Approved Conservation Services Plan 2001/2002

AS APPROVED BY Hon Sandra TeH Lee, Minister of Conservation, on 16 July 2001

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Conservation Services

Introduction

Part XIV of the Fisheries Act 1996 deals with cost recovery issues. Under section 262 the Crown can impose levies to recovery costs in respect of the provision of conservation services. These services are defined in the Act as being:

> "Outputs produced by the Minister of Conservation or the Director-General of Conservation that enables [them] to perform their statutory powers, duties and functions related to the adverse effects of commercial fishing on protected species, including –
>
> (a) research relating to such effects on protected species; and
>
> (b) research on measures to mitigate the adverse effects of commercial fishing on protected species; and
>
> (c) the development of population management plans under the Marine Mammals Protection Act 1978 and the Wildlife Act 1953."

The Fisheries (Crown Contribution) Order 1999 which is made under section 265 of the Fisheries Act 1996 requires the Crown to bear the costs of conservation services to the extent set out in the Schedule to that Order. As such they are a form of exception to section 262. The Schedule to the Order includes the research costs to be borne by the Crown relating to protected species population research:

(a) where the risk to those populations by human intervention has been estimated. This requires estimating the total risk of human intervention on the population, subtracting the estimate of the risk to populations posed by commercial fishing in the Economic Exclusive Zone of New Zealand and dividing the result by the estimated total risk; and

(b) where the risk to those populations by human intervention has not been estimated. In these circumstances the Crown's share of the costs is fixed at 50%.

The Department of Conservation has implemented projects through conservation services levies (CSL) in the following major areas:

1. Observer coverage targeted at marine mammal and seabird bycatch and selected fisheries;
2. Analysis and estimation of bycatch data for marine mammals and seabirds;
3. Research and development of mitigation measures;
4. Carcass retrieval and autopsy;
5. Monitoring of certain populations of protected species taken as bycatch.

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1 Observer Programmes

Project: The collection by fisheries observers of statistically robust data on the incidental take of protected marine species

Project Code: CSL OBS 2001/1
Project Cost: $ 636,500
Levy Component: $ 636,500
Start Date: 1 July 2001
Completion Date: 30 June 2002 (Ongoing - subject to annual review)

Project Objectives:

- To obtain statistically reliable information on the number of protected species incidentally taken in commercial fisheries;
- To identify possible means for mitigating the incidental take of protected species from these species;
- To collect other biological information on protected species by-catch.

Objectives for 2001/2002:

- To monitor fisheries that are known to interact with protected species.
- To debrief all observer trips made by Ministry of Fisheries observers in order to keep a watching brief on protected species interactions in these fisheries.

Table of Proposed Coverage for 2000/2001

	CSL FUNDED DAYS		OF CONCERN	
FISHERY	2000/2001	Requested 2001/2002	Protected species	Areas
Hoki Trawl	330	200	Fur seals	CHAT, SUBA, WCSI
			Seabirds	CHAT, SUBA
Southern Blue Whiting Trawl		100	Fur seals	Campbell & Bounty
			Sea lions	Campbell
Hake Trawl		30	Fur seals & Seabirds	WCSI
Squid Trawl	200	200	Sea lions, Fur seals & Seabirds	SQU6T, SQU1T
JV Pelagic Tuna Longline	120	120	Seabirds	WCSI, East Cape
			Fur seals	WCSI
Domestic Pelagic Tuna Longline	250	250	Seabirds (black & grey petrels) & turtles	FMA 1 & 2
Trawl – Inshore South Island	50	50	Hector's dolphin and penguins	FSA 20 & 22
Demersal Ling Longline	490	490	Seabirds	LIN 4, 5 & 6
Setnet - inshore South Island	150		Hector's dolphin & Penguins	FSA 20 & 22
Demersal Snapper Longline	30		Seabirds	FMA 1
TOTAL DAYS	**1620**	**1440**		

Notes:

1. The days for the inshore set net fishery on the East Coast South Island have been moved to project OBS2001/5. This is because the use of observers based on fishing vessels was not successful in obtaining the required coverage in 2000/01 and different techniques will be required.
2. Demersal snapper was levied in 2000/01 but is not levied this year.
3. These days are additional to days levied by the Ministry of Fisheries in the Fisheries Services Plan (FSP). Where the Ministry of Fisheries intends greater coverage than that required by Conservation Services Plan the procedure is to expend all CSL days before FSP days.
4. In days required under the Conservation Services Plan the Department sets the priorities of observer work, whereas the Ministry of Fisheries sets priorities in the FSP days. There is active co-operation between the Department of Conservation and the Ministry of Fisheries to ensure that maximum value is extracted from all at sea observer days.

Cost Estimate:

1390 days deepwater @ $400 per day	$ 556,000
50 days inshore @ $650 per day	$ 32,500
Briefing Officer (salary and expenses)	$ 45,000
Published reports	3,000
TOTAL	**$ 636,500**

100% of these costs will be recoverable through levies on the fishing industry

Note: The observer per day costs are based on estimates provided to DOC by the Ministry of Fisheries.

Background:

The Department will advocate for the deployment of observers in the fisheries described to provide an acceptable level of confidence that the observed level of incidental take of protected species is representative of the incidental take rate of the whole fleet. Recent reports to both DOC and Ministry of Fisheries have shown that it has proved extremely difficult to adequately estimate the number of protected species taken incidentally to commercial fisheries given past levels of observer coverage and the strike rates for these species (Baird 1998, 1999; Baird & Bradford, 1999; Manly et al 1999a, 1999b, 2000). A 20% coefficient of variation (CV) on the estimated level of bycatch has been generally agreed upon by CSL stakeholders. This means that the 95% confidence intervals on the estimate of the bycatch is usually plus or minus 40% of the estimate[1]. This is likely to result in coverage of between 20 and 30% of any particular fishery, however, in some cases a CV of 20% may not be achieved at levels below 100% observer coverage.

A project proposing the development of a protected species observer programme stratified by area and time was in the Approved 2000/01 Conservation Services Plan. Unfortunately, lack of suitable providers resulted in no tender being let. It is proposed to attempt to let this work in the 2001/02 tender round so the project has been included again in this paper as (CSL OBS 2001/2) but it will not be levied. It is not considered prudent to radically alter the level of observer coverage in the meantime. Therefore, coverage of fisheries for hoki, southern blue whiting, hake and squid have not been altered. The number of observer days proposed for inshore trawl has also remained at the same level as for 1999/2000. The Ministry of Fisheries has no requirements for observer days in this fishery.

The days for the inshore set net fishery on the East Coast South Island have been moved to project OBS2001/5. This is because the use of observers based on fishing vessels was not successful in obtaining the required coverage in 2000/01 and different techniques are needed.

Manly et al (2000) provide two scenarios for longlines for estimating total bycatch as a function of the expected effort in a fishery and the level of observer cover: a best case and a worst case. The best case scenario has been applied to the pelagic tuna longliner and demersal ling longline fisheries to obtain sensible interim observer coverage.

There are, in effect, two pelagic tuna longline fisheries; the joint venture (large Japanese style) fishery and the domestic fishery, largely comprising smaller vessels. In recent years observer coverage of the joint venture fleet has been 100% or approaching 100%. Low levels of coverage of total sets made by the domestic fleet have been achieved in recent years. It is proposed that coverage of this fleet be concentrated into FMA's 1 & 2 where most of the fishing effort of this fleet is concentrated and where the seabird strike rate is highest (Baird, 1999). Based on Manly et al's (2000) best case scenario the proposed 10% coverage of this fishery should increase precision to a CV of around 40%. The number of days proposed approximates 10% coverage for FMA's 1 & 2 based on 1997/98 fishing effort (Baird, 1999) and is addition to the number of days required by the Ministry of Fisheries.

[1] E.g. If estimated bycatch is 1000, then a 20% CV means that we are 95% confident that the true bycatch lies between 600 and 1400.

The increased coverage of the demersal long-line fleet in 2000/01 revealed alarming numbers of sea birds captured. Active measures are being mounted by the industry to mitigate these captures. The number of observer days used in 2000/01 proved adequate for the monitoring required by CSL. It is proposed, therefore, to continue monitoring at the same level as in 2000/01. This should provide coverage for over 3 million hooks, and again using Manly et al's (2000) best case scenario, will result in a CV of around 20%. The 490 days proposed here is based on 20% of the fishing effort in Quota Management Areas 4, 5 & 6 during the 1997/98 fishing effort (Baird, 1999) and is in addition to any requirements of the Ministry of Fisheries.

It is proposed that the Observer Programme of the Ministry of Fisheries will provide the observer services. Observer services could be put up for open tender but the number of days would need to increase as the proposed coverage has been determined taking into account the number of observer days required by the Ministry of Fisheries.

A Department of Conservation officer (funded under CSL) will brief and debrief observers, maintain instruction manuals and collate information. The Department will receive reports and relevant by-catch carcasses from the wider Ministry of Fisheries programme. Observers funded via CSL will be required to treat the collection, packaging and storage of protected species taken as by-catch and associated data as their primary task.

Baird, S. 1998. Estimation of nonfish bycatch in commercial fisheries in New Zealand waters, 1990-91 to 1993-94. Final Research Report for Ministry of Fisheries Research Project ENV9701 Objective 1.

Baird, S. 1999. Estimation of nonfish bycatch in commercial fisheries in New Zealand waters, 1997-98. Final Research Report for Ministry of Fisheries Research Project ENV9801 Objective 1.

Baird S. and Bradford, E. 1999. Factors that may influence the bycatch of nonfish species in some New Zealand fisheries. Final Research Report for Ministry of Fisheries Research Project ENV9801 Objective 3.

Manly, B., Cameron, C. and Fletcher, D. 1999a. Accidental and incidental captures of fur seals *Arctocephalus forsteri* and official observer coverage in fisheries in New Zealand waters for fishing seasons 1990/1991 to 1995/1996, with an assessment of the observer cover required for the future monitoring of fisheries. Draft report to CSL.

Manly, B., Cameron, C. and Fletcher, D. 1999b. Accidental and incidental captures of New Zealand sea lions *Phocarctos hookeri* and official observer coverage in fisheries in New Zealand waters for fishing seasons 1987/1988 to 1995/1996, with an assessment of the observer cover required for the future monitoring of fisheries. Draft report to CSL.

Manly, B., Cameron, C. and Fletcher, D. 2000. Accidental and incidental captures of seabirds and marine mammals and official observer coverage in longline fisheries in New Zealand waters for fishing seasons 1990/1991 to 1995/1996, with an assessment of the observer cover required for the future monitoring of fisheries. Draft report to CSL.

Project: The design of a protected species observer programme.

Project Code: CSL OBS 2001/2
Project Cost: Nil in 2001/02
Levy Component: Nil
Start Date: 1 July 2001
Completion Date: 30 June 2002

Note: This project appeared and was levied in the 2000/01 Conservation Services Plan. Unfortunately lack of suitable providers resulted in no tender being let. It is proposed to attempt to let this work in the 2001/02 tender round so the project has been included again in this paper as (CSL OBS 2001/2).

Project Objectives:
To design a protected species observer programme for New Zealand fisheries that will provide sufficient coverage to enable the collection of statistically robust data on the incidental take of protected marine species.

Objectives for 2001/2002:
To design a protected species observer programme for New Zealand fisheries that will provide sufficient coverage to enable the collection of statistically robust data on the incidental take of protected marine species.

To assess the feasibility that inshore observer programmes for Hector's dolphin and Yellow-eyed penguins will provide data that will be statistically robust.

To make recommendations on the best way to achieve observer coverage of inshore fisheries.

Cost Estimate: (Levied in 2000/01)

Contract	$ 100,000
Technical Working Group Expenses	$ 5,000
Publication of report	$ 2,000
TOTAL	**$ 107,000**

100% of these costs will be recoverable through levies on the fishing industry

Background:
Conservation Services Levies have been set each year since the 1995/96 fishing year to run a set of observer programmes. This series of observer programmes has been fishery focussed, with observer days allocated to specific fisheries where the incidental capture of protected species occurs, or is thought to occur. Initially CSL observer programmes were designed to elucidate the presence or absence of an interaction rather than the magnitude of an interaction. Thus, a wide range of offshore fisheries was targeted with minimal coverage. This is an established procedure. Northridge (1996) in a recent review of observer programmes stated that:

> "Observer coverage should initially be widespread throughout the geographical and seasonal distribution of the fishery. This should provide baseline data from which to make rough estimates of the total kill and to determine variance in the catch rate. These data can then be used to determine appropriate levels of coverage in the future and will also enable the survey to be stratified."

Now that a more complete picture of interactions has emerged it is appropriate to design programmes that will provide estimates of bycatch to agreed levels of precision in the most efficient manner.

Reports on the incidental catch of protected species based on observer data have highlighted the difficulty of calculating total catch for individual species in any year or area. Reasons given are the low levels of observer coverage and the relatively low rate of capture for most protected species (Baird, 1999; Baird & Bradford, 1999; Manly 1999a, 1999b, 2000). A project to investigate new estimation tools is included in the Ministry of Fisheries' Fisheries Services Plan.

It was agreed at a meeting to assess the CSL observer programme to include a project in the Conservation Service Plan for 2000/2001 to design an observer programme that would provide for adequate coverage where fisheries interact in time and space with the distribution of protected marine species. This observer programme will be designed after a careful review of coverage to date and the various reports by Baird, Baird and Bradford, and Manly et al (Projects CSL1B, ENV9701 & ENV9801). The observer programme will be stratified by fishery, area and season in the first instance, taking into account the distribution and vulnerability to capture of protected marine species. Other levels of stratification, e.g. vessel types, may be necessary.

Calls to set up observer programmes to assess the incidental take of Hector's dolphins on the west coasts of both the North and South Islands, the south coast of the South Island and to extend the current east coast South Island programme have been made. In addition, an inshore observer programme to look at the incidental take of Yellow-eyed penguins on the east and southern coast of the South Island and around Stewart Island has also been proposed. It is recommended that this project assess the feasibility of these observer programmes providing adequate coverage to achieve statistically robust results. If the assessments prove positive, the programmes may be incorporated into the overall programme.

Over the last few years it has become apparent that there are considerable difficulties to be faced in successfully running an observer programme on most domestic inshore fisheries. These include, but are not limited to, unscheduled vessel departure, marine safety and survey issues, unwillingness of skippers to carry female observers and the large number of ports used by vessels. These issues will be considered as part of this project and recommendations on how best to achieve coverage of those fisheries will be made.

Baird, S. 1999. Estimation of nonfish bycatch in commercial fisheries in New Zealand waters, 1997-98. Final Research Report for Ministry of Fisheries Research Project ENV9801 Objective 1.

Baird S. and Bradford, E. 1999. Factors that may influence the bycatch of nonfish species in some New Zealand fisheries. Final Research Report for Ministry of Fisheries Research Project ENV9801 Objective 3.

Manly, B., Cameron, C. and Fletcher, D. 1999a. Accidental and incidental captures of fur seals *Arctocephalus forsteri* and official observer coverage in fisheries in New Zealand waters for fishing seasons 1990/1991 to 1995/1996, with an assessment of the observer cover required for the future monitoring of fisheries. Draft report to CSL.

Manly, B., Cameron, C. and Fletcher, D. 1999b. Accidental and incidental captures of New Zealand sea lions *Phocarctos hookeri* and official observer coverage in fisheries in New Zealand waters for fishing seasons 1987/1988 to 1995/1996, with an assessment of the observer cover required for the future monitoring of fisheries. Draft report to CSL.

Manly, B., Cameron, C. and Fletcher, D. 2000. Accidental and incidental captures of seabirds and marine mammals and official observer coverage in longline fisheries in New Zealand waters for fishing seasons 1990/1991 to 1995/1996, with an assessment of the observer cover required for the future monitoring of fisheries. Draft report to CSL.

Northbridge, S. 1996. A review of marine mammal bycatch observer schemes with recommendations for best practice. JNCC Report, No 219. 42p.

Marine mammal carcass recovery project

Project: The collection of biological data on protected marine mammal species incidentally caught in commercial fisheries.

Project Code: CSL OBS 2001/3
Project Cost: $ 57 700
Levy Component: $ 57,700
Start Date: 1 July 2001
Completion Date: 30 June 2004 (Ongoing - subject to review)

Project Objectives:
To collect specimens of marine mammal incidentally taken in commercial fishing operations for the determination of: species, age, sex, reproductive status, stomach contents and general condition.

To analyse the above data to establish a population profile of those species caught incidentally as by-catch.

Objectives for 2001/2002 to 2003/04:
To collect, and return to port for autopsy by qualified personnel, up to 80 marine mammal by-catch specimens, including all sea lions and small cetaceans, and some fur seals. The fur seals will principally be known-age animals bearing DoC tags applied on natal rookeries.

Autopsy will examine species, age, sex, reproductive status, stomach contents and general condition of the specimens to establish a population profile for those species caught as by-catch. For Hector's dolphin and NZ sea lions an attempt to determine cause of death will be made by a veterinary pathologist.

Note that this project is being consulted for three years

Cost Estimate: (provision for up to 80 specimens)

Packaging and labelling @ $16/bag	1,280
Transport from wharf @ $250/pallet/tonne	7,500
Storage @ $40/pallet/month	1,920
Autopsy contract	45,000
Publication of reports	2,000
TOTAL	**$57,700**

100% of these costs will be recoverable through levies on the fishing industry

Background:
Before this project started in 1995/96, the bodies of most of the marine mammals incidentally taken in commercial fishing operations were dumped at sea, thus losing the opportunity to collect a considerable amount of valuable biological data related to species, age, sex, reproductive status and other physiological parameters. The data collected through this project will provide a profile of the population taken as by-catch, and will generate essential information on the impact of commercial fishing on marine mammals. The Department of Conservation considers that enough fur seal carcasses have been collected from the hoki trawl fishery on the west coast South Island to permit us to characterise the bycatch age/sex profile.

Cause of death will be determined for Hector's dolphin to attempt to assess whether they died as a result of entanglement. New Zealand sea lions recovered from squid trawl nets carrying MMED's will be examined see if it is possible to determine cause of death. The operational management of carcass recovery will be carried out by the Observer Programme Operational Manager (CSL OBS2000/1).

The increase in the cost of this project (up $10 000 from 2000/01) is due to costs of carcass disposal now being charged by the University.

Note that this project is being consulted for three years

Seabird carcass recovery project

Project: The collection of biological data on protected seabird species incidentally caught in commercial fisheries.

Project Code: CSL OBS 2001/4
Project Cost: $ 81,550
Levy Component: $ 81,550
Start Date: 1 July 2001
Completion Date: 30 June 2004 (Ongoing - subject to review)

Project Objectives:

- To collect specimens of protected seabirds incidentally taken in fishing operations for the determination of: species, age (where possible), sex, reproductive status, stomach contents and general condition.
- To analyse the above data to establish a population profile of those species caught incidentally as bycatch.

Objectives for 2001/2002 to 2003/04:

- To collect, and return to port for autopsy by qualified personnel, up to 850 seabird bycatch specimens.

Note that this project is being consulted for three years

Autopsy will examine species, age (where possible), sex, reproductive status, stomach contents and general condition of the specimens to establish a population profile for those species incidentally taken as bycatch.

Cost Estimate: (provision for up to 850 specimens)

Labelling and packing @ $8/kit	6,800
Transport from wharf to autopsy room	10,000
Autopsy and identification	63,750
Publication of report	1,000
TOTAL	**$81,550**

100% of these costs will be recoverable through levies on the fishing industry

Note: During 2000/01 observers returned over 800 sea birds for autopsy. It had been anticipated that about 800 birds would be returned but during consultations this was reduced to 550. Unfortunately, the initial estimate proved to be more correct. The trawl fisheries contributed one third of these birds: a major increase. The other major contributor was the demersal longline fishery. While the cost per bird has been held constant, problems with refrigerated transport has required an extra layer of woven packing and hence an increased packing cost.

Background:

This project will provide each year for the return to port, storage, transport and autopsy of up to 800 seabirds incidentally taken by vessels carrying observers. The data collected will provide a profile of the populations taken as bycatch, and will generate essential information on the impact of commercial fishing on seabirds.

It is expected that about 350 of these birds will be from the trawl fleet. Up to 105 seabirds will be returned from the joint venture pelagic longline fleet. This reflects the maximum number of seabirds permitted in the industry voluntary code of practice. An allowance of 100 birds has been made for the domestic pelagic longline fleet and 295 from the demersal longline fleet.

The operational management of carcass recovery will be carried out by the Observer Programme Operational Manager (CSL OBS2000/1). Since January 1998, seabird autopsies have been carried out by a Department of Conservation staff member, who is an acknowledged expert in this field. This staff member has recently resigned but will continue to carry out this work under contract to CSL.

Note that this project is being consulted for three years

2. *Bycatch mitigation projects*

Mitigation devices to minimise seabird bycatch

Project: The research, design and development of mitigation measures to minimise the incidental take of seabirds protected under the First Schedule of the Conservation Act 1987, and the Wildlife Act 1953.

Project Code: CSL MIT 2000/1
Project Cost: $ 111,000
Levy Component: $ 111,000
Start Date: 1 July 2001
Completion Date: 30 June 2002 (Ongoing - subject to annual review)

Project Objectives:

- To continue research, development and evaluation of operational methods and devices to avoid, remedy or mitigate the incidental take in commercial longline fishing operations of protected seabirds.

Objectives for 2001/2002

- Employ an advisory officer in the tuna longline fishery
- Continue development of line weighting in demersal ling longline fishery
- Employ a short-term advisory officer in the demersal ling fisheries
- Develop and trial mitigation devices in the trawl fisheries.

Cost Estimate:

Advisory officer: salary, expenses and materials (tuna) Carried forward from 2000/01	
Contracts (ling longline)	45,000
Trawl fishery mitigation	60,000
Publication of reports	6,000
TOTAL	**$111,000**

100% of these costs will be recoverable through levies on the fishing industry

Background:

Tuna longline

As a result of research and development projects undertaken through CSL, and research carried out in other countries, a suite of measures is now available to tuna fishers to enable them to fish with minimal risk of incidentally capturing seabirds. The measures developed through CSL include customised tori lines for small vessels, underwater setting and safe line weighting. Individual reports have been published in the CSL series describing each of these. These, and other measures, are reviewed in the document "The Incidental Catch of Seabirds by Longline Fisheries: Worldwide Review and Technical Guidelines for Mitigation" FAO Fisheries Circular No 937. The mix of measures a fisher will need to use will depend on the factors that effect likelihood of seabird capture (e.g. fishing gear being used, area, season, time of setting, experience of crew) and the capture rate a fisher is required to meet. In light of the availability of a number of mitigation options for fishers, no further research or development is deemed necessary at this time. Because there are a considerable number of new entrants to the fishery, continuation of the advisory officer position is considered worthwhile by both industry and Government. The role of the advisory officer would be to liaise with fishers, work on mitigation projects, identify practical measures for reducing seabird bycatch at sea, and offer advice to fishers.

Ling Longline

Projects carried out through CSL in the ling longline fishery include the development of a tori line, measurement of sink rates, and the investigation of line weighting. It is recommended that further development of line weighting is required to improve safety and to simplify the process. A short-term advisory officer will employed in this fishery. Savings due to the resignation of the ling longline advisory officer in 1999/2000 will be carried-forward to fund the operations of the advisory officer in that fishery.

Trawl Vessels

Over 800 sea birds were estimated taken by hoki and trawl fisheries in the 1997/98 fishing year (Baird 1999). In that same year sea birds were also observed taken on vessels targeting barracouta, jack mackerel, orange roughy, southern blue whiting and scampi. Observer reports and autopsy results have indicated that sticky grease on wires, spraggs, inappropriate lighting, overhead wires, offal discards, vessels turning, and certain mesh types are all implicated in the capture of sea birds by trawling. A number of possible mitigation devices have been suggested in recent years and the CSL Sea Bird Working Group will guide the development of mitigation projects. Initiatives from the fishing industry (for instance as required by the Marine Stewardship Council certification of hoki) may reduce the amount of work and levy required by CSL.

Baird, S. 1999. Estimation of nonfish bycatch in commercial fisheries in New Zealand waters, 1997-98. Final Research Report for Ministry of Fisheries Research Project ENV9801 Objective 1.

Mitigation devices to minimise marine mammal bycatch

Project: Mitigation of the incidental take of marine mammals in commercial trawling operations.

Project Code: CSL MIT 2001/2
Project Cost: $15,000
Levy Component: $ 15,000
Start Date: 1 July 2001
Completion Date: 30 June 2002 (Ongoing - subject to annual review)

Project Objectives for 2001/2002:

To review the effectiveness of devices to mitigate the incidental take of marine mammals in commercial trawling operations

Cost Estimate:

Analysis to assess trials	10,000
Technical working group expenses	5,000
TOTAL	**$15,000**

100% of these costs will be recoverable through levies on the fishing industry

Background:
From 1995/96 to 1998/99, CSL funded the development of a Marine Mammal Escape Device (MMED), a form of excluder fitted just in front of the cod-end of a pelagic or bottom trawl net. Since 1999/2000 the Squid Fishery Management Company has been carrying out trials of an industry prototype Sea Lion Exclusion Device (SLED), a derivative of the MMED. SLED's were deployed in the Auckland Islands squid fishery during early 1999. A poor fishing season meant that it was not possible to determine the success of the device.

In 2000/01 the Squid Fishery Management Company deployed SLEDs on all squid trawlers in SQU 6T and had underwater cameras on six vessels in an attempt to determine the escapement and survival of sea lions from the SLED. Three pieces of film were obtained showing sea lions passing through the escape device. All animals were judged by DoC marine mammal specialists to have survived ejection and would likely to have survived to surface. Difficulties with cameras (a two hour tape limit) and with cover net design prevented more film being obtained. It is anticipated that the Squid Fishery Management Company will mount a similar, if more limited, investigation in 2001/02. This project supports the operation of a working group to review the results from the Squid Fishery Management Company work and the payment of a university veterinarian to view any film and to discuss techniques for determining the long-term effects on sea lion survival of ejection from the device.

3 *Bycatch species research projects*

Introduction

The new cost recovery rules (see Introduction) apply to the following set of research projects. The majority of these projects will be cost recovered at the 50% level as there is no information available to assess the proportion of risk to the protected species population posed by commercial fishing in the NZ EEZ against the total human risk to the protected species.

In past years the wandering albatross research projects have, to an extent, been subsidised by the use of DOC staff to manage the projects. Changes in Departmental research priorities mean that this will not occur from 2000/2001 onwards and it will be necessary to contract a project manager for these two projects. In addition, work has been carried out to determine our ability to detect trends in albatross populations. The change in project manager will provide the opportunity for a technical working group to review the effectiveness of the fieldwork in light of this work.

The ongoing Black petrel monitoring project will continue to be carried out by Wildlife Management International Ltd, who won the tender at the inception of this project. It will not be put out to open tender.

New Zealand sea lion research continues to be carried out by DOC staff and will not be put out to open tender.

Monitoring of protected seabird bycatch

Project: Evaluation of the impact of fisheries bycatch on Gibson's (Auckland Island wandering) albatross.

Project Code: CSL BRD 2001/1
Project Cost: $ 136,300
Levy Component: $ 68,150
Start Date: July 2001
Completion Date: June 2006 (Ongoing - subject to annual review)

Project Objectives:

- To determine the present size and population trends of Gibson's albatross (*Diomedea gibsoni*) through annual census of nesting pairs on Adams Island.
- To determine breeding success, annual adult survival and recruitment.
- To determine which areas of ocean are important Gibson's albatross foraging areas and to assess whether conflict between longline fisheries and albatross can be reduced through zoning.
- To collect further population data.

Objectives for 2001/2002 through to 2003/04:

Note this project is being consulted for three years from 2001/02 to 2003/04

- To determine the survival of adult birds banded between 1991 and 1998, and to band all new pairs nesting in the study area.
- To determine breeding success each year; to band all study area fledglings; and to search for birds banded as chicks since 1995 to assess year-of-first-return, and recruitment rates.
- To census a representative sample of the Gibson's albatross breeding population (study area).
- Map the foraging zones of juvenile birds. using satellite telemetry.

Cost Estimate:

Transport	28,500
Contractor's costs (staff etc)	55,400
Equipment (including satellite time)	43,900
Capital charge on hut	4,500
Technical working group costs	2,000
Publication of report	2,000
TOTAL	**$136,300**

50% of these costs will be recoverable through levies on the fishing industry

Background:

An endemic species, Gibson's albatross breeds only on the Auckland Islands. It is considered an 'at risk' species. Between October 1996 and September 1998, 29 carcasses of this species were returned for autopsy by observers on tuna longline vessels (Bartle, 2000. Robertson, 2000). Studies of wandering albatross elsewhere have implicated bycatch as a factor in the decline of the species. Because wandering albatross are such a long lived and slow reproducing species, a fisheries induced reduction of adult survival by 1% p.a. led to a 50% decline in the population on the Crozet Islands over a 20 year period (Weimerskirch & Jouventin, 1987).

No reliable population data exists for the NZ subspecies of wandering albatross. Before a maximum level of fishing related mortality can be set, survival, recruitment and population size must be known. To allow reduction of conflict between albatross and the longline fisheries, the most important albatross foraging grounds need to be identified.

The planned research project focuses on banding and recovery of both juvenile birds and adult breeding pairs during annual visits to the Auckland Islands, plus annual census of the breeding population. Satellite telemetry will be used to determine which parts of the ocean are most used by Auckland Island wandering albatross, particularly during vulnerable periods of the birds' life cycle.

As the risk to this population by human intervention has not been estimated the Crown must bear 50% of the costs of this research as outlined in the Fisheries (Crown Contribution) Order 1999.

Bartle, J.A. 2000. Autopsy report for seabirds killed and returned from New Zealand fisheries 1 October 1996 to 31 December 1997. CAS Notes No. 293, Department of Conservation, Wellington.

Robertson, C.J.R. 2000. Autopsy report for seabirds killed and returned from New Zealand fisheries 1 January 1998 to 30 September 1998. CAS Notes No. 294, Department of Conservation, Wellington.

Weimerskirch, H., Jouventin, P. 1987: Population dynamics of the wandering albatross, *Diomedea exulans*, of the Crozet Islands: causes and consequences of the population decline. *Oikos 49*: 315-322

Note this project is being consulted for three years from 2001/02 to 2003/04

Project: Evaluation of the impact of fisheries bycatch on the Antipodes Island wandering albatross.

Project Code: CSL BRD 2001/2
Project Cost: $ 151,800
Levy Component: $ 75,900
Start Date: 1 July 2001
Completion Date: 30 June 2006 (Ongoing - subject to annual review)

Project Objectives:
To determine the present size and population trends of the Antipodes Island wandering albatross (*Diomedea antipodensis*) through annual census of nesting pairs on Antipodes Island.

- To determine annual breeding success, adult survival and recruitment.
- To determine which areas of ocean are important Antipodes Island wandering albatross foraging areas, and to assess whether conflict between long-line fisheries and albatross can be reduced through zoning.
- To collect further population data.

Objectives for 2001/2002:

Note this project is being consulted for three years from 2001/02 to 2003/04

- To determine the survival of adult birds banded between 1994 and 1998, and to band all new pairs nesting in the study area.
- To determine breeding success; to band all study area fledglings; and to search for birds banded as chicks since 1995 in assessment of recruitment rates.
- To census a representative sample of the wandering albatross breeding population (study area).
- Through satellite telemetry, map the foraging zones of juvenile birds..

Cost Estimate:

Transport	48,500
Contractor's costs (staff etc)	55,400
Equipment (including satellite time)	43,900
Technical working group costs	2,000
Publication of report	2,000
TOTAL	**$151,800**

50% of these costs will be recoverable through levies on the fishing industry

Background:
The Antipodean (wandering) albatross is an endemic species that breeds only on the Antipodes Islands and Campbell Island. It is considered an 'at risk' species. Between October 1996 and September 1998, 84 carcasses of this species were returned for autopsy by observers on tuna longline vessels (Bartle, 2000. Robertson, 2000). Studies of wandering albatross elsewhere have implicated bycatch as a factor in the decline of the species. Because wandering albatross are such a long lived and slow reproducing species, a fisheries induced reduction of adult survival by 1%pa led to a 50% decline in the population on the Crozet Islands over a 20 year period (Weimerskirch & Jouventin, 1987).

No reliable population data exists for the NZ subspecies of wandering albatross. Before a maximum level of fishing related mortality can be set, survival, recruitment and population size must be known. To allow reduction of conflict between albatross and the longline fisheries, the most important albatross foraging grounds need to be identified.

The planned research project focuses on banding and recovery of both juvenile birds and adult breeding pairs during annual visits to Antipodes Island, plus annual census of the breeding population. Satellite telemetry will be used to determine which parts of the ocean are most used by Antipodes Island wandering albatross, particularly during vulnerable periods of the bird's life cycle.

As the risk to this population by human intervention has not been estimated the Crown must bear 50% of the costs of this research as outlined in the Fisheries (Crown Contribution) Order 1999.

Bartle, J.A. 2000. Autopsy report for seabirds killed and returned from New Zealand fisheries 1 October 1996 to 31 December 1997. CAS Notes No. 293, Department of Conservation, Wellington.

Robertson, C.J.R. 2000. Autopsy report for seabirds killed and returned from New Zealand fisheries 1 January 1998 to 30 September 1998. CAS Notes No. 294, Department of Conservation, Wellington.

Weimerskirch, H., Jouventin, P. 1987: Population dynamics of the wandering albatross, *Diomedea exulans*, of the Crozet Islands: causes and consequences of the population decline. *Oikos 49*: 315-322

Note this project is being consulted for three years from 2001/02 to 2003/04

Project: Evaluation of the impact of fisheries bycatch on the black petrel of Great Barrier Island.

Project Code: CSL BRD 2001/3
Project Cost: $ 37,000
Levy Component: $ 18,500
Start Date: 1 July 2001
Completion Date: 30 June 2002 (Ongoing -subject to annual review)

Project Objectives:
To undertake a census of black petrel (*Procellaria parkinsoni*) on Great Barrier Island via burrow monitoring and the banding of adults and fledglings, initially over four consecutive breeding seasons to establish adult mortality, breeding success and recruitment.

Objectives for 2001/2002:
- To monitor a sample of black petrel breeding burrows (minimum 50, maximum 100) on Great Barrier Island and determine the number of eggs laid in the study burrows
- To band all adults in the study area.
- To band all fledglings in the study area during the 2001/2002 breeding season.
- To band as many other black petrel as possible.

Cost Estimate:

Research contract	33,000
Technical working group costs	2,000
Publication of report	2,000
TOTAL	**$37,000**

50% of these costs will be recoverable through levies on the fishing industry

Background:
The total population of black petrels (*Procellaria parkinsoni*) numbers about 5000 birds. This species is endemic to New Zealand and confined to Great and Little Barrier Islands. Great Barrier is the stronghold. Scavenging from fishing vessels is common, and this makes the black petrel vulnerable to bycatch. A domestic longline vessel, fishing within New Zealand's EEZ, reported catching six black petrel on a single set during 1993, three black petrel carcasses were returned by observers between 1 October 1996 to 30 September 1998 (Bartle, 2000. Robertson, 2000). Observer coverage of the fisheries that potentially interact with this species has been poor, and it is suspected that many more black petrel are taken incidental to fishing than are reported here. No reliable population data exists for the black petrel. Before a maximum level of fishing related mortality can be set, survival, recruitment and population size must be known. This study will investigate adult mortality, breeding success and recruitment in relation to fisheries interactions.

As the risk to this population by human intervention has not been estimated the Crown must bear 50% of the costs of this research as outlined in the Fisheries (Crown Contribution) Order 1999.

Bartle, J.A. 2000. Autopsy report for seabirds killed and returned from New Zealand fisheries 1 October 1996 to 31 December 1997. CAS Notes No. 293, Department of Conservation, Wellington.

Robertson, C.J.R. 2000. Autopsy report for seabirds killed and returned from New Zealand fisheries 1 January 1998 to 30 September 1998. CAS Notes No. 294, Department of Conservation, Wellington.

Monitoring of marine mammal bycatch

Project: Evaluation of the impact of fisheries by-catch on the New Zealand sea lion – Auckland Islands

Project Code: CSL MAM 2001/1
Project Cost: $269,000
Levy Component: $269,000
Start Date: 1 July 2001
Completion Date: 30 June 2003 (Ongoing – subject to triennial review)

Project Objectives:

- To measure annual pup production for the New Zealand sea lion (*Phocarctos hookeri*) on the Auckland Islands.
- To provide estimates of female reproductive and survival parameters, and estimates of pup survival and recruitment parameters.
- To provide inter-annual comparisons of age-specific life history parameters.
- To investigate the foraging ecology of the sea lion in so far as it relates to the Auckland shelf squid trawl fishery.

Objectives for 2001/2002 to 2002/2003:

Note this project is being consulted for two years from 2001/02 to 2002/03

- To measure pup production on the Auckland Islands.
- To resight tagged/branded adult females to provide estimates of parameters (survival and reproductive rate) for use in an age-structured model.
- To resight marked animals of other age/sex classes to provide estimates of survival rate, and other life history parameters for use in an age-structured model.
- To replace tags of adult females tagged prior to 1993/94.
- To tag pups to provide estimates of parameters (survival and recruitment) for use in an age-structured model.
- To investigate pup growth in relation to maternal characteristics (size, age, body condition, reproductive history) and foraging/attendance behaviour.
- To further evaluate the efficacy of flipper tagging, hot branding and transponder technology as permanent markers of New Zealand sea lions

Cost Estimate:

Science Officers' salaries, allowances, etc	125,000
Vessel charter, research personnel and field operations	142,000
Publication of report	2,000
TOTAL	**$269,000**

Background:
The New Zealand sea lion is a species found in the area between Cook Strait, Campbell Island, Macquarie Island, and the south east of the South Island. The range for this species is centred on the Auckland Islands, with the main breeding colonies on Dundas, Enderby and the Figure of Eight Islands. In recent years population estimates for the sea lion have been calculated from pup production counts. Fishery interaction occurs as a result of the overlap of the southern squid trawl fishery and the sea lion's foraging areas around the Auckland shelf. This project will determine the population status for the sea lion, measure female reproductive and survival parameters, and pup survival and recruitment parameters for use in an age structured population model under development by a technical working group of stakeholders.

Little is known about the population dynamics of this species. The present population estimate is calculated using annual pup production and then, using female reproductive and juvenile survival parameters, this is modelled to yield an overall population estimate, assuming the population is in equilibrium. The sea lion mortality event in January 1998 is likely to have disrupted this equilibrium, and the development of a specific age-structured model is crucial to the long term conservation management of this species. Annual estimates of pup production, and survival and fecundity schedules are essential inputs to the population modelling.

All the parameters used in the model to date have been derived from other species. It is not known to what degree these estimates are representative of the dynamics of the NZ sea lion. Recent analyses of tag data from animals marked prior to 1992/93, along with females tagged as adults is providing the first estimates of life history parameters in this species. Limited data exist on survivorship or recruitment, which are not calibrated for loss of marks. To measure these parameters accurately requires an intensive, ongoing, resighting effort of all animals tagged/branded as pups and those marked as adult females over the summers 1998/1999 – 2000/2001. The first indications of age-at-recruitment of females will be obtained in summer 2001/2002.

Two marking methods will be used on pups - double flipper tags and a Permanent Implantable Transponder (PIT) tag. A PIT tag is a small chip that is implanted beneath the skin surface and has a uniquely identifiable number that can be detected by a "reader" unit. Both flipper tags and PIT tags are known to be lost, reducing the power of statistical estimates, however, ongoing evaluation of rates of loss will permit the accurate correction of parameter estimates derived from these data.

While the estimation of survival and reproduction parameters are critical to understanding population dynamics, values for these parameters do not remain constant. To fully understand the processes driving the population we need to examine inter-annual differences, which in other otariids have been linked with changes in the marine environment. Investigation of foraging and attendance behaviour in conjunction with growth rates of pups and maternal body condition will provide an important insight into the interaction between the *P.hookeri* population and the marine environment, which is thought to have played a role in the 1998 mortality event. Maternal body condition has been shown to be an important factor in the dynamics of many pinniped populations, affecting reproductive rates, birth mass of pups, pup growth rates and maternal survival. Annual monitoring of foraging and attendance behaviour and its effects on maternal condition and related parameters will provide an important insight into the dynamics of this population and possibly a predictor of future pup production.

When applying the formula to determine the proportion of costs to be borne by the Crown (Fisheries Crown Contribution order 1999) the total risk of human intervention on the population (A) must be weighed against the risk to the population posed by commercial fishing in the EEZ (B). In the case of the Auckland Island population of the New Zealand sea lion all of the risk of human intervention is attributable to commercial fishing i.e. A=1 & B=1, therefore (A-B)/A=0. There are, therefore, no costs to be borne by the Crown.

Note this project is being consulted for two years from 2001/02 to 2002/03

Project : Development of age-structured model for New Zealand sea lion

Project Code: CSL MAM 2000/3
Project Cost: $ 16,000
Levy Component: $ 15,680
Start Date: 1 July 2001
Completion Date: 30 June 2002

Project Objectives:
To develop an age-structured model for the New Zealand sea lion.

Objectives for 2001/2002:
To further test the age-structured model for the New Zealand sea lion, using contract consultants to develop the model and computer code and steering the process through a technical working group.

Cost Estimate:

Model Development (year three)	10,000
Technical Working Group Costs	5,000
Publication of report	1,000
TOTAL	**$16,000**

98% of these costs will be recoverable through levies on the fishing industry

Background:
The known high mortalities suffered in the 1997–98 summer season by pups and the possible associated mortalities of adult females indicate that the New Zealand sea lion population is in a highly dynamic state. The model used to calculate acceptable levels of bycatch for NZ sea lion was developed by the US NMFS. This approach has been extensively used in the USA and elsewhere. In NZ legislation, the limit on bycatch is called a MALFIRM. This approach has the advantage of being able to set sustainable limits on bycatch even when biological data for the species in question are scarce.

In addition to using the MALFIRM approach to calculate limits on bycatch, it is advisable to construct a detailed, species-specific model for the species in question, which is age structured, dynamic and spatially structured. An age-structured dynamic population model has been developed, and is under review. Accordingly, this project is seeking to refine and test this model. In addition to the model testing this project cost includes financial provision for New Zealand travel and fees of a small technical working group that will steer this model development so that the working group can conduct its business expeditiously and efficiently.

Of the estimated 11,500 New Zealand sea lions (Wilkinson, DOC, pers. Comm.) an absolute maximum of 160 are found on the New Zealand mainland (McNally, University of Otago, pers. Comm.). There are known human impacts on these mainland animals including being hit by cars, attacked by dogs, and being shot. In applying the rules as outlined in the Fisheries (Crown Contribution) Order 1999, we can determine the proportion of the total risk to the population that is attributable to human intervention other that commercial fishing. As only the 160 mainland animals are subject to human intervention other that commercial fishing, the proportion of that risk to the total population can be calculated. The mainland population makes up 2% of the total population, if we assume the worst case scenario i.e. that the entire mainland population is exterminated by other factors, then A=1, B=0.98, (1-.098)/1=0.02, that is that 2% of the costs are to be borne by the Crown.

Project: Development of stochastic population model for Hector's dolphin

Project Code: CSL MAM 2000/5
Project Cost: $ 16,000
Levy Component: $ 8,000 (carried forward from 2000/01)
Start Date: 1 July 2001
Completion Date: 30 June 2002

Project Objectives:
To further develop an age-structured model for Hector's dolphin.

Objectives for 2001/2002:
To further develop and test an age-structured model for Hector's dolphin, using contract consultants to develop and test the model and computer code and steer the process through a technical working group.

Cost Estimate: (Carried forward from 2000/01 - no levy in 2001/02)	
Model Development (year three)	10,000
Technical Working Group Costs	5,000
Publication of report	1,000
TOTAL	**$16,000**

50% of these costs will be recoverable through levies on the fishing industry

Background:
A valuable complement to the Population Management Plan for Hector's dolphin will be a stochastic population model to guide management and research for the species. The model has been developed using contract consultants to develop the model and computer code and steer the process through a technical working group.

In addition to the model testing this project cost includes financial provision for New Zealand travel and fees of a small technical working group that will steer this model development so that the working group can conduct its business efficiently.

As the risk to this population by human intervention has not been estimated the Crown must bear 50% of the costs of this research as outlined in the Fisheries (Crown Contribution) Order 1999.

4 *Overheads*

Project: Overheads for CSL Projects.

Project Code: CSL OVH 2001/1
Project Cost: $ 237,000
Levy Component: $ 210,049

In light of submissions to the Department of Conservation through the Minister and the Director-General, a thorough review of resourcing levels to provide Conservation Services has been carried out. The review identified an urgent need to increase the level of staffing, this has been reflected in the costings below. In addition, to ensure that CSL contracts and the resultant reports are tracked efficiently the business section of the Science and Research Unit has introduced a Contract Management charge.

Cost Estimate:	
2.3 FTEs (full time equivalents)	140,000
Part-time Administration Assistant	25,000
Computer network system fees	11,000
Computer licensing fees and depreciation	5,000
Travel	20,000
Phone	4,000
Office rental and servicing	20,000
Contract Management costs	10,000
Photocopying	2,000
TOTAL	**$237,000**

90% of these costs ($210,049) will be recoverable through levies on the fishing industry

Other Cost Estimates	
Publication of planning and administrative reports (fully Crown funded)	4,000
Venue hire and servicing for planning meetings (fully Crown funded)	5,000

DOC overheads pay the full salaries of the CSL Programme Manager, CSL Scientific Officer and 30% of the salary of the Science Manager, Marine and Freshwater.

DOC now contracts out the provision of its computer network system the costs of which are now directly recovered from all end users, including the CSL Programme.

In order to determine what proportion of the overhead costs should be borne by the Crown the proportion of the costs of the proposed projects to be recovered through levies has been subtracted from the overall costs of the proposed projects. It should be noted that the costs of the Observer programme operations manager and of publishing project reports, which were previously allocated to overheads, have now been assigned directly to projects.

5 *Project Summary Table*

Conservation Services Plan 2001/2002 - Department of Conservation, Fisheries Act 1996

Code	Project	Costs	Crown Contribution	Levies	Outputs
	OBSERVER PROJECTS **Total cost $ 775,750** **Total levies $ 775,750**				
OBS 2001/1	Fisheries Observer Programme - observer sea days	$ 636,500	$ Nil	$ 636,500	Collection of statistically reliable data by fisheries observers on the incidental take of protected marine species.
OBS 2001/2	Design Protected Species Observer Programme	$ Nil	$ Nil	$ Nil	Protected Species Observer Programme stratified to enable collection of statistically reliable data.
OBS 2001/3	Marine mammal carcass recovery project	$ 57,700	$ Nil	$ 57,700	Biological data on marine mammal bycatch specimens recorded by fisheries observers and vessel operators.
OBS 2001/4	Seabird carcass recovery project	$ 81,550	$ Nil	$ 81,550	Biological data on seabird bycatch specimens recorded by fisheries observers and vessel operators.
	MITIGATION MEASURES **Total Cost $ 126,000** **Total Levies $ 126,000**				
MIT 2001/1	Mitigation measures to minimise bycatch of seabirds	$ 111,000	$ Nil	$ 111,000	Research, design and development of measures and devices to mitigate seabird bycatch.
MIT 2001/2	Mitigation measures to minimise bycatch of marine mammals in trawl fisheries	$ 15,000	$ Nil	$ 15,000	Research, design and development of measures and devices to mitigate marine mammal bycatch.
	RESEARCH PROJECTS **Total Cost 610,100** **Total Levies $ 447,230**				
BRD 2000/1-3	Monitoring of populations of protected seabird bycatch species	$ 325,100	$ 162,550	$ 162,550	Population status; breeding success; recruitment and mortality rates; and foraging zones of high priority seabird bycatch species.
MAM 2000/1,3	Monitoring of populations of protected marine mammal bycatch species	$ 285,500	$ 320	$ 284,6800	Measurement of New Zealand sea lion 1998/99 pup production at the Auckland Islands; statistical modelling of fisheries impacts; determination of female reproductive parameters, and ongoing work on foraging ecology as it relates to fisheries. Population models for NZ sea lion and Hector's dolphins.
	OVERHEAD **Total Cost $ 237,000** **Total Levies $ 210,049**				
OVH 2000/1	Overheads for CSL projects	$ 237,000	$ 35,951	$ 210,049	
	OVERALL PROGRAMME TOTAL COST (GST EXCLUSIVE)	**$1,757,850**	**$ 198,821**	**$1,559,029**	