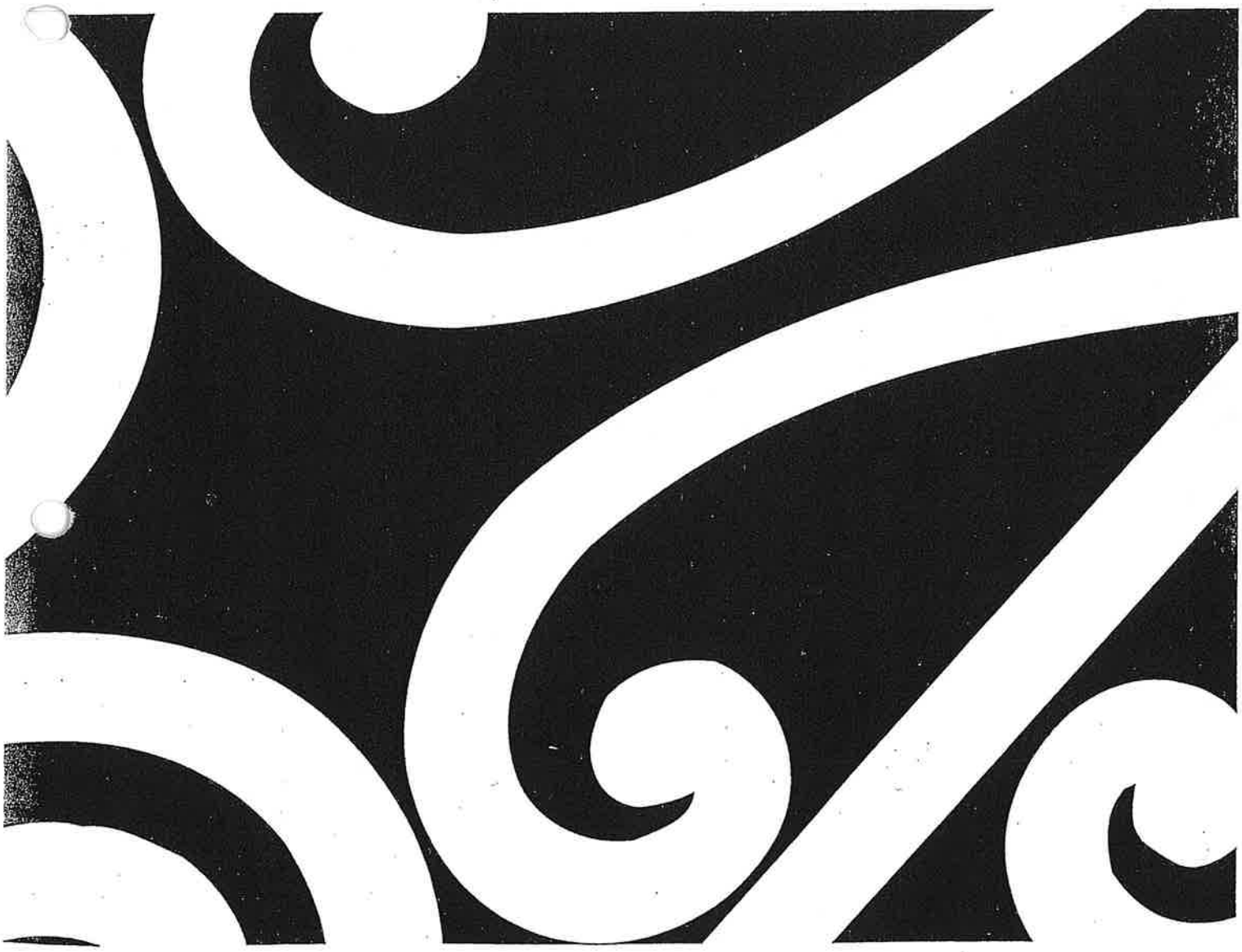
Conservation Services Plan 2000/2001

AS APPROVED BY THE MINISTER OF CONSERVATION, 28 AUGUST 2000



Department of Conservation
Te Papa Atawhai

Conservation Services Plan 2000/2001

AS APPROVED BY THE MINISTER OF CONSERVATION, 28 AUGUST 2000

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Te Papa Atawhai

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2000/2001 Nature & Extent Conservation Services Plan as Approved by the Minister of Conservation

1. This document contains the 2000/2001 Conservation Services Plan as approved by the Minister of Conservation, Hon Sandra Lee, on 28 August 2000.

2. The total value of the work approved is $ 1,996,188 of which $ 298,250 is the Crown contribution and $ 1,697,938 is to be recovered from levies on the commercial fishing industry.

3. The deletions and alterations from the May 2000 version of the Nature & Extent Conservation Services Plan circulated for consultation are as follows:

   - 460 observer days allocated to the snapper longline fishery in project OBS 2000/1 are deleted. This results in a reduction in levies of $ 169,988
   - The snapper fishery liaison officer and the proposed work on mitigation of sea bird bycatch in trawl fisheries in project MIT 2000/1 are deleted with a consequent reduction in levies of $ 60,000.
   - The provision of video cameras and other services for the testing of the Sea Lion Exclusion Device in project MIT 2000/2 is deleted with a levy saving of $ 80,000.
   - Project MIT 2000/3, Mitigation of Hector's Dolphin bycatch is deleted, with a reduction in levies of $ 17,000.
   - Project MIT 2000/5, Modelling of Black Petrel, is deleted with a reduction of levies of $ 26,000 and a reduction in Crown contribution of $26,000.
   - Project MAM 2000/2, New Zealand Sea Lion on Campbell Island, is deleted with a reduction in levy of $ 42,000.
   - Overheads are adjusted so that the Crown picks up expenses that are arguably planning costs, resulting in a reduction of levies by $ 7830.

   The net result of these changes is a reduction in levies by $ 402,818 and a reduction in Crown contribution of $ 18,170

I. West.

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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%.

These new rules have been reflected in this document.

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.

Table of Contents - Approved Projects

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 2000/1
Project Cost: $ 644,238
Levy Component: $ 644,238
Start Date: 1 July 2000
Completion Date: 30 June 2001 (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 2000/2001:
To improve observer coverage on demersal ling longliners.

To improve observer coverage on domestic pelagic tuna longliners.

To pilot observer coverage in the snapper longline fishery that will test whether an assessment can be made of the nature and level of interaction occurring between this fishery and protected species.

To maintain the level of coverage in other fisheries that interact with protected species.

Table of Proposed Coverage for 2000/2001

	CSL FUNDED DAYS		OF CONCERN	
FISHERY	1999/2000	Approved 2000/2001	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
Trawl – Inshore South Island	50	50	Hector's dolphin	FSA 20 & 22
Set Net – Inshore South Island	150	150	Hector's dolphin & penguins	FSA 20 & 22
JV Pelagic Tuna Longline	195	120	Seabirds	WCSI, East Cape
			Fur seals	WCSI
Domestic Pelagic Tuna Longline		250	Seabirds (black & grey petrels) & turtles	FMA 1 & 2
Demersal Ling Longline	90	490	Seabirds	LIN 4, 5 & 6
Demersal Snapper Longline	Nil	30	Seabirds (black & grey petrels) & turtles	FMA 1
TOTAL DAYS	**1065**	**1620**		

Cost Estimate:

1140 days deepwater @ $367.42	$ 418,859
480days inshore @ $369.54	$ 177,379
Operational Manager (salary and expenses)	$ 45,000
Published reports	3,000
TOTAL	**$ 644,238**

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. The Ministry of Fisheries is yet to indicate to DOC whether it will be able to provide observer coverage for inshore 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 is included in this document (CSL OBS 2000/2). 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 days are in addition to the Ministry of Fisheries observer day requirements. The number of observer days proposed for inshore trawl and set net fisheries has also remained at the same levels as for 1999/2000. The Ministry of Fisheries has no requirements for observer days in these fisheries.

However, it is acknowledged that three longline fisheries require some urgent improvement to the past levels of observer coverage. It is therefore proposed to improve the coverage of pelagic tuna longliners and demersal ling longliners. It is also proposed to pilot observer coverage in the snapper longline fishery to test whether an assessment of the nature and extent of the interaction between this fishery and protected marine species is possible. 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. For the past several years the JV fishery has had 100% observer coverage and it has been agreed that this level of coverage continue. To achieve the 100% coverage 120 observer days will be purchased through CSL and any shortfall of coverage once the Ministry of Fisheries requirements have been met will be made up industry directly purchasing observer days from MFish. In contrast, coverage of the domestic fleet has been extremely poor. Only 4.2% of the total sets made by the domestic fleet in 1997/98 were observed. 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

[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.

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.

Ministry of Fisheries records show that demersal longline vessels targeted ling on a total of 2701 days in 1998/1999, of which only 4% (90 days) were covered by observer days purchased for the purposes of CSL. The recent incidental take of at least 90 seabirds on one of these vessels over a six-week period has raised serious concerns about the level of incidental take. It is proposed to increase observer coverage in FMA's 4, 5 & 6 to 20% of the fishery. 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 the 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. However, 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. If the Ministry of Fisheries is unable to provide observers for the inshore fisheries then it is unlikely that these fisheries will be observed.

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 2000/2
Project Cost: $ 107,000
Levy Component: $ 107,000
Start Date: 1 July 2000
Completion Date: 30 November 2000

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 2000/2001:
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-ey 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:

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 w 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.

The protected marine species observer programme design will be reviewed by a technical working group. Note that this project has a short completion date with a view to incorporating the resulting programmes into the Conservation Services Plan 2001/2002.

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 2000/3
Project Cost: $ 47 700
Levy Component: $ 47,700
Start Date: 1 July 2000
Completion Date: 30 June 2001 (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 2000/2001:
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.

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	35,000
Publication of reports	2,000
TOTAL	**$47,700**

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. Should a substantial interaction resulting in the mortality of fur seals develop in other fisheries it will be necessary to collect carcasses to characterise the bycatch profiles for those fisheries. It is not envisaged that this will occur during the 2000/2001 year.

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).

Seabird carcass recovery project

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

Project Code: CSL OBS 2000/4
Project Cost: $ 54,350
Levy Component: $ 54,350
Start Date: 1 July 2000
Completion Date: 30 June 2001 (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 2000/2001:
To collect, and return to port for autopsy by qualified personnel, up to 550 seabird bycatch specimens.

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 550 specimens)

Labelling and packing @ $7/kit	3,850
Transport from wharf to autopsy room	8,250
Autopsy and identification	41,250
Publication of report	1,000
TOTAL	**$54,350**

100% of these costs will be recoverable through levies on the fishing industry
Note: The increase in numbers of carcasses expected reflects the increased observer coverage.

Background:
This project will provide for the return to port, storage, transport and autopsy of up to 800 seabirds incidentally taken during the 2000/2001 fishing year 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 100 of these birds will be from the trawl fleet (based on observer coverage from 1997/98: Baird, 1999). 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. As no information is available from which to estimate the expected number of seabirds to be returned for autopsy from each of the snapper and domestic tuna longline fleets, an arbitrary allocation of up to 50 carcasses from each fishery has been allowed. Based on previous estimates it would have been expected that few seabirds would be returned from the demersal ling longline fleet. However, the observed capture of at least 90 seabirds during one 6-week trip (approx. 2 per day) in the 1999/2000 fishing season has put that assumption into question. Given the doubt in catch rate, the Department has arbitrarily allowed for up to 245 seabirds to be returned for autopsy from the observed ling longline vessels, this is based on 0.5 seabirds captured per observed day. This is based on the hopeful scenario that the vessel that caught at least 90 birds in six weeks is atypical.

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 retired and will continue to carry out this work under contract to CSL. As some of the costs associated with this project were previously covered by DOC baseline funding, this change in status has resulted in an increased cost per carcass. Should the number of carcasses returned for autopsy fall short of the 550 allowed for in this project, then the costs of the project in 2001/2002 will be reduced accordingly.

Seabird video observation project

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

Project Code: CSL OBS 2000/5
Project Cost: Nil
Levy Component: Nil
Start Date: 1 July 2000
Completion Date: 30 June 2001

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 2000/2001:
To implement the use of video monitoring equipment on small domestic longline vessels.

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

To monitor the capture of sea birds.

Cost Estimate:

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

* Levies collected in 1999/2000.

Background:
A report on the feasibility of using time lapse videos to monitor the use of bird streamer lines, and capture of seabirds (CSL 98 2A) will be reviewed by a Technical Working Group. If the outcomes of that report, and the review are favourable, this project will then proceed. This project was initially proposed and levies were collected in 1999/2000. As a delay in the feasibility study meant that this project did not proceed at that time, levies previously collected will be carried forward to 2000/2001. In the event that this project does not proceed the levies will be returned via the over-recovery provisions of the Fisheries Act (1996).

The idea originated at a meeting between the Department and pelagic longline 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 line while it is being hauled. Depending on vessel set up, the 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 videotape 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 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 OBS 2000/4.

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: $125,500
Levy Component: $ 125,500
Start Date: 1 July 2000
Completion Date: 30 June 2001 (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 2000/2001
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 and bluenose fisheries

Cost Estimate:	
Advisory officer: salary, expenses and materials (tuna)	74,500
Contracts (ling and bluenose longline)	45,000
Publication of reports	6,000
TOTAL	**$125,500**

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 and Bluenose 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. It is proposed that this advisory officer also investigate how mitigation methods, in particular tori lines, used in the ling longline fishery could be used in the bluenose longline fishery on the Chatham Rise and in the Bay of Plenty. 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. Levies will be collected from the bluenose longline fishery to cover the additional costs of that fishery.

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 2000/2
Project Cost: $15,000
Levy Component: $ 15,000
Start Date: 1 July 2000
Completion Date: 30 June 2001 (Ongoing - subject to annual review)

Project Objectives for 2000/2001:

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. An important issue is the determination of whether any captured seals or sea lions are ejected through the SLED while still alive.

The Squid Fishery Management Company has choosen to source cameras themselves in an attempt to determine the escapement and survival of sea lions from the SLED. This project supports the operation of a working group to review the rsults from the Squid Fishery Management Company work 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.

In previous years the Hector's dolphin population survey was not put out to open tender, as it was considered important that the boat-based surveys be carried out from the same platform using the same project supervisors in order to ensure that the methodology was comparable across years. The change in methodology and platform for the proposed 2000/2001 season means that this project will now 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 2000/1
Project Cost: $ 136,300
Levy Component: $ 68,150
Start Date: July 2000
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.

) 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 2000/2001:
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 in 2000; to band all 2000 season 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 in 2001.

Map the foraging zones of 4 male and 4 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
Project Manager (costs shared with BRD 2000/2)	25,000
Science personnel	30,400
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.

This project will go ahead as described subject to a review of the field methodology by the seabird technical working group.

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

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

Project Code: CSL BRD 2000/2
Project Cost: $ 151,800
Levy Component: $ 75,900
Start Date: 1 July 2000
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 2000/2001:
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 in 2000; to band all 2000 season 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 in 2001.

Through satellite telemetry, map the foraging zones of 4 male and 4 female adults in the last half of their breeding year and the first half of their non-breeding year.

Cost Estimate:

Transport	48,500
Project Manager (Cost shared with project BRD 2000/1)	25,000
Science personnel	30,400
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.

This project will go ahead as described subject to a review of the field methodology by the seabird technical working group.

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

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

Project Code: CSL BRD 2000/3
Project Cost: $ 37,000
Levy Component: $ 18,500
Start Date: 1 July 2000
Completion Date: 30 June 2001 (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 2000/2001:
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 2000/2001 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 (as previously agreed).

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:
In 1999/2000 a project to carry out preliminary modelling of the black petrel was undertaken. The results of that project will be used by a technical working group to review the black petrel monitoring programme and recommend any changes to this project for the 2000/2001 season.

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.

Grey Petrel on Antipodes Island

Project: Grey petrel (*Procellaria cinerea*) on Antipodes Island

Project Code: CSL BRD 2000/4 (New)
Project Cost: $ 77,000
Levy Component: $ 38,500
Start Date: 1 July 2000
Completion Date: 30 June 2001

Project Objectives:
Evaluation of the impact of fisheries bycatch on Antipodes Island grey petrel.

Objectives for 2000/2001:
To investigate the feasibility of studying grey petrels (*Procellaria cinerea*) by burrow monitoring and banding of adults and fledglings on Antipodes Islands.

Cost Estimate:

Transport (assumes common changeover with the Antipodes Islands Wandering albatross team)	40,000
Research personnel and field costs	35,000
Publication of report	2,000
TOTAL	**$77,000**

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

Background:
Grey petrels have long been a major component of longline fisheries bycatch in New Zealand. Of the 302 birds returned for autopsy from observed commercial longline vessels between 1 October 1996 and 31 December 1997, 66 were grey petrels (Bartle, 2000). From 1 January 1998 to 30 September, 195 seabirds were returned and autopsied, 73 of which were grey petrels (Robertson, 2000). These were the largest numbers for any of the seabird species autopsied. The autopsy results also revealed that the majority of the grey petrels returned by observers were breeding females.

In New Zealand grey petrels nest principally on Antipodes Islands, although a few hundred pairs nest on main Campbell Island and its outlying islands. The other main breeding site is on Gough Island in the South Atlantic. The population dynamics of the species are not well known with estimates of 10,000 to 50,000 pairs in the New Zealand region (Heather & Robertson, 1996). The remoteness of Antipodes Islands, the bird's burrowing habit in dense vegetation and its winter breeding make it a difficult bird to study. It may be possible to monitor the birds using defined study areas in a similar manner to the monitoring of the black petrel. The objective of this project is to put an experienced team of petrel researchers on the Antipodes Islands for up to six weeks in the autumn of 2001 and assess whether sensible study sites can be established.

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.

Heather, B.D. & Robertson, H.A. 1996. The Field Guide to the Birds of New Zealand. Viking, Auckland. 432pp.

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 protected marine mammal bycatch

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

Project Code: CSL MAM 2000/1
Project Cost: $ 236,000
Levy Component: $ 236,000
Start Date: 1 July 2000
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 and inter-cohort comparisons of life history parameters, and investigate the foraging ecology of the sea lion in so far as it relates to the Auckland shelf squid trawl fishery.

Objectives for 2000/2001:
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.
3. To tag pups to provide estimates of parameters (survival and recruitment) for use in an age-structured model.
4. To investigate foraging ecology, as it relates to the Auckland shelf squid trawl fishery.

Cost Estimate:

Science Officers salaries, allowances, etc. (1.6 FTE)	92,000
Vessel charter and field operations	142,000
Publication of report	2,000
TOTAL (for year 2000/2001)	**$236,000**

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

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. Two marking methods will be used - double flipper tags and a Permanent Implantable Transponder (PIT) tag.

Investigation of foraging behaviour, in conjunction with growth rates of pups and body condition of adult females 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, neonate size and pup growth rates, and maternal survival rates. Annual monitoring of these parameters will provide important insight into the dynamics of this population, and possibly a predictor to 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.

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 2000
Completion Date: 30 June 2001

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

Objectives for 2000/2001:
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 two)	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: Population Surveys for Hector's Dolphins: West Coast South Island

Project Code: CSL MAM 2000/4
Project Cost: $ 71,300
Levy Component: $ 35,650
Start Date: 31 October 2000
Completion Date: 30 October 2001 (Ongoing - subject to review)

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

Objectives for 2000/2001:
Complete abundance surveys for Hector's dolphin by carrying out aerial surveys off the west coast of the South Island. Analyse data to derive a statistically robust population estimate for Hector's dolphin.

Cost Estimate:

Statistical consultancy and stipend for field assistants	9,800
Field operations	59,500
(including aircraft hire, boat hire for dive interval work, travel and accommodation)	
Publication of report	2,000
TOTAL	**$71,300**

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

Background:
An up-to-date quantitative population estimate for Hector's dolphin is essential in order to manage gillnet bycatch. Data on the genetics of Hector's dolphins show several different sub-populations (Pichler et al., 1998). This highlights the need for recent, fine-scale information on the distribution and abundance of Hector's dolphins to allow management on a regional basis.

A series of abundance surveys was started in 1998. So far the Canterbury (Motunau to Timaru), Otago and Southland coasts (Timaru to Te Wae Wae Bay) and The Marlborough area (Motunau to Farewell Spit) have been surveyed. The remaining key areas of Hector's dolphin habitat are the west coasts of the North and South Islands. Both of these areas have a well developed gillnet fishery. In general boat surveys are preferred to aerial surveys for providing detailed fine-scale data on distribution and abundance, because boat surveys encounter a higher proportion of the population. Surveys on a 15m catamaran have worked very well off the east and south coast of the South Island. However, the swell, glare and prevailing weather conditions on the west coast do not favour surveys from small boats. On the west coast, transect lines would need to be set out in a southwest to northeast direction in order to minimise pitching in the prevailing southwest swell. This would result in travelling into the glare during the early morning, when sighting conditions are best. Aerial surveys, because they are not influenced by swell conditions, are the most practical option for the west coasts of the North and South Island.

The survey design for the aerial surveys should be similar to that used for the boat surveys. The aerial surveys should be stratified on the basis of past information about the distribution of Hector's dolphins. Responsive movement of dolphins (avoidance or attraction) is not a problem for aerial surveys, due to the high speed of the aircraft relative to that of the dolphins. However, there will be a need to correct for dolphins that are underwater when the plane passes by, and are, therefore, missed by the observers. This should be corrected for by detailed dive interval studies in the same areas where the surveys are carried out.

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.

Pichler, F., Dawson, D., Slooten, E. and Baker, C. 1998. Geographic isolation of Hector's dolphin populations described by mitochondrial DNA sequences. Conservation Biology, Vol. 12, No 3 (676-682).

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

Project Code: CSL MAM 2000/5
Project Cost: $ 16,000
Levy Component: $ 8,000
Start Date: 31 July 2000
Completion Date: 30 June 2001

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

Objectives for 2000/2001:
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:

Model Development (year two)	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 is being 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.

Project: Population boundaries for South Island Hector's dolphin.

Project Code: CSL MAM 2000/6 (New)
Project Cost: $ 31,000
Levy Component: $ 15,500
Start Date: 1 July 2000
Completion Date: 30 June 2001

Project Objectives:
Determination of regional boundaries of the South Island Hector's dolphin population for the purpose of defining abundance.

Objectives for 2000/2001:
Determination of regional boundaries of the South Island Hector's dolphin population for the purpose of defining abundance.

Cost Estimate:

Analysis and report	$30,000
Publication of report	$ 1,000
TOTAL	**$31,000**

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

Background:
Calculation of the maximum sustainable number of dolphin entanglements in set-nets requires knowledge of population boundaries. For example, any MALFIRM for Hector's dolphins will require a definition of population boundaries within which an estimate of abundance of Hector's dolphins can be calculated. As the fishing impact is localised, it is necessary to determine the abundance of the dolphins within that area of impact and also determine the abundance of dolphins in adjacent areas that can potentially supply recruits into the affected population. Martien et al (1999) used deterministic population models to show the effect of commercial fishing by-catch on the abundance of regional populations of Hector's dolphins. An outcome of the model was the observation that the population growth rate and the impact of fisheries were, in part, dependent upon the level of dispersal between adjacent populations.

Genetic analysis, particularly mitochondrial DNA, is a powerful method for the determination of maximum population boundaries and detection of dispersal. This concept has been adopted by conservation managers worldwide as an effective tool for population management of endangered species (e.g. Bowen *et al* 1991, Hedrick 1995, Baker et al 1994, Wayne and Jenks, 1991).

The objective of this proposal is to detect population boundaries and to determine the maximum range of South Island regional Hector's dolphin populations using genetic analysis. A preliminary genetic analysis of population structure (Pichler *et al* 1998) indicated that the East Coast and West Coast populations of Hector's dolphin were isolated from each other. Here, we intend to examine the mtDNA population structure of the entire South Island in terms of fisheries statistical units, to provide an indication of the locations between which dispersal is low or absent. Over 200 tissue samples from the South Island have been collected and sample sizes are greater than 20 individuals in each of Cloudy Bay, Kaikoura, Pegasus Bay, Akaroa, Te Waewae Bay, Jackson Bay, Greymouth and Westport. We expect to be able to successfully extract DNA and obtain mtDNA sequence from the majority (>80%) of these specimens. Power of detection of genetic distinctiveness between populations, due to barriers to dispersal, is dependent both on effect size and the number of samples analysed (Taylor et al 1997). The comparison will use sequence information from the maternally inherited mitochondrial DNA control region to provide an estimate of female distinctiveness. The result of this analysis will define a maximum area within which abundance should be calculated for the management of Hector's dolphins around South Island.

References:

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Wayne, R.K. and Jenks S.M. (1991) Mitochondrial DNA analysis supports extensive hybridization of the endangered red wolf (*Canis rufus*). *Nature* **351**: 565-568

4 *Overheads*

Project: Overheads for CSL Projects.

Project Code: CSL OVH 2000/1
Project Cost: $ 230,000
Levy Component: $ 192,270

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)	134,000
Part-time Administration Assistant	15,000
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	**$221,000**

87% of these costs ($192,270) 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. Wages of a part-time administrative assistant have been included this year, in the past this cost has been borne by the Department.

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. As the lease has expired on the Tory St premises the Science and Research Unit of DOC moved into new accommodation as of July 2000and the higher rent is reflected in the increased cost of office rental and servicing.. The overheads also pay for equipment, travel, toll calls, stationary, photocopying, library fees etc.

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 2000/2001 - Department of Conservation, Fisheries Act 1996

Code	Project	Costs	Crown Contribution	Levies	Outputs
	OBSERVER PROJECTS **Total cost $ 853,288** **Total levies $ 853,288**				
OBS 2000/1	Fisheries Observer Programme - observer sea days	$ 644,238	$ Nil	$ 644,238	Collection of statistically reliable data by fisheries observers on the incidental take of protected marine species.
OBS 2000/2	Design Protected Species Observer Programme	$ 107,000	$ Nil	$ 107,000	Protected Species Observer Programme stratified to enable collection of statistically reliable data.
OBS 2000/3	Marine mammal carcass recovery project	$ 47,700	$ Nil	$ 47,700	Biological data on marine mammal bycatch specimens recorded by fisheries observers and vessel operators.
OBS 2000/4	Seabird carcass recovery project	$ 54,350	$ Nil	$ 54,350	Biological data on seabird bycatch specimens recorded by fisheries observers and vessel operators.
OBS 2000/5	Seabird video observation project	$ Nil	$ Nil	$ Nil	Biological data on seabird bycatch specimens recorded by vessel operators.
	MITIGATION MEASURES **Total Cost $ 140,500** **Total Levies $ 140,500**				
MIT 2000/1	Mitigation measures to minimise bycatch of seabirds	$ 125,500	$ Nil	$ 125,500	Research, design and development of measures and devices to mitigate seabird bycatch.
MIT 2000/2	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 772,400** **Total Levies $ 511,880**				
BRD 2000/1-5	Monitoring of populations of protected seabird bycatch species	$ 402,100	$ 201,050	$ 201,050	Population status; breeding success; recruitment and mortality rates; and foraging zones of high priority seabird bycatch species.
MAM 2000/1-6	Monitoring of populations of protected marine mammal bycatch species	$ 370,300	$ 59,470	$ 310,830	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.
	OVERHEAD **Total Cost $ 230,000** **Total Levies $ 192,270**				
OVH 2000/1	Overheads for CSL projects	$ 230,000	$ 37,730	$ 192,270	
	OVERALL PROGRAMME TOTAL COST [GST EXCLUSIVE	**$ 1,996,188**	**$ 298,250**	**$1,697,938**	