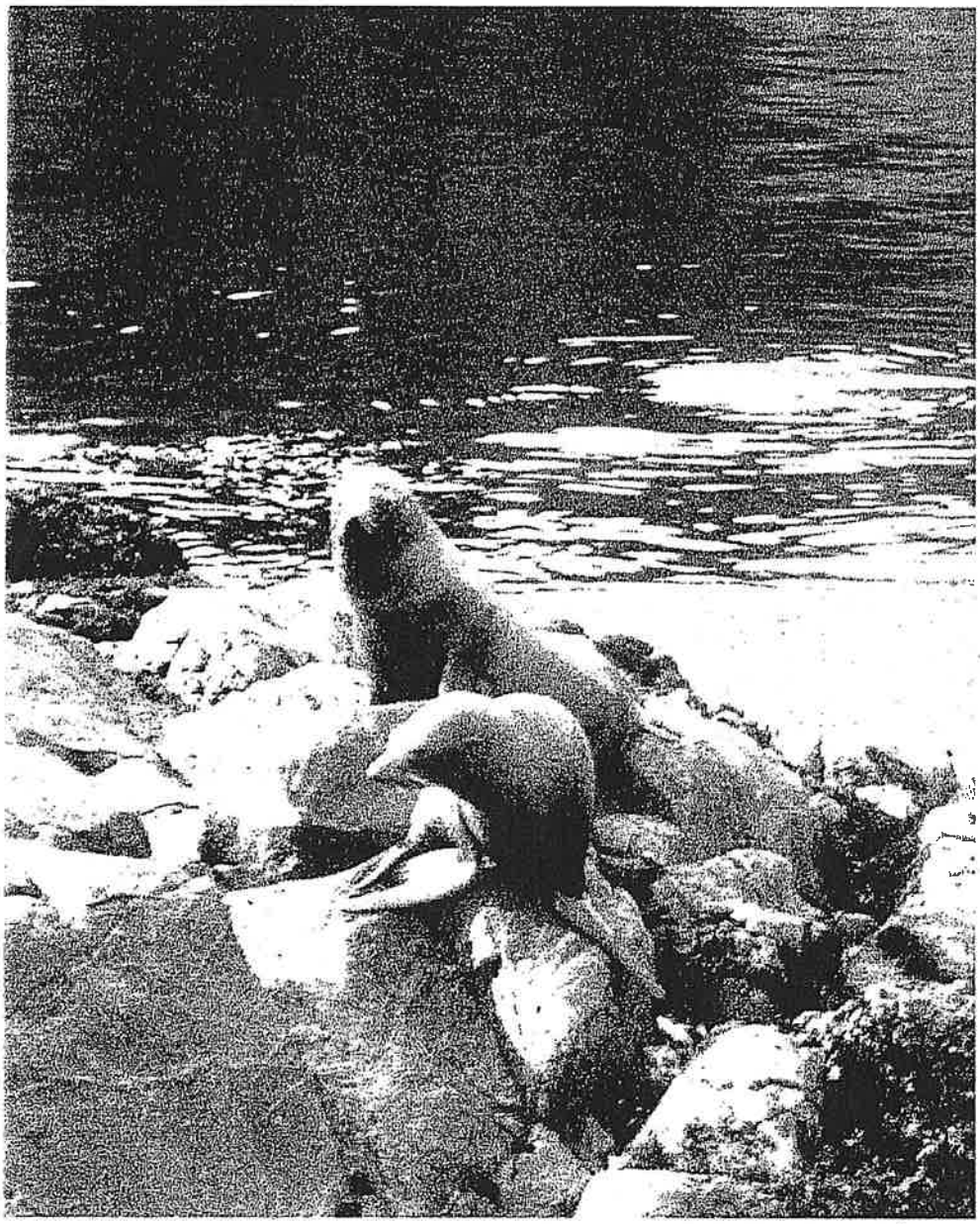
Department of Conservation, PO Box 10 420, Wellington. New Zealand

Nature and extent of Conservation Services for 1999/2000



Signed-off version

Hon. Dr Nick Smith

M.P. for Nelson

Minister of Education

Minister of Conservatior

1999/2000 Conservation Services Levy Nature and Extent White Paper as Approved by the Minister of Conservation.

1. I hereby approve the attached 1999/2000 Nature and Extent White Paper for the Conservation Services Levy Programme.

2. The total value of work approved (after deduction of the $203,500 contribution from the Operational Science Fund) is $1,149,370.

3. The deletions from the version of the Nature and Extent White Paper circulated for consultation are as follows:

   - Up to 100 **observer days** allocated for inshore fisheries in project CSL OBS9901 are deleted. This results in a saving of $15,000.
   - Projects CSL MIT9904 (**Mitigation of the incidental catch of turtles**) and CSL BRD9905 (**Grey petrel on Antipodes Island**) are deleted resulting in savings of $6,000 and $75,000 respectively.
   - Reduction of **overheads** in CSL OVH9901. Resulting in a saving of $14,315.

Nick Smith
Minister of Conservation

7 JUL 1999

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Conservation Services

Introduction

The Fisheries Act 1996, in Part XIV, Section 262 allows the Crown to recover its 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 of the Department of Conservation that enable those persons 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.

These services are known in the Act as 'Conservation Services'.

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 in 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.

The Minister has approved a similar set of projects for the 1999/2000 fishing year, these projects are described in this document.

1 *Observer Programme*

Fisheries Observer Programme - observer sea days

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

Project Code: CSL OBS 9901
Project Cost: $317,025
Start Date: 1 July 1999
Completion Date: 30 June 2000 (Ongoing - subject to annual review)

Project Objectives:

To obtain statistically reliable information on the number of protected species incidentally taken in a number of commercial fisheries;

To identify possible means for mitigating the incidental take of protected species;

To collect other biological information on protected species by-catch.

Objectives for 1999/2000:

To meet the project objectives, above, in a number of commercial fisheries where the bycatch of protected species occurs or is thought to occur. These are:

Trawl fisheries for hoki, southern blue whiting and hake;
Trawl fishery for squid;
Inshore set net fisheries
Inshore trawl fisheries
Pelagic longlining for tuna
Demersal longlining for ling

Fishery	HOK, SBW, HAK	SQUID	SQUID	Inshore fisheries SI[1]		Pelagic longlining	Demersal longlining	**Total**
	Hoki, Southern Blue Whiting, Hake	Squid trawl	Squid jig	Trawl	Set net	Tuna	Ling	
CSL funded sea days	330	200	50	50	150	195	90	1065

In the trips in the table above observers will be required to treat the collection, packaging and storage of protected species taken as by-catch and associated data as their primary task.

Cost Estimate:

Observer costs:	
Deepwater	$165,300
Longlining	$81,225
Inshore observer programme	$70,500
TOTAL	**$317,025**

Background:

The Department will advocate for the deployment of observers in the fisheries described to provid an acceptable level of confidence that the observed level of incidental take of protected species : representative of the incidental take rate of the whole fleet.

It is proposed that, where appropriate, the Observer Programme of the Ministry of Fisheries wi provide the observer services.

An overhead is collected (via CSL OVH9901) to fund a Department of Conservation officer to brie and debrief observers, maintain instruction manuals and collate information.

Observer days for hoki, southern blue whiting and hake have in previous years been allocate separately. As these fisheries are operationally very closely related and generally operat sequentially the proposed observer days have been combined into a single programme.

The deepwater programmes are integrated into the broader programmes run by the Ministry o Fisheries. The Department receives reports and relevant by-catch carcasses from the wider MFis programme.

Marine mammal carcass recovery project

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

Project Code: CSL OBS9902
Project Cost: $45 060
Start Date: 1 July 1999
Completion Date: 30 June 2000 (Ongoing - subject to review)

Project Objectives:
To collect specimens of marine mammal incidentally taken in 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 1999/2000:

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 to 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.

Cost Estimate:

Packaging and labelling @ $16/bag	960
Transport from wharf @ $250/pallet/tonne	7,500
Storage @ $40/pallet/month	1,600
Autopsy contract	35,000
TOTAL	**$45,060**

Background:
Before this project started in 1995/96, the bodies of most of the marine mammals incidentally taken in commercial fishing operations are 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.

Seabird carcass recovery project

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

Project Code: CSL OBS9903
Project Cost: $33,500
Start Date: 1 July 1999
Completion Date: 30 June 2000 (Ongoing - subject to review)

Project Objectives:
To collect specimens of protected seabirds incidentally taken in fishing operations for the analy of: species; age (where possible); sex; reproductive status; stomach contents; and general conditic

To analyse the above data to establish a population profile of those species caught incidentally bycatch.

Objectives for 1999/2000:
To collect, and return to port for autopsy by qualified personnel, up to 400 seabird bycai specimens.

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

Cost Estimate:

Autopsy and identification	25,000
Transport from wharf to autopsy room	6,000
Labelling and packing	2,500
TOTAL	**$33,500**

Background:
This project will provide for the return to port, storage, transport and autopsy of up to 400 seabir incidentally taken during the 1999/2000 fishing year by vessels carrying Ministry of Fisheri and/or industry observers. The data collected will provide a profile of the population taken bycatch, and will generate essential information on the impact of commercial fishing on seabirds.

It is expected that about 100 of these birds will be from the trawl fleet and the balance fro demersal and surface longline fisheries.

The Department of Conservation will use its own staff, who are expert in this field, to carry out th work.

Seabird video observation project

Project: The trialing of collection of video data on protected seabird species interactions with commercial fisheries.

Project Code: CSL OBS9904
Project Cost: $45,000
Start Date: 1 July 1999
Completion Date: 30 June 2000

Project Objectives:
To assess the feasibility and effectiveness of using time lapse videos for monitoring the use of bird streamer lines, and capture of sea birds.

Objectives for 1999/2000:
To implement the use of video monitoring equipment on small domestic longline vessels.

To monitor use of bird streamer lines and there assess effectiveness.

To monitor the capture sea birds.

Cost Estimate:

Contractor	$10,000
Video equipment and mounting platforms (three sets)	$35,000
TOTAL	**$45,000**

Background:
The feasibility of using time lapse videos to monitor the use of bird streamer lines, and capture of seabirds is being investigated (CSL 98 2A), if the outcomes of that project are favourable, this project will then proceed. The idea originated at a meeting between the Department and pelagic longliner fishers in September 1998. Small domestic longline vessels are frequently not able to ship official observers without substantial modification and re-survey or without the observer displacing a member of the regular crew. However, observation is required on small domestic vessels because:

- There is a need to understand the interactions between this class of vessel, predominant in the northern fishery, and seabirds.
- There is a need to monitor the seabird catch of these vessels for factoring into total seabird catch estimates.

It is anticipated that the video camera will be mounted high on the mast to view the rear deck of the vessel, and in particular the line while it is being hauled. Performance of the tori line will also be able to be monitored during setting. The camera will be connected to a recorder and power supply mounted in the wheel-house. The camera will operate on time lapse (probably one frame per second).

Observer days will not be conducted on boats that supply video tape coverage that meets specified standards. Boat owners will need to install mounting platforms and cabling to enable the CSL programme's video equipment to be installed on their vessel. On vessels able to otherwise carry an observer the cost of installing the video platform (by an approved contractor), may be recoverable

from the CSL programme. In the case of vessels not surveyed to carry an observer, the cost of installing the monitoring platform will be a charge to the vessel. If a significant proportion of vessels are equipped to undertake video monitoring it should be possible to reduce total observer sea days in the fleet and thus reduce the observer levy. Birds killed in interactions with fishing boats and their lines will be required to be returned for analysis under project CSL OBS9903.

Contestability

This project will be contestable.

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 MIT9901
Project Cost: $92,000
Start Date: 1 July 1999
Completion Date: 30 June 2000 (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 1999/2000

Tuna
The technical seabird group will continue to guide the Department in determining priorities for mitigation research and development. Provision of advice to skippers on ways to minimise the capture of seabirds is likely to continue to be a priority, in particular for new entrants to the fishery. Other priority work includes continuing investigations into line sink rates, and further evaluation of underwater setting and other new mitigation measures proposed by fishers. The feasibility of using time lapse videos to monitor the use of bird streamer lines, and capture of seabirds is being investigated, and if the outcomes of this project are favourable, this may also be continued. [Refer to project CSL OBS9904].

Ling and Snapper
As with tuna, the technical seabird group will guide the Department in the work that is undertaken. Many of the projects proposed for tuna will also be applicable to the ling and snapper fishery.

Cost Estimate:

Contracts	92,000
TOTAL	**$92,000**

Contestability
These projects will be contestable.

Mitigation devices to minimise marine mammal bycatch

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

Project Code: CSL MIT9902
Project Cost: nil
Start Date: 1 July 1999
Completion Date: 30 June 2000 (Ongoing - subject to annual review)

Project Objectives for 1999/2000:

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

Background:
For the past three years, CSL has funded the development of a Marine Mammal Escape Device, form of excluder fitted just in front of the cod-end of a pelagic or bottom trawl net. MMED's were deployed in the Auckland Islands squid fishery during early 1999. Further development of the current prototypes will be dependent on an evaluation of these trials. An important issue is the determination of whether any captured seals or sea lions are ejected through the MMED while still alive.

A thorough review of the trials of an MMED in the Auckland Islands squid fishery is therefore required before any proposals for future work or development of the device can be considered. Field work for the 1999/2000 season is likely to focus on further attempts to obtain a video record of the device in operation and whether or not marine mammals passed through the MMED are released alive or dead.

No additional funding has been approved for 1999/2000 at this time, pending a review of the success of trials and budget expenditure during the 1998/99 Fishing Year.

ject: Mitigation of incidental take of Hector's Dolphins in commercial set net fishing operations

ject Code: CSL MIT9903
ject Cost: $25,000
rt Date: 1 July 1999
mpletion Date: 30 June 2000 (Ongoing - subject to annual review)

ject Objectives:
develop effective acoustic methods and devices to mitigate the incidental take of Hector's phins commercial set net fishing operations.

jectives for 1999/2000
assess the effectiveness of pingers through undertaking a field trial of sufficient statistical bustness.

st Estimate:

pervising Scientist, analysis and report	25,000
OTAL	**$25,000**

ckground:
ring January and February 1999, Conservation Services Levies were employed to fund a research ogramme to investigate the effectiveness of acoustic warning devices as a deterrent to tanglement of Hector's dolphins in set nets. Some commercial fishers expressed their interest in taining pingers to put on their nets. To assess the effectiveness of pingers, however, a field trial of fficient statistical robustness needs to oc effective itigation tool in the Canterbury set net fishe

he costs for an observer programme pro level of cidental take in this fishery are proposed a de for the sts of a supervising scientist to oversee an in set net sheries where Hector's dolphin occur.

Chris,
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3 *Bycatch species research projects*

Introduction

In the 1996/97 fishing year the majority of the cost of this set of projects was proposed to be allocated to the STN fishery (tuna fishery). As a result of agreement between the Ministers of Conservation, Science and Fisheries $179,000 was allocated from the government science envelope (administered by the Ministry of Research, Science and Technology) to offset the cost of the STN levy. This was calculated as covering 75% of the total STN allocation of 1995/96 CSL Project 3A - Monitoring of protected seabird bycatch.

Project 3A - costs	Total project cost	MoRST grant
1996/97	$289,000	$179,000
1997/98	$361,000	$194,500
1998/99	$444,000	$199.000
1999/2000	$320,100	$165,000

The Department of Conservation applied to MoRST for funding on a similar basis for the 1997/98 fishing year and MoRST granted $194,500 for the 1997/98 fishing year. $199,000 was granted for the 1998/99 fishing year. The Department of Conservation has again applied to MoRST and $165,000 ($147,000 GST exclusive) has been granted for the 1999/2000 fishing year. MoRST has advised that this will be the last year of such a grant.

This grant is reflected as a deduction in the project summary table, but **not** in the individual project costs listed below.

Annual variation in the number of birds breeding is large in long-lived, biennial breeding species such as wandering albatross. Censuses of breeding birds need to be repeated regularly and over a relatively long period to detect population trends. Small increases in mortality (e.g. a total mortality increase of 1% p.a.) can lead cumulatively to large population declines (Weimerskirch and Jouventin, 1987). In order to have the statistical power to detect these declines populations will need to be censused annually until at least 2006.

In the 1997/98 White Paper CSL Project 3A(v) was simulation of albatross populations using the Antipodes and Auckland Island wandering albatross studies. It was hoped that an outcome of this modelling would be an optimisation of the experimental methods used in wandering albatross and other long-lived seabird studies. This modelling work has not yet been let and so the wandering albatross studies proposed this year are subject to revision in the light of the simulation work.

Monitoring of protected seabird bycatch

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

Project Code: CSL BRD9901
Project Cost: $107,300
Start Date: July 1999
Completion Date: June 2000 (Ongoing - subject to annual review)

Project Objectives:

To determine the present size and population trends of the Auckland Island wandering albatross (*Diomedea gibsoni*) through annual census of nesting pairs on Adams Island.

To determine annual adult survival and recruitment.

To determine which areas of ocean are important Auckland Island wandering 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 1999/2000:

To determine the survival of adult birds banded between 1991 and 1996, and to band all new pairs nesting in the study area.

To determine breeding success in 1999; to band all 1999 season study area fledglings; and to search for birds banded as chicks in 1995 to assess year-of-first-return, and recruitment rates.

To census a representative sample of the wandering albatross breeding population in 2000.

Map the foraging zones of 5 male and 5 female adults in the last half of their breeding year and the first half of their non-breeding year using satellite telemetry.

Cost Estimate:

Transport	28,500
Science personnel	30,400
Equipment (including satellite time)	43,900
Capital charge on hut	4,500
TOTAL	**$107,300**

Background:
MAF observer data between 1987 and 1992, and Ministry of Fisheries observer data in the 1996/97 fishing year, in New Zealand's EEZ found wandering albatrosses were a frequent bycatch in longline tuna fisheries. 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, 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).

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.

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

Project Code: CSL BRD9902
Project Cost: $122,800
Start Date: 1 July 1999
Completion Date: 30 June 2000 (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 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 1999/2000:

To determine the survival of adult birds banded between 1991 and 1997, and to band all new pairs nesting in the study area.

To determine breeding success in 1999; to band all 1999 season study area fledglings; and to search for birds banded as chicks in 1996 in assessment of recruitment rates.

To census a representative sample of the wandering albatross breeding population in 2000.

Through satellite telemetry, map the foraging zones of 5 male and 5 female adults in the last half of their breeding year and the first half of their non-breeding year.

Cost Estimate:

Transport	48,500
Science personnel	30,400
Equipment (including satellite time)	43,900
TOTAL	**$122,800**

Background:
MAF observer data between 1987 and 1992 and Ministry of Fisheries observer data in the 1996/97 fishing year in New Zealand's EEZ found wandering albatrosses were a frequent bycatch in longline tuna fisheries. 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, 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).

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.

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

Project Code: CSL BRD9903
Project Cost: $28,000
Start Date: 1 July 1999
Completion Date: 30 June 2000 (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 1999/2000:
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 1999/2000 breeding season.

To band as many other black petrel as possible.

To establish one further replicate 40x40 study plot in each of the three environment stratum types.

Cost Estimate:

Research personnel	28,000
TOTAL	**$28,000**

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, and others have been reported caught since. 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.

Project: Foraging of Chatham Island albatross (Chatham Island mollymawk)

Project Code: CSL BRD9904
Project Cost: $40,000
Start Date: 1 July 1999
Completion Date: 30 June 2000

Project Objectives:
Identification of foraging areas for the Chatham Island albatross (Chatham Island mollymawk, *Diomedea eremita*) during its breeding season.

Objectives for 1999/2000:

To retrieve the existing seven transmitters and return to manufacturer for new batteries.

To complete analyse data and write a final report.

Cost Estimate:

Field costs	$20,000
Report preparation and data analysis	$20,000
TOTAL	**$40,000**

Background:
The Chatham Island albatross (Chatham Island mollymawk) is one of the world's rarest albatrosses and is ranked by the IUCN as critically endangered. Currently the only nesting site is The Pyramid in the Chatham Islands. It is thought that there may currently be as few as c2500 pairs (G. Taylor, pers. obs.). In the 1996/97 fishing year five Chatham Island mollymawks were among the 302 birds returned for autopsy from observed longline vessels: four of these birds were from demersal ling longliners and one from a pelagic longliner. A further four birds were returned in 1998 from research vessels.

Because of the critically endangered nature of these birds, DoC has an active research programme in place. It has been observed that the non-sitting bird of a pair frequently returns to the nest in the evening, so it was thought that foraging was close to the Chatham Islands. Observations at sea and the positions of capture in 1996/97 suggested that this species might have a tightly defined foraging area. It was thought that if this area could be identified and fishing vessels directed elsewhere, when the nesting birds are vulnerable, then fishing bycatch may be minimised.

The deployment of 10 transmitters in late 1998 has suggested a wider dispersal in NZ waters than previously anticipated. This may have been because 1998 was the end of an intense El Nino phase. It may be prudent to confirm the pattern demonstrated in 1998/99, and the three previous experimental transmitters, in future years.

During the 1999/2000 it will be necessary to return to The Pyramids to retrieve the transmitters and attach dataloggers to the birds. The satellite transmitters will be returned to the manufacturer for refurbishment. Analysis and write up of current results will also occur.

Project: Preliminary modelling of black petrel (*Procellaria parkinsoni)*

Project code: CSL BRD9906
Project cost: $22,000
Start date: 1 October 1999
Completion date: 1 April 2000

Project Objectives:

To develop a sound conceptual and information framework for future work on developing a population management model for *P. parkinsoni.*

Objectives for 1999/2000

(i) To provide a critical analysis of current field work being undertaken on black petrels and assess the completeness and adequacy of this programme for assessing the current population status of *P. parkinsoni* and as input for population management models. This work will include power analysis of the available data

(ii) To undertake a comprehensive review the scientific literature on the four *Procellaria* petrel species, to compile a review paper for publication and to assess the literature for information that would assist in efficiently developing a population management model for *P. parkinsoni.* An assessment of the relevance of this literature in the development of a population management will form a major part of this review.

Cost Estimate:

Analysis work	8,000
Literature review	10,000
Technical Working Group costs	4,000
TOTAL	**$22,000**

Background:
An ongoing census of black petrels on Great and Little Barrier Island is being undertaken to establish adult mortality, breeding success and recruitment (CSL BRD9903). This needs to be determined before any assessment can be made of whether the additional mortality incidental to fishing poses a threat to the sustainability of the population. It is advisable to construct a detailed, species-specific model, which is age structured, dynamic and spatially structured. Such models are currently proposed to be developed for New Zealand wandering albatross species (CSL 97 3A(v)), New Zealand sea lion (CSL MAM9901) and Hector's dolphin (CSL MAM9902). It is intended that the generic code developed from these other models be used for the black petrel model where feasible.

Monitoring of protected marine mammal bycatch

Project: Evaluation of the impact of fisheries by-catch on the New Zealand sea lion.

Project Code: CSL MAM9901
Project Cost: $116,000
Start Date: 1 July 1999
Completion Date: 30 June 2000 (Ongoing - subject to annual 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. Also, to continue to monitor the impacts of the January 1998 mortality event on the population.

Objectives for 1999/2000:
1. To measure pup production on the Auckland Islands.
2. To tag adult females to provide estimates of parameters (survival and reproductive rate) for use in an age-structured model. Retag animals tagged prior to 1993/94.
3. To tag pups to provide estimates of parameters (survival and recruitment) for use in an age-structured model.
4. To monitor the population and assess impacts of the January 1998 mortality event.
5. Analysis of tag data.

Cost Estimate:

Science Officer salary, allowances, etc.	45,000
Vessel charter and field operations (this is costed at 50% of known costs)	71,000
TOTAL	**$116,000**

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. Because of the sea lion mortality event in January 1998 it is expected that the estimation of population numbers from this method will now not be possible until approximate equilibrium returns. Estimates of pup production will be essential as an input to the population modelling, and to assess the speed of return to approximate equilibrium.

All the parameters that have been 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. There is also no information available on survivorship or recruitment. To measure these parameters requires the capture and marking of adult females (approximately 300 per year), and then subsequent observations in successive years to yield recapture information. Up to three marking methods will be used - double flipper tags, some form of branding 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. This permanent marking system is necessary as other pinniped studies have suffered from a high rate of mark loss (both flipper tags and freeze brands are known to be "lost") and hence a reduction in the power of the statistical estimates.

A senior DOC scientist, who will prepare documents for and seek the necessary Ethics Committee approvals, will manage this research. The costs of this scientist's time on this work will continue to be covered by existing DOC funding. Furthermore, significant costs of capital equipment such as anaesthetic machines and other capture and handling equipment are not being proposed for CSL funding. Since a significant proportion of this work is necessary as a direct consequence of the squid fishery, funds from CSL are proposed to fund the acquisition of field equipment and 50% of the costs of technical and field assistance.

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

Project Code: CSL MAM9902
Project Cost: $60,000
Start Date: 1 July 1999
Completion Date: 30 June 2000

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

Objectives for 1999/2000:
To further develop an 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 one)	45,000
Technical Working Group Costs	15,000
TOTAL	**$60,000**

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 developed by Dr. R. Hilborn (and others) has been reviewed by a DoC technical working group. (This group also showed a high level of support for the MALFIRM model). Further development of the proposed model has since taken place in the United States in discussions between Dr Hilborn and Dr Paul Wade of NMFS. Accordingly, this project is seeking to refine and further develop this model. In addition to the model development and 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.

It is anticipated that the model will be developed using the AD Model Builder™ software package and the code developed in the C++ computer language. The model will be developed in a generalised manner such that the code can be used to model other NZ marine mammal populations by adjusting the input data. The development of such a generalised marine mammal population model may greatly aid the resolution of similar problems in other NZ marine mammal populations with significant fishery interactions.

Project: Quantifying the abundance of Hector's dolphins

Project Code: CSL MAM9903
Project Cost: $56,500 (subsidised by $26,500 from DoC Science Budget)
Start Date: 31 July 1999
Completion Date: 30 June 2000 (Ongoing - subject to review)

Project Objectives:
To provide an updated and statistically robust population estimate for Hector's dolphin.

Objectives for 1999/2000:
To provide an updated and statistically robust population estimate for Hector's dolphin in the northern part of the South Island. This will be achieved by carrying out a line transect survey between Motunau and Farewell Spit and using the results to derive a statistically robust population estimate for Hector's dolphin in this region.

Cost Estimate:

Statistical and other consultants etc.	10,000
Travel	1,500
Field operations	45,000
TOTAL	**$56,500**

Background:
Line-transect techniques offer a well-proven method of estimating abundance (e.g. Buckland et al. 1993). The first line-transect dolphin survey in New Zealand waters was conducted in Canterbury waters in the summer of 1998. It was successful, proving that reliable line transect data can be gathered at moderate cost.

As not all of the study area is open to commercial fishing a contribution of $26,500 will be made to this project from the Department's Science budget.

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

Project Code: CSL MAM9904
Project Cost: $60,000 (subsidised by $30,000 from DoC Science Budget)
Start Date: 31 July 1999
Completion Date: 30 June 2000

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

Objectives for 1999/2000:
To further develop an age-structured model for Hector's dolphin, using contract consultants to develop the model and computer code and steering the process through a technical working group.

Cost Estimate:	
Model Development (year one)	30,000
Parameter estimation	15,000
Technical Working Group Costs	15,000
TOTAL	**$60,000**

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 will be developed using contract consultants to develop the model and computer code and steering the process through a technical working group. It is envisaged that the process will be similar to that proposed for the development of a stochastic population model for the New Zealand sea lion.

Any stochastic population model needs to be fully specified and then converted into computer code. It needs to be written in an open form so that other than its original coder can readily modify it, if necessary, to accommodate increases in knowledge and difference inference procedures. In addition to the model development and 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 recreational fishing may contribute to dolphin mortality the Department's Science budget is contributing $30,000 to this project. Salaries and travel costs for DOC and the Ministry of Fisheries are not included in this project, but will be met within existing departmental budgets. This work will also complement the work proposed for the development of a stochastic population model for the New Zealand sea lion. The project includes work to estimate input parameters for the model. Further work on tooth sections and reproductive samples from autopsies is needed to improve the estimates of reproductive and survival rates to be used in the model. In addition, mark-recapture analyses need to be updated to include the most recent photographic identification data to refine estimates of survival rate.

It is anticipated that the developer of this model can make use of generic code that will have been developed using the AD Model Builder™ software package for a similar project involving New Zealand sea lion. This model should have been developed in a generalised manner so that other NZ marine mammal populations can be modelling by adjusting the input data to the model and code adjustments.

4 Overheads

Project: Overheads for CSL Projects.

Project Code: CSL OVH9901
Project Cost: $182,685

DoC overheads pay the full salaries of the CSL Manager and Debriefing Officer, and 30% of the salary of the Science Manager, Marine. They also pay for equipment (computers and computer licensing fees), travel, toll calls and meeting costs. DoC has funded all other overheads such as office accommodation and servicing, stationary, network charges, policy and external relations support, library fees etc. Not all of these will continue to be funded by DoC, levies will need to cover accommodation and publication costs in 1999/2000.

Cost Estimate:

2.3 FTEs (full time equivalents)	130,000
Computer licensing fees and depreciation	4,685
Travel	5,000
Phone	10,000
Meeting costs	2,000
Office rental and servicing	16,000
Publications (editing, printing, distribution)	15,000
TOTAL	**$182,685**

5 Project Summary Table

Conservation Services Levy 1999/2000 - Department of Conservation, Fisheries Act 1996

Code	Project	Objective	Inputs	Outputs	Standards and Specifications
	OBSERVER PROJECTS **Total cost $440,585**				
CSL OBS9901	Fisheries Observer Programme - observer sea days	Objective 1	$317,025	Collection of statistically reliable data by fisheries observers on the incidental take of protected marine species.	See MFish standards.
CSL OBS9902	Marine mammal carcass recovery project	Objectives 1, 4	$45,060	Biological data on marine mammal bycatch specimens recorded by fisheries observers and vessel operators.	To be specified in contract documentation, also see MFish standards.
CSL OBS9903	Seabird carcass recovery project	Objective 1	$33,500	Biological data on seabird bycatch specimens recorded by fisheries observers and vessel operators.	To be specified in contract documentation, also see MFish standards.
CSL OBS9904	Seabird video observation project	Objective 1	$45,000	Biological data on seabird bycatch specimens recorded by vessel operators.	To be specified in contract documentation, also see MFish standards.
	MITIGATION MEASURES **Total Cost $117,000**				
CSL MIT9901	Mitigation measures to minimise bycatch of seabirds	Objective 2	$92,000	Research, design and development of measures and devices to mitigate seabird bycatch.	To be specified in contract documentation.
CSL MIT9902	Mitigation measures to minimise bycatch of marine mammals in trawl fisheries	Objective 2	$nil	Research, design and development of measures and devices to mitigate marine mammal bycatch.	
CSL MIT9903	Mitigation measures to minimise bycatch of Hector's dolphins in commercial set nets	Objective 2	$25,000	Research, design and development of measures and devices to mitigate marine mammal bycatch.	To be specified in contract documentation.
	RESEARCH PROJECTS **Total cost $409,100**				
CSL BRD99	Monitoring of populations of protected seabird bycatch species	Objectives 3, 4	$173,100 ($320,100 less MoRST grant of $147,000)	Population status; breeding success; recruitment and mortality rates; and foraging zones of high priority seabird bycatch species.	To standards set by DOC Science and Research Division.
CSL MAM99	Monitoring of populations of protected marine mammal bycatch species	Objectives 3, 4	$236,000 ($292,500 less DoC Science Budget subsidy of $56,500)	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. Survey Hector's Dolphins. Population models for NZ sea lion and Hector's dolphins.	To standards set by DOC Science and Research Division.
	OVERHEAD **Total cost $182,685**				
CSL OVH9901	Overheads for CSL projects		$182,685		
	OVERALL LEVY COST $1,149,370 [GST EXCLUSIVE]				

Appendix to Project Summary Table
Conservation Services Levy - Department of Conservation, Fisheries Act 1996

Main objective: To work in partnership with the New Zealand commercial fishing industry, Ministry of Fisheries, and other interested groups, to assess the impacts of fishing operations on protected marine species and to develop and investigate the effectiveness of mitigation measures which minimise the incidental take of protected marine species in interactions with the New Zealand commercial fishing industry. "Objectives" referenced in table above:

1. To ensure that adequate bycatch data is collected, verified and analysed to give a sufficiently reliable estimate of the numbers and characteristics of the incidental take of protected marine species in New Zealand commercial fisheries interactions to enable the Minister of Conservation to carry out his/her statutory duties.

2. In partnership with the Minister of Fisheries and sector groups, to develop and test mitigation measures designed to minimise the incidental take of protected marine species.

3. To research the status and population demography of protected marine species so as to enable the Minister of Conservation to make informed decisions about the relative threat of New Zealand commercial fisheries interactions on individual species, and to carry out his/her statutory duties.

4. On a species specific basis to assess fisheries related mortality and the spatial and temporal aspects of commercial fisheries interactions, to provide information on the impact of New Zealand commercial fishing interactions on protected marine species (as opposed to fisheries outside the EEZ, and the variety of other causes of mortality), to enable the Minister of Conservation to carry out his/her statutory duties.

5. Develop, in consultation with the Minister of Fisheries and Approved Parties, Population Management Plans.

Standards

Conservation Services Levy Standards

Fisheries Observer Projects

Standards Documents	Reference
Information Collection and Management Services	Ministry of Fisheries
Biological Data Collection by Scientific Observers	Ministry of Fisheries

Other Projects

Documents	Reference
Department of Conservation, Science and Research Division, Science Planning Handbook for 1997/98	Department of Conservation, S&R Internal Report No. 149
Department of Conservation, CSL Contestable Tendering Process	Department of Conservation
Department of Conservation, Science and Research Division, contract for service	Department of Conservation