKenzie, D. I. 2012. Review of female New Zealand sea lion tag-resight data collected on Enderby Island. Unpublished report held by the Department of Conservation, Wellington.

¹⁶ Development of the New Zealand sea lion database is in progress as part of work under CSP project POP2011-01 (Specific Objective 3).

- Bowen, W.D. 2012. A review of evidence for indirect effects of commercial fishing on New Zealand sea lions (*Phocarctos hookeri*) breeding on the Auckland Islands. Report of Department of Conservation, Wellington. 41 p. Available for download at <http://www.doc.govt.nz/publications/conservation/marine-and-coastal/marine-conservation-services/csp-reports/review-of-indirect-effects-of-fishing-on-new-zealand-sea-lions/>
- Castinel, A.; Duignan, P.J.; Pomroy, W.E.; Lopez-Villalobos, N.; Gibbs, N.J.; Chilvers, B.L.; Wilkinson, I.S. 2007: Neonatal mortality in New Zealand sea lions (*Phocarctos hookeri*) at Sandy Bay, Enderby Island, Auckland Islands from 1998 to 2005. *Journal of Wildlife Diseases* 43: 461.
- Chilvers, B.L. 2008: Foraging site fidelity of lactating New Zealand sea lions. *Journal of Zoology* 276: 28-36.
- Chilvers, B.L. 2010 Research to assess the demographic parameters and at sea distribution of New Zealand sea lions, Auckland Islands. Draft Final Report POP2007-01 for Department of Conservation, Wellington. 32 p. Available for download at <http://www.doc.govt.nz/mcs>
- Chilvers, B.L. 2011 Research to assess the demographic parameters of New Zealand sea lions, Auckland Islands: Draft Final Report November 2011. POP2010-01 Draft Final Report for Department of Conservation, Wellington. 20 p. Available for download at <http://www.doc.govt.nz/mcs>
- Maloney, A.; Chilvers, B.L.; Haley, M.; Muller, C.G.; Roe, W.; Debski, I. 2009: Distribution, pup production and mortality of New Zealand sea lion *Phocarctos hookeri* on Campbell Island / Motu Ihupuku, 2008. *New Zealand Journal of Ecology* 33: 97-105.

Indicative Research Cost: \$150,000.

Cost Recovery: F(CR) Item 2 (90% Industry, 10% Crown)

Fish Stocks: SQU6T, SCI6A.

3.3 New Zealand sea lions – demographic assessment of the cause of decline at the Auckland Islands

Project code: POP2012-02

Start Date: 1 July 2012

Completion Date: 30 June 2014¹⁷

Overall Objective

To determine the key demographic factors driving the observed population decline of New Zealand sea lions at the Auckland Islands.

Specific Objectives

1. To identify which demographic parameters are the key drivers of the observed population decline of New Zealand sea lions at the Auckland Islands.
2. To identify potential demographic mechanisms through which both direct and potential indirect effects of fishing can impact on the population level of New Zealand sea lions at the Auckland Islands, or increase the susceptibility of the population to such effects.

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 (e.g. Chilvers 2008, 2010). Approximately 75% 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. Over the last decade there has been a considerable decline in pup production at the Auckland Islands (Chilvers 2010, 2011), and while disease events have occurred over this period (Castinel et al 2007), direct fishing bycatch is the major known anthropogenic impact on the population. In contrast, pup production appears to have increased on Campbell Island, the second major breeding location for the species (Maloney et al 2009). 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 key demographic factors driving trends in the population and how fishing impacts on these parameters, or how any demographic processes influencing the population may alter its susceptibility to fishing impacts. This project aims to both identify these key parameters and identify the mechanisms through which fishing impacts are influencing these parameters and hence influencing the population trend.

¹⁷ This project is planned to be funded in annual terms. Continuation to 30 June 2014 would be subject to annual review and Ministerial approval.

Research Approach

A large body of relevant data is available, particularly mark-resight data that has been collected in a standardised way for several years (see Chilvers 2010, 2011 for further details of how data is collected), and data proposed to be collected in 2012/13 (see POP2012-01). Data will be made available through the New Zealand sea lion database, currently in development as part of work under CSP project POP2011-01 (Specific Objective 3). It is envisaged that a staged process incorporating technical input and advice from the CSP Technical Working Group will be used to develop and refine the methodological approach.

During the first year of this project a number of candidate methods should be identified, trialled and presented to the CSP Technical Working Group. The Group will assist in identifying the preferred analytical approach or approaches, and these will be applied for an in-depth analysis in year 2 in order to address the specific objectives of this project.

See also related project POP2012-01.

Note: previous CSP projects on New Zealand sea lions include: POP2011-01, POP2010-01, POP2007-01, POP2006-01, POP2005-01, POP2004-01, MAM2002-1, MAM2001-1 and MAM2000-1. Outputs of these projects include DOC reports, published papers, and CSP Technical Working Group reports. See the Marine Conservation Services website (<http://www.doc.govt.nz/mcs>) for links to many of these publications.

Outputs

1. A technical report (or reports) that identify and describe a range of potential modelling approaches suitable for addressing the specific objectives of this project by utilising existing data.
2. A technical report (or reports) detailing an in-depth analysis, including a detailed methodology, of existing data to address the specific objectives of this project. The results must include identification of key demographic drivers of the observed population decline and assess the actual and potential impacts of commercial fishing on the population through these drivers.

References

- Baker C.S., Chilvers B.L., Constantine R., DuFresne S., Mattlin R., van Helden A., Hitchmough R. (2010) Conservation status of New Zealand Marine Mammals (suborders Cetacea and Pinnipedia), 2009. *New Zealand Journal of Marine & Freshwater Research* 44:101-115.
- Bowen, W.D. 2012. A review of evidence for indirect effects of commercial fishing on New Zealand sea lions (*Phocarctos hookeri*) breeding on the Auckland Islands. Report of Department of Conservation, Wellington. 41 p. Available for download at <http://www.doc.govt.nz/publications/conservation/marine-and-coastal/marine-conservation-services/csp-reports/review-of-indirect-effects-of-fishing-on-new-zealand-sea-lions/>
- Castinel, A.; Duignan, P.J.; Pomroy, W.E.; Lopez-Villalobos, N.; Gibbs, N.J.; Chilvers, B.L.; Wilkinson, I.S. 2007: Neonatal mortality in New Zealand sea lions (*Phocarctos hookeri*) at Sandy Bay, Enderby Island, Auckland Islands from 1998 to 2005. *Journal of Wildlife Diseases* 43: 461.
- Chilvers, B.L. 2008: Foraging site fidelity of lactating New Zealand sea lions. *Journal of Zoology* 276: 28-36.
- Chilvers, B.L. 2010 Research to assess the demographic parameters and at sea distribution of New Zealand sea lions, Auckland Islands. Draft Final Report POP2007-01 for Department of Conservation, Wellington. 32 p. Available for download at <http://www.doc.govt.nz/mcs>

Chilvers, B.L. 2011 Research to assess the demographic parameters of New Zealand sea lions, Auckland Islands: Draft Final Report November 2011. POP2010-01 Draft Final Report for Department of Conservation, Wellington. 20 p. Available for download at <http://www.doc.govt.nz/mcs>

Maloney, A.; Chilvers, B.L.; Haley, M.; Muller, C.G.; Roe, W.; Debski, I. 2009: Distribution, pup production and mortality of New Zealand sea lion *Phocarcos hookeri* on Campbell Island / Motu Ihupuku, 2008. *New Zealand Journal of Ecology* 33: 97-105.

Indicative Research Cost:

\$60,000 for the period 1 July 2012-30 June 2013

\$50,000 for the period 1 July 2013-30 June 2014

Cost Recovery: F(CR) Item 2 (90% Industry, 10% Crown)

Fish Stocks: SQU6T, SCI6A.

3.4 Black petrel – at-sea distribution and population estimate

Project code: POP2012-03

Start Date: 1 July 2012

Completion Date: 30 June 2013

Overall Objective

To describe the population trend and detailed at-sea foraging distribution of black petrels during the breeding season.

Specific Objective

1. To provide detailed at-sea foraging distributional data of black petrels during the breeding season, suitable for inclusion in fisheries risk assessments.
2. To estimate the black petrel population size at Great Barrier Island and describe the population trend by comparing the estimate to relevant existing data.

Rationale

Black petrels are endemic to New Zealand and breed only on Great Barrier Island (Aotea Island) and Hauturu/Little Barrier Island. Black petrels have been observed caught in trawl, surface longline and bottom longline fisheries. Recent observer coverage found relatively high numbers of captures in inshore bottom longline fisheries in Fisheries Management Area 1 (e.g. Ramm 2010). Considerable research on black petrels on Great Barrier Island has now been completed, including CSP projects POP2009-01, POP2008-01, POP2007-02, POP2005-04, POP2004-4, BRD2003-1, BRD2002-5 and BRD2001-3. This research has included the collection numerous tracking data from coarse-scale geologgers (e.g. Bell et al 2011a), and some more detailed tracking data using GPS devices (e.g. Freeman et al. 2010). Good estimates of key population parameters for Great Barrier Island have been made (e.g. Bell et al. 2011b, Francis & Bell 2010), though estimates of juvenile survival remain highly uncertain (Bell et al 2011b). Population modelling in a fisheries context (Bell et al 2011b) concluded that uncertainty in population trajectory was driven by uncertainty over juvenile survival, but that repeated transect surveys showed an apparent decline in total population. In order to improve our understanding of the population dynamics further time-series data are necessary on the population level. The spatial data will inform detailed future fisheries risk assessment for black petrels at a within-New Zealand waters scale.

Research Approach

Wildlife Management International Limited have in place a research programme for black petrels at Great Barrier Island in 2012/13, that aims to deploy limited numbers of GPS tracking devices and dive-depth recorders, in addition to routine monitoring of the core study burrows.

To maximise cost efficiencies this project will be implemented alongside the (non-CSP) research programme at the Great Barrier Island study colony to:

- deploy additional GPS tracking devices and dive-depth recorders in order to better describe the at-sea distribution and foraging activity at a fine-scale to allow detailed overlay with domestic fishing activity; and
- estimate population size using the random transect methodology of Bell et al (2007, 2011b), and describe population trend in comparison to these earlier estimates.

Outputs

1. A technical report (or reports) detailing the methods used and results found, including an updated population estimate and an analysis of population trend, to the extent possible given existing data.
2. At-sea distribution and foraging data suitable for fisheries risk assessment analyses.

References

- Bell, E.A.; Sim, J.L.; Scofield, P. 2007. Demographic parameters of the black petrel (*Procellaria parkinsoni*). DOC Research and Development Series 273. Department of Conservation, Wellington. 32p.
- Bell, E.A., Sim, J.L., Torres, L., Schaffer, S. 2011a: At sea distribution of the black petrels (*Procellaria parkinsoni*) on Great Barrier Island (Aotea Island), 2009/10: Part 1 - Environmental variables. Research report for Department of Conservation, Wellington. Available for download from <http://www.doc.govt.nz/mcs>
- Bell, E.A., Sim, J.L., Scofield, P., Francis, C. 2011b: Population parameters of the black petrels (*Procellaria parkinsoni*) on Great Barrier Island (Aotea Island), 2009/10. Research report for Department of Conservation, Wellington. Available for download from <http://www.doc.govt.nz/mcs>
- Francis, R.I.C.C.; Bell, E.A. 2010: Fisheries risks to the population viability of black petrel (*Procellaria parkinsoni*). *New Zealand Aquatic Environment and Biodiversity Report No. 51*. Ministry of Agriculture and Forestry, Wellington.
- Freeman R, Dennis T, Landers T, Thompson D, Bell E, et al. 2010: Black petrels (*Procellaria parkinsoni*) patrol the ocean shelf-break: GPS tracking of a vulnerable Procellariiform seabird. *PLoS ONE* 5(2): e9236. doi:10.1371/journal.pone.0009236
- Ramm, K. 2010: Conservation Services Programme Observer Report: 1 July 2008 to 30 June 2009 - Final Draft. Department of Conservation, Wellington. Available for download from <http://www.doc.govt.nz/mcs>

Indicative Research Cost: \$40,000

Cost Recovery: F(CR) Item 3 (50% Industry 50% Crown)

Fish Stocks: BIG1, BNS1, SNA1,

3.5 Campbell Island and grey-headed albatrosses – population estimates

Project code: POP2012-04

Start Date: 1 July 2012

Completion Date: 30 June 2013

Overall Objective

To estimate the population size and trend of Campbell Island and grey-headed albatrosses at Campbell Island.

Specific Objectives

1. To estimate the population size of Campbell Island and grey-headed albatrosses at Campbell Island.
2. Determine the population trend of Campbell Island and grey-headed albatrosses at Campbell Island with reference to historic data.

Rationale

The Campbell Island albatross is endemic to New Zealand and breeds only at the Campbell Islands, which is also the only New Zealand breeding site of the grey-headed albatross. Campbell Island albatross has been reported bycaught mainly in surface longline fisheries, and also trawl, and although there have been very few observed captures of grey-headed albatross in New Zealand commercial fisheries, the risk ratio of Richard et al. (2011) is high, and substantial declines have been documented (e.g. Waugh et al. 1999). Population size is a parameter contributing a large proportion of uncertainty to the risk ratio of Richard et al. (2011), and thus updated information on the population size and trend will allow a more precise assessment of the impact of commercial fishing on these species.

Both Campbell Island albatross and grey-headed albatross are currently subject to tracking work as part of a National Institute of Water and Atmospheric Research Limited (NIWA) research project (D. Thompson, pers. comm.). This provides a research platform that allows for collection of additional information required to estimate the population size of these species at relatively low cost as the substantial overhead logistical costs related to work at Campbell Island do not have to be met.

Research Approach

The field work component will consist of taking digital photographs from each of the 12 photo-points established by Moore (2004) on one day in October 2012 (weather permitting). In addition, a ground count of occupied nests and birds present will be undertaken in sections of the South Bull Rock colony (consisting of about 2,000 occupied nests) on a day as close as possible to when the photo-points are covered.

Photographic montages will be constructed from the resulting overlapping photographs and counts will be made of these by one observer. The ground count of occupied nests will be used to determine the proportion of occupied nests that contain an egg, and thus estimate the population size. The resulting data will be analysed in comparison with those reported by Moore (2004) to determine population trends.

This project will be conducted alongside the existing NIWA research programme.

Outputs

1. A technical report (or reports) detailing the methods used and results found, including updated population estimates and an analysis of population trend, to the extent possible given existing data, of Campbell Island and grey-headed albatrosses.

References

- Moore, P. 2004: Abundance and population trends of mollymawks on Campbell Island. *Science for Conservation* 242, Department of Conservation, Wellington.
- Richard, Y., Abraham, E.R., Filippi, D. 2011: Assessment of the risk to seabird populations from New Zealand commercial fisheries. Final Research Report for projects IPA2009/19 and IPA2009/20. Unpublished report held by the Ministry of Fisheries, Wellington.
- Waugh, S.M., Weimerskirch, H., Moore, P.J., Sagar, P.M. 1999: Population dynamics of black-browed and grey-headed albatrosses *Diomedea melanophrys* and *D. chrysostoma* at Campbell Island, New Zealand, 1942-96. *Ibis* 141: 216-225.

Indicative Research Cost: \$20,000

Cost Recovery: F(CR) Item 3 (50% Industry 50% Crown)

Fish Stocks: BIG1, SCI1, STN1, LIN4

3.6 White-capped albatross – population estimate

Project code: POP2012-05

Start Date: 1 July 2012

Completion Date: 30 June 2013

Overall Objective

To estimate the population size and trend of white-capped albatross at the Auckland Islands.

Specific Objectives

1. To estimate the population size of white-capped albatross at the Auckland Island.
2. Determine the population trend of white-capped albatross at the Auckland Island.

Rationale

White-capped albatross is endemic to New Zealand and breeds predominantly on the Auckland Islands. This species has been one of the most commonly recorded bycaught protected species in New Zealand waters, particularly in off-shore trawl fisheries. A small-scale five-year population study as part of CSP project POP2005-02 has recently been completed, including collection of tracking data (Thompson et al. 2011, Torres et al. 2011). A series of aerial counts of all main colonies of this species have been completed as part of MPI project PRO2006/01, and show an apparent population decline (Baker et al. 2011). Additional photographic material has been collected in January 2012, under contract to DOC, but requires analysis. Population modelling in a fisheries context has been conducted as part of MPI project PRO2006/02 (Francis 2011) which concludes that global fishing bycatch (but not New Zealand fishing only) presents a risk to population viability and highlights the absence of information on juvenile survival and age at first breeding. Updated information on the population trend will assist in determining the susceptibility of this population to fisheries impacts as well as allow future assessment of ongoing fisheries management in regards to impacts on this species.

Research Approach

Aerial photo survey techniques have proved a suitable tool for estimating the white-capped albatross population at the Auckland Islands, and a census in January 2013 should follow established techniques (Baker et al. 2011). It is envisaged this will be conducted alongside the aerial survey component of project POP2012-01 in order to minimise overhead costs.

The photographs obtained, and those obtained in January 2012 should be analysed using the methods described by Baker et al. (2011), to report on a time series that maximises consistency between years.

Outputs

1. A technical report (or reports) detailing the methods used and results found, including updated population estimates and an analysis of population trend, to the extent possible given existing data, of white-capped albatrosses at the Auckland Islands.

References

- Baker, B., Jenz, K., Cunningham, R. 2011: Data collection of demographic, distributional and trophic information on the white-capped albatross to allow estimation of effects of fishing on population viability – 2010 Field Season. Final Research Report for project PRO2006/01. Unpublished report held by the Ministry of Fisheries, Wellington.
- Francis, R.I.C.C. 2011: Fisheries Risks to the Population Viability of White-capped Albatross. Final Research Report for project PRO2006/02. Unpublished report held by the Ministry of Fisheries, Wellington.
- Thompson, D., Sagar, P., Torres, L. 2011: A population and distributional study of white-capped albatross (Auckland Islands). Research report for the Department of Conservation, Wellington. Available for download from <http://www.doc.govt.nz/mcs>
- Torres, L.G., Thompson, D.R., Bearhop, S., Votier, S., Taylor, G.A., Sagar, P.M., Robertson, B.C. 2011: White-capped albatrosses alter fine-scale foraging behavior patterns when associated with fishing vessels. *Mar Ecol Prog Ser* 428: 289-301 doi: 10.3354/meps09068.

Indicative Research Cost: \$55,000

Cost Recovery: F(CR) Item 3 (50% Industry 50% Crown)

Fish Stocks: BAR5, BIG1, HOK1, SCI6A, SQU1T, SQU6T, STN1, SWA4

3.7 Salvin's albatross – population estimate and at-sea distribution

Project code: POP2012-06

Start Date: 1 July 2012

Completion Date: 30 June 2014¹⁸

Overall Objective

To estimate the at-sea distribution and population size and trend of Salvin's albatross at the Bounty Islands.

Specific Objectives

1. To determine the foraging range of Salvin's albatross at the Bounty Islands.
2. To estimate the population size of Salvin's albatross at the Bounty Islands.
3. To determine the population trend of Salvin's albatross at the Bounty Islands with reference to historic data.

Rationale

Salvin's albatross is endemic to New Zealand, with the main breeding population at the Bounty Islands. Salvin's albatross has been recorded bycaught predominantly in trawl fisheries, in relatively high numbers, and has been identified as at potentially high risk from commercial fisheries impacts (Richard et al. 2011). There is poor knowledge of Salvin's albatross currently, limited mainly to study of the small population at The Snares Islands (e.g. Sagar et al. 2011). In late 2011 an expedition to the Bounty Islands collected population information on Salvin's albatross on two islands, and initial results suggest a substantial population decline since 2004, in addition to apparent declines from 1997 to 2004 (J. Amey pers. comm.). The apparent decline in population combined with relatively high fisheries risk makes obtaining robust population information for this species a high priority requirement to ensure fisheries impacts can be adequately managed. An aerial census of the Bounty Islands was also completed in 2010 (Baker et al. 2011), and whilst this method showed promise as a suitable monitoring method, ground truthing is required. No tracking data has been collected for Salvin's albatross at the Bounty Islands. Determining the population trend and foraging ranges of the Bounty Islands population has also been recognised internationally as a research priority (ACAP 2011).

Research Approach

In the first year of this project a full analysis of the ground count data collected in 2011 in comparison to existing ground count and aerial information will be conducted to determine trends in population level, and if possible make estimates of the entire population size. Results of the analysis should be used to make recommendations on suitable methodological approaches to monitoring the population size of Salvin's albatross at the Bounty Islands, including consideration of aerial survey methods.

The tracking component of this project will involve two visits to the Bounty Islands. The first visit, in 2012/13, will be to place logging devices on breeding birds that are capable of recording data for at least one year. A second visit in 2013/14 will retrieve the devices, and the data gained will be analysed to produce kernel density plots of temporal spatial

¹⁸ This project is planned to be funded in annual terms. Continuation to 30 June 2014 would be subject to annual review and Ministerial approval.

foraging distribution. The data obtained will be reported in a format suitable for use in future fisheries risk assessments.

Dependent on the recommendations from the year 1 analysis of existing population information, it is envisaged that an aerial survey to estimate population size will be trialled in year 2, together with ground-truthing assistance provided by personnel recovering tracking devices. The results will be reported in comparison to the aerial survey of Baker et al (2011), and make recommendations on the suitability and accuracy of the method to monitor the population in future years.

Outputs

1. A technical report (or reports) detailing the methods used and results found, including the spatial distribution of foraging areas in relation to fishing effort, updated population estimates and an analysis of population trend, to the extent possible given existing data, of Salvin's albatross at the Bounty Islands.
2. Electronic data of the spatial distribution of foraging areas in a format suitable for use in fisheries risk assessments for Salvin's albatross at the Bounty Islands.
3. Recommendations for future monitoring of the population level of Salvin's albatross at the Bounty Islands.

References

- Agreement on the Conservation of Albatrosses and Petrels. 2011: Report of the Breeding Sites Working Group and Status and Trends Working Group – Joint BSWG4/STWG6. Final Report to the Sixth Meeting of Advisory Committee, Guayaquil, Ecuador, 29 August – 2 September 2011
- Baker, B., Jenz, K., Cunningham, R. 2011: Data collection of demographic, distributional and trophic information on the white-capped albatross to allow estimation of effects of fishing on population viability – 2010 Field Season. Final Research Report for project PRO2006/01. Unpublished report held by the Ministry of Fisheries, Wellington.
- Richard, Y., Abraham, E.R., Filippi, D. 2011: Assessment of the risk to seabird populations from New Zealand commercial fisheries. Final Research Report for projects IPA2009/19 and IPA2009/20. Unpublished report held by the Ministry of Fisheries, Wellington.
- Sagar, P.M., Charteris, M.R., Carrol, J.W.A., Scofield, R.P. 2011: Population size, breeding frequency and survival of Salvin's albatrosses (*Thalassarche salvini*) at the Western Chain, The Snares, New Zealand. *Notornis* 58: 57-63.

Indicative Research Cost:

\$80,000 for the period 1 July 2012-30 June 2013

\$120,000 for the period 1 July 2013-30 June 2014 (subject to findings from year 1, annual review and Ministerial approval)

Cost Recovery: F(CR) Item 3 (50% Industry 50% Crown)

Fish Stocks: BAR1, BIG1, GUR3, HOK1, LIN4, OEO3A, OEO4, ORH3B, SBW6A, SCI3A, SCI4A

3.8 Gibson's albatross – population estimate

Project code: POP2012-07

Start Date: 1 July 2012

Completion Date: 30 June 2013

Overall Objective

To estimate the population trend and adult survival of Gibson's albatross at the Auckland Islands.

Specific Objectives

1. To estimate the population size and trend of Gibson's albatross at the Auckland Islands.
2. To estimate the adult survival of Gibson's albatross at the Auckland Islands.

Rationale

This taxon (*Diomedea antipodensis gibsoni*) is endemic to New Zealand and breeds only at the Auckland Islands. Reported incidental captures have been predominantly from surface longline fisheries. Population studies have been conducted at the Auckland Islands, including work carried out as part of CSP projects (e.g. POP2004-02, BRD2001-01), with monitoring continued over recent years, as well as some tracking studies (K. Walker & G. Elliott, unpublished). Work is currently being completed to model the effects of fishing on this taxon as part of MPI project PRO2006/02. Whilst there were difficulties in assessing the effect of fisheries mortality on the viability of the population, initial results did reveal concern for the status of the population, with a marked decline in the population since 2005 due to reductions in adult survival, proportion of adults breeding and breeding success (Francis et al 2012). Adult survival was the parameter contributing most uncertainty to the risk ratio of Richard et al. (2011). Further information on population size and trend, and updated estimates of adult survival will inform updated fisheries risk assessment work.

Research Approach

Detailed counts of breeding birds and observations of marked birds have been made in a 53 ha study area on Adams Island, Auckland Islands, the major breeding site for Gibson's albatross (see Walker & Elliot 1999, 2005 for further details). It is envisaged that similar methods will be used in the 2012/13 breeding season to provide comparable, updated estimates of population size and trend and adult survival.

Outputs

1. A technical report (or reports) detailing the methods used and results found, including updated an updated population estimate, an analysis of population trend and updated estimates of adult survival of Gibson's albatross at the Auckland Islands.

References

- Francis, R.I.C.C., Elliot, G., Walker, K. 2012: Fisheries risk to the viability of Gibson's wandering albatross *Diomedea gibsoni*. Draft New Zealand Aquatic Environment and Biodiversity Report. Unpublished report held by the Ministry of Fisheries, Wellington.
- Richard, Y., Abraham, E.R., Filippi, D. 2011: Assessment of the risk to seabird populations from New Zealand commercial fisheries. Final Research Report for projects IPA2009/19 and IPA2009/20. Unpublished report held by the Ministry of Fisheries, Wellington.

Walker, K.; Elliott, G. 1999: Population changes and biology of the wandering albatross *Diomedea exulans gibsoni* at the Auckland Islands. *Emu* 99: 239-247

Walker, K.; Elliott, G. 2006: At-sea distribution of Gibson's and Antipodean wandering albatrosses, and relationships with long-line fisheries. *Notornis* 53 (3): 265-290

Indicative Research Cost: \$55,000

Cost Recovery: F(CR) Item 3 (50% Industry 50% Crown)

Fish Stocks: BIG1, HOK1, SQU1T, STN1

3.9 Pitt Island shags – foraging ecology

Project code: POP2012-08

Start Date: 1 July 2012

Completion Date: 30 June 2013

Overall Objective

To describe the foraging ecology of Pitt Island shags.

Specific Objectives

1. To describe the spatial distribution and dive profiling of Pitt Island shag foraging behaviour at the Chatham Islands.
2. To describe the diet of Pitt Island shags at the Chatham Islands.

Rationale

Pitt Island and Chatham Island shags are endemic to New Zealand and are both restricted to the Chatham Islands. There is limited knowledge on the breeding biology and demographic parameters of these species, and two censuses (1997/98 and 2003/04; Bell & Bell 2000, Bester & Charteris 2005) revealed apparent declines of 25% and 65%, respectively. A third census was completed in late 2011 as part of CSP project MCSPOP2010-02 has confirmed that significant declines of both species have occurred since 1997 (Debski et al 2012), and at-sea factors appear to be driving the declines of both species, though causal mechanisms remain unknown. The extent of potential captures in New Zealand fisheries remains uncertain, although Rowe (2010) identified high-moderate risk, primarily from poorly observed setnet and pot and trap fisheries. Results from CSP project INT2011-02 (Bell 2012) found that fishermen reported historic captures of Chatham Island shags in cray fish pots, but no captures in the last five years due to changes in fishing practice. No information exists on the foraging distribution or diet of Pitt Island and Chatham Island shags. In order to understand the mechanisms by which fisheries may effect Pitt Island and Chatham Island shags, and the extent of these effects, a proper understanding of the diet and foraging distribution is required.

This project focuses on Pitt Island shags as this species has been identified as an easier study species for foraging ecology study in comparison to Chatham Island shags. It is envisaged that methods developed may be applicable to comparative future studies of Chatham Island shags.

Research Approach

GSP and time-depth recorders will be deployed on adult breeding birds at the Chatham Islands, following recommendations from an initial attempt to tag this species¹⁹. Results will be reported in relation to marine environmental and habitat variables, and fishing effort data if available at sufficiently high resolution.

To complement the spatial description of foraging areas, suitable regurgitate/scat samples will be collected at Pitt Island shag breeding sites and analysed to determine quantitatively the range of prey items.

¹⁹ Bell, M. Brief report on attempts to deploy GPS devices on Pitt Island shag. Unpublished report held by Department of Conservation, Wellington.

Outputs

1. A technical report (or reports) detailing the methods used and results found, including an analysis of spatial distribution in relation fishing effort, and a description and quantification of diet, of Pitt Island shags at the Chatham Islands.

References

- Bell, M. 2012. Shag interactions with commercial rock lobster pot and trap fishing methods in the Chatham Islands. Draft report for the Department of Conservation, Wellington. Available for download from: <http://www.doc.govt.nz/upload/documents/conservation/marine-and-coastal/marine-conservation-services/int-2011-02-shag-pot-interaction-draft-report.pdf>
- Bell, M.; Bell, D. 2000: Census of the three shag species in the Chatham Islands. *Notornis* 47: 148-153.
- Bester, A.J.; Charteris, M. 2005: The second census of Chatham Island shag and Pitt Island shag – are numbers declining? *Notornis* 52: 6-10.
- Debski, I., Bell, M., Palmer, D. 2012. MCSPOP2010-02: Chatham Island and Pitt Island shag census 2011. Draft report for the Department of Conservation, Wellington. Available for download from: <http://www.doc.govt.nz/upload/documents/conservation/marine-and-coastal/marine-conservation-services/mcspop-2010-02-chatham-island-and-pitt-island-shag-survey-2011-draft-report.pdf>
- Rowe, S. 2010: Level 1 Risk Assessment for incidental seabird mortality associated with New Zealand fisheries in the NZ-EEZ. Marine Conservation Services, Department of Conservation, Wellington. 75 p. Available for download from <http://www.doc.govt.nz/mcs>

Indicative Research Cost: \$25,000

Cost Recovery: Nil (100% Crown)

4. Mitigation Projects

4.1 Inshore bottom longline seabird mitigation - design and analysis

Project code: MIT2012-01

Start Date: 1 July 2012

Completion Date: 30 June 2013

Overall Objective

To design a process of experimental testing, and analyse results, to determine the effectiveness of seabird mitigation strategies used by inshore bottom longline fishermen in the Hauraki Gulf.

Specific Objectives

1. To design suitable experimental techniques for testing of seabird mitigation techniques used by inshore bottom longline fishermen.
2. To develop forms for use by observers as part of INT2012-01 Inshore Objective C
3. To collate and groom both quantitative and qualitative data collected by observers in inshore bottom longline fisheries.
4. To undertake statistical analyses of these data to determine the effectiveness of mitigation strategies used by inshore bottom longline fishermen and those factors contributing to their effectiveness.
5. To provide recommendations for possible improvements to mitigation strategies and their wider applicability throughout the fleet.
6. To provide recommendations for improvements to testing protocols and suitable generalised metrics for measuring effectiveness of mitigation techniques, including required sample sizes.

Rationale

Inshore fishers employ a number of strategies, both regulated and voluntary to mitigate against the capture of seabirds. These techniques have been observed to be varied between vessels and previous observer coverage has shown large variation in the incidence of seabird bycatch, much of which has been qualitatively linked to mitigation practices (Rowe 2009, 2010, Ramm 2010, 2012). To date, no quantitative assessments of the efficacy of these measures have been undertaken. This project will design the data collection work undertaken by observers as part of INT2012-01 Inshore Objective C, utilising recommendations from the inshore bottom longline mitigation Technical Advisory Group (TAG) to the extent feasible, and analyse the resulting data.

Determining the effectiveness of different mitigation strategies over different vessels allows a wider suite of mitigation to be identified. This gives fishers the opportunity to apply the most appropriate measures to their specific operations with the aim of increasing both implementation rate and effectiveness of mitigation strategies over the entire fleet.

This work will feed in to practical recommendations for the most effective strategies to mitigate against seabird captures in the inshore bottom longline fishery.

Research approach

Data collection specifically for the purpose of assessing the effectiveness of mitigation strategies will be undertaken by Government observers during key periods of seabird and fishing activity during the 2012/13 observer year. The initial portion of this project will be to develop a detailed project design for this data collection, based on recommendations from the inshore bottom longline mitigation TAG. This will include development of data collection forms and briefing of observers. This data must then be collated, groomed and appropriate statistical methods applied in order to determine the efficacy of mitigation devices employed by fishers. Recommendations for improvements to mitigation devices and future efficacy trials should also be made.

Outputs

1. Written report detailing the methods and results of analyses of the mitigation assessment data. This report must include a description of grooming and statistical analyses applied to the data collected at sea. The report must also contain a summary of mitigation techniques employed by the vessels and a quantitative assessment of the efficacy of these techniques.
2. Presentation to the CSP Technical Working Group outlining the methods and results of analyses and discussion of possible improvements to both the mitigation practices and assessment techniques.

References:

- Ramm, K. 2010: Conservation Services Programme observer report: 01 July 2008 to 30 June 2009. Final research report. Department of Conservation, Wellington.
<http://www.doc.govt.nz/upload/documents/science-and-technical/2008-09-csp-observer-report.pdf>
- Ramm, K. 2012: Conservation Services Programme observer report: 01 July 2009 to 30 June 2010. Final research report. Department of Conservation, Wellington. Available for download from <http://www.doc.govt.nz/upload/documents/conservation/marine-and-coastal/fishing/draft-csp-observer-report-2009-10.pdf>
- Rowe, S.J. 2009: Conservation Services Programme observer report: 01 July 2004 to 30 June 2007. *DOC Marine Conservation Services Series 1*. Department of Conservation, Wellington. 93p. Available for download from <http://www.doc.govt.nz/publications/conservation/marine-and-coastal/marine-conservation-services/csp-reports/csp-observer-report-01-july-2004-to-30-june-2007/>
- Rowe, S.J. 2010: Conservation Services Programme observer report: 01 July 2007 to 30 June 2008. *DOC Marine Conservation Services Series 4*. Department of Conservation, Wellington. 97p. Available for download from <http://www.doc.govt.nz/upload/documents/science-and-technical/dmcs4entire.pdf>

Research Cost: \$60,000

Cost Recovery: F(CR) Item 4 (100% Industry)

Fish Stocks: BNS1, BNS2, HPB1, HPB2, HPB3, HPB4, LIN1, LIN2, LIN3, LIN4, RSN1, RSN2, SCH1, SCH2, SNA1, SNA2, TAR1, TAR2

4.2 Inshore trawl warp-strike mitigation- analysis of effectiveness

Project code: MIT2012-02

Start Date: 1 July 2012

Completion Date: 30 June 2013

Overall Objective

To collate and groom data collected by Government observers in experimental trials of warp strike mitigation devices used by inshore trawl fishermen and provide statistical analyses of the efficacy of these devices.

Specific Objectives

1. To collate and groom both quantitative and qualitative data collected by Government observers in inshore bottom longline fisheries.
2. To undertake statistical analyses of these data to identify the effectiveness of mitigation strategies used by inshore trawl fishermen and those factors contributing to their effectiveness.
3. To provide recommendations for possible improvements to mitigation strategies and their wider applicability throughout the fleet.
4. To provide recommendations for improvements to testing protocols and suitable generalised metrics for measuring effectiveness of mitigation techniques.

Rationale

Inshore trawl vessels (under 28m in length) are not required to employ any devices or techniques to mitigate against seabird captures. Despite this a number of fishers have been observed to have developed and implemented their own techniques to mitigate against seabird warp strikes. These techniques have been observed to vary between vessels in both design and function (Rowe 2009, 2010, Ramm 2010, 2012). To date, no quantitative assessments of the efficacy of these measures have been undertaken. This project will support the data collection work undertaken by observers as part of INT2012-01 Inshore Objective B.

Determining the effectiveness of different mitigation strategies over different vessels allows a wider suite of mitigation to be identified. This gives fishers the opportunity to apply the most appropriate measures to their specific operations with the aim of increasing both implementation and effectiveness of mitigation strategies over the entire fleet.

This work will feed into practical recommendations for the most effective strategies to mitigate against seabird captures in inshore trawl fisheries.

Research approach

Data collection specifically for the purpose of assessing the effectiveness of mitigation strategies for seabird warp strikes will be undertaken by Government observers during key periods of seabird and fishing activity during the 2012/13 observer year. This data must then be collated and groomed and appropriate statistical methods applied in order to determine the efficacy of mitigation devices employed by fishers. Recommendations for improvements to mitigation devices and future efficacy trials should also be made.

Outputs

1. Written report detailing the methods and results of analyses of the mitigation assessment data. This report must include a description of grooming and statistical analyses applied to the data collected at sea. The report must also contain summary of mitigation techniques employed by the vessels and a quantitative assessment of the efficacy of these techniques.
2. A set of recommendations for improvements to mitigation devices and future efficacy trials.

References:

- Ramm, K. 2010: Conservation Services Programme observer report: 01 July 2008 to 30 June 2009. Final research report. Department of Conservation, Wellington. Available for download from: <http://www.doc.govt.nz/upload/documents/conservation/marine-and-coastal/marine-conservation-services/int-2011-02-shag-pot-interaction-draft-report.pdf>
- Ramm, K. 2012: Conservation Services Programme observer report: 01 July 2009 to 30 June 2010. Final research report. Department of Conservation, Wellington. Available for download from <http://www.doc.govt.nz/upload/documents/conservation/marine-and-coastal/fishing/draft-csp-observer-report-2009-10.pdf>
- Rowe, S.J. 2009: Conservation Services Programme observer report: 01 July 2004 to 30 June 2007. *DOC Marine Conservation Services Series 1*. Department of Conservation, Wellington. 93p. Available for download from <http://www.doc.govt.nz/publications/conservation/marine-and-coastal/marine-conservation-services/csp-reports/csp-observer-report-01-july-2004-to-30-june-2007/>
- Rowe, S.J. 2010: Conservation Services Programme observer report: 01 July 2007 to 30 June 2008. *DOC Marine Conservation Services Series 4*. Department of Conservation, Wellington. 97p. Available for download from <http://www.doc.govt.nz/upload/documents/science-and-technical/dmcs4entire.pdf>

Research Cost: \$50,000

Cost Recovery: F(CR) Item 4 (100% Industry)

Fish Stocks: BAR1 BAR5, BAR7, ELE3, ELE5, ELE7, FLA3, FLA7, GSH3, GSH5, GSH7, GUR 2, GIR3, GUR7, LIN2, LIN3, LIN5, LIN7, RCO3 RCO7, SCH3, SNA1, SNA2, SPO3, SPO7, STA3, STA5, STA7 TAR3, TAR 5 TAR7

4.3 Review of mitigation techniques in setnet fisheries

Project code: MIT2012-03

Start Date: 1 July 2012

Completion Date: 30 June 2013

Overall Objective

To identify and assess the current mitigation techniques for both marine mammal and seabird capture employed in setnet fisheries both domestically and internationally and make recommendations as to their applicability to the New Zealand situation.

Specific Objectives

1. To undertake a literature review of historic and current mitigation techniques used in setnet fishing around the world.
2. To produce a catalogue of these techniques defining their nature, strengths and shortcomings, and possible applicability to New Zealand fisheries.
3. To provide any relevant recommendations for testing within New Zealand fisheries.

Rationale

Setnet fisheries have been observed to interact with a number of species of marine mammals and seabirds (Rowe 2009, 2010a, 2010b, Ramm 2010, 2012). To date, spatial closures are the only regulated form of mitigation applied to these fisheries in New Zealand. Through time, a number of techniques for mitigation against interactions in this fishery have been developed including differing net materials, acoustic deterrents, alterations to fishing practice and soak time (The Consortium for Wildlife Bycatch Reduction 2012). Much of the recent development work in this field has been conducted overseas.

Given that many of the bycatch events in this fishery involve species endemic to New Zealand it is timely and relevant to produce a review of international bycatch mitigation techniques and determine their applicability to New Zealand's fishery, in order to inform potential future management actions in the fishery.

Research Approach

A review of existing research including, but not limited to, international scientific literature, government agency commissioned reports, conference proceedings, commercial research and industry trials should be conducted. The work should build on the previous DOC-funded reviews by Bull (2007) and Rowe (2007), as well as the recent global review by Waugh et al (2011). Each mitigation method identified should be analysed in terms of the scientific rigor of any reported trials, the level of proven efficacy in any reported trials, and their relevance to the New Zealand situation, particularly in respect to any caveats or uncertainties in the methods, and in relation to the protected species assemblages likely to be effected in New Zealand.

A comprehensive report should be produced detailing mitigation techniques available in setnet fisheries, outlining costs and benefits of each, highlighting uncertainties and caveats of reported trials, and making recommendations for areas of future research.

Outputs

1. Written report detailing the mitigation techniques available to sentnet fisheries in New Zealand and assessment of the costs and benefits associated with these techniques highlighting uncertainties and caveats of reported trials, particularly in respect to the protected species assemblages likely to be effected in New Zealand.
2. A set of recommendations for areas of future research.

References:

- Consortium for Wildlife Bycatch Reduction 2011: International marine mammal – gillnet bycatch mitigation workshop 2011, Woods Hole, Massachusetts²⁰.
- Ramm, K. 2010: Conservation Services Programme observer report: 01 July 2008 to 30 June 2009. Final research report. Department of Conservation, Wellington.
<http://www.doc.govt.nz/upload/documents/science-and-technical/2008-09-csp-observer-report.pdf>
- Ramm, K. 2012: Conservation Services Programme observer report: 01 July 2009 to 30 June 2010. Final research report. Department of Conservation, Wellington. Available for download from <http://www.doc.govt.nz/upload/documents/conservation/marine-and-coastal/fishing/draft-csp-observer-report-2009-10.pdf>
- Rowe, S.J. 2009: Conservation Services Programme observer report: 01 July 2004 to 30 June 2007. *DOC Marine Conservation Services Series 1*. Department of Conservation, Wellington. 93p. Available for download from <http://www.doc.govt.nz/publications/conservation/marine-and-coastal/marine-conservation-services/csp-reports/csp-observer-report-01-july-2004-to-30-june-2007/>
- Rowe, S.J. 2010a: Conservation Services Programme observer report: 01 July 2007 to 30 June 2008. *DOC Marine Conservation Services Series 4*. Department of Conservation, Wellington. 97p. Available for download from <http://www.doc.govt.nz/upload/documents/science-and-technical/dmcs4entire.pdf>
- Rowe, S. 2010b: Level 1 Risk Assessment for incidental seabird mortality associated with New Zealand fisheries in the NZ-EEZ. Marine Conservation Services, Department of Conservation, Wellington. 75 p.

Research Cost: \$30,000

Cost Recovery: F(CR) Item 4 (100% Industry)

Fish Stocks: BUT_{5, 7}, SCH_{3, 5, 7, 8}, SPO_{3, 7, 8}

²⁰ Presentation abstracts available at http://bycatch.org/marine_mammal_gillnet_bycatch

4.4 Surface Longline Seabird Mitigation

Project code: MIT2011-04

Start Date: 1 July 2012

Completion Date: 30 June 2013

Overall Objective

To test one or more mitigation method which reduces the availability of surface longline hooks to seabirds at line setting.

Specific Objectives

1. To test the safe use and mitigation effectiveness of one or more mitigation methods, not currently in common use in New Zealand surface longline fisheries, that reduce the availability of surface longline hooks to seabirds at line setting.
2. To assess and quantify any impacts on catch rates between target and bycatch species between snoods with and without the target mitigation method.

Rationale

Surface longline fisheries globally have accounted for significant levels of seabird bycatch (Anderson et al. 2011). Despite the introduction of a number of mandatory mitigation methods for this fishing method in New Zealand²¹, recent seabird risk assessment has identified that surface longline fisheries still poses considerable risk to seabirds in New Zealand waters (Richard et al. 2011).

International research into seabird mitigation measures has had a considerable focus on developing novel methods for surface longline fisheries (e.g. ACAP 2011), and a number of methods have recently been developed that show good potential to reduce the availability of baited hooks to seabirds, whilst not causing additional safety or operational difficulties for fishermen.

Research Approach

Two mitigation methods identified as candidate targets for this project: the 'Hook Pod' (Sullivan 2011) and double weighted branch lines (WWF 2011). These ideas have displayed positive results in international trials (e.g. Sullivan 2011, Melvin et al. 2011) however testing for New Zealand vessels and conditions is appropriate before progressing further.

It is envisaged that trialing of these devices will be performed in conjunction with collaborative plans in development to test the effectiveness of 'Safe Leads'. Side by side trials of multiple methods will allow for direct comparison as well as providing economies by requiring fewer testing platforms. Observer coverage (see project INT2012-01) provides a cost-effective platform for delivery of at-sea components of the project.

Outputs

1. A written report detailing the experimental methods undertaken in the trial, the grooming and statistical analyses conducted on the data and results of the trial in terms of effectiveness and practicality of the mitigation method, practicality onboard New Zealand vessels and impact on target and non-target catch.

²¹ Details of current regulations can be found on the follow web page: http://www.fish.govt.nz/en/nz/Environmental/Seabirds/default.htm?wbc_purpose=Basic%252526WBCMODE

2. Recommendations for any future testing and the applicability of these methods to New Zealand surface longline fisheries.

References:

Agreement on the Conservation of Albatrosses and Petrels. 2011: Report of the Seabird Bycatch Working Group SBWG4. Report to the Sixth Meeting of Advisory Committee, Guayaquil, Ecuador, 29 August – 2 September 2011 (AC6 Doc 14 Rev4).

Anderson, O.R.J., Small, C., Croxall, J.P., Dunn, E.K., Sullivan, B.J., Yates, O., Black, A. 2011. Global seabird bycatch in longline fisheries. *Endangered Species Research* 14: 91-106.

Melvin, E., Guy, T., Sato, N. 2011. Preliminary report of the 2010 weighted branchline trials in the tuna joint venture fishery in the South African EEZ. *SBWG-4 Doc 07*. Fourth Meeting of the Seabird Bycatch Working Group, Agreement on the Conservation of Albatrosses and Petrels; Guayaquil, Ecuador, 22 – 24 August 2011.²²

Sullivan, B., 2011: Hook Pod Update. *SBWG-4 Doc 10 Rev 1*. Fourth Meeting of the Seabird Bycatch Working Group, Agreement on the Conservation of Albatrosses and Petrels; Guayaquil, Ecuador, 22 – 24 August 2011²³

WWF, 2011: *Smartgear Grand Prize Winner 2011*. Retrieved from http://www.smartgear.org/smartgear_winners/2011/grand_prize/

Research Cost: \$60,000

Cost Recovery: F(CR) Item 4 (100% Industry)

Fish Stocks: BIG1, STN1, SWO1, YFN1

²² Available at <http://www.acap.aq/english/view-document-details/1643-sbwg4-doc-07-weighted-branchline-trials-in-the-south-african-eez>

²³ Available at <http://www.acap.aq/meeting-documents/download-document/1716-sbwg4-doc-10-hook-pod-update>

Non-research mitigation project proposals

The following projects are for non-research services that aim to avoid, remedy or mitigate the impacts of commercial fishing on protected species.

4.5 Protected species bycatch newsletter

Project code: MIT2012-05

Start Date: 1 July 2012

Completion Date: 30 June 2014²⁴

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.

Outputs

A bimonthly newsletter covering best practice mitigation methods, current relevant events, updates on novel methods or new mitigation trials and information on protected species and the nature of their interaction with commercial fishing. The newsletter must build on the recommendations of Pierre (2012) where possible.

References:

Pierre, J. 2012. MIT2011-05 Protected Species Bycatch Newsletter Report to the CSP TWG 28 May 2012. Available for download at:
<http://www.doc.govt.nz/upload/documents/conservation/marine-and-coastal/marine-conservation-services/mit-2011-05-ocean-guardian-evaluation-report.pdf>

Indicative Research Cost: \$20,000

Cost Recovery: F(CR) Item 4 (100% Industry)

Fish Stocks: BAR 1, 7, BCO 4, BIG 1, BNS1, 2, 3, 7, BUT5, 7, BWS 1, ELE3, 5, 7, EMA 1, 3, 7, FLA1, 2, 3, 7, GMU1, GSH 1, 3, 4, 7, 8, 9, GSP 1, 7, GUR 1, 2, 3, 7, 8, HAK 1, 4, 7, HOK 1, HPB 1,

²⁴ This project is planned to be funded in annual terms. Continuation to 30 June 2014 would be subject to annual review and Ministerial approval.

2, 3, 4, 7, 8, JDO 1, 2, 3, 7, JMA 1, 3, 7, KIN 1, 7, 8, LEA 1, 2, 3, LIN 1, 2, 3, 4, 5, 6, 7, MAK 1, MOK 1, 3, 5, MOO 1, ORH 1, 2A, 2B, 3A, 3B, OEO 1, 3A, 4, 6, PAR 1, 9, POR 1, POS 1, RBM 1, RSN 1, 2, RIB 1, 2, RCO 1, 3, 7, RSK 1, 3, 7, 8, SBW 6A, 6R, 6I, 6B, SCH1, 2, 3, 4, 5, 7, SCI 1, 2, 4A, 6A, 6B, SKI 1, 3, 7, SNA 1, 2, 3, 7, 8, SPD 1, 3, 4, 5, 7, 8, SPE 1, 3, 4, 7, SPO1, 3, 7, 8, SQU1T, 6T, SSK 1, 3, 7, 8, STA 1, 3, 4,, 5, 7, STN 1, SWA 1, 3, 4, SWO 1, TAR 1, 2, 3, 4, 5, 7, 8, TOR 1, TRE 1, 2, 7, TRU 3, 4, WAR 1, 2, 3, 7, 8, WWA 2, 3, 4, 5B, 7, YEM 1, 8, 9, YFN 1

4.6 Protected species mitigation training for commercial fishing vessel crew

Project code: MIT2012-06

Start Date: 1 July 2012

Completion Date: 30 June 2013

Overall Objective

To educate crew of trawl and longline vessels >28 m in length in best practice environmental impact mitigation practices.

Rationale

There are a number of seabird and marine mammal mitigation requirements, both legislative and by industry code of best practice, for offshore trawl and longline commercial fishing vessels (>28 m in length). To ensure all these requirements are met, and applied in the most effective way for each vessel, it is important for crew to understand both the environmental issues to be mitigated, and the mitigation methods and how to implement them. Crews of these vessels include speakers of Russian and Korean, and translated information is required to ensure full understanding.

Outputs

1. Face to face delivery of an environmental training resource to senior crew.
2. Vessel visits to assess and advise on best practice mitigation methods for individual vessels.
3. Development of a mitigation resource kit, including translated mitigation resource booklets in Russian and Korean.
4. Delivery of the NZQA seabird unit to New Zealand vessel crews.

Research Cost: \$30,000

Cost Recovery: F(CR) Item 4 (100% Industry)

Fish Stocks: BYX_{1, 2, 3, 7, 8}, BAR_{4, 5, 7}, CDL_{1, 2, 3, 4, 5, 6, 7, 8, 9}, EMA_{3, 7}, FRO_{1, 2, 3, 4, 5, 6, 7, 8, 9}, SKI_{3, 7}, GSH_{4, 5, 6}, GSP_{1, 5, 7}, HAK_{1, 4, 7}, HOK₁, JMA_{3, 7}, LIN_{3, 4, 5, 6, 7}, LDO_{1, 3}, ORH_{1, 2A, 2B, 3A, 3B, 7A, 7B}, OEO_{1, 3A, 4, 6}, PRK_{1, 2, 3, 4A, 5, 6A, 6B, 7, 8, 9}, RBT_{1, 3, 7}, RIB_{3, 4, 5, 6, 7, 8}, RBY_{1, 2, 3, 4, 5, 6, 7, 8, 9}, SCI_{1, 2, 3, 4A, 5, 6A, 6B, 7, 8, 9}, SPE_{3, 4, 5, 6, 7}, SWA_{1, 3, 4}, SBW_{1, 6A, 6B, 6I, 6R}, SPD_{4, 5}, SQU_{1T, 6T}, WWA_{1, 2, 3, 4, 5, 6, 7, 8, 9}

Appendix 1: Cost Allocation Tables

A: 2012/13 Projects

Code	Project	Research	Admin	Total	CR Item	Industry %	Industry	Crown
Interaction projects								
INT2012-01	Observing commercial fisheries	\$747,275	\$108,545	\$855,820	8	100	\$855,820	\$-
INT2010-02	Identification of seabirds captured in New Zealand fisheries	\$80,000	\$11,620	\$91,620	4	100	\$91,620	\$-
Population projects								
POP2011-02	Flesh-footed shearwater - population study trial and at-sea distribution	\$90,000	\$13,073	\$103,073	3	50	\$51,536	\$51,537
POP2012-01	New Zealand sea lions - Auckland Islands population study	\$150,000	\$21,788	\$171,788	2	90	\$154,609	\$17,179
POP2012-02	New Zealand sea lions - demographic assessment of the cause of decline at the Auckland Islands	\$60,000	\$8,715	\$68,715	2	90	\$61,843	\$6,872
POP2012-03	Black petrel - at-sea distribution and population estimate	\$40,000	\$5,810	\$45,810	3	50	\$22,905	\$22,905
POP2012-04	Campbell Island and grey-headed albatrosses - population estimates	\$20,000	\$2,905	\$22,905	3	50	\$11,452	\$11,453
POP2012-05	White-capped albatross - population estimate	\$55,000	\$7,989	\$62,989	3	50	\$31,494	\$31,495
POP2012-06	Salvin's albatross - population estimate and at-sea distribution	\$80,000	\$11,620	\$91,620	3	50	\$45,810	\$45,810
POP2012-07	Gibson's albatross - population estimate	\$55,000	\$7,989	\$62,989	3	50	\$31,494	\$31,495
POP2012-08	Pitt Island shags - foraging ecology	\$25,000	\$3,632	\$28,632			\$-	\$28,632

Mitigation projects								
MIT2012-01	Inshore bottom longline seabird mitigation - design and analysis	\$60,000	\$8,715	\$68,715	4	100	\$68,715	\$-
MIT2012-02	Inshore trawl warp-strike mitigation- analysis of effectiveness	\$50,000	\$7,263	\$57,263	4	100	\$57,263	\$-
MIT2012-03	Review of mitigation techniques in setnet fisheries	\$30,000	\$4,358	\$34,358	4	100	\$34,358	\$-
MIT2012-04	Surface longline seabird mitigation	\$60,000	\$8,715	\$68,715	4	100	\$68,715	\$-
MIT2012-05	Protected species bycatch newsletter	\$20,000	\$2,905	\$22,905	4	100	\$22,905	\$-
MIT2012-06	Protected species mitigation training for commercial fishing vessel crew	\$30,000	\$4,358	\$34,358	4	100	\$34,358	\$-
TOTAL		\$1,652,275	\$240,000	\$1,892,275			\$1,644,897	\$247,378

B: CSP Observer Allocation

Fishery	Stocks	Total days	CSP CR %	CSP Days	Cost per day	CSP Research Cost
Deepwater trawl fisheries						
ORH 1	ORH1	65	10	7	\$450	\$3,150
East Coast NI Deepwater	ORH2A, BYX2, CDL2	269	10	27	\$450	\$12,150
Chatham Rise Deepwater	ORH3B, OEO3A, OEO4, BYX3	310	10	31	\$450	\$13,950
Sub-Antarctic Deepwater	ORH3B, OEO1, OEO6	254	10	25	\$450	\$11,250
West Coast NI Deepwater	ORH7A	15	10	2	\$450	\$900
Hoki & Middle Depth trawl fisheries						
West Coast SI (CHA)	HOK1, HAK7, LIN7, SWA1, JMA7, EMA7	971	15	146	\$450	\$65,700
Cook Strait	HOK1, HAK1, HAK7, LIN2, LIN7	250	15	38	\$450	\$17,100
Chatham Rise (SEC/SOE)	HOK1, HAK1, HAK4, LIN3, LIN4, SWA3, SWA4, JMA3, EMA3, SQU1T	961	15	144	\$450	\$64,800
Sub-Antarctic (SOU/SUB)	HOK1, HAK1, LIN5, LIN6, SBW6B, SBW6I, SBW6R, JMA3, EMA3, SQU1T	895	15	134	\$450	\$60,300
West Coast NI (CEE)	HOK1, LIN7, SWA1, JMA7, EMA7	230	15	35	\$450	\$15,750
Shellfish:						
Scampi	SCI1, SCI2, SCI3, SCI4A, SCI5, SCI6A, SCI6B, SCI7, SCI8, SCI9	450	20	90	\$450	\$40,500
Squid6T:						
Squid6T	SQU6T	700	20	140	\$450	\$63,000
Deepwater bottom longline fisheries						
Bottom longline	LIN2, LIN3, LIN4, LIN5, LIN6, LIN7, PTO1	190	15	29	\$450	\$13,050
Surface longline fisheries:						
SLL - domestic Bigeye tuna and swordfish	STN1, BIG1, YFN1, SWO1	230	15	35	\$585	\$20,475
SLL - domestic Southern bluefin East Coast	STN1, BIG1, YFN1, SWO1	169	15	25	\$585	\$14,625
SLL - domestic Southern bluefin West Coast	STN1, BIG1, YFN1, SWO1	58	15	9	\$585	\$5,265
SLL - Charter	STN1, BIG1, YFN1, SWO1	350	15	53	\$450	\$23,850
Purse Seine fisheries:						
Domestic SKJ	SKJ1	70	15	11	\$585	\$6,435
Super seiner SKJ	SKJ1	30	15	5	\$585	\$2,925
Inshore Observer Coverage	See Table C for details	460	100	460	\$635	\$292,100
Totals						\$747,275

C: Inshore Observer Programme: Allocation of costs for coverage delivered as Conservation Services

Objective	2012/13 observer days[†]	CSP % cost	MPI % Cost	CSP Research cost	Stocks
A: Gather information to reduce uncertainty in estimates of seabird vulnerability to - and overall mortality arising from - high risk flatfish trawl fisheries.	160	100	0	\$101,600	ELE3 ELE7, FLA3, FLA7, GUR3, GUR7, RCO3, RCO7 STA3 STA7 TAR7,
B: Gather information to establish the effectiveness of alternative mitigation measures and fishing practices in reducing the extent of seabird strikes and captures in inshore trawl fisheries.	150	100	0	\$95,250	BAR1 BAR5, BAR7, ELE3, ELE5, ELE7, FLA3, FLA7, GSH3, GSH5, GSH7, GUR 2, GIR3, GUR7, LIN2, LIN3, LIN5, LIN7, RCO3 RCO7, SCH3, SNA1, SNA2, SPO3, SPO7, STA3, STA5, STA7 TAR3, TAR 5 TAR7
C: Gather information to establish the effectiveness of alternative mitigation measures (including current regulated measures) and fishing practices in reducing the extent of captures of seabirds in high-risk bottom longline fisheries.	150	100	0	\$95,250	BNS1, BNS2, HPB1, HPB2, HPB3, HPB4, LIN1, LIN2, LIN3 LIN4, RSN1, RSN2, SCH1, SCH2, SNA1, SNA2, TAR1, TAR2
Totals	460			\$292,100	