

Marine Conservation Services Research Proposals for 2010/11
Research Planning Session, 26-27 August 2009

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Conservation Services Programme projects

1. Consultation Process

The following process and documents will contribute to the development of the 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
4 December 2009	Draft 2010/2011 Conservation Services Annual Plan circulated to stakeholders for submissions
5 February 2010	Submissions on Draft 2010/2011 Conservation Services Annual Plan close
13 February 2010	Submissions made available to stakeholders
15-19 March 2010	Small meetings to discuss submissions held with different stakeholders who request them
26 March 2010	Revised Draft 2010/2011 Conservation Services Annual Plan forwarded to SeaFIC for finalisation of allocation of project costs to fisheries
30 April 2010	Annual Plan approved by the Minister of Conservation circulated to stakeholders

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:

The information presented here is draft only. Observer days will be finalised with the Ministry of Fisheries and discussed with stakeholders prior to the 2010/11 Annual Plan being released in December.

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. Observer days in this category of fisheries are set at a level agreed with MFish to be deliverable. In order to enhance the likelihood of achieving greater than 10% effort in particular FMAs, observer coverage is planned for a small number of FMAs at specific times of the year where the risk to protected species is considered highest.

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 will be examined to ensure that desired coverage levels are achievable with the days planned. (This is because 2009/10 data will 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.
(<http://www.doc.govt.nz/upload/documents/science-and-technical/sap250entire.pdf>)
- Rowe, S.J. (in press): Conservation Services Programme observer report: 01 July 2008 to 30 June 2008. *DOC Marine Conservation Services Series*. Department of Conservation, Wellington.
(draft available <http://www.doc.govt.nz/upload/documents/conservation/marine-and-coastal/fishing/twg/csp-16-mar-0708-draft-observer-report-jun-update.pdf>)

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

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

2.1.1 Poorly known, smaller vessel fisheries

In recent years, CSP has paid for 100% of days in 'inshore' fisheries (bottom longline, setnet and trawl). From 2008/09 the Ministry began contributing to a portion of days in these fisheries to gather catch effort information and further monitoring was undertaken by the Ministry for the summer observer programme focused on Hector's dolphin interactions. The priority for inshore days will continue to be monitoring protected species interactions for both agencies.

Table 1 provides draft days to be delivered in small vessel, poorly known fisheries during the 2010/2011 observer year. Observations in these fisheries are undertaken to determine whether protected species interactions are occurring and, if so, how they might be mitigated. While greater observer coverage is required to estimate total bycatch of protected species, the logistical and financial constraints of higher observer coverage must be considered. Also, the Ministry of Fisheries will be planning additional observer days in order to enhance monitoring of protected species interactions in the inshore area. Both agencies will be working together to deploy and deliver observer coverage.

As for the 2009/10 observer year, the Conservation Services team will be running portside workshops with fishers to:

- Introduce fishers to the work of CSP
- Describe the objectives of the observer programme
- Provide a summary of what is known about protected species interactions from observer coverage
- Describe the data observers will be collecting
- Provide educational material to fisheries

Ministry of Fisheries Observer Services and Science staff will attend these meetings.

The timetable for portside workshops is as follows (exact locations and venues to be confirmed):

Timaru	27 August
Bluff, Riverton	28 August
Akaroa, Lyttleton	24 September
Kaikoura	25 September
Dunedin region	8 October
Oamaru region	9 October
Auckland and Leigh	2 November
Whangarei	3 November
Houhora	9 November
Mangonui	10 November
Westport & Greymouth	12 November
Hokitika	13 November
New Plymouth	16 November
Raglan	17 November

Table 1. Summary of DRAFT 2010/11 observer days planned in poorly known fisheries

Method / Fishery	Fisheries Management Area	% coverage planned	2010/11 observer days
Setnet	AKE, SEC, SOU	< 5% total effort	200*
Inshore trawl	CHA, SEC, SOU	< 5% total effort	300*
Small vessel bottom longline	AKE, SEC, SOE	< 5% total effort	250*
Potting and trapping	SOE, SOU	< 5% total effort	80
Dredging	CHA, SOU	< 5% total effort	70
Total days			900

* Subject to change depending on Ministry of Fisheries plans for of observer days in 2010/11 (when these become available)

Further background to each of these fisheries is provided below.

Setnet

The extent to which commercial setnet fishing activities interact with protected species is largely unknown due to very low historic achievement of observer coverage. Despite historic intent to collect observer data, this fishery has been difficult to observe because, as with other inshore fisheries, it encompasses smaller vessels carrying out short trips, less predictable operations and there are practical difficulties notwithstanding the legal requirement to take government fisheries observers. The Pegasus Bay-Canterbury Bight setnet fishery (Statistical Areas 020 and 022) was observed during the 1997-1998 fishing year, during which time eight Hector's dolphins were observed caught in setnets, of which two were released alive. This fishery is therefore being monitored in line with Policy 12 (b) of the CSP Strategic Plan which states that the Observer Programme will enhance observations in unobserved fisheries or where interactions are not understood.

Observations aboard commercial setnet vessels in the 2005/06 fishing year were undertaken in Southland (SOU) and the Nelson / Marlborough region (CHA) to monitor interactions with Hector's dolphins and seabirds. During the 2005/06 fishing year, a small number of fur seals and shags were recorded caught. Setnet fisheries were also observed in the 2006/07 fishing year in Kaikoura (SEC), Nelson (CHA) and in Southland (SOU). Protected species mortalities during 2006/07 included one dusky dolphin, one Hector's dolphin, one fluttering shearwater and two yellow-eyed penguins, all as separate incidents.

Observations of commercial setnet fishing in 2007/08 were planned for SEC (Statistical Areas 018, 022 and 024), SOU (025 and 030), CHA (034, 035 and 038), CEE and CEW. During the 2007/08 observer year, one Hector's dolphin, a fur seal, one yellow-eyed penguin and one sooty shearwater were incidentally killed. One pilot whale, three Westland petrels and one cape petrel were caught and released alive.

During the 2008/09 observer year, CSP observer coverage was undertaken in AKW, CHA and SEC. One Hector's dolphin and one cape petrel were incidentally killed and another 12 seabirds were released alive following net captures. With the MFish Hector's summer observer programme overlapping with CSP coverage areas, 112 setnet days were delivered for CSP.

Observer coverage for 2010/11

The Department and the Ministry of Fisheries will continue to monitor setnet fisheries during the 2009/10 observer year with a focus on protected species interactions and the mitigation and offal management techniques employed by individual vessels.

Given the additional days likely to be delivered by the Ministry of Fisheries, the Department has planned 200 observer days aboard setnet vessels in 2010/11 (see Table 2). Observer coverage will be undertaken in AKE to monitor for petrel interactions, in SEC to monitor for Hector's dolphin, petrel and penguin interactions and in SOU to monitor for shag and penguin interactions.

Table 2: Allocation of setnet days in 2010/11

Setnet	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Total
Days				30	30	30	30	30	30	20			200
FMA's				3	3, 5	3, 5	1, 3, 5	1, 3, 5	1, 3	3			

Inshore trawl

The extent to which inshore trawl vessels interact with protected species is extremely poorly known due to minimal historic observer coverage. Observer coverage of the inshore trawl fishery in the Pegasus Bay – Canterbury Bight area in 1997-1998 reported the capture of one Hector's dolphin. Prior to observing this fishery, five dolphins were known to have been caught by trawlers off the east coast of the South Island. Hector's dolphins have also been recorded caught on unobserved inshore trawl vessels operating on the west coast of the South Island in the late 1980s. Since 1997-1998, four dolphin mortalities have been caused by inshore trawlers including three animals caught in one trawling event in April 2006. This fishery is therefore being monitored in line with Policy 12 (b) of the CSP Strategic Plan which states that the Observer Programme will enhance observations in unobserved fisheries or where interactions are not understood.

Observations aboard inshore trawl vessels began in the 2006/07 fishing year with coverage undertaken in AKE to monitor seabird interactions, CHA to monitor Hector's dolphin and seabird interactions and in CEW and AKW to monitor Maui's dolphin interactions. A total of nine vessels were observed during the 2006/07 observer year, during which 106 observer days were achieved. Captures included the incidental mortality of six white-capped albatrosses, one unidentified albatross, one black petrel and one flesh-footed shearwater.

During the 2007/08 observer year 250 days were planned across the following areas: AKE to monitor interactions with seabirds, SEC to monitor interactions with Hector's dolphins and seabirds, SOU to monitor interactions with penguins, shearwaters, shags and Hector's

dolphins, CHA to monitor interactions with Hector’s dolphins and AKE to monitor potential interactions with Maui’s dolphins. Only 81 days were achieved across ten vessels: two vessels operating in AKW, two operating in CHA, one operating in CHA and CEW and five operating in SEC. Three Salvin’s albatross, one white-capped albatross and one unidentified albatross were incidentally killed in SEC and one Westland petrel deck strike was also reported from that area. One white capped albatross and one cape petrel were incidentally killed in CHA and deck strikes of eight Westland petrels and seven sooty shearwaters were also reported. The vessel operating in CHA and CEW incidentally killed one cape petrel and five sooty shearwaters were reported as deck strikes. No captures were reported from AKW.

During 2008/09 observer year all CSP observer coverage was delivered in AKE as overlaps with the Hector’s summer observer programme made delivery of observer days in the South Island difficult. Interactions with bottlenose dolphins and Australasian gannets were reported.

Observer coverage for 2010/11

Observer coverage is aimed at describing the fishing methods employed, identifying whether any protected species interactions are occurring and, if so, how those interactions might be mitigated. In recent years, the seabird captures reported from inshore trawl fisheries have been the result of both warp strikes and net captures. Monitoring priorities include collecting data on protected species interactions and the mitigation and offal management techniques employed aboard inshore trawl vessels. CSP may also use electronic monitoring as an alternative to human observers.

Given the additional days likely to be delivered by the Ministry of Fisheries, the Department has planned 300 observer days aboard inshore trawl vessels in 2010/11 (Table 3). Observer coverage will be undertaken in CHA, SEC (highest priority) and SOU (2nd priority) to monitor for Hector’s dolphin and seabird interactions, both in the net and with the warp.

Table 3: Allocation of inshore trawl days in 2010/11

Inshore trawl	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Total
Days			30	30	40	40	30	50	40	40	30		300
FMAAs			3, 7	3, 7	3, 5, 7	3, 5	3, 5	3, 5, 7	3, 5	3, 7	3, 7		

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

Historically, CSP observer coverage in the inshore LIN, BNS, HPB fisheries has been focussed in AKE, CEE, SOE and SOU. Observations in the snapper fishery were undertaken in AKE to monitor interactions with seabirds, particularly black petrels. Since the 2008/09 observer year inshore longline observations encompass multiple stocks in order to enhance coverage levels through enabling greater flexibility in observer placement.

In line with Policy 12 (b) of the CSP strategic plan, observer coverage of inshore longline fisheries will be maintained as interactions are not well understood. Observer time has been focussed on monitoring and recording interactions with seabirds including captures and behaviour around the vessel. Of particular interest will be increased observer effort in AKE

and SOE to monitor interactions with seabirds, particularly following the large seabird bycatch event in SOE in September 2007.

During the 2008/09 observer year, a total of 258 observer days were achieved. The majority of coverage was focussed in AKE where captures of black petrels and flesh-footed shearwaters were reported.

Observer coverage for 2010/11 (draft)

Coverage levels for 2010/11 are set at 250 days (see Table 4) with additional days to be delivered by the Ministry of Fisheries. Monitoring priorities will continue to be in AKE (highest priority), SEC and SOE (2nd priority).

Table 4: Allocation of small vessel bottom longline days in 2010/11

Small vessel BLL	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Total
Days		20	20	30	40	40	40	40	20				250
FMAAs		3, 4	3, 4	3, 4	1, 4	1, 4	1	1	1				

Potting and trapping

Rock lobsters and blue cod are caught in pots, usually made of a steel frame, covered with wire mesh. The pot is baited with fish and dropped from the boat on the end of a rope long enough to reach the bottom. The position of the pot is marked with floats so the pot can be easily recovered. Fish are trapped in stationary gear where the fish can enter the trap but cannot escape. Target species for potting and trapping techniques include rock lobster, cod, crab and hagfish. Fishing effort occurs throughout the year around the NZ mainland and Chatham Islands. Seabirds of concern include shags and penguins, particularly shags breeding in the Chatham Island group.

Observer coverage for 2010/11 (draft)

No observer coverage has been undertaken in potting or trapping fisheries to monitor for protected species interactions. There is some knowledge, yet extremely limited information, available on interactions between some seabirds and cetaceans and this fishing gear (e.g. Bell & Bell 2000). Seabirds will be the focus of the proposed coverage, which seeks greater understanding of how the fishery interacts with species such as penguins and shags. CSP will work with the fishing industry to determine the best way to achieve the small number of observer days. Providers other than the Ministry of Fisheries will be considered.

Coverage levels for 2010/11 are set at 80 days (see Table 5) to be delivered in SOE and SOU (STA 025, 030).

Table 5: Allocation of potting and trapping days in 2010/11

Dredge	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Total
Days							20	20	20	20			80
FMAAs							5	5	4	4			

Dredge

Dredging is used to gather scallops and oysters. To gather scallops, the fishing vessel tows a rigid steel-framed dredge along the sea floor. With oysters, a heavier ring mesh is usually used. Deepwater tuatua, oysters, scallops, sea urchins, triangle shells and trough shells are all targeted using this method. Most effort targets oysters and scallops.

Fishing effort is undertaken throughout the year with oysters targeted from January through to June and scallops from July through to February. This fishery has never been observed so that any direct or indirect effects of dredging on protected marine species are unknown. For the purposes of observer coverage, effort will be divided between oyster dredge in Foveaux Strait; oyster dredge in Marlborough/Nelson; and scallop dredge. Species of particular interest are yellow-eyed penguins in Foveaux Strait and mainland-nesting shags in Southland, east coast South Island and the Marlborough Sounds.

Observer coverage for 2010/11 (draft)

No observer coverage has been undertaken in this fishery and so potential risk to protected species is unknown. CSP proposes to work with the fishing industry to achieve the small number of observer days planned. Providers other than the Ministry of Fisheries will be considered.

Coverage levels for 2010/11 are set at 70 days (see Table 6) to be delivered in CHA and SOU.

Table 6: Allocation of dredge days in 2010/11

Dredge	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Total plan
Days			15	15					15	15	10		70
FMAAs			7	7					5	5	5		

2.1.2 'Offshore' fisheries

In these fisheries, CSP contributes to a proportion of Ministry of Fisheries observer days, typically 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 poorly known 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 detailed in Table 7.

Table 7. Summary of DRAFT 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
Total days					668

* 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 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 8.

Table 8: Allocation of domestic surface longline days in 2010/11

Fishery	FMA	Coverage days
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 9.

Table 9: Allocation of charter surface longline days in 2010/11

Fishery	FMA	Coverage days
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 10) to monitor seabird interactions during September, October, May and June.

Table 10: Allocation of deep sea ling bottom longline days in 2010/11

Fishery	FMA	Coverage days
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, 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 11.

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

Fishery	FMA	Coverage days
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 12.

Table 12: 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 13).

Table 13: 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 14.

Table 14: Allocation of scampi trawl days in 2010/11

Fishery	FMA	Coverage days
Scampi trawl	AKE	12
	SOE	14
	SUB	6
Total days		32

Squid

CSP will contribute to 15% 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 targeted research on 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 15.

Table 15: Allocation of squid trawl days in 2010/11

Fishery	FMA	Coverage days
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 16.

Table 16: Allocation of deep water bottom trawl days in 2010/11

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

Outputs

- A descriptive summary of observer data will be provided to stakeholders
- 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 for identification and autopsy (see project INT 2007/02: Identification of seabirds captured in NZ fisheries).
- All protected corals (or corals that cannot be correctly identified) are returned for identification (see project INT 2009/02: Identification of protected corals).
- Data will be available for other DOC and Ministry projects including offal management, seabird net captures, 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 2014¹

Overall Objective

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

Specific Objectives²

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.

¹ This project is funded in annual terms. Continuation to 31 May 2014 is subject to annual review and Ministerial approval.

² 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.
- Provision of specific information requested by CSP 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. 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.

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 full reasons for the 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 in press).

In the absence of a Population Management Plan, 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 is currently being completed (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-Sapriza 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 research by DOC, currently underway or planned for 2009/10, that will provide information relevant to the management of the adverse 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 Plan¹ Policies include: 1, 2, 5, 13, 14 and 19.

Outputs:

1. A database containing information collected through this project. The format of the data must 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.

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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 becoming 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 poorly known. However, even with poor 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 Plan¹ 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.

Marine Conservation Services projects

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

5 Bycatch of protected corals in NZ fisheries waters

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) are returned by government observers and delivered to the contractor 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.

6 Investigation of poorly known protected species in a commercial fisheries context

6.1 Mainland and Chatham Island shag species

Objectives:

- To describe the foraging distribution in relation to commercial fishing effort; and,
- Establish population levels and trends, and where possible, estimate relevant life history parameters

Background:

There a number of shag species inhabiting the coastal regions of New Zealand, many of which are poorly studied. 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. Recent (Jan-Feb 2009) observer coverage of inshore trawl vessels off the East Coast South Island has recorded a high number of spotted shag captures. In the Chatham Islands, Pitt Island shags are known to be caught in fishing pots (e.g. Bell & Bell 2000), although this area has yet not been covered by government observers. The Pitt Island shag is classified as Nationally Vulnerable and the Chatham Island shag is Nationally Endangered. Pied shags are found primarily in the coastal regions around much of the main islands of New Zealand. They have been recorded 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). There is very little information available on the population trends and life history parameters of this species.

Knowledge on the population level, trend and foraging areas of these species is limited. The extent of their interaction with commercial fishing operations is also limited.

6.2 Yellow-eyed penguin

Objectives:

- To describe the foraging distribution in relation to commercial fishing effort; and,
- Establish population levels and trends, and where possible, estimate relevant life history parameters

Background: This species breeds 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 2008). 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 (Moore and Wakelin 1997; Moore 1999; Mattern et al. 2007). However, mortality at sea is very poorly understood. This species has been reported bycaught in set net fisheries and 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).

Population studies have been completed for selected populations of yellow-eyed penguin, but further data is required. This project will aim to augment existing data, focusing on less studied populations where fishing interactions are known to occur or have the potential to occur.

7 Electronic monitoring: assessing interactions between protected species and inshore fishing vessels

Overall objective

- To increase monitoring coverage and understanding of the interactions between small inshore trawl vessels and protected species in New Zealand fisheries

Specific Objectives

1. To further test and develop the standard installation process for EM kits on inshore trawl vessels.
2. To further develop a standard methodology to analyse data collected from EM of inshore trawl vessels. Required outputs:
 - counts of seabird, marine mammal or coral bycatch in the trawl net
 - counts of seabird interaction with trawl warps, by nature of the contact (flying or on the water; heavy or light contact), and if feasible the outcome of the contact (no apparent injury, minor or major injury, death or suspected death)
 - estimate of abundance of seabirds around vessel
 - identify protected species involved in these interactions to species or species group, e.g. large albatross/small albatross/petrel
 - use of mitigation devices
 - occurrence of offal discharge.

Background

Over the last ten years, the Conservation Services Programme (CSP) has monitored interactions between large trawl vessels (> 28 m in length) and protected species, by placement of government observers on vessels. Since January 2007 CSP has placed a limited number of observers on smaller trawl vessels for the first time and early results show the potentially large impact they may have on protected species, including albatrosses, shearwaters and marine mammals.

In 2008, with the support of Sanford Ltd, CSP started investigating 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.

The aim of this project is to apply the latest electronic monitoring technology to other inshore trawl fisheries. Implementing the technology to record protected species interactions with inshore vessels will increase our understanding of the impacts this fishery may be having on protected species. 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.

8 Analysis of observer seabird abundance data

Objective

To determine the abundance of seabirds in the vicinity of fishing vessels, throughout the New Zealand region, using observer data.

Background

During the past decade, fisheries observers have made counts of the numbers of seabirds around fishing vessels. At first these observations were made in observer diaries, but since 2005 bird counts have been made in a more structured way using a form developed for the purpose. Aside from limited tracking data and bycatch records, little is known about the at-sea distribution of birds in New Zealand waters. The assessment and availability of this information will improve knowledge of seabird interactions with fishing activities and contribute to other projects such as assessments of seabird mortality during non-observed fishing.

This project began in 2008 and transcribes seabird abundance data collected from 2000 onwards into a database, from both the observer diaries and the seabird observation forms. Because of difficulties with counting seabirds behind vessels, and variations that may exist between observers, the data will need to be extensively groomed. Key issues include assessing observer skill at identifying bird species, normalising the counts between different observers, and integrating this data with other observer data available from the Ministry of Fisheries.

Having groomed the data, quantitative maps of seabird will be produced. Statistical models are being used to allow seabird numbers to be predicted by position and time of year, and will include observer random effects. These models will be used to produce maps that will be published as a DOC report. Data will be anonymised before publications are produced, or before it is distributed, to ensure that observer identities, the names of fishing vessels, and fishing locations, are not revealed.

The ongoing collection of abundance data collected by observers will be assessed at the completion of this project.

Outputs

1. Groomed dataset of seabird abundance observations.
2. Report presenting a preliminary summary of the data.
3. Detailed report including maps of seabird distributions.

9 Protected species interactions: Knowledge exchange

Objective: To facilitate knowledge exchange amongst fishers, and with other stakeholders involved in the identification and monitoring of protected species interactions with fisheries.

Background: New Zealand has a diverse range of fisheries. Work to date on investigating protected species interactions has also varied greatly between fisheries. In offshore commercial fisheries, a number of mitigation techniques have been developed and implemented with promising results. However, improvements are still required in other aspects of fishing and in other offshore fisheries.

Inshore trawl and bottom longline fisheries in New Zealand represent a diverse range of fisheries, generally with localised rather than national fishery organisation or governance bodies. In comparison to many of the offshore fisheries, the protected species interactions, and mitigation techniques used, are poorly documented. Mitigation techniques used by one fisher, or in one geographic area, may be unknown to other fishers, or those in other areas. While CSP has a commercial fisheries remit, the broader fisheries remit (and funding base) of Marine Conservation Services can support work on recreational fishing. While commercial fishing will remain first priority, knowledge exchange work will also include recreational fisheries. Knowledge exchange may be facilitated through means such as workshops, written guides or face-to-face discussions, including with specially trained and appointed advisory officers.

Proposed research projects for next 5 years:

- Production and distribution of identification guides (e.g A Fisher's Guide to New Zealand seabirds).
- Production and distribution of protected species handling guidelines (e.g. Seabird handling after capture in fisheries).
- Production and distribution on best practice mitigation guides.