Marine Conservation Services Annual Plan 2011/12

Marine Conservation Services
Department of Conservation
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www.doc.govt.nz/mcs

Statement on Conservation Services

The commercial fishing industry forms a vital part of New Zealand's economy. Because of the interaction between fishers and our environment and fisheries and protected species, it is also uniquely placed to contribute to conservation.

A significant conservation challenge is to ensure the viability of our marine protected species. These too contribute to New Zealand's economy and conservation. Many people visit our shores each year to see our unique marine species, and protection of these species contributes to the maintenance of our unique biodiversity.

This 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 species with declining populations co-exist. It also contains new research into protected species' interactions that involve newly listed species, species identified as being at particular risk, or different approaches to studying species that have been looked at in the past.

An emphasis has been placed on developing mitigation techniques and in disseminating the lessons from this research into practices and techniques that can be employed to avoid capture of protected species while not impacting commercial fishing efficiencies.

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 2011/2012 are conservation services.

I acknowledge the collaboration between officials of my Department, the Ministry of Fisheries, and commercial fishing representatives in developing this plan. I look forward to further individual and collaborative efforts that will ensure a thriving commercial fishing industry and healthy populations of some of New Zealand's most iconic species.

Hon Kate Wilkinson
Minister of Conservation

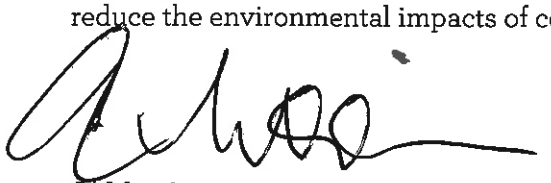
Director-General's Introduction

I have signalled that the way conservation in New Zealand is delivered will change. The Government can not be looked to as the sole provider of conservation. The future of conservation efforts rest on all of us engaging in conservation issues: government, business, non-governmental organisations, and individuals. The commercial fishing industry can play an even more active role in finding solutions to conservation challenges in the industry. In return, the industry will reap market benefits through providing sustainably caught fish using effective methods with low adverse effects.

A critical part of the industry's role lies in avoiding and mitigating the capture of marine protected species. These species are intrinsically important to New Zealanders and also provide significant economic returns to others operating in the marine environment.

The research contained in this plan will materially assist in our understanding of the interaction of commercial fishing with protected species. As important as this is; where interactions are occurring and they are understood, it is important to move forward to investigate avoidance and mitigation techniques and devices. This plan places emphasis on this latter aspect. There will be opportunity for discussion and interaction between industry representatives, government officials, non-governmental organisation representatives and interested public. I urge you to engage fully and to bring your experience and ideas to the table – particularly in the area of mitigation techniques and devices.

The projects in this Plan will deliver information that will contribute to ongoing efforts to reduce the environmental impacts of commercial fishing.



Al Morrison
Director-General of Conservation

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1. Overview

1.1 Introduction

The Marine Conservation Services Annual Plan 2011/12 ("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 2005-2010[1] ("Strategic Plan"). Note also that this Annual Plan includes projects as not considered within the levy framework for 2011/12. However, these do have allocated (crown-funded) administration components, to reflect staff time involved in delivery.

In the absence of a current strategic plan, guiding principles and policies from the 2005-10 Strategic Plan were used, to the extent that they remain relevant, in developing this Annual Plan. Recent work on risk assessment to protected species by commercial fishing was also used to identify research requirements and prioritise species[2]. In addition, during 2010 a number of species were added to Schedule 7A of the Wildlife Act 1953[3] (a number of sharks/rays and coral taxa), thus widening the scope of this Annual Plan compared to previous years. It should also be noted that a consultative process has been developed to review the Strategic Plan during the 2011/12 year.

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.

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[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] 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.

[3] See Wildlife Order 2010 (SR 2010/159)
http://www.legislation.govt.nz/regulation/public/2010/0159/latest/dlm3012938.html
and Wildlife (Basking Shark) Order 2010 (SR 2010/411)
http://www.legislation.govt.nz/regulation/public/2010/0411/latest/DLM3347006.html

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 One. All financial amounts appearing in this document are exclusive of GST.

1.3 Consultation

Construction of the Conservation Services Annual Plan 2011/12 has been undertaken collaboratively as follows:

Inshore observer coverage was developed jointly by the Marine Conservations Services team at the Department of Conservation and the Inshore Fisheries team at the Ministry of Fisheries 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 the Department of Conservation and the deepwater fisheries team at the Ministry of Fisheries.

The research component of the plan was compiled from existing projects that are scheduled over a number of years. Additionally, research proposals were solicited widely both within the Department of Conservation and Ministry of Fisheries and from stakeholder representatives. Those proposals that addressed priority protected species were included. In order to determine priority species, areas and fisheries, reliance was placed upon the results of previous Conservation Services research. For seabirds, recent risk assessments[2] were used to determine priority species, areas and fisheries.

Consultation Timetable

4 May 2011	Draft Marine Conservation Services Annual Plan 2011/12 released for public comments
15 June 2011	Public comment period closes.
1 July 2011	Summary of public submissions and response to comments completed
4 July 2011	Director-General of Conservation conveys the Marine Conservation Services Annual Plan 2011/12 as amended in accordance with public comments to the Minister of Conservation.

1.4 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, in that the most costly project (e.g. INT2011/01 Observing commercial fisheries in 2011/12) incurs the majority of administration expenses. For that project, administration included 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: INT2011-01

Start Date: 1 July 2011

Completion Date: 30 June 2012

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 the Ministry of Fisheries 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 the Ministry of Fisheries Observer Services has been used. As such, for the purposes of planning, costings for observer coverage are based on those provided by the Ministry of Fisheries 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 (Department of Conservation / Ministry of Fisheries) 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 (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, 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; and
- 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 2011/12:

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 plan. In general, coverage in these fisheries was aimed at reducing uncertainly 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 2011 – 30 June 2012, effort data from previous years was examined, in conjunction with MFish, 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. 93 p.[4]

Rowe, S.J. (in press): Conservation Services Programme observer report: 01 July 2007 to 30 June 2008. *DOC Marine Conservation Services Series*. Department of Conservation, Wellington.[5]

Ramm, K. C 2010: Draft Conservation Services Programme observer report: 01 July 2008 to 30 June 2009. *DOC Marine Conservation Services Series*. Department of Conservation, Wellington.[6]

Ramm, K. C 2011: Draft Conservation Services Programme observer draft report: 01 July 2009 to 30 June 2010. *DOC Marine Conservation Services Series*. Department of Conservation, Wellington.[7]

[4] 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/

[5] Draft report available for download from http://www.doc.govt.nz/upload/documents/conservation/marine-and-coastal/fishing/twg/csp-16-mar-0708-draft-observer-report-jun-update.pdf

[6] Draft report available for download from http://www.doc.govt.nz/upload/documents/science-and-technical/2008-09-csp-observer-report.pdf

[7] Draft report 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-MFish Inshore Observer Programme

Introduction

The Department of Conservation (DOC) and the Ministry of Fisheries (MFish) both have interests in monitoring fishing-related impacts on protected species. Prior to 2008, DOC had run focussed inshore observer programmes designed to investigate possible interactions between specific inshore fishing methods and protected species. In 2008, following development of the Maui and Hector's dolphin Threat Management Plan (TMP), the government approved additional funding for MFish to increase the level of independent monitoring of inshore fisheries interactions with protected species. In order to avoid duplication of effort and to ensure the efficient and cost effective delivery of the programme, DOC, MFish and industry representatives (Seafood Industry Council [SeaFIC], Federation of Commercial Fishermen/Inshore Fishing Industry Council) have been working together to develop a plan for the Inshore Observer Programme 2011/12.

Approach to observer coverage

Planning of, and rationale for, the Programme is based on a tiered approach to gathering data about risk (whether fishing is having and adverse effect on the population of a protected species). The process envisages that over a few years fisheries will move through these tiers as quickly as possible in order to reduce cost to fishers and cumulative impact on protected species. This would involve moving from risk assessment to rotational monitoring, with testing of mitigation or other form of management where the level of risk identified suggests that fishing-related mortality is having an adverse effect. Note this does not preclude development or implementation of mitigation measures prior to the level of risk being assessed, either voluntarily or otherwise.

Fisheries may not have to move through these tiers sequentially, depending on whether data on the nature of the risk (tier 1) suggests:

- estimation of the extent of risk is required (tier 2),
- that mitigation or management of the impacts is necessary (tiers 3 and 4, respectively), or
- that risk is considered sufficiently low to warrant only periodic ongoing monitoring (tier 5).

Once risk (likelihood and magnitude of effect on the population of a protected species) has been assessed, and where necessary quantified and managed, fisheries would only be monitored periodically on a rotational basis to ensure risks are maintained at acceptable levels (tier 5).

Specific objectives

Specific objectives under each of the tiers described above (except tiers 1 and 5 for which no coverage is planned this year) are driven by risk assessments (Richard et al 2011 and Rowe 2010). Planed coverage is aimed at reducing uncertainty with respect to total species-level risk to the greatest extent possible within feasibility limitations and management priorities. This includes focusing coverage in areas where it is practical to deliver it, during the months where higher levels of fishing effort are expected. For completeness, all objectives have been documented below, however set net coverage on the East Coast of the South Island would be funded by the Ministry of Fisheries and levied as a Fisheries Service and not levied as a Conservation Service.

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, Steward Island shag, Campbell albatross, spotted shag) overlap with this fishery and the risk assessment[8] 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. This fishery also employs distinct trawl gear types and has different offal discard practices to inshore trawl vessels targeting other species.

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.

MFish, DOC and the industry (the planning group) expect that some of the mitigation measures and practices trialled under Objective C 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.

[8] 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.

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 planed.

Planed coverage:

- Statistical areas 024, 026 and 034[9]
- 20-30% of effort
- 500 observer days

Recently observed captures (refer to table under Objective C).

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

[9] Statistical area 038 (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

As part of the at-sea work to assess the effectiveness of mitigation measures, captures would be monitored allowing for improvements to bycatch estimations and risk assessments, where possible. Mitigation assessment work in projects under this objective are seen as additional to, rather than replacing, the need to estimate overall fishing-related mortality. In order to estimate the overall effectiveness of mitigation in relation to reducing captures below required levels, Objectives A and C (flatfish trawl) are linked and a subsequent objective in 2012/13 may also be required, at least for bottom longline, for that purpose.

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 both observer coverage and risk assessment work. 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. 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 the most cost-effective and safest available. Therefore trials would 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.

The process would begin with a review of current mitigation measures identified by previous observer coverage and the fishing industry (to be drawn up by CSP), building on previous work from the Southern Seabirds Solutions Trust. This would identify key mitigation devices for testing. Protocols for robust assessment would be developed on a case by case basis, using existing tested methods where possible, by a seabird technical advisory group (TAG) to be convened by CSP. In addition to participants from DOC, MFish and SeaFIC, the TAG would invite participation from operational level industry representatives (skippers or vessel managers) from the inshore trawl sector, and other relevant professionals with experience in mitigation trial design and/or analysis, in order to ensure that protocols developed are robust. Results from trials would be reviewed via existing technical working groups.

Testing would take place on vessels operating out of the East Coast of the South Island as large numbers of warp captures have observed in this area during previous coverage and a number of vessels are already operating and developing bird scaring devices.

Following mitigation trials, the planning group expects some of these measures and practices to be applied during delivery of coverage for Objective A.

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

Planed coverage: to be determined by TAG, but limited to 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 häpuku. Level 2 risk assessments have identified that estimated captures far exceed PBR[10] for black petrels. Despite uncertainty in the assessments, the industry acknowledges there are significant issues with seabirds 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, and further work is planed for 2011/12 to develop initial findings further (CSP planed project MIT2011-03). CSP project MIT2010-01 has also been assisting in development of a line setting device (and CSP planed project MIT2011-04 aims to develop one or more such novel devices). 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.

The process would begin with a review of current mitigation measures identified by previous observer coverage and by the fishing industry (to be drawn up by CSP), building on previous work from the Southern Seabirds Solutions Trust. This would identify key mitigation devices for testing. Protocols for robust assessment would be developed on a case by case basis, using existing tested methods where possible, by a seabird technical advisory group (TAG) to be convened by CSP. In addition to participants from DOC, MFish and SeaFIC, the TAG would invite participation from operational level industry representatives (skippers or vessel managers) from the inshore bottom longline sector, and other relevant professionals with experience in mitigation trial design and/or analysis, in order to ensure that protocols developed 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 qualitative observations of seabird concentration to potentially identify particularly high-risk areas.

Planed 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). [11]

[10] PBR- Potential Biological Removal is an index used to assess maximum levels of human induced mortality that can be sustained by a population. This was initially developed in a marine mammal context and has been adapted for application to seabirds. PBRs referred to here are calculated by Richard et. al 2011

[11] 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	TBC
Black-browed albatross (Unidentified)			1		
Southern royal albatross			1		
Petrels, Prions and Shearwaters (unid)	1				3
Shearwaters			1		
Black petrel	3	8	31	13	
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
Coverage Levels as a percentage of fishing effort (Nationally)	4.81%		7.98%		

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

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/

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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

TIER 4: KNOWN INTERACTIONS [CURRENTLY MANAGED]: determine extent of residual risk

Objective D Gather information to estimate overall mortality/mortality rate of Hector's dolphins in set net fisheries on the East Coast of the South Island.

Dolphin bycatch has been reported in this fishery during the limited coverage which has been achieved. Monitoring should continue primarily as part of the Hector's and Maui's Threat Management Plan, which is due to be reviewed in 2013. Additionally, lack of reporting by unobserved vessels maintains this as a monitoring priority for 2011/12. Statistical area 018 was covered last year (100 days as of March 2011). Delivery issues have seriously affected coverage in this fishery in the past and work is underway to address these prior to implementation of the 2011/12 Programme.

The output of coverage under this objective would be an estimated 'mortality rate' (i.e. rate of dolphin captures per set) in the specified statistical areas. To estimate an overall level of mortality/mortality rate for the East Coast of the South Island, a study to define the spatial distribution of dolphins throughout that area is required. This objective's outcome is therefore contingent on a study of spatial distribution of dolphins which is scheduled to occur concurrently within the Ministry of Fisheries' Aquatic Environment research programme.

Information gathered would be acceptable so long as the fishing behaviour observed is representative of normal situations (i.e. if we can assume that observer placement is not changing behaviour). To minimise any potential bias, relatively high coverage as a percentage of effort by area/month is planed.

There is also ongoing risk posed to protected seabirds in this fishery, as shown by previous observed captures. As a secondary objective, information would be gathered to further reduce uncertainty of the existing estimates of method-specific vulnerability and species-specific mortality of seabirds in this fishery, in the context of the risk assessment.

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

Planed coverage:

- Statistical areas 017 (158 days April to September) and 022 (242 days October to March)[12]
- 60-70% of effort for the method, statistical area and period
- 400 observer days

[12] Statistical area 018 (Kaikoura) is also a priority for coverage for this objective. However, some level of coverage has been achieved in that area in recent years.

Recently observed captures

Species	2008/09		2009/10		2010/11
	Alive	Dead	Alive	Dead	TBC
Giant petrels (Unidentified)	1				
Petrel (Unidentified)					
Sooty shearwater	6				
Westland petrel	1		1		
White chinned petrel	1				
Cape petrel	6	2			
Yellow-eyed penguin		4		1	
Stewart Island Shag				2	
New Zealand fur seal				2	1
Dusky dolphin				2	2
Hector's dolphin		1		2	
Coverage Level as a percentage of fishing effort (Nationally)	4.31%		8.4%		

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

Note: Not planed to be delivered as a Conservation Service during 2011/12. This work would be funded through the Ministry of Fisheries and levied as a Fisheries Service.

Table 1. Summary of Planned Inshore Observer Coverage

Objective	2011/12 observer days	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.	403	97	$299,555	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
D: Gather information to estimate overall mortality/mortality rate of Hector's dolphins in set net fisheries on the East Coast of the South Island.	367	33	$247,895	BUT7, SCH3, SPO3,	Fisheries
Conservation Services Total	*703*	*97*	*$ 490,055*		
Fisheries Services Total	*367*	*33*	*$ 247,895*		
Overall Total	1070	130	$ 737,950		

*Costs are based on a target per day cost of $635 for Ministry of Fisheries inshore observer coverage in the 2011/12 financial year and $450 in the 2012/13 financial year.

2.1.2 "Offshore" Fisheries

For the 2011/12 observer year, planning of observer days was conducted jointly with the Ministry of Fisheries 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 the 2011/12 observer year target species assemblages have been changed in the middle depth trawl fisheries to better reflect the fact that vessels will target multiple species over a single trip. Instead the middle depth fisheries have been divided on an area basis to both assist in addressing information needs and observer planning.

Planned days for 2011/12 are summarised in Table 2. 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. For the 2011/12 year the CSP will also be levying a percentage of observer coverage in the purse seine fishery. This is due to this fishery's historic captures of the now protected rays species (*Manta birostris* and *Mobula japanica*).

Table 2. Summary of 2010/11 observer days planned in better known fisheries

Fishery	Fisheries covered	Total days	MFish CR %	MFish 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	85	382	15	68
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		5503		964

***** NB: As these figures are based on a percentage split between MCS and MFish 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 2011/12 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	MFish 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. Project POP2011-05 aims to undertake a genetic analysis of bycaught New Zealand fur seals in order to better understand population structure of the bycatch, and will utilise samples collected during this coverage. 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	MFish 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	MFish 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 20011/12 is spelled out below.

Fishery	Fisheries covered	Total days	MFish 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 2011/12 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 2011/12 is detailed below.

Fishery	Fisheries covered	Total days	MFish 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 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. Observer coverage in 2011/12 will has increased significantly compared to previous years due to recent multiple capture events of petrels and shearwaters, and will cover all areas fished. Coverage is shown in below.

Fishery	Fisheries covered	Total days	MFish CR %	DOC – CSP CR %
Scampi	SCI1, SCI2, SCI3, SCI4A, SCI5, SCI6A, SCI6B, SCI7, SCI8, SCI9	450	85	15

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 2011/12 will be focussed to monitor interactions with NZ sea lions and seabirds from January to May.

Fishery	Fisheries covered	Total days	MFish 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	MFish 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 2011/12 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	MFish 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 2011/12 will be dependent on where charter tuna vessels focus fishing effort, but coverage is tentatively planned below.

Fishery	Fisheries covered	Total days	MFish 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 2011/12 will be focussed to monitor seabird interactions during September, October, May and June, as shown below:

Fishery	Fisheries covered	Total days	MFish 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*) were added to Schedule 7a of the Wildlife Act (1953)[13] during 2010, and these species have historically been reported as bycatch in this fishery and therefore for the 2011/12 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. A focus will be on release techniques of any captured animals along with injury status and likelihood of survival (see project MIT2011-01). 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	MFish CR %	DOC – CSP CR %
Domestic SKJ	SKJ1	70	85	15
Super seiner SKJ	SKJ1	30	85	15

[13] See Wildlife Order 2010 (SR 2010/159)
http://www.legislation.govt.nz/regulation/public/2010/0159/latest/dlm3012938.html

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/MFish 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 Ministry of Fisheries 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.

Research Cost: See Appendix 1 for details

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

Fish Stocks: See Appendix 1 for details

2.2 Protected species interactions with commercial pot and trap fishing methods in New Zealand

Project code: INT2011-02

Start Date: 1 July 2011

Completion Date: 30 June 2012

Overall Objective

To understand the nature of seabird interactions with New Zealand commercial pot and trap fishing activities.

Specific Objectives

1. To describe shag interactions with commercial pot and trap fishing methods around the Chatham Islands.
2. To identify and describe measures for mitigating shag interactions with commercial pot and trap fishing methods around the Chatham Islands.
3. To collect other relevant information on shag interactions with commercial pot and trap fishing methods around the Chatham Islands that will assist in assessing, developing and improving mitigation measures.
4. To make recommendations on suitable methods for collecting information on, and mitigating any impacts of, interactions of shags and commercial pot and trap fishing activity.

Rationale

Recent qualitative risk assessment identified three shag species as being at high or moderate risk to pot and trap fishing methods (Rowe 2010). Shag captures have been documented in the Chatham Islands (Bell & Bell 2000, DOC unpublished data). No observer coverage has been obtained from these fisheries. Because of the paucity of data, these fisheries were not included in recent quantitative risk assessment work (Richard et al 2011).

Two Nationally Endangered shags, the Chatham Island shag and Pitt Island shag (Miskelly et al 2008) are found in, and are endemic to, the Chatham Islands area. The most recent population estimates are only 271 and 547 breeding pairs, for Chatham Island and Pitt Island shags, respectively (Bester & Charteris 2005), making these species very susceptible to human-induced mortality. Both species are subject of a Threatened Species Recovery Plan (Department of Conservation 2001). The information collected by this project will be used to better determine the nature and extent of interactions between these species and commercial fishing, as well as help identify possible methods to mitigate any impacts.

Fishing returns indicate that approximately 2000 days of rock lobster potting effort, with over 200,000 pot lifts, are conducted each year around the Chatham Islands by 38 vessels ranging from 6 to 16m in length. Peak fishing times are in the months of November to February, which coincides with the breeding period for these shag species (October to January).

Research Approach

This project will involve documenting existing knowledge on the nature of interactions, and any mitigation already in use. It is expected that interviews will be conducted with

fishermen, as well as reviewing and summarise all existing reports that contain relevant information.

Note: as part of project MCSPOP2010-02 a recensus of Chatham Island and Pitt Island shags is planned for late 2011. Information on current population level, and population trends, gained from the census will also be used to better determine the fisheries risk posed to these species.

Outputs

1. A report or reports describing work undertaken under each Specific Objective 1-3, methods employed, and results found.
2. A set of recommendations for future data collection and mitigation methods related to protected species interactions with commercial pot and trap fishing activities.

References

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.

Department of Conservation 2001 Recovery plan for the Chatham Island shag and Pitt Island shag 2001-2011 Threatened Species Recovery Plan 43. Department of Conservation, Wellington. 16 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.

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

Relevant CSP Strategic Plan policies include: 1, 2, 3, 9, 12

Research Cost: $10,000

Cost Recovery: Nil (100% Crown)

2.3 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 2014[14]

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

[14] 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;
- Moult 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.

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 New Zealand sea lions - Auckland Islands population study

Project code: POP2011-01

Start Date: 1 July 2011

Completion Date: 30 June 2012

Overall Objective

To provide information on the population level and dynamics of the New Zealand sea lion, relevant to the management of commercial fishing impacts on this species

Specific Objectives

1. To estimate New Zealand sea lion pup production on the Auckland Islands
2. To collect information on marked animals relevant to improving the understanding of population dynamics of New Zealand sea lions at the Auckland Islands
3. To maintain and update the New Zealand sea lion database and make all information collected under Specific Objectives 1 and 2 readily available for relevant analytical or modelling work

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 (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. These data have been used to generate estimates of fecundity, survival and other components of population dynamics (e.g. Gilbert 2008; MacKenzie 2010). Over the last decade there has been a considerable decline in pup production at the Auckland Islands (Chilvers 2010). During this period disease events have occurred (Castinel et al 2007), but the reasons for the apparent decline remain unclear. In contrast, pup production appears to have increased on Campbell Island, the second major breeding location for the species (Maloney et al 2009).

In recent years the Minister of Fisheries has, in the absence of a population management plan, set an annual fisheries-related mortality limit on the number of sea lions killed in the SQU6T fishery. In order to determine such a limit in a robust fashion information on the population level, and an understanding of the susceptibility of the population to human-induced mortality is required. The method used to set a limit in recent years has required an annual estimate of pup production at the Auckland Islands (Specific Objective 1), and the suitability of the rules used have been tested by a model which relies on population information including that gathered by sighting previously marked animals (Specific Objective 2). Key population parameters relevant to assessing the susceptibility of a species to human-induced impacts, and therefore relevant to assessing the impact of commercial fishing, include adult survival, fecundity, age of maturation,

and juvenile survival. These parameters can be estimated from sighting observations of previously marked animals (Specific Objective 2).

Research Approach

Methods used to estimate pup production (Specific Objective 1) must be comparable with those used in recent years and described by Chilvers (2010). Data collected on previously marked animals (Specific Objective 2) should be suitable for estimation of population parameters including pupping rate (fecundity), adult survival, juvenile survival, age of first breeding, and recruitment rate. The nature of the data collected must allow for integrated analysis with data collected over the last decade (see Chilvers 2010). It is envisaged that the period over which the resighting data is collected will be complementary to work conducted under Specific Objective 1 and planned in such a way as to maximise cost efficiencies around logistical operations such as transport.

Work to update and maintain the New Zealand sea lion database (Specific Objective 3) must ensure robust data management principles are applied and allow for easy querying of the raw data. Building an improved database structure may form part of work to address this Specific Objective.

Note: previous CSP projects on New Zealand sea lions include: 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 dataset containing information collected through this project. The format of the data will be consistent with that collected previously through sea lion population work carried out through the Conservation Services Programme (as collated in the New Zealand sea lion database, and described by Chilvers, 2010).
2. An updated New Zealand sea lion database that includes robust data management principles and allows for easy querying of the raw data.
3. A technical report (or reports) detailing:
    - the methods used and a summary of data collected.
    - estimation of pup production at the Auckland Islands.

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.

Breen. P.A., Fu D., Gilbert, D.J. 2010 Sea lion population modelling and management procedure evaluations: Report for Project SAP2008-14, Objective 2. Final Research Report for the Ministry of Fisheries.

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 for Department of Conservation, Wellington. 32 p. Available for download at http://www.doc.govt.nz/mcs

Gilbert, D.J.; Chilvers, B.L. 2008: Final report on the New Zealand sea lion pupping rate. Client report for the Department of Conservation. Department of Conservation, Wellington. 26 p. Available for download at http://www.doc.govt.nz/mcs

MacKenzie, D.I. 2011: Estimation of demographic parameters for New Zealand sea lions breeding on the Auckland Islands – Final Report: 1997/98-2009/10. Draft Final Report for Department of Conservation, Wellington. 74 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.

Relevant CSP Strategic Plan policies include: 1, 2, 5, 6, 8, 19

Research Cost: $250,000

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

Fish Stocks: SQU6T

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

Project code POP2011-02

Start Date: 1 July 2011

Completion Date: 30 June 2013[15]

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 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.

[15] This project is planed to be funded in annual terms. Continuation to 30 June 2013 would be subject to annual review and Ministerial approval.

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.

Relevant CSP Strategic Plan policies include: 1, 2, 6, 22

Research Cost: $90,000

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

Fish Stocks: BNS1, SCI1, SNA1

3.3 Protected fish – review of interactions and populations

Project code POP2011-03

Start Date: 1 July 2011

Completion Date: 30 June 2012

Overall Objectives

- To describe the nature and extent of interactions between commercial fishing and protected fish species to the extent possible from existing information
- To describe population information relevant to assessing risk to protected fish species from commercial fishing to the extent possible from existing information

Specific Objectives

1. To review existing information to describe the nature and extent of interactions between commercial fishing and
    - 1.1 basking sharks
    - 1.2 nurse sharks
    - 1.3 white pointer sharks
    - 1.4 whale sharks
    - 1.5 manta rays
    - 1.6 spinetail devil rays
    - 1.7 giant groupers
    - 1.8 spotted black groupers
2. To identify information gaps in the understanding of the nature and extent of interactions between commercial fishing and protected fish species, and provide recommendations for further research to address any gaps identified
3. To review existing information to describe population information relevant to assessing risk from commercial fishing to
    - 2.1 basking sharks
    - 2.2 nurse sharks
    - 2.3 white pointer sharks
    - 2.4 whale sharks
    - 2.5 manta rays
    - 2.6 spinetail devil rays
    - 2.7 giant groupers
    - 2.8 spotted black groupers
4. To identify population information gaps relevant to assessing risk from commercial fishing to protected fish species, and provide recommendations for further research to address any gaps identified

Rationale

Since the development of the Marine Conservation Services Annual Plan 2010/11 a number of fish species were added to Schedule 7A of the Wildlife Act 1953[16], thus becoming absolutely protected. All eight protected fish have been observed bycaught in various commercial fisheries. Some protected fish species have been the subject of scientific studies (e.g. white pointer shark) or assessments of commercial fisheries bycatch (e.g. basking shark), whilst for other species little information exists on either their population status/dynamics, or interactions with commercial fishing. Information is required in both these areas in order to understand the nature and extent of any adverse effects of commercial fishing on protected fish. This work also contributes to meeting of the government's obligations under the National Plan of Action Sharks (NPOA Sharks) Consolidating existing information (Specific Objectives 1 and 3) and identifying key information gaps in existing information (Specific Objectives 2 and 4) forms the first stage of this process.

Research Approach

Existing information that must be reviewed in order to adequately address Specific Objectives 1 and 3 includes, but is not limited to: Ministry of Fisheries observer information, commercial fishing information, scientific literature, government agency commissioned reports, research reports and any existing fisheries-independent distributional data

Note: project POP2011-04 is targeted at an information gap that has already been identified to further our understanding of factors relating to basking shark captures.

Outputs

1. A technical report (or reports) detailing the methods used and reviewing existing information relevant to addressing Specific Objectives 1 and 3.
2. A technical report (or reports) identifying information gaps from Output 1 review(s) and recommendations for further research to address any gaps identified.

Relevant CSP Strategic Plan policies include: 1, 2, 6, 22

Research Cost: $50,000

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

Fish Stocks: BAR1,7, CDL6, HAK1, 4, 7, HOK1, JMA7, LIN5, 6, OEO 6, ORH 1, 2A, 2B, 3B, RCO3, SCI6A, 6B, SKI2, SKJ1, SPD3, 5, SQU1T, 6T, SWA3, 4, WWA5B

[16] See Wildlife Order 2010 (SR 2010/159)
http://www.legislation.govt.nz/regulation/public/2010/0159/latest/dlm3012938.html
and Wildlife (Basking Shark) Order 2010 (SR 2010/411)
http://www.legislation.govt.nz/regulation/public/2010/0411/latest/DLM3347006.html

3.4 Basking shark bycatch review

Project code POP2011-04

Start Date: 1 July 2011

Completion Date: 30 June 2012

Overall Objective

To identify factors related to apparent reductions in basking shark captures

Specific Objective

1. To identify factors, including variation in fishing vessels and areas, related to the apparent decline in bycatch of basking sharks over the period 1994/95 to 2007/08.

Rationale

Basking shark was added to Schedule 7A of the Wildlife Act 1953 in 2010[17], thus becoming absolutely protected. A recent study to describe the nature and extent of fishery-induced mortality of basking sharks in New Zealand waters (Francis & Smith 2010) used predictive models to estimate catches in three trawl fisheries between 1994/95 and 2007/08, and predicted that captures peaked in 1997/98 and declined in later years. A previous study (Francis & Duffy 2002) suggested basking shark catch rates varied with depth. An expert panel discussion as part of a recent ecological risk assessment of hoki fisheries hypothesised that high water temperatures may have increased the risk to this species in 1997/98 (Boyd, 2011). Further investigation of the causes of captures, and variables related to capture rates (Specific Objective 1), is required in order to develop mitigation strategies for this interaction. This work also contributes to meeting of the government's obligations under the NPOA Sharks.

Note: consolidation of the entire range of existing information relating to interactions between commercial fishing and basking sharks forms part of project POP2011-03. This project is targeted at an information gap that has already been identified as limiting our understanding of factors relating to basking shark captures.

Outputs

1. A technical report (or reports) detailing the methods used and identifying factors related to the apparent decline in bycatch of basking sharks over the period 1994/95 to 2007/08.

References

Boyd, R. O. 2011 Ecological risk assessment of the New Zealand hoki fisheries. 76p. + CD. Unpublished report held by Deepwater Group Limited, Nelson.

Francis, M.P., Duffy, C. 2002 Distribution, seasonal abundance and bycatch of basking sharks (*Cetorhinus maximus*) in New Zealand, with observations on their winter habitat. *Marine Biology* 140:831–842.

Francis, M.P., Smith, M.H. 2010 Basking shark (*Cetorhinus maximus*) bycatch in New Zealand fisheries, 1994–95 to 2007–08. *New Zealand Aquatic Environment and Biodiversity Report No. 49*.

[17] See Wildlife (Basking Shark) Order 2010 (SR 2010/411) http://www.legislation.govt.nz/regulation/public/2010/0411/latest/DLM3347006.html

Relevant CSP Strategic Plan policies include: 1, 2, 6, 22

Research Cost: $20,000

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

Fish Stocks: CDL6, HAK1, 4, 7, HOK1, JMA7, LIN5, 6, OEO 6, ORH 1, 2A, 2B, 3B, RCO3, SCI6A, 6B, SKI2, SKJ1, SPD3, 5, SQU1T, 6T, SWA3, 4, WWA5B

3.5 Identify New Zealand fur seal populations bycaught in commercial fisheries

Project code POP2011-05

Start Date: 1 July 2011

Completion Date: 30 June 2012

Overall Objective

To identify the populations of New Zealand fur seals caught in key commercial fisheries known to impact on the species

Specific Objective

1. To determine the population of origin of New Zealand fur seals caught in key commercial fisheries known to impact on the species

Rationale

New Zealand fur seals are one of the most commonly observed bycaught protected species (e.g. Thompson & Abraham 2010), with certain area-target trawl fisheries accounting for many of the captures (e.g. hoki trawls on the West Coast South Island and Cook Strait, and southern blue whiting trawls at the Bounty Islands). New Zealand fur seals breed colonially (Harcourt 2001), and long term studies at different colonies have shown differences in population trends (e.g. Boren et al 2006, Best/DOC unpublished data).

An expert panel discussion, as part of a recent ecological risk assessment of hoki fisheries, highlighted the uncertainty around both the level of captures of New Zealand fur seals in the Cook Strait hoki fishery and the populations of fur seals in the region (Boyd, 2011). In order to assess the impact of commercial fishing captures on the regional populations of fur seals it is necessary to identify the natal colonies of bycaught animals (Specific Objective 1). Genetic studies of by-caught fur seals is the most cost-effective way to identify which natal colonies are being most impacted by commercial fishing captures. This research will, where necessary, inform where more detailed monitoring work on fur seal populations should be undertaken, eg, those most heavily impacted by the bycatch from the Cook Strait hoki fishery.

Initial work to identify the natal colony of bycaught animals by genetic analysis has shown promise in the methodology (Robertson & Gemmell 2005). Tissue samples from bycaught animals are routinely collected by the CSP Observer Programme, and a historic collection of material from bycaught animals is available for genetic analysis, as well as ongoing collection from delivery of the 2011/12 CSP Observer Programme (INT2011-01). Additionally, project INT2011-01 aims to achieve higher levels of observer coverage in the Cook Strait hoki fishery during 2011/12, and any fur seals observed incidentally killed will be tissue sampled.

Research Approach

Work to address Specific Objective 1 will focus on genetic comparison of tissue samples from bycaught New Zealand fur seals to reference samples from known colonies. A number of projects involving study at various fur seal colonies are underway, and may provide mechanisms for obtaining reference samples (L. Boren, DOC Marine Mammal Coordinator, pers. comm.). It is envisaged that existing reference samples, or collection of reference samples through existing projects, will be utilised to the maximum extent

possible. Additional collection of reference samples at key locations that current projects do not cover may form part of this project if required.

Outputs

1. A technical report (or reports) detailing the methods used and identifying the natal colony of sampled New Zealand fur seals bycaught in key commercial fisheries.
2. An electronic dataset matching observer records of bycaught New Zealand fur seals with results from genetic determination of natal colony.

References

Boren, L.J., Muller, C.G., Gemmell, N.J. 2006. Colony growth and pup condition of the New Zealand fur seal (*Arctocephalus forsteri*) on the Kaikoura coastline compared with other east coast colonies. *Wildlife Research* 33: 497-505.

Boyd, R. O. 2011 Ecological risk assessment of the New Zealand hoki fisheries. 76p. + CD. Unpublished report held by Deepwater Group Limited, Nelson.

Harcourt, R.G. 2001: Advances in New Zealand mammalogy 1990-2000: Pinnipeds. *Journal of the Royal Society of New Zealand* 31: 135-160.

Robertson, B.C.; Gemmell, N.J. 2005: Microsatellite DNA markers for the study of population structure in the New Zealand fur seal Arctocephalus forsteri. *DOC Internal Science Series 196*. Department of Conservation, Wellington. 18 p.

Thompson, F.N., Abraham, E.R. 2010 Estimation of fur seal (*Arctocephalus forsteri*) bycatch in New Zealand trawl fisheries, 2002–03 to 2008–09. *New Zealand Aquatic Environment and Biodiversity Report No. 61.*

Relevant CSP Strategic Plan policies include: 1, 2, 5, 6, 22

Research Cost: $50,000

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

Fish Stocks: BAR1, 5, EMA7, HAK1, 7, HOK1, JMA7, LIN5, 6, SQU1T, ORH3B, SBW6A, 6I, 6R, SCI3, 4A, 6A, STN1, SWA3 WWA3

3.6 Protected coral distribution and overlap with commercial fishing

Project code POP2011-06

Start Date: 1 July 2011

Completion Date: 30 June 2012

Overall Objective

To identify areas where deep sea corals are at highest risk of interactions with commercial fishing gear

Specific Objective

1. To expand recent work on identifying areas where deep sea corals are at highest risk of interactions with commercial fishing gear by utilising additional sources of information relevant to the distribution of corals
2. To provide recommendations on any future research required to further improve the estimation of risk to protected corals from commercial fishing

Rationale

During 2010, amendment of Schedule 7A of the Wildlife Act 1953[18] widened the range of corals afforded protection to include all deepwater hard corals (all species in the orders Antipatharia, Gorgonacea, Scleractinia, and family Stylasteridae). A number of these taxa are known to be bycaught in commercial fisheries in New Zealand, particularly deepwater trawls targeting orange roughy or oreo species (Tracey & Sanders 2011). In order to understand the risk to protected corals, and ensure commercial fishing impacts on protected corals is minimised, it is important to quantify the spatial extent of these impacts. Work is currently underway to analyse the spatial distribution of coral sub-samples returned through the CSP observer programme in relation to fishing effort (Tracey & Baird 2011). Building on the work of Tracey & Baird (2011) by utilising additional sources of information (Specific Objective 1) will broaden our understanding of the nature and extent of interactions and further clarify areas of highest commercial fisheries risk to protected corals.

Research Approach

This project will involve expanding the existing dataset of coral distribution in New Zealand fisheries waters developed during previous CSP projects (see below) by combining the observer data with coral research data from biodiversity and research trawl surveys. In addition, investigation of coral distribution data in relation to underwater topographical features such as seamounts may expand knowledge on the wider distribution of protected corals. Such distributional data should then be overlaid with commercial fishing effort data to identify areas where protected corals are at highest risk from fisheries interactions.

Note: previous CSP projects on deepwater corals include: MCSINT2010-03, INT2009-02, INT2008-02, INT2007-03. Outputs of these projects include DOC reports, guides, 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.

[18] See Wildlife Order 2010 (SR 2010/159)
http://www.legislation.govt.nz/regulation/public/2010/0159/latest/dlm3012938.html

Outputs

1. A technical report or reports describing the methods used and mapping the distribution of protected corals in relation to commercial fishing effort, clearly identifying areas of highest risk to corals.
2. Recommendations for any future research required to further improve the estimation of risk to protected corals from commercial fishing

References

Tracey, D, Barid, S. J. 2011 Idenficiation of protected corals (MCSINT 2010/03). Progress Report prepared for the Marine Conservation Services, Department of Conservation. Available for download at http://www.doc.govt.nz/mcs

Tracey, D, Sanders, B. 2011 Idenficiation of protected corals (INT 2009/03). Research Report prepared for the Marine Conservation Services, Department of Conservation. Available for download at http://www.doc.govt.nz/mcs

Relevant CSP Strategic Plan policies include: 1, 2, 7, 22

Research Cost: $50,000

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

Fish Stocks: BYX1, 2, 3, 7, 8, BAR4, 5, 7, CDL1, 2, 3, 4, 5, 6, 7, 8, 9, EMA3, 7, FRO1, 2, 3, 4, 5, 6, 7, 8, 9, SKI3, 7, GSH 4, 5, 6, GSP1, 5, 7, HAK1, 4, 7, HOK1, JMA3, 7, LIN3, 4, 5, 6, 7, LDO1, 3, ORH1, 2A, 2B, 3A, 3B, 7A, 7B, OEO1, 3A, 4, 6, PRK1, 2, 3, 4A, 5, 6A, 6B, 7, 8, 9, RBT 1, 3, 7, RIB3, 4, 5, 6, 7, 8, RBY1, 2, 3, 4, 5, 6, 7, 8, 9, SCI1, 2, 3, 4A, 5, 6A, 6B, 7, 8, 9, SPE3, 4, 5, 6, 7, SWA1, 3, 4, SBW1, 6A, 6B, 6I, 6R, SPD4, 5, SQU1T, 6T, WWA1, 2, 3, 4, 5, 6, 7, 8, 9

3.7 Pied shag - population review and estimation

Project code POP2011-07

Start Date: 1 July 2011

Completion Date: 30 June 2012

Overall Objective

To describe the range, population level and trend, and key population parameters of pied shags

Specific Objectives

1. To describe the range of pied shags
2. To estimate regional population levels of pied shags and describe any trends over time
3. To summarise existing information on key population parameters for pied shags
4. To provide recommendations for future research to allow a better understanding of the impacts of commercial fishing on pied shags

Rationale

Pied shags have been observed bycaught in both setnet and inshore bottom longline fisheries (Conservation Services Programme 2010, Ramm 2011, Rowe 2009). Recent qualitative risk assessment work found pied shags to be at higher-moderate potential risk from New Zealand fisheries (Rowe 2010). Information on the population level and trends for this species is generally poor and patchy. In order to aid future quantitative risk assessment (as a tool for fisheries management) it is important to have thorough information on range, population levels and trends, and key demographic parameters. Some of this information may already be available (Specific Objectives 1 and 3), others may need to be collected (Specific Objectives 2 and 4).

Research Approach

To adequately address Specific Objectives 1-3 existing information that must be reviewed includes the scientific literature, research reports, government agency held data and amateur ornithological data. Additional, targeted, data may also be collected.

Outputs

1. A technical report or reports describing the methods and results found under each Specific Objective 1-3.
2. Recommendations for any future research required to allow a better understanding of the impacts of commercial fishing on pied shags.

References

Conservation Services Programme 2010. Protected species interactions with the snapper (*Pagrus auratus*) demersal longline fishery in FMA 1. *DOC Marine Conservation Services Series 6*. Department of Conservation, Wellington. 23 p. Available for download at http://www.doc.govt.nz/mcs

Ramm, K. 2011 Conservation Services Programme Observer Report: 1 July 2009 to 30 June 2010. Draft Report. Department of Conservation, Wellington. 103 p. Available for download at http://www.doc.govt.nz/mcs

Rowe, S.J. 2009: Conservation Services Programme observer report: 01 July 2004 to 30 June 2007. *DOC Marine Conservation Services Series 1*. Department of Conservation, Wellington. 93 p. Available for download at http://www.doc.govt.nz/mcs

Relevant CSP Strategic Plan policies include: 1, 2, 6, 22

Research Cost: $50,000

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

Fish Stocks: BNS3, BUT3, 5, ELE3, FLA3, GSH3, HPB3, LIN3, MOK3, SCH3, 5, SPD3, 5, SPO3, STA3, TAR3, WAR3

3.8 Yellow-eyed penguin - review of population information

Project code POP2011-08

Start Date: 1 July 2011

Completion Date: 30 June 2012

Overall Objective

To describe the range, population level and trend, and key population parameters of yellow-eyed penguins

Specific Objectives

1. To describe the range of yellow-eyed penguins, to the extent possible from existing information.
2. To estimate regional population levels of yellow-eyed penguins and describe any trends over time, to the extent possible from existing information.
3. To summarise existing information on key population parameters for yellow-eyed penguins.
4. To provide recommendations for future research to allow a better understanding of the impacts of commercial fishing on yellow-eyed penguins.

Rationale

Yellow-eyed penguins (hoiho) are classified as Nationally Vulnerable (Miskelly et al 2008), and are restricted to south-eastern South Island, Stewart Island and offshore islands. A recovery plan has been developed for this species (Department of Conservation 2001). Yellow-eyed penguins have been observed bycaught in setnet fisheries over multiple years (Ramm 2010, 2011, Rowe 2009, 2010a). Recent qualitative risk assessment work found yellow-eyed penguins to be at extreme potential risk from setnet fisheries (Rowe 2010b). Relatively large amounts of information exist on localised population levels and parameters, and a review of existing information has recently been completed (Seddon et al, in press). In order to aid future quantitative risk assessment (as a tool for fisheries management) it is important to have thorough information on range, population levels and trends, and key demographic parameters. Some of this information may already be available (Specific Objectives 1 to 3), others may need to be collected (Specific Objective 4).

Research Approach

The yellow-eyed penguin Recovery Group, in collaboration with Otago University, have begun a process to develop an integrated research agenda for yellow-eyed penguins (B. McKinlay, Recovery Group Leader, pers. comm.). This involves identifying key gaps in our understanding of threats to yellow-eyed penguins. It is envisaged that work to address Specific Objectives 1-4 will consider review work completed to date (including Seddon et al, in press) and in addition review any other relevant sources of published or unpublished information. Population parameters of interest are those most relevant to assessing the susceptibility of yellow-eyed penguins to commercial fishing and include adult survival, juvenile survival, age of first breeding and fecundity.

Outputs

1. A technical report or reports describing the methods and results found under each Specific Objective 1-3.

2. Recommendations for any future research required to allow a better understanding of the impacts of commercial fishing on yellow-eyed penguins.

References

Department of Conservation 2001 Hoiho (*Megadyptes antipodes*) recovery plan 2000Ð2025 Threatened Species Recovery Plan 35. Department of Conservation, Wellington. 25 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.

Ramm, K. 2010 Conservation Services Programme Observer Report: 1 July 2008 to 30 June 2009. Final Draft Report. Department of Conservation, Wellington. 126 p. Available for download at http://www.doc.govt.nz/mcs

Ramm, K. 2011 Conservation Services Programme Observer Report: 1 July 2009 to 30 June 2010. Draft Report. Department of Conservation, Wellington. 103 p. Available for download at http://www.doc.govt.nz/mcs

Rowe, S.J. 2009 Conservation Services Programme observer report: 01 July 2004 to 30 June 2007. DOC Marine Conservation Services Series 1. Department of Conservation, Wellington. 93 p. Available for download at http://www.doc.govt.nz/mcs

Rowe, S.J. 2010a Conservation Services Programme observer report: 1 July 2007 to 30 June 2008. DOC Marine Conservation Services Series 4. Department of Conservation, Wellington. 97 p. Available for download at http://www.doc.govt.nz/mcs

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. Available for download from http://www.doc.govt.nz/mcs

Seddon, P.J., Ellenberg, U., van Heezik, Y. *In press* Yellow-eyed Penguin. In: *Biology and Conservation of the World's Penguins*. University of Washington Press

Relevant CSP Strategic Plan policies include: 1, 2, 6, 22

Research Cost: $20,000

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

Fish Stocks: BNS3, BUT3, 5, ELE3, FLA3, GSH3, HPB3, LIN3, MOK3, SCH3, 5, SPD3, 5, SPO3, STA3, TAR3, WAR3

3.9 Northern royal albatross - analysis of population data from Tairoa head colony

Project code POP2011-09

Start Date: 1 July 2011

Completion Date: 30 June 2012

Overall Objective

To estimate key population parameters for northern royal albatross from the Tairoa head colony

Specific Objective

1. To update estimates of key population parameters, using existing information, for northern royal albatross at the Tairoa head colony

Rationale

Northern royal albatross is classified as Naturally Uncommon (Miskelly et al 2008), and breeds primarily at the Chatham Islands, with a small population at Tairoa Head on the Otago Peninsula. This species has been observed captured in offshore trawl and surface longline fisheries (Ramm 2010, Rowe 2010), and recent quantitative risk assessment work has found considerable potential risk from a range of trawl and longline commercial fisheries (Richard et al 2011). Sensitivity analysis performed as part of this risk assessment found much of the uncertainty around estimated risk came from uncertainty around estimates of adult survival and number of breeding pairs. Whilst detailed information from the main breeding colonies is generally poor, the Tairoa Head colony has been intensively monitored over many years and the potential exists for further analysis of this data to update and improve estimates of adult survival and other population dynamics relevant to assessing susceptibility of this species to human-induced impacts (Specific Objective 1). This information will improve future quantitative risk assessment, as a tool for fisheries management.

Outputs

1. A technical report or reports describing the methods used and estimates derived for key population parameters of northern royal albatross at the Tairoa head colony.

References

Ramm, K. 2010 Conservation Services Programme Observer Report: 1 July 2008 to 30 June 2009. Final Draft Report. Department of Conservation, Wellington. 126 p. Available for download at 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.

Rowe, S.J. 2010 Conservation Services Programme observer report: 1 July 2007 to 30 June 2008. DOC Marine Conservation Services Series 4. Department of Conservation, Wellington. 97 p. Available for download at http://www.doc.govt.nz/mcs

Relevant CSP Strategic Plan policies include: 1, 2, 6, 22

Research Cost: $20,000

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

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

3.10 King shag - census

Project code POP2011-10

Start Date: 1 July 2011

Completion Date: 30 June 2012

Overall Objective

To estimate the population level, and trend, for king shags

Specific Objective

1. To estimate the population level of king shags
2. To determine any trend in population level of kings shags

Rationale

King shags are classified as Nationally Endangered (Miskelly et al 2008), are restricted to the Marlborough Sounds region and have a total population estimated to be only 645 birds (Schuckard 2006). Whilst there have been no reported captures of king shags in commercial fishing operations, recent quantitative risk assessment work found very high potential risk to this species, primarily from flatfish trawl (Richard et al 2011). Sensitivity analysis performed as part of this risk assessment found much of the uncertainty around estimated risk came from uncertainty around levels of captures. In the absence of good information on captures, and because of the susceptibility of this species to human-induced mortality due to its low population level, it is important to quantify any trend in the population level of king shags (Specific Objectives 1 and 2) to determine the urgency for any fisheries management actions related to potential impacts on this species. Work is currently underway to summarise existing scientific knowledge on king shags and highlight research gaps (R. Schukard, pers. comm.). It is envisaged that this review will be useful for both identifying existing work relevant to assessing the risk of commercial fishing to king shags, and future research priorities.

Outputs

1. A technical report or reports describing the methods used and estimates derived of king shag population level and trend.

References

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.

Schuckard, R. 2006: Population status of the New Zealand king shag (*Leucocarbo carunculatus*). *Notornis* 53: 297-307.

Relevant CSP Strategic Plan policies include: 6

Research Cost: $10,000

Cost Recovery: Nil (100% Crown)

4. Mitigation Projects

4.1 Protected rays - mitigate captures and assess survival of live-released animals

Project code MIT2011-01

Start Date: 1 July 2011

Completion Date: 30 June 2012

Overall Objective

To identify methods to mitigate captures of protected rays and assess the fate of live released rays

Specific Objectives

1. To identify methods to mitigate the capture of protected rays in commercial purse seine fisheries
2. To make recommendations for future work to develop and/or assess the efficacy of methods to mitigate the capture of protected rays in commercial purse seine fisheries
3. To assess the fate of live released protected rays captured in commercial purse seine fisheries and describe their spatial behaviour

Rationale

During 2010 a number of fish species, including manta rays and spinetail devil rays, were added to Schedule 7A of the Wildlife Act 1953[19], thus becoming absolutely protected. These two protected rays are known to be incidentally captured during commercial fishing activity, primarily by the purse seine method (Ministry of Fisheries Observer Programme, unpublished data). Ray captures in purse seine nets are often of live animals, and government observer records indicate the process used by vessel crew to return these individuals to the ocean is variable (Ministry of Fisheries Observer Programme, unpublished data). Development and testing of live release methods that maximise post-release survival (Specific Objectives 1 and 3) is an obvious mitigation development to minimise the impact of fishing on these species.

Research Approach

It is envisaged that this project will utilise observer coverage of the purse seine fishery in project INT2011-01 (100 days coverage in total) as a platform to collect observational data and execute experimental methods. Post-release survival of protected rays may be assessed by deploying pop-up archival transmitting tags on live-released animals.

Outputs

1. A technical report or reports describing methods undertaken, and results found for work completed to address Specific Objectives 1 and 3.

[19] See Wildlife Order 2010 (SR 2010/159)
http://www.legislation.govt.nz/regulation/public/2010/0159/latest/dlm3012938.html

2. Recommendations for future work to develop and/or assess the efficacy of methods to mitigate the capture of protected rays in commercial purse seine fisheries

Relevant CSP Strategic Plan policies include: 1, 2, 3, 6, 11, 15, 24

Research Cost: $70,000

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

Fish Stocks: SKJ1

4.2 Scampi trawl - mitigate seabird captures

Project code MIT2011-02

Start Date: 1 July 2011

Completion Date: 30 June 2012

Overall Objective

To develop methods to mitigate the capture of seabirds in the commercial scampi trawl fishery

Specific Objectives

1. To identify methods to mitigate the capture of seabirds in the commercial scampi trawl fishery
2. To test the feasibility, and to the extent possible the effectiveness, of methods to mitigate the capture of seabirds in the commercial scampi trawl fishery
3. To make recommendations for future work to develop and/or test the effectiveness of methods to mitigate the capture of seabirds in the commercial scampi trawl fishery

Rationale

CSP Observer Programme coverage of the scampi fishery has focussed on identifying, understanding and providing information to quantify interactions with seabirds and New Zealand sea lions, with recent coverage levels of 6% in 2008/09 and 9% in 2009/10 (Ramm 2011). As documented by Ramm (2011) 15 seabirds were observed captured on one trip on one vessel in 2009/10. In this case the observer highlighted the nature of the fishing operations typical of this fishery, using a triple codend net that remained partially open at the surface for an extended period, contributed to the high capture rate on that vessel. So far during 2010/11 three observed scampi trawl trips have had similar high seabird capture rates (CSP Observer Programme, unpublished data). Because of the particular nature of the trawl operations in this fishery, focussed mitigation efforts are clearly required to develop solutions to avoid or minimise any further large seabird capture events in this fishery (Specific Objectives 1 and 2). The outputs of this research will be used to inform appropriate mitigation measures for vessel management plans.

Research Approach

It is envisaged that this project will utilise observer coverage of the scampi trawl fishery in project INT2011-01 (450 days coverage in total) as a platform to collect observational data and execute experimental methods.

Outputs

1. A technical report or reports describing methods undertaken, and results found for work completed to address Specific Objectives 1 and 2.
2. Recommendations for future work to develop and/or test the effectiveness of methods to mitigate the capture of seabirds in the commercial scampi trawl fishery.

References

Ramm, K. 2011 Conservation Services Programme Observer Report: 1 July 2009 to 30 June 2010. Draft Report. Department of Conservation, Wellington. 103 p. Available for download at http://www.doc.govt.nz/mcs

Relevant CSP Strategic Plan policies include: 1, 2, 3, 6, 11, 15, 24

Research Cost: $90,000

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

Fish Stocks: SCI1, 2, 3, 4A, 5, 6A, 6B, 7, 8, 9

4.3 Inshore bottom longline - develop strategies to increase line sink rates

Project code MIT2011-03

Start Date: 1 July 2011

Completion Date: 30 June 2012

Overall Objective

To develop strategies to mitigate seabird captures in inshore bottom longline fisheries by increasing line sink rates

Specific Objective

1. To develop strategies to increase line sink rates in inshore bottom longline fisheries by building on previous investigations on factors related to sink rates in these fisheries

Rationale

Recent quantitative seabird risk assessment work (Richard et al 2011) has highlighted the high degree of potential risk that small vessel (inshore) bottom longline fisheries pose to a number of protected species, such as black petrels and flesh-footed shearwaters. A suite of mitigation measures are now mandatory in these fisheries[20], but observations suggest the use of mitigation methods across these fisheries is still highly variable, and some methods are deemed not feasible by fishers on some vessels or in some circumstances (Goad et al 2010). A project aiming to identify measures to reduce seabird captures in these fisheries (CSP project MIT2009-01) summarised mitigation practices currently employed, and reported initial findings on factors related line sink rates on inshore bottom longline vessels primarily targeting snapper (Goad et al 2010). Increasing line sink rates through methods such as line weighting reduces the availability of baited hooks to seabirds and has been proven to reduce seabird capture rates in longline fisheries (Bull 2007). Further work is currently underway as part of CSP project MIT2010-01 to further investigate factors influencing line sink rates in a wider variety of inshore bottom longline fisheries. Results are due to be made available for technical review in June 2011. To ensure feasible, effective mitigation methods are available to manage the impact of these fisheries on protected seabird species it is important that findings from recent investigations are developed and adequately tested (Specific Objective 1).

Research Approach

It is envisaged that this project will build upon findings from CSP projects MIT2010-01 and MIT2009-01. Inshore observer coverage for 2011/12 (INT2011-01) includes provision for a platform for conducting at-sea testing of mitigation methods in these fisheries that may potentially be utilised as part of this project.

Outputs

1. A technical report or reports detailing methods used results found as part of work to develop strategies to increase line sink rates in inshore bottom longline fisheries.
2. A described strategy or strategies to increase line sink rates in inshore bottom longline fisheries

[20] See *Fisheries (Seabird Sustainability Measures—Bottom Longlines) Notice (No. 2) 2008 (No. F441)*

References

Bull, L.S. 2007: Reducing seabird bycatch in longline, trawl and gillnet fisheries. *Fish and Fisheries* 8: 31-56.

Goad, D., Temple, S., Williamson, J. 2010 MIT 2009/01 Development of mitigation strategies: Inshore fisheries Final Draft Research Report to the Department of Conservation, Wellington. 62 p. Available for download at 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.

Relevant CSP Strategic Plan policies include: 1, 2, 3, 6, 10, 11, 15, 24

Research Cost: $60,000

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

Fish Stocks: BAR 1, 4, 5, 7, BNS 1, 2, 3, 7, 8, GUR 1, 2, 3, 7, 8, HPB 1, 2, 3, 4, 5, 7, 8, JDO 1, 2, 3, 7, KIN 1, 2, 7, 8, LEA 1, 2, 3, LIN 1, 2, 3, 4, 5, 6, 7, MOK 1, 3, 5, PAR 1, 9, POR 1, 2, RSN 1, 2, SPO 1, 2, 3, 7, 8, RCO 1, 2, 3, 7, RSK 1, 3, 7, 8, SCH 1, 3, 5, 7, 8, SNA 1, 2, 7, 8, SPD 1, 3, 4, 5, 7, 8, SPE 1, 2, 3, 4, 5, 7, SSK 1, 3, 7, 8, STA 1, 2, 3, 4, 5, 7, TAR 1, 2, 3, 4, 5, 7, 8, TRE 1, 2, 7, TRU 3, 4

4.4 Inshore bottom longline - novel methods to reduce availability of hooks to seabirds

Project code MIT2011-04

Start Date: 1 July 2011

Completion Date: 30 June 2012

Overall Objective

To develop one or more novel methods to mitigate seabird captures in inshore bottom longline fisheries by reducing the availability of hooks to seabirds

Specific Objectives

1. To identify one or more novel methods to potentially mitigate seabird captures in inshore bottom longline fisheries by reducing the availability of hooks to seabirds
2. To develop, test the feasibility, and to the extent possible the effectiveness, of one or more methods identified in Specific Objective 1
3. To make recommendations for future work to develop and/or test the effectiveness of novel methods to mitigate seabird captures in inshore bottom longline fisheries by reducing the availability of hooks to seabirds

Rationale

Recent quantitative seabird risk assessment work (Richard et al 2011) has highlighted the high degree of potential risk that small vessel (inshore) bottom longline fisheries pose to a number of protected species, such as black petrels and flesh-footed shearwaters. A suite of mitigation measures are now mandatory in these fisheries[21], but observations suggest the use of mitigation methods across these fisheries is still highly variable, and some methods are deemed not feasible by fishers on some vessels or in some circumstances (Goad et al 2010). To ensure a range of feasible, effective mitigation methods are available to manage the impact of these fisheries on protected seabird species it is important that suitable novel mitigation methods are identified, developed and tested (Specific Objectives 1 and 2). Existing methods and tests of their efficacy were reviewed by Bull (2007).

Research Approach

Inshore observer coverage for 2011/12 (INT2011-01) includes provision for a platform for conducting at-sea testing of mitigation methods in these fisheries that may potentially be utilised as part of this project.

Outputs

1. A technical report or reports detailing methods used results for work to address Specific Objectives 1 and 2.
2. Recommendations for future work to develop and/or test the effectiveness of novel methods to mitigate seabird captures in inshore bottom longline fisheries by reducing the availability of hooks to seabirds.

[21] See *Fisheries (Seabird Sustainability Measures—Bottom Longlines) Notice (No. 2) 2008 (No. F441)*

References

Bull, L.S. 2007: Reducing seabird bycatch in longline, trawl and gillnet fisheries. *Fish and Fisheries* 8: 31-56.

Goad, D., Temple, S., Williamson, J. 2010 MIT 2009/01 Development of mitigation strategies: Inshore fisheries Final Draft Research Report to the Department of Conservation, Wellington. 62 p. Available for download at 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.

Relevant CSP Strategic Plan policies include: 1, 2, 3, 6, 10, 11, 15, 24

Research Cost: $60,000

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

Fish Stocks: BAR 1, 4, 5, 7, BNS 1, 2, 3, 7, 8, GUR 1, 2, 3, 7, 8, HPB 1, 2, 3, 4, 5, 7, 8, JDO 1, 2, 3, 7, KIN 1, 2, 7, 8, LEA 1, 2, 3, LIN 1, 2, 3, 4, 5, 6, 7, MOK 1, 3, 5, PAR 1, 9, POR 1, 2, RSN 1, 2, SPO 1, 2, 3, 7, 8, RCO 1, 2, 3, 7, RSK 1, 3, 7, 8, SCH 1, 3, 5, 7, 8, SNA 1, 2, 7, 8, SPD 1, 3, 4, 5, 7, 8, SPE 1, 2, 3, 4, 5, 7, SSK 1, 3, 7, 8, STA 1, 2, 3, 4, 5, 7, TAR 1, 2, 3, 4, 5, 7, 8, TRE 1, 2, 7, TRU 3, 4

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 MIT2011-05

Start Date: 1 July 2011

Completion Date: 30 June 2012

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.

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.

Relevant CSP Strategic Plan policies include: 1, 2, 15, 24

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, 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 MIT2011-06

Start Date: 1 July 2011

Completion Date: 30 June 2012

Overall Objective

To educate crew of trawl and longline vessels >28 m 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 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 NZQA seabird unit to New Zealand vessel crews.

Relevant CSP Strategic Plan policies include: 1, 2, 15, 24

Research Cost: $30,000

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

Fish Stocks: BYX1, 2, 3, 7, 8, BAR4, 5, 7, CDL1, 2, 3, 4, 5, 6, 7, 8, 9, EMA3, 7, FRO1, 2, 3, 4, 5, 6, 7, 8, 9, SKI3, 7, GSH 4, 5, 6, GSP1, 5, 7, HAK1, 4, 7, HOK1, JMA3, 7, LIN3, 4, 5, 6, 7, LDO1, 3, ORH1, 2A, 2B, 3A, 3B, 7A, 7B, OEO1, 3A, 4, 6, PRK1, 2, 3, 4A, 5, 6A, 6B, 7, 8, 9, RBT 1, 3, 7, RIB3, 4, 5, 6, 7, 8, RBY1, 2, 3, 4, 5, 6, 7, 8, 9, SCI1, 2, 3, 4A, 5, 6A, 6B, 7, 8, 9, SPE3, 4, 5, 6, 7, SWA1, 3, 4, SBW1, 6A, 6B, 6I, 6R, SPD4, 5, SQU1T, 6T, WWA1, 2, 3, 4, 5, 6, 7, 8, 9

4.7 Review seabird scaring devices on offshore commercial trawl fishing vessels

Project code MIT2011-07

Start Date: 1 July 2011

Completion Date: 30 June 2012

Overall Objective

To assess, and improve where necessary, the design, durability and performance of seabird scaring devices currently deployed by trawl vessels >28 m length.

Rationale

Legislative requirements for deployment of seabird scaring devices were introduced for trawl vessels >28 m in length in 2006. Since that time a large number of variations on standard designs of tori lines, bafflers and warp deflectors have been developed. There has not, however, been a through fleet-wide assessment of the practicality and effectiveness of these devices. Such a fleet-wide assessment would enable the sharing and uptake of the most effective and practical devices by new vessels to the fleet or vessels that may currently operate sub-optimal devices.

Outputs

1. A catalogue of seabird scaring devices currently used by offshore trawlers.
2. Workshop of vessel crew and observers completed to brain storm for design improvements on current devices, within regulated specifications, to maximise effectiveness and durability.
3. Design, construction and testing of devices following workshop.
4. Resource factsheet(s) for offshore trawl vessels on optimal designs for seabird scaring devices.

Relevant CSP Strategic Plan policies include: 1, 2, 15, 24

Research Cost: $50,000

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

Fish Stocks: BYX1, 2, 3, 7, 8, BAR4, 5, 7, CDL1, 2, 3, 4, 5, 6, 7, 8, 9, EMA3, 7, FRO1, 2, 3, 4, 5, 6, 7, 8, 9, SKI3, 7, GSH 4, 5, 6, GSP1, 5, 7, HAK1, 4, 7, HOK1, JMA3, 7, LIN3, 4, 5, 6, 7, LDO1, 3, ORH1, 2A, 2B, 3A, 3B, 7A, 7B, OEO1, 3A, 4, 6, PRK1, 2, 3, 4A, 5, 6A, 6B, 7, 8, 9, RBT 1, 3, 7, RIB3, 4, 5, 6, 7, 8, RBY1, 2, 3, 4, 5, 6, 7, 8, 9, SCI1, 2, 3, 4A, 5, 6A, 6B, 7, 8, 9, SPE3, 4, 5, 6, 7, SWA1, 3, 4, SBW1, 6A, 6B, 6I, 6R, SPD4, 5, SQU1T, 6T, WWA1, 2, 3, 4, 5, 6, 7, 8, 9

Appendix 1 Cost Allocation Tables

A: 2011/12 Projects

Code	Project	Research	Admin	Total	CR Item	Industry %	Industry	Crown
Interaction projects								
INT2011-01	Observing commercial fisheries *SEE TABLES B AND C FOR DETAILS*	$ 891,680	$ 107,086	$ 998,766	8	100	$ 998,766	$ -
INT2011-02	Protected species interactions with commercial pot and trap fishing methods	$ 10,000	$ 1,201	$ 11,201		-	$ -	$ 11,201
INT2010-02	Identification of seabirds captured in New Zealand fisheries	$ 80,000	$ 9,607	$ 89,607	4	100	$ 89,607	$ -
Population projects								
POP2011-01	New Zealand sea lions - Auckland Islands population study	$ 250,000	$ 30,024	$ 280,024	2	90	$ 252,021	$ 28,003
POP2011-02	Flesh-footed shearwater - population study and foraging areas	$ 90,000	$ 10,808	$ 100,808	3	50	$ 50,404	$ 50,404
POP2011-03	Protected fish - review of interactions and populations	$ 50,000	$ 6,005	$ 56,005	3	50	$ 28,003	$ 28,002
POP2011-04	Basking shark bycatch review	$ 20,000	$ 2,402	$ 22,402	3	50	$ 11,201	$ 11,201
POP2011-05	Identify New Zealand fur seal populations bycaught in commercial fisheries	$ 50,000	$ 6,005	$ 56,005	3	50	$ 28,002	$ 28,003
POP2011-06	Distribution of protected corals and overlap with commercial fishing	$ 50,000	$ 6,005	$ 56,005	3	50	$ 28,002	$ 28,003
POP2011-07	Pied shag - population review	$ 50,000	$ 6,005	$ 56,005	3	50	$ 28,002	$ 28,003
POP2011-08	Yellow-eyed penguin - review of population information	$ 20,000	$ 2,402	$ 22,402	3	50	$ 11,201	$ 11,201
POP2011-09	Northern royal albatross - analysis of population data from Tairoa head colony	$ 20,000	$ 2,402	$ 22,402	3	50	$ 11,201	$ 11,201
POP2011-10	King shag - census	$ 10,000	$ 1,201	$ 11,201		-	$ -	$ 11,201

A: 2011/12 Projects (contd)

Code	Project	Research	Admin	Total	CR Item	Industry %	Industry	Crown
Mitigation projects								
MIT2011-01	Protected rays - mitigate captures and assess survival of live-released animals	$ 70,000	$ 8,407	$ 78,407	4	100	$ 78,407	$ -
MIT2011-02	Scampi trawl - mitigate seabird captures	$ 90,000	$ 10,809	$ 100,809	4	100	$ 100,809	$ -
MIT2011-03	Inshore bottom longline - develop strategies to increase line sink rates	$ 60,000	$ 7,206	$ 67,206	4	100	$ 67,206	$ -
MIT2011-04	Inshore bottom longline - novel methods to reduce availability of hooks to seabirds	$ 60,000	$ 7,206	$ 67,206	4	100	$ 67,206	$ -
MIT2011-05	Protected species bycatch newsletter	$ 20,000	$ 2,402	$ 22,402	4	100	$ 22,402	$ -
MIT2011-06	Protected species mitigation training for commercial fishing vessel crew	$ 30,000	$ 3,603	$ 33,603	4	100	$ 33,603	$ -
MIT2011-07	Review mandatory seabird scaring devices on offshore commercial trawl fishing vessels	$ 50,000	$ 6,005	$ 56,005	4	100	$ 56,005	$ -
TOTAL		$ 1,971,680	$236,791	$2,208,471			$1,962,048	$ 246,423

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	15	68	$ 450	$ 30,600
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**	**1,070**[†]		**703**[†]	**$ 635**	**$ 446,405**
Totals		**7,537**		**1,667**		**$ 891,680**

[†]Only days planed in the 2011/12 financial year (July-June) are included here. Additional days for some objectives are planned for 2012/13, financial year - see project INT2011-01 description for details.

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

Objective	2011/12 observer days†	CSP % cost	MFish % 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.	403	100	0	$ 255,905*	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
D: Gather information to estimate overall mortality/mortality rate of Hector's dolphins in set net fisheries on the East Coast of the South Island.	367	0	100	$ -	BUT7, SCH3, SPO3,
Totals	**1070**			$ 446,405*	

†Only days planed in the 2011/12 financial year (July-June) are included here. Additional days for some objectives are planned for 2012/13, financial year - see project INT2011-01 description for details.

*Costs are based on an indicative per day cost of $635 for Ministry of Fisheries inshore observer coverage in 2011/12. Total cost is for coverage planed to be delivered as conservation services only