

*Marine Conservation  
Services  
Annual Plan 2010/11*

Marine Conservation Services  
Department of Conservation  
PO Box 10 420  
Wellington  
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[www.doc.govt.nz/mcs](http://www.doc.govt.nz/mcs)

## Statement on Conservation Services

The commercial fishing industry has a long history in New Zealand. It is dynamic, adaptable and contributes significantly to the country's economy. I am pleased to have an involvement in this industry in our shared concern over marine protected species. Like the fishing industry, our protected species are a vital part of this country, contributing not only to our unique biodiversity, but also to our economy from the many people who visit our shores every year.

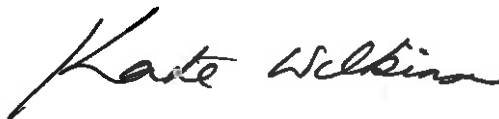
My involvement is at the intersection of these two activities. It is important that we have an efficient and dynamic fishing industry, and it is equally important that we ensure healthy populations of our protected species. This plan describes a number of projects designed to understand better the interactions between protected species and commercial fishing. It also seeks the development of pragmatic mitigation techniques to minimise the known interactions.

The Fisheries Act 1996 provides for cost recovery of conservation services delivered in the general public interest. Conservation services are defined in the Act 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 2010/2011 are conservation services.

I acknowledge the collaboration of 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 New Zealand's protected species.



Hon Kate Wilkinson  
*Minister of Conservation*

## **Director-General's Introduction**

The Department of Conservation is committed to the conservation of protected species in the marine environment, including those species that interact with commercial fisheries. The delivery of conservation services is a key avenue through which the department engages with the commercial fishing industry, in order to work towards the vision of commercial fishing being undertaken in a manner that does not compromise the protection and recovery of protected species in New Zealand fisheries waters.

In recent years there has been a developing focus on the impacts of small vessel inshore fishing on protected species, which are still poorly understood in comparison to some offshore fisheries. The work described in this Plan continues to build on previous work, with an increased focus on developing and testing of protected species capture mitigation techniques. I look forward to seeing collaborative engagement in the development and implementation of this important work.

Fisheries management is a challenging environment in which divergent goals must be reconciled. The projects in this Plan will deliver information to be used in fisheries management, specifically as it relates to protected species, and contribute to ongoing efforts to reduce the environmental impacts of this industry.

*Al Morrison*  
*Director-General of Conservation*

A handwritten signature in black ink, appearing to read 'Al Morrison', written in a cursive style.

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# **1. Overview: Marine Conservation Services Annual Plan 2010/11**

## ***1.1. Introduction***

The Marine Conservation Services Annual Plan 2010/11 (“Annual Plan”) includes the conservation services that will be delivered as the Conservation Services Programme (“CSP”), and subject to cost recovery from the commercial fishing industry. As such, the 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 included in this draft Annual Plan, refer to the *Conservation Services Strategic Plan 2005-2010*<sup>1</sup> (“Strategic Plan”). Note also that Marine Conservation Services projects drafted here are not considered within the levy framework for 2010/11. However, these do have allocated (crown-funded) administration components, to reflect staff time involved in delivery.

The Strategic Plan also describes the Programme’s policy framework for the five-year period 2005/06 – 2009/10. The Programme’s objectives 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.

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.

Key policies relevant to the Marine Conservation Services Annual Plan 2010/11 are described in the Strategic Plan. Note that the strategic documentation for marine conservation services is due for review, and this will be undertaken in consultation with stakeholders in 2010/11.

## ***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

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

determine cost allocation. Costs are summarised in Appendix One. All financial amounts appearing in this document are exclusive of GST.

### ***1.3 Consultation processes***

The following process and documents have contributed to the development of the Marine Conservation Services Programme Annual Plan 2010/11:

26-27 August 2009	Combined meeting of Conservation Services Programme Technical Working Group, MFish Aquatic Environment Research Planning Group, and National Plan of Action - Seabirds Technical Working Group, to consider research plans and proposed projects for 2010/11
7 December 2009	Draft 2010/2011 Marine Conservation Services Annual Plan circulated to stakeholders for submissions
5 February 2010	Submissions on Draft 2010/2011 Marine Conservation Services Annual Plan close
13 February 2010	Submissions made available to stakeholders
March 2010	No meetings requested by stakeholders who submitted on the draft Marine Conservation Services Annual Plan 2010/11
7 May 2010	Draft Joint DOC/Ministry of Fisheries Inshore Observer Programme plan circulated to stakeholders
21 May 2010	Submissions closed on draft Joint DOC/Ministry of Fisheries Inshore Observer Programme plan
21 June 2010	Extended submissions period closed on draft Joint DOC/Ministry of Fisheries Inshore Observer Programme plan
23 June 2010	Director General conveys Annual Plan to Minister of Conservation for consideration and agreement

### ***1.3 Administration costs***

Administration costs have always 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 (INT2010/01 Observing commercial fisheries) incurs the majority of administration expenses. For this project, administration includes observer training programmes and training materials, the development and implementation of data collection protocols and forms, data management, briefing and debriefing, liaison at sea and with other agencies when necessary, and reporting. For other projects, the administration burden may be significantly less. Administration also includes charges for the use of Departmental facilities and services.

DOC is continually striving to maximise efficiencies, and the administration costs for delivering conservation services dropped by \$15,000 between 2008/09 and 2009/10, and is maintained at that level for 2010/11. We also welcome stakeholder views on different ways to attribute administration costs across projects.

## **2. Fisheries Interactions Projects**

### **2.1 Observing commercial fisheries**

**Project Code:** INT 2010/01

**Start Date:** 1 July 2010

**Completion Date:** 30 June 2011

#### **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 whether protected species mortality is sustainable and whether mitigation strategies employed by fishing fleets are effective at reducing protected species captures.

The Conservation Services Programme will continue to purchase baseline services from Ministry of Fisheries Observer Services given the scale of the operation, which allows observers to be placed strategically across New Zealand fisheries. However, for small scale fisheries and those to be observed for the first time, alternate providers and methods for data collection will be considered.

##### ***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; and



- Current level of information.

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

- Monitoring and recording the interactions of protected species with fishing operations;
- Reporting on the efforts made to mitigate the adverse effects of commercial fishing on protected species;
- Recording, photographing, tagging all protected species bycatch;
- Recovering and retaining the bodies of dead protected species for autopsy ;
- Recording at least on a daily basis the numbers, and the behaviour of, marine mammal and seabird species seen around the fishing vessel; and
- 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 2010/11:***

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 2010/11 plan.

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 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 2010 – 30 June 2011, effort data from 1 July 2008 – 30 June 2009 was examined to ensure that desired coverage levels are achievable with the days planned (2009/10 data was not be available in full in time to inform 2010/11 planning). 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 2008 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.<sup>2</sup>
- 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.<sup>3</sup>

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

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<sup>2</sup> 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/>

<sup>3</sup> 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>

### ***2.1.1 Small vessel inshore fisheries – DOC / MFish 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 draft 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 the Seafood Industry Council (SeaFIC) have been working together to develop an Inshore Observer Programme).

#### **Joint DOC/MFish Inshore Observer Programme for 2010/11**

This joint programme is intended to cover all inshore commercial fishing methods likely to pose a risk of adverse effect to protected species. This section (2.1.1) details the objectives and coverage plan for inshore observer services to be delivered under CSP (inshore trawl and bottom longline fisheries). It does not contain observer coverage of setnet fisheries.

DOC and MFish recognise that there is a need to monitor setnet fisheries to enable an estimation of the extent of risk from this method to some protected species. However, estimating the extent of risk relies on high levels of coverage in order to obtain statistically robust information, due to the probable rare occurrence of captures of certain protected species.

There has been a significant difference between planned and achieved coverage levels in setnet fisheries during 2009/10 which DOC and MFish expect will continue under the current framework. DOC and MFish are conscious of not wanting to specify objectives, coverage levels, and importantly recover costs for objectives if they are not likely to be achieved.

For 2010/11 any setnet coverage will be considered by the Minister of Fisheries after analysis of these deliverability issues and will not be delivered as conservation services.

## **Planning Process**

The overarching goal for the Inshore Observer Programme is: “*Develop knowledge of interactions between protected species and inshore fishing activities to better inform management interventions when they are necessary*”.

The planning process involved the following steps:

1. *Review of available information*

All relevant available information was collated. This information consisted primarily of previous observer programme results<sup>4</sup> and seabird risk assessments<sup>5</sup>. This information was used to analyse which methods and areas would be of greatest risk and to which protected species.

2. *Definition of objectives*

Based on the available information and previous observer programme objectives, the projects for 2010/11 were developed and refined to investigate the risk posed by the inshore fisheries to protected species. Objectives from previous observer programmes were continued for a further year if actual coverage achieved was well below planned levels such that the objective of the coverage had not been achieved, or risk to additional protected species was revealed.

Objectives, and within them specific projects were developed on the basis of a tiered approach to gathering data about risk. We intend that fisheries will move through the tiers (i.e. from risk assessment to rotational monitoring, with mitigation development only if needed) as quickly as possible in order to reduce cost to fishers and cumulative impact on protected species. Fisheries may not have to move through these tiers sequentially depending on whether data on the nature of the risk (tier one objective) suggests estimation of the extent of risk is required (tier two objective) or that risk is considered sufficiently low to warrant only periodic ongoing monitoring. The tiered objectives are:

- A. For uncertain risk determine if interactions occur,
- B. For known interactions which are not currently managed explicitly; determine extent of risk,
- C. For known interactions which are currently managed explicitly; determine the extent of residual risk,
- D. For known interactions; test alternative mitigation measures in terms of reducing risks,
- E. Periodic rotational monitoring to ensure that risk is maintained at acceptable levels.

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<sup>4</sup> Including preliminary results of the 2009/10 Inshore Observer Programme (Appendix 2), Summer Observer Programme Results 2008/09, and DOC Observer Reports for 2007/08 and 2004/05-2006/07.

<sup>5</sup> Rowe 2009 Level 1 Risk Assessment for Incidental Seabird Mortality Associated with New Zealand Fisheries in the NZ-EEZ, Draft DOC Report, and draft report to MFish project PRO2008-01 Level 2 Seabird Risk Assessment.

### 3. *Prioritisation of projects*

Once projects and target areas had been determined, discussions were held to prioritise delivery of the programme by objective as it was considered that ideal coverage levels for all projects were likely to exceed potential funding<sup>6</sup> (this programme is being developed on the basis of coverage planned by DOC and MFish for the Inshore Observer 2009/10 Programme). The prioritisation process included consideration of the management priority of the protected species concerned and how well the nature of the fishery and the risk it poses to protected species is known.

A summary list of projects, together with relative priority rankings, resulting from the joint planning process, is given in Table 1.

### 4. *Definition of ideal required coverage required to deliver on each objective*

The planning group considered the type of objective (tiers as noted above) and the likely rate of interactions occurring when deciding on the number of observer days required for each project to provide adequate levels of data to deliver on objectives. Broadly the categorisations were as follows:

- Where the objective is to determine whether interactions occur, coverage of 15-20% of effort for statistical area/month combinations was considered appropriate.
- Where the objective is to estimate the extent of interactions where the likely rate of interactions is considered to be high or medium 20-40% of effort for statistical area/month combinations was considered appropriate.
- Where the objective is to estimate the extent of interactions where the likely rate of interactions is low but the significance of interaction is high, 40-80% of effort for statistical area/month combinations was considered appropriate.

### 5. *Identification of projects for which deliverability of ideal days is a concern*

Given the experiences from previous observer programmes in inshore fisheries, it was possible to identify risks to delivery of proposed coverage levels.

As referred to previously, there has been a significant difference between planned and achieved coverage levels in setnet fisheries during 2009/10 which DOC and MFish expect to continue under the current framework. There will be ongoing work to find options to address these deliverability issues in setnet fisheries.

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<sup>6</sup> The Minister of Fisheries has not yet decided whether an MFish funded observer programme will proceed for 2010/11.

## **Inshore Observer Plan**

The resulting projects are outlined in this section, along with supporting rationale, and a brief summary of relevant previous coverage levels (planned and achieved) and numbers of protected species captures that were observed from that coverage.

Details of the observer allocation for inshore trawl and bottom longline are given in Appendix 1.

A more detailed summary of planned coverage, coverage achieved and protected species interactions observed during the 2009/10 programme is contained in Appendix 2.

**Table 1. Relative prioritisation of the inshore observer programme projects.**

<b>Ranking</b>	<b>Project</b>
1	A.2 Gather information to establish whether trawl fishing in Te Waewae Bay during the summer poses a risk of capture to the SCSI population of Hector's dolphins.
2	D.1 Gather information to establish the effectiveness of alternative mitigation measures in reducing the extent of captures of seabirds in the trawl fishery of the ECSI.
3	B.2 Gather information to establish the extent of captures of diving seabirds and penguins in the setnet fishery on the SCSI.
4	C.1 Gather information to establish the extent of residual risk to the ECSI Hector's dolphin population from setnet fishing on the ECSI.
5	B.1 Gather information to establish the extent of captures of diving seabirds and yellow-eyed penguins in the setnet fishery on the ECSI.
6	A.3 Gather information to establish whether trawl fishing in FMA1 and FMA2 poses a risk of capture to seabirds and marine mammals.
7	C.2 Gather information to establish the extent of residual risk of seabird capture in bottom longline fisheries around the Chatham Islands.
8	D.2 Gather information to establish the effectiveness of alternative mitigation measures (including current regulated measures) in reducing extent of captures of seabirds in high-risk bottom longline fisheries in FMA1 and FMA2.
9	A.4 Gather information to establish whether trawl fishing in Statistical Area 038 poses a risk of capture to seabirds and marine mammals.
10	A.1 Gather information to establish whether setnet fishing in the Hauraki Gulf and Northland's East Coast poses a risk of capture to diving seabirds and penguins.

Note: SCSI = South Coast South Island, ECSI=East Coast South Island, FMA=Fisheries Management Area

## Projects and rationale

**Including planned coverage for projects to be delivered as conservation services in 2010/11**

**Preliminary information on protected species captures, and further details of achieved coverage levels, for the DOC and MFish Inshore Observer Programme 2009/10 are presented in Appendix 2.**

### A For uncertain interactions; determine if there are risks

#### ***A.1 Gather information to establish whether commercial setnet fishing in the Hauraki Gulf and Northland's East Coast poses a risk of capture to diving seabirds, penguins and dolphins.***

**Rationale:** The Hauraki Gulf area has one of the highest diversities of seabird species in the world, with petrels, shearwaters, penguins and shags breeding in the area year round. There is also considerable setnet effort in the area. Risk assessment results suggest that setnet fishing in the Hauraki Gulf and Northland's East Coast (statistical area 003) may pose a high risk to some species of diving seabirds, penguins and dolphins. However, information is poor. The purpose of observer coverage is to determine whether setnet fishing in the Hauraki Gulf and Northland's East Coast does, in fact, pose a risk of capture to diving seabirds and penguins. Coverage in 2009/10 was not enough to determine risk.

Reason for coverage:	Verify whether risk exists
Birds identified as at risk <sup>7</sup> :	Spotted shag, fluttering shearwater, blue penguin, little black shag, Hutton's shearwater, sooty shearwater, black shag, little shag.
Likelihood of capture:	Medium
Level of effort:	High
Relative Priority:	Ranked 10 (Table 1)
Target statistical areas:	3, 7
Target months for coverage:	To be confirmed – see note below
Coverage achieved in 2009/10 (as of 30 April 2010):	10% of total planned coverage days achieved (Appendix 2)

**Note:** **Not proposed to be delivered as a conservation service in 2010/11.** There are issues related to deliverability of required coverage levels in setnet fisheries. MFish and DOC are working on options to mitigate these issues as a priority. Further consultation will occur regarding any inshore programme for setnet fisheries once analysis on resolving these deliverability issues has been completed. The Minister of Fisheries will then make a decision on the scope, and level of funding for any further monitoring programme covering set net fisheries.

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<sup>7</sup> See Planning Process stage 1 *Review of available information*

**A.2 Gather information to establish whether trawl fishing in Te Waewae Bay during the summer poses a risk of capture to the South Coast South Island (SCSI) population of Hector's dolphins.**

**Rationale:** Restrictions on trawl fishing were introduced to the SCSI in 2008, including Te Waewae Bay. These require trawlers to fish using low headline height nets when within 2 nautical miles of shore. However, it is not known whether trawling with low headline height nets poses a risk of capture to dolphins. Furthermore, the majority of Te Waewae Bay remains open to trawling, without any restrictions on gear use. Te Waewae Bay is an area of particular importance to the very small SCSI Hector's dolphin population. The purpose of observer coverage is to determine whether trawl fishing in Te Waewae Bay, including fishing with low headline height nets, poses a risk of capture to Hector's dolphins. Observer coverage will focus on the summer months as dolphin density is thought to be higher in Te Waewae Bay during this period. Through both observer coverage and risk assessment modelling, a number of bird species have also been identified to be at risk from this trawl fishery.

Reason for coverage:	Verify whether risk exists
Birds identified as at risk <sup>7</sup> :	Codfish Island South Georgian diving petrel, Southern Buller's albatross, light-mantled sooty albatross, Chatham albatross, Campbell albatross, flesh-footed shearwater, grey petrel, Northern giant petrel, Salvin's albatross, sooty shearwater, Southern black-browed albatross, white-chinned petrel, white-capped albatross, Westland petrel.
Likelihood of capture:	Low
Level of effort:	Medium
Required coverage levels:	60% coverage of trawl fishing effort in Te Waewae Bay per high risk month.
Relative Priority:	Ranked 1 (Table 1)
Target statistical areas:	30
Target months for coverage:	3 months, summer
Coverage achieved in 2009/10 (as of 30 April 2010):	48% of total planned days achieved (Appendix 2)

**Planned coverage days for 2010/11: 120 days**



**A.3 Gather information to establish whether trawl fishing in Fisheries Management Areas 1 and 2 (FMA 1 and FMA2) poses a risk of capture to seabirds and marine mammals.**

**Rationale:** A large number of seabird species identified as at risk from inshore trawl fisheries are known to occur in FMA1 and FMA2 (e.g. black petrel). Approximately 5,000 days of inshore trawling were undertaken in each of these areas during the 2008/09 fishing year. Mortalities of seabirds and marine mammals are known to occur in some inshore trawl fisheries, but knowledge on the extent of mortalities is poor. There has been very limited observer coverage in inshore trawl fisheries in FMA1 and 2. The inshore trawl fishery is one of the few remaining significant fisheries (along with setnet) that do not have a requirement to use seabird mitigation measures.

Reason for coverage:	Verify whether risk exists
Birds identified as at risk <sup>7</sup> :	Chatham albatross, Westland petrel, black petrel, light-mantled sooty albatross, Pacific albatross, Southern black-browed albatross, Hutton's shearwater, Salvin's albatross, Campbell albatross, sooty shearwater, white-chinned petrel, white-capped albatross, grey petrel, Southern Buller's albatross, Buller's shearwater, grey-headed albatross, white-faced storm petrel, cape petrel.
Likelihood of capture:	High
Level of effort:	High
Required coverage levels:	30% coverage of trawl fishing per Statistical Area, per month (in selected areas and months) in order to verify and where possible describe risk.
Relative Priority:	Ranked 6 (Table 1)
Target statistical areas:	3, 8, 9, 10, 12, 13, 14
Target months for coverage:	2-3 months, spring-summer
Coverage achieved in 2009/10 (as of 30 April 2010):	62% of total planned days achieved (Appendix 2)

**Planned coverage days for 2010/11: 300 days**

**A.4 Gather information to establish whether trawl fishing in Statistical Area 038 (Golden Bay area) poses a risk of capture to seabirds and marine mammals.**

**Rationale:** Mortalities of seabirds, fur seals and dolphins have been observed in some inshore trawl fisheries, but knowledge on the extent of mortalities is poor. Approximately 2,000 days of inshore trawling were conducted in Statistical Area 038 in the 2008/09 fishing year. There has been only very limited observer coverage of inshore trawl fishing in Statistical Area 038 and this has revealed captures of common dolphins. The inshore trawl fishery is one of the few remaining significant fisheries (along with setnet) that do not have a requirement to use seabird mitigation measures.

Reason for coverage:	Verify whether risk exist
Birds identified as at risk <sup>7</sup> :	Westland petrel, Chatham albatross, light-mantled sooty albatross, Southern Buller's albatross, Southern black-browed albatross, white-capped albatross, flesh-footed shearwater, white-chinned petrel, Salvin's albatross, sooty shearwater, Campbell albatross, black petrel, grey petrel, Northern giant petrel, Hutton's shearwater, Buller's shearwater, cape petrel, grey-headed albatross, white-faced storm petrel.
Likelihood of capture:	Moderate
Level of effort:	High
Required coverage levels:	30% coverage of trawl fishing in selected months in order to verify and describe risk.
Relative Priority:	Ranked 9 (Table 1)
Target statistical areas:	38
Target months for coverage:	2 months, spring-summer
Coverage achieved in 2009/10 (as of 30 April 2010):	Not applicable

**Planned coverage days for 2010/11: 100 days**

**B For known interactions which are not currently managed explicitly; determine the extent of risk**

***B.1 Gather information to establish the extent of captures of diving seabirds and yellow-eyed penguins in the commercial setnet fishery on the East Coast South Island (ECSI).***

**Rationale:** Observer coverage and risk assessments have revealed captures of high-risk yellow-eyed penguins and shags in ECSI setnet fisheries. However, current information is poor. The purpose of observer coverage is to determine the extent of captures of these species and to gain a greater understanding of the spatial and temporal nature of captures. Coverage will be shared with ECSI Hector's dolphin objective (C1).

Reason for coverage:	Extent of risk
Birds identified as at risk <sup>7</sup> :	King shag, white-flipped penguin, Stuart Island shag, yellow-eyed penguin, Fiordland crested penguin, Hutton's shearwater, Codfish Island South Georgian diving petrel, Peid shag, fluttering shearwater, little black shag, black shag, little shag, sooty shearwater.
Likelihood of capture:	Medium
Level of effort:	High
Relative Priority:	Ranked 5 (Table 1)
Target statistical areas:	17, 18, 22, 24
Target months for coverage:	To be confirmed – see note below
Coverage achieved in 2009/10 (as of 30 April 2010):	45% of total planned days achieved (Appendix 2)

**Note:** Not proposed to be delivered as a conservation service in 2010/11. There are issues related to deliverability of required coverage levels in setnet fisheries. MFish and DOC are working on options to mitigate these issues as a priority. Further consultation will occur regarding any inshore programme for setnet fisheries once analysis on resolving these deliverability issues has been completed. The Minister of Fisheries will then make a decision on the scope, and level of funding for any further monitoring programme covering set net fisheries.

**B.2 Gather information to establish the extent of captures of diving seabirds and penguins in the commercial setnet fishery on the South Coast South Island (SCSI).**

**Rationale:** Observer coverage in this area has been conducted over a number of years at low levels (5-16%). During this coverage, there have been captures of a number of penguin and shag species including yellow-eyed penguin captures. Additionally it has been found that by-catch composition recorded over time differs, suggesting the nature of interactions is yet to be adequately described. Risk assessment results suggest that SCSI setnet fishing may pose a high or extreme risk to a number of species of diving seabirds and penguins. However, information is poor. The purpose of observer coverage is to determine the nature and extent of captures of diving seabirds and penguins and to gain a greater understanding of the spatial and temporal nature of captures. Combined with ECSI setnet coverage, it may be possible to assess risk to yellow-eyed penguins from setnetting across the majority of their range.

Reason for coverage:	Extent of risk
Birds identified as at risk <sup>7</sup> :	Stuart Island shag, yellow-eyed penguin, Fiordland crested penguin, Southern blue penguin, Codfish Island South Georgian diving petrel, pied shag, sooty shearwater, black shag, little shag.
Likelihood of capture:	Medium
Level of effort:	Medium
Relative Priority:	Ranked 3 (Table 1)
Target statistical areas:	25, 27, 29, 30
Target months for coverage:	To be confirmed – see note below
Coverage achieved in 2009/10 (as of 30 April 2010):	78% of total planned days achieved (Appendix 2)

**Note:** Not proposed to be delivered as a conservation service in 2010/11. There are issues related to deliverability of required coverage levels in setnet fisheries. MFish and DOC are working on options to mitigate these issues as a priority. Further consultation will occur regarding any inshore programme for setnet fisheries once analysis on resolving these deliverability issues has been completed. The Minister of Fisheries will then make a decision on the scope, and level of funding for any further monitoring programme covering set net fisheries.

**C For known interactions which are currently managed explicitly; determine the extent of residual risk**

***C.1 Gather information to establish the extent of residual risk to the East Coast South Island (ECSI) Hector's dolphin population from commercial setnet fishing on the ECSI.***

**Rationale:** Significant setnet closures were implemented on ECSI in 2008, reducing risk to the ECSI population of Hector's dolphins. However, the combination of high fishing effort and shallow fishing grounds means that there is a residual risk to this population from setnetting. The purpose of observer coverage is to determine whether mortalities are occurring in these high risk areas. Ideally, the quantification of captures (including nil captures) could be assessed against a biological reference point such as the PBR. Observed captures to date suggest a potentially significant risk, considering the relatively low percentage of coverage achieved.

Reason for coverage:	Extent of residual risk
Likelihood of capture:	Low
Level of effort:	High
Relative Priority:	Ranked 4 (Table 1)
Target statistical areas:	17, 18, 22, 24
Target months for coverage:	To be confirmed – see note below
Coverage achieved in 2009/10 (as of 30 April 2010):	45% of total planned days achieved (Appendix 2)

**Note:** **Not proposed to be delivered as a conservation service in 2010/11.** There are issues related to deliverability of required coverage levels in setnet fisheries. MFish and DOC are working on options to mitigate these issues as a priority. Further consultation will occur regarding any inshore programme for setnet fisheries once analysis on resolving these deliverability issues has been completed. The Minister of Fisheries will then make a decision on the scope, and level of funding for any further monitoring programme covering set net fisheries.

**C.2 Gather information to establish the extent of residual risk of seabirds to capture in bottom longline fisheries around the Chatham Islands.**

**Rationale:** Observer coverage and risk assessment modelling have revealed captures of high risk seabird species in bottom longline fisheries around the Chatham Islands. However, current information is poor. Furthermore, bottom longline fisheries are now subject to minimum mitigation requirements, the effectiveness of which is not known. The purpose of observer coverage is to determine the extent of residual risk of seabird captures from key high-risk fisheries and to gain a greater understanding of the effectiveness of regulated mitigation measures.

Reason for coverage:	Extent of residual risk
Birds identified as at risk <sup>7</sup> :	Chatham Island albatross, light-mantled sooty albatross, Southern black-browed albatross, Pacific albatross, Southern Buller's albatross, Salvin's albatross, Westland petrel, Northern giant petrel, white-chinned petrel, Campbell Island albatross, Northern royal albatross, Southern royal albatross, Antipodean albatross, Gibson's albatross.
Likelihood of capture:	High
Level of effort:	High
Required coverage levels:	Approximately 25% coverage of bottom longline fishing around the Chatham Islands over the entire year, focused to achieve at least 50% coverage by Statistical Area and month combinations.
Relative Priority:	Ranked 7 (Table 1)
Target statistical areas:	49-51, 401-410
Target months for coverage:	2-4 months, summer
Coverage achieved in 2009/10 (as of 30 April 2010):	64% of total planned days achieved (Appendix 2)

**Planned coverage days for 2010/11: 100 days**

## **D For known interactions; test alternative mitigation measures in terms of reducing risks**

### ***D.1 Gather information to establish the effectiveness of alternative mitigation measures in reducing the extent of captures of seabirds in trawl fisheries of the East Coast South Island (ECSI).***

**Rationale:** The inshore trawl fishery is one of the few remaining significant fisheries (along with setnet) that do not have a requirement to use seabird mitigation measures. Mortalities of seabirds are known to occur in some inshore trawl fisheries, but knowledge on the extent of mortalities is poor. Modelling work and information from previous observer coverage suggests that mortalities may be significant. The ECSI trawl fishery is one of the largest in the country, and includes fisheries where discharges of offal and whole fish are known to occur, at least for a proportion of the fleet. The ECSI trawl fishery therefore represents a high potential risk to seabirds. The purpose of observer coverage would be to test different mitigation measures in terms of their effect on the extent of seabird captures from this fishery and to gain a greater understanding of fishery-seabird interactions and fishing practices. A research protocol will be developed through a collaborative advisory group (process outlined in Appendix 3), with possible extension to a further Conservation Services Programme project in 2011/12 to analyse results (dependent on progress in 2010/11). Trawl coverage on the West Coast South Island (WCSI) is not proposed for 2010/11 to concentrate efforts on the ECSI, focusing on mitigation. The outcomes of this coverage could then be applied to the WCSI trawl fishery.

Reason for coverage:	Effectiveness of mitigation
Birds identified as at risk <sup>7</sup> :	Southern Buller's albatross, Chatham Island albatross, Light-mantled sooty albatross, Westland petrel, Campbell Island albatross, Codfish Island South Georgian diving petrel, Hutton's shearwater, Southern black-browed albatross, Salvin's albatross, sooty shearwater, flesh-footed shearwater, grey petrel, Pacific albatross, Northern giant petrel, Buller's shearwater, grey-headed albatross, cape petrel, white-faced storm petrel.
Likelihood of capture:	High
Level of effort:	High
Required coverage levels:	Initially 20-25 days per vessel for a sample of vessels/mitigation measures (2010/11 coverage). Dependent on early results further coverage may be required in 2011/12 in order to achieve robust testing of promising mitigation measures.
Relative Priority:	Ranked 2 (Table 1)
Target statistical areas:	20, 22
Target months for coverage:	summer-autumn
Coverage achieved in 2009/10 (as of 30 April 2010):	

78% of total planned days achieved (Appendix 2)

**Planned coverage days for 2010/11: 120 days.**

**D.2 Gather information to establish the effectiveness of alternative mitigation measures (including current regulated measures) in reducing extent of captures of seabirds in high-risk bottom longline fisheries in Fisheries Management Areas 1 and 2 (FMA1 and FMA2).**

**Rationale:** Observer coverage and risk assessment modelling have revealed captures of high-risk seabird species in bottom longline fisheries in FMA1. Risk assessment modelling indicates this risk is also prevalent in FMA2. Furthermore, bottom longline fisheries are now subject to minimum mitigation requirements, the effectiveness of which is not known. Although current information is poor, a number of seabird captures have been observed in FMA1 since introduction of regulated mitigation measures, including captures of the threatened black petrel. The purpose of observer coverage is to determine the nature and extent of seabird captures from bottom longline fishing in FMA 1 and FMA 2 (with a focus on areas with poorest historic coverage), and assess the effectiveness of current mitigation measures. Potential risk of seabird captures can be quantified by measuring sink rates and assessing other mitigation measures, such as tori line effectiveness and haul mitigation devices (process outlined in Appendix 3). The nature and extent of data collected will be dependent on the outcomes of DOC project MIT2009-01 and detailed plans to be developed for DOC project MIT2010-01, to ensure there is no duplication of effort.

Reason for coverage:	Extent and effectiveness of mitigation
Birds identified as at risk <sup>7</sup> :	Westland petrel, black petrel, Chatham Island albatross, flesh-footed shearwater, Hutton's shearwater, light-mantled sooty albatross, Pacific albatross, Southern black-browed albatross, Southern Buller's albatross, Gibson's albatross, Campbell Island albatross, grey petrel, Southern royal albatross, Salvin's albatross, white-capped albatross, Antipodean albatross, Northern giant petrel, Northern royal albatross, white-chinned petrel, grey-headed albatross.
Likelihood of capture:	High
Level of effort:	High
Required coverage levels:	20-30% coverage in certain Statistical Area and month combinations within FMA 1 and FMA2 bottom longline fishing. 100 days dedicated to mitigation assessment.
Relative Priority:	Ranked 8 (Table 1)
Target statistical areas:	5-9, 12-14



Target months for coverage: 2-4 months, summer  
Coverage achieved in 2009/10 (as of 30 April 2010):  
97% of total planned days achieved (Appendix  
2)

**Planned coverage days for 2010/11: 270 days in total, including 100 days  
dedicated to mitigation assessment**

### 2.1.2 'Offshore' fisheries

In these fisheries, a proportion of Ministry of Fisheries observer days are delivered as a conservation service. 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 remains below 10% in recent years. Planned days for 2010/11 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.

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

Method / Fishery	Target	Fisheries Management Area	2009/10 total observer days*	2010/11 CSP % day	2010/11 CSP observer days
Longline fisheries	Surface longline - domestic	AKE, CEE, CHA, KER	457	15	69
	Surface longline - charter	CEE, CHA, SOU	350	15	53
	Bottom longline - deep sea ling	SOE, SOU	180	15	27
Pelagic trawl	JMA, EMA, BAR	AKW, CHA, CEW, SEC	441	15	66
Middle depth trawl	Finfish (HAK, HOK, LIN, SWA)	CEE, CHA, SEC, SOE, SOU, SUB	1280	15	192
	SCI	AKE, SOE, SUB	210	15	32
	SBW	SOI	210	15	32
	SQU	SEC, SUB, SOU	545	20	109
Deep water trawl	ORH, OEO	SEC, SOE, SOU, SUB	880	10	88
<b>Total CSP days</b>					<b>668</b>

\* NB: These figures may change by +/- 15%. As 2010/11 days have not yet been set by the Ministry, 2009/10 days are used as a guide for CSP days.

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

## **SURFACE LONGLINE FISHERIES**

### ***Domestic surface longline***

Monitoring priorities for 2010/11 will include collecting information on protected species interactions, mitigation techniques and offal/discard management practices employed in the fishery. 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 in Table 3.

**Table 3: Allocation of domestic surface longline days in 2010/11**

<b>Fishery</b>	<b>FMA</b>	<b>Coverage days</b>
Surface longline - domestic	AKE	20
	CEE	15
	CHA	14
	KER	20
Total days		69

### ***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 2010/11 will be dependent on where charter tuna vessels focus fishing effort, but coverage is tentatively planned in Table 4.

**Table 4: Allocation of charter surface longline days in 2010/11**

<b>Fishery</b>	<b>FMA</b>	<b>Coverage days</b>
Surface longline - charter	CEE	13
	CHA	15
	SOU	25
Total		53

## **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 2010/11 will be focussed on SOE and SOU (see Table 5) to monitor seabird interactions during September, October, May and June.

**Table 5: Allocation of deep sea ling bottom longline days in 2010/11**

<b>Fishery</b>	<b>FMA</b>	<b>Coverage days</b>
Bottom longline - deep sea ling	SOE	13
	SOU	14
Total days		27

## PELAGIC TRAWL FISHERIES

### *Jack Mackerel, Barracouta and English Mackerel*

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 2010/11 observer year, 66 observer days are planned for pelagic trawl fisheries, mostly from October to December and April to June and divided between FMAs as shown in Table 6.

**Table 6: Allocation of pelagic trawl days in 2010/11**

<b>Fishery</b>	<b>FMA</b>	<b>Coverage days</b>
Pelagic trawl	SEC	11
	CHA	15
	CEW and AKW	40
Total		66

## MIDDLE DEPTH TRAWL FISHERIES

### Finfish (excluding southern blue whiting)

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 CEE, CHA and SEC. Observer coverage for the period October to May will be spread across SEC, SOE, SOU and SUB. The allocation of days is shown in Table 7.

**Table 7: Allocation of middle depth trawl finfish days in 2010/11**

Fishery	Target / FMA	Coverage days
Finfish (HAK, HOK, LIN, SWA)	Hake	5
	CHA	85
	SOE	38
	SUB	44
	CEE, SEC	20
Total days		192

### *Southern Blue Whiting*

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 2009/10 will be focused in SUB (Table 8).

**Table 8: Allocation of southern blue whiting trawl days in 2010/11**

Fishery	FMA	Coverage days
Southern blue whiting trawl	SUB	32
Total days		32

### *Scampi*

The priority for observers 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. 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. Observer coverage in 2010/11 will be focused in AKE and SOI with additional coverage in SOE if possible.

Coverage will mostly be from November to December and March to June and will be divided between FMAs as shown in Table 9.

**Table 9: Allocation of scampi trawl days in 2010/11**

<b>Fishery</b>	<b>FMA</b>	<b>Coverage days</b>
Scampi trawl	AKE	12
	SOE	14
	SUB	6
Total days		32

### ***Squid***

CSP will contribute to 20% of days planned for the squid 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 2010/11 will be focussed in the Squid 6T fishery to monitor interactions with NZ sea lions and seabirds from January to May as well as the 1T fishery area to monitor for seabird interactions. Coverage will be sought on the Stewart-Snares shelf and in SEC off Banks Peninsula. Division of observer days between FMAs are shown in Table 10.

**Table 10: Allocation of squid trawl days in 2010/11**

<b>Fishery</b>	<b>FMA</b>	<b>Coverage days</b>
Squid trawl	SOU	30
	SUB	64
	SEC	15
Total days		109

## **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 and behaviours of seabirds. Sub-samples of corals will be taken for identification. 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 planned for SEC, SOE, SOU and SUB as shown by the orange roughy and oreo stocks in Table 11.

**Table 11: Allocation of deep water bottom trawl days in 2010/11**

<b>Fishery</b>	<b>FMA</b>	<b>Coverage days</b>
ORH, OEO	ORH 3B	35
	OEO 3A/4	35
	OEO 6	18
Total days		88

## **Outputs**

- A descriptive report including observer data relating to protected species and 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).
- All protected corals (or corals that cannot be correctly identified) are returned for identification (see project INT 2009/03: Identification of protected corals – for samples collected up to 30 Sept 2010).
- Data will be available for other DOC and Ministry of Fisheries projects including mitigation development/testing, bycatch estimation, risk management and other modelling projects.



## 2.2. Identification of seabirds captured in New Zealand fisheries

**Project Code:** INT 2010/02

**Start Date:** 1 October 2010

**Completion Date:** 31 May 2014<sup>8</sup>

### Overall Objective

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

### Specific Objectives<sup>9</sup>

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.

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<sup>8</sup> This project is funded in annual terms. Continuation to 31 May 2014 is subject to annual review and Ministerial approval.

<sup>9</sup> Specific objectives will be reviewed annually through a working group process.

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 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;
- Moults 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, SQUIT, 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 Studies***

#### **3.1 Effects of commercial fishing on New Zealand sea lions breeding on the Auckland Islands**

**Project Code:** POP2010/01

**Start Date:** 1 July 2010

**Completion Date:** 30 June 2011

##### **Overall Objective:**

- To inform management of the adverse effects of commercial fishing on the New Zealand sea lion.

##### **Specific Objectives:**

1. To collect field data that will allow quantification and estimation of:
  - pup production,
  - survival of previously marked New Zealand sea lions,
  - reproduction by known-age female New Zealand sea lions;
2. To conduct analyses to estimate trends and year to year variation in demographic parameters;
3. To maintain and update the New Zealand sea lion database and to make available field data for relevant analytical or modelling work;
4. To identify potential effects of commercial fishing on the availability of food or behaviour of sea lions around the Auckland Islands by reviewing existing knowledge; and
5. To provide recommendations for the assessment of potential indirect fishing effects on New Zealand sea lions and the Auckland Islands sea lion population.

##### **Rationale:**

New Zealand sea lions are incidentally killed each year in southern commercial trawl fishing operations targeting species including squid, scampi and southern blue whiting. The foraging areas of lactating female and juvenile New Zealand sea lions at the Auckland Islands have been shown to overlap with commercial trawl fishing activity (e.g. Chilvers 2008, 2009). Approximately 80% 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. This data has been used to generate estimates of fecundity, survival and other components of population dynamics (e.g. Gilbert 2008; MacKenzie 2009). Over the last decade there has been a considerable decline in pup production at the Auckland Islands (Chilvers 2009). 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).

The Minister of Fisheries has, in recent years, set an annual fisheries-related mortality limit on the number of sea lions killed in the SQU6T fishery. The use of demographic information collected at the Auckland Islands has been important in making informed management

decisions, both through modelling and the use of annual pup production estimates in the development of mortality limits (e.g. by various iterations of the “Breen-Kim” model). Work has recently been conducted (under MFish contract SAP2008-14) to further revise the Breen-Kim model in light of the most recent (2008-09) demographic data and analyses. Discussions during this revision highlighted a number of important caveats in using the model results, including uncertainty around the maximum rate of population increase, the shape, extent and mode of action of density-dependence and differences from other studies in estimation of pupping rates (see Aquatic Environment Working Group minutes from 20 May and 17 July 2009).

Potential indirect effects of commercial fishing on New Zealand sea lions have not been fully assessed and the ecosystem impacts of the fishery are poorly understood. While information available is patchy, arrow squid (*Nototodarus sloanii*) has been considered a seasonally important component of the sea lion diet (Childerhouse et al 2001), and resource competition with the arrow squid fishery in years of low squid abundance has been suggested (Meynier 2009). Recent work may suggest potential physiological challenges for sea lions, for example in their foraging and milk production (Chilvers et al 2006, Riet-Saprizza 2007). A thorough review of existing information relevant to any indirect effects of commercial fishing on New Zealand sea lions can identify key information gaps and be used to propose detailed methods to assess the effects on individuals, and on the population.

Other (Crown-funded) research by DOC, completed or currently underway in 2009/10, that will provide information relevant to the management of the effects of commercial fishing on the New Zealand sea lion includes:

- Investigation of the population genetic structure of New Zealand sea lions by comparing samples from individuals born on Campbell Island to those born on the Auckland Islands;
- An expedition to estimate pup production on Campbell Island in 2009/10; and
- Ongoing work to monitor breeding in Otago.

Previous CSP projects on sea lions include: 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.

Relevant CSP Strategic Plan<sup>1</sup> Policies include: 1, 2, 5, 13, 14 and 19.

### **Outputs:**

1. A database 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).

2. A technical report (or reports) detailing:

- the methods used in collecting demographic data and a summary of data collected;
- estimation of pup production at the Auckland Islands;
- estimation of trends and year to year variation in demographic parameters;

- identification of potential indirect effects of commercial fishing on sea lions around the Auckland Islands, and review of existing knowledge on any effects; and
- detailed recommendations for the assessment of potential indirect fishing effects on New Zealand sea lions and the Auckland Islands sea lion population.

## References

- 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.
- Childerhouse, S.; Dix, B.; Gales, N. 2001: Diet of New Zealand sea lions (*Phocarctos hookeri*) at the Auckland Islands. *Wildlife Research* 28: 291-298.
- Chilvers, B.L. 2008: Foraging site fidelity of lactating New Zealand sea lions. *Journal of Zoology* 276: 28-36.
- Chilvers, B.L. 2009. New Zealand sea lion research trip, Auckland Islands, December 2 2008 to February 16 2009. Department of Conservation Report.
- Chilvers, B.L.; Wilkinson, I.S.; Duignan, P.J.; Gemmell, N.J. 2006: Diving to extremes: are New Zealand sea lions (*Phocarctos hookeri*) pushing their limits in a marginal habitat? *Journal of Zoology* 269: 233-240.
- 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.
- MacKenzie, D.I. 2009: Estimation of demographic parameters for New Zealand sea lions breeding on the Auckland Islands – Final Report: 1998-2008. Client report for Department of Conservation. Department of Conservation, Wellington. 40 p.
- Meynier, L. 2009: Feeding ecology of the New Zealand sea lion (*Phocarctos hookeri*). Unpublished thesis. University of Massey, Palmerston North. 193 p.
- 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
- Riet-Sapriza, F.G. 2008: Milk composition of the New Zealand sea lion and factors that influence it. Unpublished thesis. Massey University, Palmerston North. p.

**Research cost:** \$270,000

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

**Fish stock:** SQU6T

## **4. Mitigation Projects**

### **4.1 Development of mitigation strategies: Inshore fisheries**

**Project Code:** MIT2010/01

**Start Date:** 1 July 2010

**Completion Date:** 30 June 2011

#### **Overall Objective:**

- To work in inshore fisheries to develop and implement measures to reduce interactions with protected species, especially for the trawl and demersal longline methods.

#### **Specific Objectives:**

1. To work with inshore fishers to improve awareness and understanding of protected species interactions with inshore fisheries;
2. To identify characteristics of inshore fisheries that may influence the likelihood of protected species interactions.
3. To assess current use of mitigation measures, and work with fishers to develop, test, and implement measures for mitigating protected species interactions.

#### **Rationale:**

Inshore fisheries are the focus of increased attention due to recorded and potential interactions with protected species. The nature and extent of these interactions, and measures that may be implemented to reduce them, are generally not well known. However, even with minimal knowledge, interactions leading to protected species bycatch are known to occur. Also, in the inshore environment, materials describing protected species interactions and the implications of these are generally not as widely available, or as widely distributed, as in deepwater fisheries.

Informed by recent government workshops undertaken with inshore fishers, this project involves making contact with fishers, gathering anecdotal information on protected species interactions, and distributing materials to increase awareness and understanding of the interactions and impacts of inshore fisheries on protected species. The work will also include identifying, developing, and testing potential mitigation strategies to reduce these interactions. The role will be strongly guided by the operational climate of the inshore fishing environment, including relevant industry initiatives and government policies.

Relevant CSP Strategic Plan<sup>1</sup> Policies include: 1, 2, 3, 6, 15

#### **Outputs:**

A technical report (or reports) describing methods used to address objectives and presentations of findings at appropriate fishers' meetings or conferences.

**Research cost:** \$90,000

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

**Fish stocks:** BAR 1, 4, 5, 7, BNS 1, 2, 3, 7, 8, ELE 2, 3, 5, 7, FLA 1, 2, 3, 7, GMU 1, GSH 1, 2, 3, 4, 5, 6, 7, 8, 9, GSP 1, 5, 7, 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, YEM 1, 8, 9



## **5. Marine Conservation Services projects**

These projects will be funded by the Department of Conservation and are included for information only.

### **5.1 Bycatch of protected corals in NZ fisheries waters**

**Project Code:** MCSINT2010/03

**Start Date:** 1 July 2010

**Completion Date:** 30 June 2011

#### **Objectives:**

- To analyse the spatial distribution of coral sub-samples returned through the CSP observer programme in relation to fishing effort (2007/08 – 2009/10).

#### **Specific Objectives**

1. To identify areas where deep sea corals are at highest risk of interactions with fishing gear;
2. To assess the value of identifying sub-samples of corals returned by observers and, specifically, whether there is an ongoing need to monitor and quantify the level of interaction between fisheries and protected corals.

#### **Rationale**

The Conservation Services Programme Observer Programme seeks to identify, monitor and, where possible, quantify protected species interactions with commercial fisheries. As such, CSP has requested that observers collect specimens of corals as an initial step to monitor and quantify the level of interaction between fisheries and protected corals. Fisheries of particular interest include orange roughy, oreo, hoki, scampi, squid and southern blue whiting.

During the 2007/08, 2008/09 and 2009/10 fishing years, CSP has requested observers to assess hauls for the presence of corals and to record presence and weight on the Benthic Materials Form. Coral specimens are photographed and one sample of each coral per species is returned for identification. Protected corals (or corals that cannot be identified) were returned by government observers for identification to lower taxa (see INT 2007/03, INT 2008/02, INT 2009/03). These sub-samples represent a valuable data source that could be better used to elucidate the relationships between invertebrates and commercial fishing activity. The spatial and temporal analysis of the three years of data will enable researchers and managers to help identify where corals and their associated fauna are at the highest risk of interactions with fishing gear.

#### **Outputs**

1. A report describing and mapping the distribution of coral bycatch in relation to fishing effort.
2. An assessment of how returning and identifying sub-samples of corals can best contribute to fisheries management.

## **5.2 Investigation of poorly known protected species in a commercial fisheries context: Mainland and Chatham Island shag and penguin species**

**Project Code:** MCSPOP2010/02

**Start Date:** 1 July 2010

**Completion Date:** 30 June 2011

### **Overall objectives:**

- To describe the foraging distribution of selected species in relation to commercial fishing effort; and,
- Establish population levels and trends, and where possible, estimate relevant life history parameters (including adult survival, juvenile survival and recruitment)

### **Priority species:**

A recent qualitative risk assessment (Rowe 2009) undertaken as part of the National Plan of Action – Seabirds process indicated the following shag and penguin taxa were at higher to moderate potential risk and mitigated risk of population effects from New Zealand fisheries: New Zealand king shag; Pitt Island shag; Chatham Island shag; pied shag; spotted shag; Stewart Island shag; northern blue penguin and yellow-eyed penguin.

### **Background:**

Many of the shag species inhabiting coastal regions of New Zealand are very poorly studied. Of the priority species above, there has been no full national census of spotted or pied shags, and the only full census of Stewart Island shags dates back to the late 1970s/early 1980s (Lalas 1983), although more recent data is available for part of the entire population of this species (Lalas & Perriman 2009). New Zealand king, Pitt Island and Chatham Island shags (all Nationally Endangered: Miskelly 2008) have population estimates 5-10 years old (Bester & Charteris 2005; Schukard 2006), and both Pitt Island and Chatham Island shags have exhibited apparent declines. Information on population parameters and diet is limited for all shag species in New Zealand (relevant studies include Lalas 1983; Millener 1972).

Our knowledge on the extent of interactions between shag species and commercial fishing is also very limited, due to the low levels of observer coverage of the inshore fisheries that overlap the foraging areas of shags. In early 2009, observer coverage of inshore trawl vessels off the East Coast South Island recorded the capture of 32 spotted shags. In the Chatham Islands, Pitt Island shags are known to be caught in fishing pots (e.g. Bell & Bell 2000; DOC unpublished data), although this area has yet not been covered by government observers. Pied shags are found primarily in the coastal regions around much of the main islands of New Zealand. They have been observed bycaught in setnet and inshore longline fisheries (the extent of captures can not be estimated due to the low levels of historic coverage in these fisheries). Two Stewart Island shags were observed captured in a setnet fishery off the Otago coast. There is very little information available on the population trends and life history parameters of this species.

Yellow-eyed penguins breed only on the east and south coasts of South Island and on islands south to Campbell Island. Yellow-eyed penguin is listed as Endangered by the IUCN with a decreasing population trend (IUCN 2009). The yellow-eyed penguin has been thoroughly studied on land. For example, breeding biology, vital rates and population dynamics, social

organisation and behaviour have all received attention (e.g. Richdale 1941, 1951; Darby and Seddon 1990; Ratz et al. 2004). This penguin is vulnerable to a number of threats on land, including predation, fires and disease (Darby and Seddon 1990; Graczyk et al. 1995; McKinlay 2001). To further understand penguins at sea, investigations of foraging range and diet have been conducted at some colonies (Moore and Wakelin 1997; Moore 1999; Mattern 2006a; Mattern et al. 2007), and potential indirect effects of commercial fishing have been identified (Mattern 2006b). Mortality at sea is very poorly understood. This species has been reported bycaught in set net fisheries, including five observed mortalities in the 2008/09 fishing year. There is concern that recreational and/or commercial fisheries related mortality may be substantial (Darby and Dawson 2000; McKinlay 2001). A recent feasibility study (MFish project ENV2005/13) could not estimate the impact of fisheries on yellow-eyed penguins with the information currently available (Maunder *et al.* 2008).

### **Priority projects:**

The extent of research conducted in 2010/11 will be dependent on the level of financial resource available and the extent of research conducted by other parties (e.g. DOC is aware of a research proposal by Waugh & Wilson to study Chatham Island & Pitt Island shags). Priority projects, with defined specific objectives, are listed below:

- Census of Chatham Island and Pitt Island shags. Specific objective: estimate current population level; and determine population trend since previous surveys in 1997 and 2003.
- Compile all known records of mainland (and surrounding islands) breeding sites of spotted, pied and Stewart Island shags. Specific objectives: determine the extent of spatial overlap with inshore fisheries for shag species during breeding (where information is available on breeding sites); and identify coastal areas where the breeding distribution of shags is not well understood.
- Conduct surveys of mainland (and surrounding islands) breeding sites of spotted, pied and Stewart Island shags. Specific objectives; determine the extent of spatial overlap with inshore fisheries for breeding shag species; estimate current population levels for these shag species; and determine trends in colony size for colonies previously monitored.
- Spatial tracking of yellow-eyed penguin foraging distributions at colonies, or times of the year, where no information is available. Specific objective: determine the extent of spatial overlap of breeding yellow-eyed penguin foraging areas with inshore fisheries.
- Census mainland (and surrounding islands) breeding sites of yellow-eyed penguins, where these counts are not currently being conducted. Specific objectives; estimate current population level; and determine population trend since previous surveys.

### **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.
- Darby, J.T.; Dawson, S.M. 2000: Bycatch of yellow-eyed penguins (*Megadyptes antipodes*) in gillnets in New Zealand waters 1979-1997. *Biological Conservation* 93: 327-332.
- Darby, J.T.; Seddon, P.J. 1990: Breeding biology of yellow-eyed penguins (*Megadyptes antipodes*). Pp. 45-62 in Davis, L.S.; Darby, J.T. (Ed.): *Penguin Biology*. Academic Press, San Diego.
- Graczyk, T.K.; Cockrem, J.E.; Cranfield, M.R.; Darby, J.T.; Moore, P. 1995: Avian malaria seroprevalence in wild New Zealand penguins. *Parasite* 2: 401-405.

- IUCN 2009. IUCN Red List of Threatened Species. Version 2009.2. <www.iucnredlist.org>. Downloaded on 03 December 2009.
- Lalas, C. 1983: Comparative feeding ecology of New Zealand marine shags (Phalacrocoracidae). Unpublished thesis. University of Otago, Dunedin. p.
- Lalas, C.; Perriman, L. 2009: Nest counts of Stewart Island shags/mapua (*Leucocarbo chalconotus*) in Otago. Department of Conservation, Wellington. 29 p.
- Mattern, T. 2006a: Marine ecology of offshore and inshore foraging penguins: the Snares penguin *Eudyptes robustus* and Yellow-eyed penguin *Megadyptes antipodes*. Unpublished thesis. University of Otago, Dunedin. 160 p.
- Mattern, T. 2006b: At-sea distribution, shore distances and basic dive behaviour of Yellow-eyed penguins *Megadyptes antipodes* along the species mainland breeding range. Unpublished Report to the Ministry of Fisheries. Ministry of Fisheries, Wellington. 18 p.
- Mattern, T.; Ellenberg, U.; Houston, D.M.; Davis, L.S. 2007: Consistent foraging routes and benthic foraging behaviour in yellow-eyed penguins. *Marine Ecology Progress Series 343*: 295-306.
- Maunder, M. 2008: Assessment of risk of yellow-eyed penguins *Megadyptes antipodes* from fisheries incidental mortality in New Zealand fisheries and definition of information requirements for managing fisheries related risk. Client report for Ministry of Fisheries project ENV2005/13. Ministry of Fisheries, Wellington. p.
- McKinlay, B. 2001: Hoiho (*Megadyptes antipodes*) recovery plan 2000-2025. Threatened Species Plan 35. Department of Conservation, Wellington. 27 p.
- Millener, P.R. 1972: The biology of the New Zealand pied cormorant *Phalacrocorax varius varius* Gmelin (1789). Unpublished thesis. University of Auckland, Auckland. 303 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.
- Moore, P.J. 1999: Foraging range of the yellow-eyed penguin *Megadyptes antipodes*. *Marine Ornithology 27*: 49-58.
- Moore, P.J.; Wakelin, M.D. 1997: Diet of the yellow-eyed penguin *Megadyptes antipodes*, South Island, New Zealand, 1991-1993. *Marine Ornithology 25*: 17-29.
- Ratz, H.; Darby, J.T.; Edge, K.A.; Thompson, C. 2004: Survival and breeding of yellow-eyed penguins (*Megadyptes antipodes*), at two locations on Otago Peninsula, South Island, New Zealand, 1991-96. *New Zealand Journal of Zoology 31*: 133-147.
- Richdale, L.E. 1941: A brief summary of the history of the yellow-eyed penguin. *Emu 40*: 265-287.
- Rowe, S.J. 2009: Level 1 Risk Assessment for Incidental Seabird Mortality Associated with New Zealand Fisheries in the NZ-EEZ. Draft report. Department of Conservation, Wellington. p.
- Schuckard, R. 2006: Population status of the New Zealand king shag (*Leucocarbo carunculatus*). *Notornis 53*: 297-307.

### **5.3 Alternative monitoring methods to assess interactions between protected species and fishing vessels**

**Project Code:** MCSINT2010/04

**Start Date:** 1 July 2010

**Completion Date:** 30 June 2011

#### **Overall objective**

- To increase the efficiency, flexibility, and extent of monitoring selected sectors of the New Zealand commercial fishing fleet, by trialling methods of monitoring alternative to human observers

#### **Specific Objectives**

1. To investigate the efficacy of EM for investigating protected species captures and interactions on vessels with gear types not yet monitored using this method.
2. To further develop standard methodologies for analysis of data collected from EM that can be applied across multiple fishing methods.

#### **Background**

Over the last ten years, the Conservation Services Programme (CSP) has monitored interactions between large fishing vessels (> 28 m in length) and protected species, by placement of government observers on vessels. Within this time period, observer coverage of smaller inshore vessels has also been undertaken. In recent years, EM trials have been undertaken (by DOC/CSP) in two inshore fisheries, setnet and trawl, and by MFish in surface longline. In 2008, with the support of Sanford Ltd, DOC investigated novel ways of increasing our monitoring coverage and understanding of the interactions between small inshore trawl vessels and protected species in New Zealand fisheries. This was done through electronic monitoring on small inshore fishing boats, on which observer placement is often problematic<sup>10</sup>.

The aim of this project is to diversify application of electronic monitoring technology to other fisheries, and, if funding allows, broaden application to multiple vessels within a fishery. Fisheries will be selected in collaboration with appropriate industry sectors. Implementing the technology to record protected species interactions with a range of vessels will increase flexibility in techniques available for monitoring. Further, we will be able to identify risk factors that may encourage protected species interactions with vessels (e.g. offal discharge) and potentially mitigation measures to address these.

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<sup>10</sup> <http://www.doc.govt.nz/publications/conservation/marine-and-coastal/marine-conservation-services/other-publications/electronic-monitoring-in-the-new-zealand-inshore-trawl-fishery-a-pilot-study/>

## Appendix 1: Research Costs and Cost Allocation

### A: Proposed 2010/11 Projects

Number	Project	Research	Admin	Total	Cost Recovery Item	Industry %	Industry	Crown
<b>Proposed levied projects</b>								
INT2010/01	<b>Observing Commercial Fisheries</b>	\$1,411,068	\$175,096	\$1,586,164	8	100	\$1,586,164	\$0
INT2010/02	<b>Identification of seabirds captured in New Zealand fisheries</b>	\$80,000	\$9,927	\$89,927	4	100	\$89,927	\$0
POP2010/01	<b>Sea lion – Auckland Is</b>	\$270,000	\$33,504	\$303,504	2	90	\$273,153	\$30,350
MIT2010/01	<b>Mitigation strategies: Inshore fisheries</b>	\$90,000	\$11,168	\$101,168	4	100	\$101,168	\$0
<b>Crown-funded projects</b>								
MCSINT2010/03	<b>Coral spatial analysis and review</b>	\$40,000	\$4,964	\$44,964		0	\$0	\$44,964
MCSINT2010/04	<b>Alternative monitoring methods</b>	\$70,000	\$8,686	\$78,686		0	\$0	\$78,686
MCSPOP2010/02	<b>Shags and penguins</b>	\$60,000	\$7,445	\$67,445		0	\$0	\$67,445
<b>Totals</b>		\$2,021,068	\$250,790	\$2,271,858			\$2,050,413	\$221,445

**B: CSP 2010/11 Observer Allocation**

Method / Fishery	Target	2010/11 observer days	Per day cost (\$)	At-sea cost (\$)	Stocks
Inshore fisheries	Joint DOC/MFish Inshore Observer Programme 2010/11	<b>1010</b>	1,000.00*	1,010,000	BAR1, BAR7, BCO4, BNS1, BNS2, BNS3, ELE3, ELE5, FLA1, FLA2, FLA3, FLA7, GSH3, GSH7, GUR1, GUR2, GUR3, GUR7, HPB1, HPB2, HPB4, JDO1, JDO2, JDO7, LEA1, LEA2, LIN1, LIN2, LIN3, LIN4, LIN5, MOK1, RCO3, RCO7, RIB1, RIB2, RSN1, RSN2, SCH1, SCH2, SCH3, SCH4, SCH7, SKI1, SKI2, SNA1, SNA2, SNA7, SPD3, SPD5, SPE3, SPO3, STA3, STA5, SWA3, TAR1, TAR2, TAR3, TAR5, TAR7, TRE1, TRE2, TRE7, TRU4, WAR1, WAR2, WAR3, WAR7
Longline fisheries	Surface longline - domestic	<b>69</b>	850.00	58,650	STN1, BIG1, YFN1, SWO1
	Surface longline - charter	<b>53</b>	571.65	30,297	STN1, BIG1, YFN1, SWO1
	Bottom longline - deep sea ling	<b>27</b>	571.65	15,434	LIN2, LIN3, LIN 4, LIN5, LIN6, LIN7
Pelagic trawl	JMA, EMA, BAR	<b>66</b>	571.65	37,729	BAR 1, BAR 5, BAR 7, EMA 1, EMA3, EMA 7, JMA1, JMA3, JMA7
Middle depth trawl	HAK, HOK, LIN, SWA	<b>192</b>	571.65	109,757	HOK1, HAK1, HAK7, HAK4, LIN2, LIN3, LIN4, LIN5, LIN6, LIN7, SWA1, SWA3, SWA4
	SCI	<b>32</b>	571.65	18,293	SCI1, SCI2, SCI3, SCI4A, SCI 6B,SCI 6A
	SBW	<b>32</b>	571.65	18,293	SBW6A, SBW6R, SBW6I, SBW6B
	SQU	<b>109</b>	571.65	62,310	SQU1T, SQU6T
Deep water trawl	ORH, OEO	<b>88</b>	571.65	50,305	ORH1,2A,2B,3A,3B,7B; OEO1,3A,4,6
		<b>1731</b>		\$1,411,068	

\*Subject to change. Any difference in actual cost incurred will be addressed during the Unders and Overs process.

**C: Allocation summary of Inshore Observer Programme 2010/11 to be delivered as conservation services in 2010/11, as part of the Conservation Services Programme.**

	<b>2010/11 observer days</b>	<b>Per day cost</b>	<b>At-sea cost</b>	<b>Stocks</b>
A.2 Gather information to establish whether trawl fishing in Te Waewae Bay during the summer poses a risk of capture to the SCSI population of Hector's dolphins.	120	\$1,000*	\$120,000	ELE5, FLA3, GUR3, LIN5, SPD5, SPO3, STA5, TAR5
A.3 Gather information to establish whether trawl fishing in FMA1 and FMA2 poses a risk of capture to seabirds and marine mammals.	300	\$1,000*	\$300,000	BAR1, FLA1, FLA2, GUR1, GUR2, JDO1, JDO2, LEA1, LEA2, LIN1 LIN2, MOK1, SCH1, SCH2, SKI1, SKI2, SNA1, SNA2, TAR1, TAR2, TRE1, TRE2, WAR1, WAR2
A.4 Gather information to establish whether trawl fishing in Statistical Area 038 poses a risk of capture to seabirds and marine mammals.	100	\$1,000*	\$100,000	BAR7, FLA7, GSH7, GUR7, JDO7, LEA2, RCO7, SCH7, SNA7, TAR7, TRE7, WAR7
C.2 Gather information to establish the extent of residual risk of seabird capture in bottom longline fisheries around the Chatham Islands.	100	\$1,000*	\$100,000	BCO4, BNS3, HPB4, LIN4, SCH4, TRU4
D.1 Gather information to establish the effectiveness of alternative mitigation measures in reducing the extent of captures of seabirds in the trawl fishery of the ECSI.	120	\$1,000*	\$120,000	BAR1, ELE3, FLA3, GSH3, GUR3, LIN3, RCO3, SCH3, SPD3, SPE3, SPO3, STA3, SWA3, TAR3, WAR3.
D.2 Gather information to establish the effectiveness of alternative mitigation measures (including current regulated measures) in reducing extent of captures of seabirds in high-risk bottom longline fisheries in FMA1 and FMA2.	270	\$1,000*	\$270,000	BNS1, BNS2, GUR1, GUR2, HPB1, HPB2, LIN1, LIN2, RIB1, RIB2, RSN1, RSN2, SCH1, SCH2, SNA1, SNA2, TAR1, TAR2
<b>Total Days Levied</b>	<b>1,010</b>	<b>\$1,000*</b>	<b>\$1,010,000</b>	

\*Subject to change. Any difference in actual cost incurred will be addressed during the Unders and Overs process.



## **Appendix 2. DOC and MFish Inshore Observer Programme 2009/10: PRELIMINARY RESULTS**

### **Purpose**

- 1 To present preliminary results from the Department of Conservation (DOC) and Ministry of Fisheries (MFish) Inshore Observer Programme 2009/2010. The results detail coverage achieved against planned levels, and observed interactions with protected species as of 30 April 2010.

### **Background**

- 2 DOC and MFish both have interests in monitoring fishing related impacts on protected species. Management of fishing-related threats to protected species relies on information on these interactions and the effectiveness of mitigation measures. For inshore fisheries in particular, this information is very limited and uncertain, complicating the management of impacts. In this context, the aim of the observer programme is to support the legislative requirement to provide for the utilisation of fisheries resources while ensuring sustainability, with emphasis on the requirement to avoid, remedy or mitigate the effects of fishing on protected species.
- 3 In 2008/09 observer coverage in inshore fisheries was significantly increased with increased funding (of \$1 million) for monitoring as part of the Hector's dolphin Threat Management Plan (TMP). The observer programme continued during 2009/10, widening in scope to encompass all protected species so increasing the amount of independent and reliable information on interactions between inshore fisheries and protected species. In 2008/09 MFish and DOC planned and delivered separate observer programmes. The 2009/10 observer programme was planned and delivered jointly by MFish and DOC. Budget allocations for the MFish component of the 2009/10 programme were set at \$1 million per year, for both 2008/2009 and 2009/2010 the DOC component was levied as a conservation service. Both components were cost recovered from industry.

4 Observer coverage during 2009/2010 was focused on the following priority objectives:

<b>Objective</b>	<b>MFish Priority</b>	<b>Description</b>
SN1	1	Determine the extent of residual risk to the ECSI population of Hector's dolphins from setnet fishing
T1	2	Determine whether summer trawl fishing in Te Waewae Bay is posing a risk of capture to the SCSi population of Hector's dolphins
T2	3	Determine the extent of captures of seabirds in the ECSI trawl fishery
BL1	4	Determine the extent of captures of seabirds in high risk bottom longline fisheries in FMA1
SN2	5	Determine the extent of captures of Yellow-eyed penguins in the ECSI setnet fishery
SN3	6	Determine the extent of captures of diving seabirds and penguins in the Foveaux Straight area
SN4	7	Determine whether setnet fishing in the Hauraki Gulf is posing a risk of capture to diving seabirds and penguins
T3	8	Determine whether trawl fishing on the WCSi is posing a risk of capture to the WCSi population of Hector's dolphins
T4	9	Determine the extent of captures of seabirds in the WCSi trawl fishery
CSP INT2009/01 <sup>11</sup> (CSP1)		Inshore Trawl in FMA 1
CSP INT2009/01 <sup>11</sup> (CSP2)		Small vessel bottom longline on Chatham Rise

### Coverage achieved

5 For 2009/2010, a total of 1786 observed fishing days were planned to be delivered between September 2009 and May 2010<sup>12</sup>. As of 30 April 2010, 1163 fishing days have been delivered. Observer coverage as part of the programme has concluded around most of the country, except for coverage in a few bottom-longline in the North Island. Additional coverage on these vessels is planned to be delivered during May 2010. Table 1 summarises achieved coverage, in comparison to planned coverage against area and fishing method during 2009/2010. Table 2 presents this information against the objectives listed above.

<sup>11</sup> See Conservation Services Annual Plan 2009/10 for full details

<sup>12</sup> Originally 1900 days were planned, however due to deliverability issues 120 days were not attempted to be delivered.

Table 1 – Total Planned and actual coverage by area and method as of 30 April 2010

Method	Area	Stat Area	Total planned days 2009/10	Days delivered as of 30 April	% Delivered/ planned coverage		
					Area	Method	
Bottom longline	FMA1		430	418	97%	93%	
	FMA3/4		70	45	68%		
Setnet	FMA1	7	70	7	10%	48%	
	ECSI		17	77	0		0%
			18	103	104		101%
			22	205	98		48%
			24	120	24		20%
SCSI		137	107	78%			
Trawl	FMA1	5	50	31	62%	65%	
	ECSI	22	167	166	99%		
		24	47	0	0%		
	SCSI	26, 30	142	68	48%		
WCSI	33;34;35	168	107	64%			
<b>Total</b>			<b>1786<sup>12</sup></b>	<b>1175</b>	<b>66%</b>		

Table 2 – Total planned and actual coverage by objective as of 30 April 2010

Objective	Total planned days 2009/10	Days delivered as of 30 April	% Delivered/ planned coverage
SN1 & SN2	505	226	45%
T1	142	68	48%
T2	214	166	78%
BL1	430	418 <sup>+</sup>	97%
SN3	137	107	78%
SN4	70	7	10%
T3 & T4	168	107	64%
CSP1	50	31	62%
CSP2	70	45	64%
<b>Total</b>	<b>1786<sup>12</sup></b>	<b>1175</b>	<b>66%</b>

<sup>+</sup> Further coverage pending during May 2010

## Observed captures

- 6 Up to 30 April 2010, a total of 92 protected species captures have been observed during the programme. Table 3 summarises protected species captures observed (both mortalities and live captures) by objective, area and method. Species identifications used in Table 3 have been confirmed by autopsy where possible but other identifications are yet to be confirmed. Final capture information will be given in the 2009/10 Conservation Services Programme Observer Report.

Table 3 – Observed captures of protected species as of 30 April 2010

Species		Objective/Area/Method									Total
		BL1	SN4	CSP1	SN1, SN2	T2	CSP2	SN3	T1	T3, T4	
		FMA1			ECSI		FMA3/4	SCSI		WCSI	
		BLL	Setnet	Trawl	Setnet	Trawl	BLL	Setnet	Trawl	Trawl	
Marine Mammals	Hector's dolphin				2						2
	Dusky dolphin				2						2
	Fur seal				2			3			5
Albatross	Albatross (unknown)					3					3
	Salvin's albatross					10	1				11
	White-capped albatross								1	3	4
	Shy/white-capped albatross					2					2
	Chatham Island albatross						1				1
Penguins	Yellow-eyed penguin				1						1
	Fiordland crested penguin							1			1
Petrels	Flesh-footed shearwater	10									10
	Black petrel	36									36
	Grey petrel						3				3
	Cape petrel						3				3
	Storm petrel	1									1
Shags	Spotted shag							3			3
	Pied shag							1			1
	Stewart Island shag				2						2
Sharks	White pointer shark							1			1
<b>Total</b>		<b>47</b>	<b>0</b>	<b>0</b>	<b>9</b>	<b>15</b>	<b>8</b>	<b>9</b>	<b>1</b>	<b>3</b>	<b>92</b>

## **Appendix 3. Outline for developing mitigation trial**

### **Project D1. Warp-strike mitigation device assessment- Inshore Trawl**

#### **Background**

Warp-strikes by seabirds are known to lead to both injuries and mortalities in inshore trawl fisheries around New Zealand. The exact relationship between warp strikes and mortalities is unclear; however a positive correlation is logical. Vessels less than 28m are not required to carry or operate any mitigation devices or practices to reduce incidental seabird capture. Even so, a number of operators have either developed their own mitigation devices or adapted those used on other types or sizes of vessels. It is important to understand how effective these devices are at mitigating warp-strikes in order to give good advice as to which devices should be in use widely in the New Zealand inshore trawl fleet.

#### **Documenting Devices currently used**

Some data has been collected by inshore observers on warp strike interactions, particularly in the past observer year. This data comprising warp-strike observations, photographs and diary notes (along with any other available information e.g. from the literature or anecdotally from the fishing industry) will be used to form a document summarising and identifying mitigation devices and practices known to currently be in use in the inshore trawl fleet. The document should include:

- Device types
- Extent of use
- Variability in design between vessels
- Anecdotal information on effectiveness
- Indication of cost
- Pro's and Con's of use
- Where possible summaries of warp strike information

#### **Selection of devices to test**

Based on the available knowledge a small number of devices should be selected to be tested. These devices should be those that seem the most practical, safest and most cost effective as identified in the document described above.

#### **Forming assessment protocols**

Assessment criteria will be developed through a collaborative advisory group. This will be based upon the Seabird Warp- Strike Measurement Protocol, using the data collected by observers in the 09/10 observer year to identify where refinements need to be made in the sampling protocol.

#### **Duration of Trials**

In the 09/10 year trial durations of 20 days per vessel were decided upon based on talks with industry members. It is proposed to keep this duration per vessel and look at covering six vessels. An initial assessment of this data will be made during the 10/11 year. This assessment will be used to determine the extent of additional information that may be required to robustly assess the devices, and thus form the basis of extended work in 2011/12.

## Timeline

Date	Action
Current to Aug 2010	Documenting and summarising current knowledge
Sept to Dec 2010 group	Defining assessment protocols through collaborative advisory group
Feb 2011 to May 2011	Observer coverage
	Project Proposal for 11/12 Year for analysis of data and possible extension of trials or development of devices.

## Project D2. Inshore Bottom Longline

### Background

Work is currently underway to identify and document characteristics of inshore fisheries that influence protected species interactions, as part of DOC project MIT 2009/01 Development of mitigation strategies: Inshore fisheries<sup>13</sup>. The fishery is subject to minimum mitigation requirements, but the effectiveness of the current mitigation practices has not been quantified. Potential risk of seabird captures can be quantified by measuring sink rates and assessing other mitigation measures, such as tori line effectiveness and haul mitigation devices.

### Project development

Findings from DOC project MIT 2009/01, detailed plans to be developed for DOC project MIT2010-01<sup>14</sup>, and previous observer records will form the basis for developing plans on which mitigation practices to focus on in 2010/11. Detailed trial objectives, and methodology, will be developed through a collaborative advisory group

## Timeline

Date	Action
Aug to Sept 2010	Development of project through collaborative advisory group
Nov 2010 to Feb 2011	Observer coverage

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<sup>13</sup> See the Conservation Services Annual Plan 2009/10 for further details.

<sup>14</sup> See the Marine Conservation Services Annual Plan 2010/11 for further details.