Approved Conservation Services Plan 2002/2003

AS APPROVED BY Hon. Sandra Lee, Minister of Conservation, on 12 May 2002

Science and Research Unit
Department of Conservation
PO Box 10 420
Wellington

Statement on Conservation Services

The Fisheries Act 1996, defines conservation services as "outputs produced in relation to the adverse effects of commercial fishing on protected species, as agreed between the Minister responsible for the administration of the Conservation Act 1987 and the Director-General of the Department of Conservation, including –

(a) research relating to those effects on protected species:
(b) research on measures to mitigate the adverse effects of commercial fishing on protected species:
(c) the development of population management plans under the Wildlife Act 1953 and the Marine Mammals Protection Act 1978."

Section 263 of the Fisheries Act 1996 sets out procedures for promulgating cost recovery rules. On 10 September 2001 the Governor-General pursuant to section 263 made the Fisheries (Cost Recovery) Rules 2001, which provides for the apportionment of costs of conservation services as follows:

(a) Research relating to protected species populations where risk to those populations by human intervention has been estimated - percentage of costs to be borne by industry is calculated using the formula: A over B, expressed as a percentage, where-
   - A is the risk to the populations posed by commercial fishing in the EEZ of New Zealand
   - B is the total risk of human interventions on the populations
(b) Research relating to protected species populations where risk to those populations by human intervention has not been estimated - 50% of costs to be borne by industry.
(c) Services (including research) provided to avoid, remedy, or mitigate that portion of the risk to, or adverse effect on, the aquatic environment or biological diversity of the aquatic environment caused by commercial fishing - 100% of costs to be borne by industry.
(d) Observer coverage to support stock assessment process and conservation services - 100% of costs to be borne by industry.
(e) Aquaculture services - 100% of costs to be borne by industry.

After consultation with 'interested parties[1]', which include individuals and representatives of Maori, environmental, commercial, and recreational groups, I hereby approve the attached Conservation Services Plan 2002/2003.

Sandra Lee
Minister of Conservation

[1]Groups or individuals who firstly, have a demonstrable interest in the Department of Conservation's work on the investigation and mitigation of the impacts of commercial fishing on New Zealand protected species, and secondly, have expressed an interest in participating in conservation services levy working groups and/or the annual process of determining 'nature and extent' of conservation services projects.

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1. Overview of the Draft 2002/2003 Conservation Services Plan

Conservation Services are services required by the Minster of Conservation and the Director General of the Department of Conservation as a consequence of the impacts of commercial fishing on protected species. A summary of the legal basis of the Plan can be found in the section of the Plan entitled " Legislation and Guidelines used for the Formulation of this Plan".

The services in this Plan are divided into three sections: observer programme; bycatch mitigation; interaction and sustainability research. The format used to specify the conservation services follows the research brief specifications used by the Department of Conservation, Science and Research Unit. This is because the services are administered within the Science and Research Unit and use the same research and contract control systems. An explanation of the template used can be found in the section of the Plan entitled 'Interpreting the template used to specify conservation services'.

The overall objective of 'conservation services' is 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.

For the 2002/2003 year the objectives are:

- *to ensure 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 her statutory duties;*
- *in partnership with the Minister of Fisheries and sector groups, to develop, test and promulgate mitigation measures designed to minimise the incidental take of protected marine species;*
- *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 her statutory duties;*
- *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 her statutory duties.*

Conservation services can be consulted on the understanding that they will be run over more than one year, although all costs given here and in previous Conservation Services Plans refer to annual expenditures. Services, which were previously consulted in 2001/2002 to run over multiple years are not being consulted on this year unless they have been changed (e.g. increased costs). However, because these previously consulted services impact on 2002/2003 finances, they are included in the project summary tables where they are denoted by an asterisk. Information on these previously consulted projects (autopsies of seabirds and marine mammals subject to incidental take and interaction and, sustainability research on wandering albatross) has been copied from last year's Conservation Services Plan and is included for reference purposes as Appendix 1.

The 2001/2002 Conservation Services Plan detailed services totalling $1,757,850. The Draft 2002/2003 Plan released 18/01/02 had conservation services totalling $4,054,650. This revised 2002/2003 Plan has services totalling $3,063,600. This increase from 2001/2002 is principally due to the following new services.

Observers

- 910 extra days of observer coverage in the deep sea ling longline fishery at an additional cost (from the 2001/2002 Plan) of $449,000.
- 200 days of observer coverage in the inshore ling longline fishery at a cost of $142,200.
- 150 days of observer coverage in the longline snapper fishery at a cost of $106,650.
- Upgrading observer equipment and supplies at a cost of $75,000.

Mitigation Services

- Advisory services and mitigation device supply in the pelagic tuna and snapper longline fisheries at a cost of $85,000 for each fishery ($170,000 total).
- Designing a trial of blue dyed baits in the domestic tuna longline fishery at a cost of $40,000.

Interaction and Sustainability Research

- Study of fisheries impacts on Hoiho (Yellow-eyed penguins) at a cost of $40,000.
- A study of the fate of seabirds classified as released alive at a cost of $25,000.

- Genetic studies on Hector's dolphins and fur seals at a cost of $70,000.
- A census of sea lion pup production on Campbell Island at a cost of $75,000.

Administrative Support – now re-spread over each project

- Increased costs of $141,600 because of increased computer network fees, office rental and servicing costs; and additional staffing (observer debriefing, and science officer).

Significant changes made to the Draft 2002/2003 Plan released 18/01/02 include:

- Deleting the following projects:
  - King Shags and mussel farms (BRD 2002/3) resulting in a cost reduction of $221,000.
  - Foraging ecology of Westland black petrel (BRD 2002/4) resulting in a cost reduction of $36,700.
  - Hector's dolphin interactions with marine farms (MAM 2002/5) resulting in a cost reduction of $40,000.

  The overall savings from deleting these projects is $297,700.
- Reducing the demersal ling longline observer coverage from 3,400 to 1,600 observer days resulting in a cost reduction of $822,400.
- An increase in the observer day costs charged by MFish of $61 per day. This has resulted in an increase in costs (excluding the 1600 ling longline days) of $64,050.
- Deleting the two overhead projects OVH2002/1 and OVH2002/2. Administrative support costs (OVH2002/1) are now allocated as part of each of the project budgets. Deleting project OVH 2002/01 results in a saving of $30,000. Deleting and re-spreading OVH2002/01 is cost neutral.
- An increase in total administrative support costs of $85,000 because of the need to increase staff by 1.4 FTE to meet increased expectations re. consultation and reporting to stakeholders (1 FTE) and to cover the increased workload for observer debriefing (0.4 FTE).
- The $130,000 (2,260,000 – 2,130,000) previously allocated (18/01/02 Draft 2002/2003 Plan) for observer programme (OBS202/1) staff costs, observer equipment (binoculars) and consumables has now been split into two parts. Firstly, staff costs ($55,000) for the observer debriefing officer (1FTE) have been transferred to administrative support (formerly OVH2002/1), and secondly, a new column has been added to the resources required for the observer programme (see project OBS 2002/1, Table 2). This column shows a pro rata split by observer days of the remaining $75,000 i.e. costs for observer equipment ($55,000) and consumables ($20,000). These changes (excepting the addition of another 0.4FTE debriefing officer accounted for above) are cost neutral.
- Moving the Black Petrel Great Barrier Island project into the main body of the document from the appendix as it was not in fact consulted on for three years last year. The project has also been expanded after discussions at the Seabird Working Group meeting on 28th August 2001. These changes have increased costs by $10,000.
- Adding information on how to interpret the template used to specify conservation services.
- A summary of outputs for ongoing projects has been added to the project specification forms.
- Making 'open tender' the default situation unless special circumstances apply – such circumstances are explained in the appropriate project specification box (bottom left corner of the project specification form).

Administrative support costs needed to effectively administer CSL projects include the costs of providing the following: staff (5.3FTE), computer network system fees, computer leasing, travel, office rental and services, contract management costs, photocopier and office supplies, publication of administrative and projects reports, planning and holding meetings.

The total administrative support cost is now $423,600. This cost is made up from the $283,600 transferred from OVH2002/01, a provision of $85,000 for an extra 1.4FTE of staffing, and the transfer of $55,000 (1FTE) from project OBS2002/01.

Staffing of 5.3 (FTE) is made up as follows: science manager (0.4FTE), CSL manager (1 FTE), science officers (2 FTE), administrative support (0.5 FTE), debriefing officers (1.4 FTE). The additional science officer position emerged from recent discussions with the Office of the Auditor General and after submissions from industry stakeholders to increase the Department's accountability. For example the department's accountability with regard to Treasury guidelines on setting charges in the public sector, in particular the need to enhance consultation, financial and reporting processes.

The deleted research projects: King Shags and mussel farms (BRD 2002/3); Foraging ecology of Westland black petrel (BRD 2002/4); Hector's dolphin interactions with marine farms (MAM 2002/5); are still seen as a priority for CSL. They will be discussed at appropriate Seabird or Marine Mammal Working Group meetings and with government policy staff to determine how best to progress them in time for the 2003/2004 Plan.

Please note: All financial amounts appearing in this document are exclusive of GST.

PROJECT SUMMARY TABLE 1 - COST ALLOCATION BETWEEN CROWN AND INDUSTRY Conservation Services Plan 2002/2003 – Department of Conservation						
Code	**Project**	**Cost recovery 'rule' used[1]**	**% of costs to be borne by industry**	**Costs [$]**	**Crown contribution [$]**	**Industry contribution [$]**
1. Observer Programme				**1,840,365**	**NIL**	**1,840,365**
OBS 2001/3	Marine Mammal Carcass Recovery Project	8	100%	66,958	NIL	66,958
OBS 2001/4	Seabird Carcass Recovery Project	8	100%	94,635	NIL	94,635
OBS 2002/1	Fisheries Observer Programme – observer sea days	8	100%	1,678,772	NIL	1,678,772
2. Bycatch Mitigation				**243,695**	**NIL**	**243,695**
MIT 2002/1	Advisory Services for the Domestic Tuna Longline Fishery	4	100%	98,639	NIL	98,639
MIT 2002/2	Advisory Services for the Snapper Longline Fishery	4	100%	98,639	NIL	98,639
MIT 2002/3	Design of a Trial to Test the Effectiveness of Blue Bait in Reducing Bird Bycatch and its Effect on Fish Catch Rates in the Domestic Tuna Longline Fishery	4	100%	46,418	NIL	46,418
3. Interaction and Sustainability Research				**979,540**	**223,446**	**756,094**
BRD2001/1*	Evaluation of the Impact of Fisheries Bycatch on Gibson's (Auckland Island Wandering) Albatross	3	50%	158,170	79,085	79,085
BRD2001/2*	Evaluation of the Impact of Fisheries Bycatch on the Antipodes Island Wandering Albatross	3	50%	176,157	88,079	88,079
BRD 2002/1	The impact of Commercial and Recreational Fishing on Hoiho (Yellow-eyed Penguin).	3	50%	46,418	23,209	23,209
BRD 2002/2	Assessment of Potential Survival of Bycaught Seabirds Classified as Released Alive. The Development of Euthanasia Criteria and Protocols for Fatally Injured Birds and Relevant Observer Training.	2	100%	29,011	NIL	29,011
BRD 2002/5	Evaluation of the Impact of Fisheries Bycatch on the Black Petrel of Great Barrier Island	3	50%	54,541	27,271	27,271
MAM 2002/1	The Impact of Fisheries Bycatch on the New Zealand Sea Lion – Auckland Islands	2	100%	346,976	NIL	346,976
MAM 2002/2	New Zealand Sea Lion Pup Production Measurement – Campbell Island	2	100%	87,034	NIL	87,034
MAM 2002/3	Determination of Differentiating Genetic Markers in West Coast South Island Fur Seal Populations	2	100%	69,627	NIL	69,627
MAM 2002/4	Establishment of Hector's Dolphin Populations Boundaries on the West and South Coasts of South Island by Genetic Analysis	3	50%	11,605	5,802	5,802
Please note: All financial amounts appearing in this table are exclusive of GST. TOTAL				**$3,063,600**	**$223,446**	**$2,840,154**

* Denotes previously consulted project.

[1] Number refers to the numbered items in the schedule to the Fisheries (Cost Recovery) Rules 2001.

PROJECT SUMMARY TABLE II – PROJECT COSTINGS Conservation Services Plan 2002/2003 – Department of Conservation					
Code	**Project**	**Total costs [$]**	**Administrative support costs [$]**	**Research costs [$]**	**Other costs [$]**
1. Observer Programme					
OBS 2001/3*	Marine Mammal Carcass Recovery Project	66,958	9,258	57,700	
OBS 2001/4*	Seabird Carcass Recovery Project	94,635	13,085	81,550	
OBS 2002/1	Fisheries Observer Programme – observer sea days	1,678,772	232,122	1,371,650	75,000
2. Bycatch Mitigation					
MIT 2002/1	Advisory Services for the Domestic Tuna Longline Fishery	98,639	13,639	85,000	
MIT 2002/2	Advisory Services for the Snapper Longline Fishery	98,639	13,639	85,000	
MIT 2002/3	Design of a Trial to Test the Effectiveness of Blue Bait in Reducing Bird Bycatch and its Effect on Fish Catch Rates in the Domestic Tuna Longline Fishery	46,418	6,418	40,000	
3. Interaction and Sustainability Research					
BRD2001/1*	Evaluation of the Impact of Fisheries Bycatch on Gibson's (Auckland Island Wandering) Albatross	158,170	21,870	136,300	
BRD2001/2*	Evaluation of the Impact of Fisheries Bycatch on the Antipodes Island Wandering Albatross	176,157	24,357	151,800	
BRD 2002/1	The impact of Commercial and Recreational Fishing on Hoiho (Yellow-eyed Penguin).	46,418	6,418	40,000	
BRD 2002/2	Assessment of Potential Survival of Bycaught Seabirds Classified as Released Alive	29,011	4,011	25,000	
BRD 2002/5	Evaluation of the Impact of Fisheries Bycatch on the Black Petrel of Great Barrier Island	54,541	7,541	47,000	
MAM 2002/1	The Impact of Fisheries Bycatch on the New Zealand Sea Lion – Auckland Islands	346,976	47,976	299,000	
MAM 2002/2	New Zealand Sea Lion Pup Production Measurement – Campbell Island	87,034	12,034	75,000	
MAM 2002/3	Determination of Differentiating Genetic Markers in West Coast South Island Fur Seal Populations	69,627	9,627	60,000	
MAM 2002/4	Establishment of Hector's Dolphin Populations Boundaries on the West and South Coasts of South Island by Genetic Analysis	11,605	1,605	10,000	
Please note: All financial amounts appearing in this table are exclusive of GST. TOTAL		**$3,063,600**	**$423,600**	**$2,565,000**	**75,000**

2. Legislation and Guidelines used for the Formulation of this Plan

The outline below is a summary designed to orientate readers of this plan.

There are three parts to the 'purpose and principles' (Part II) of the Fisheries Act 1996. These three section are 'purpose and principles', 'environmental principles', and 'information principles'. All of them apply to the Conservation Services Plan.

The first (section 8) states that the purpose of the Act "*is to provide for the utilisation of fisheries resources while ensuring sustainability.* Section 9, the 'environmental principles, of the Act states that:

(a) Associated or dependant species shall be maintained above a level that ensures their long-term viability;
(b) Biological diversity of the aquatic environment should be maintained;
(c) Habitat of particular significance for fisheries management should be protected.

The information principles (section 10) state that:

(a) Decisions should be based on the best available information:
(b) Decision makers should consider any uncertainty in the information available in any case:
(c) Decision makers should be cautious when information is uncertain, unreliable or inadequate:
(d) The absence of, or any uncertainty in, any information should not be used as a reason for postponing or failing to take any measure to achieve the purpose of this Act.

Part XIV of the Fisheries Act 1996 deals with cost recovery issues. This part was replaced by the Fisheries Act 1996 Amendment Act 1999, which now becomes part of the principal act. Under section 261 the Crown can impose levies to recover costs in respect of the provision of conservation services. These services are defined in the definitions of the Fisheries Act 1996 Amendment Act ("the Act") 1999 as:

'Conservation services' means outputs produced in relation to the adverse effects of commercial fishing on protected species, as agreed between the Minister responsible for the administration of the Conservation Act 1987 and the Director-General of the Department of Conservation, including –

(a) research relating to these 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."

Section 262 of the Act sets out cost recovery principles:

(a) If a conservation service or fisheries service is provided at the request of an identifiable person, that person must pay a fee for the service:
(b) Costs of conservation services or fisheries services provided in the general public interest, rather than the interest of an identifiable person or class of person, may not be recovered:
(c) Costs of conservation services or fisheries services provided to manage or administer the harvesting or farming of fisheries resources must, so far as is practicable, be attributed to the persons who benefit from harvesting or farming the resources:
(d) Costs of conservation services or fisheries services provided to avoid, remedy, or mitigate a risk to, or an adverse effect on, the aquatic environment or the biological diversity of the aquatic environment must, so far as is practicable, be attributed to the persons who caused the risk or adverse effect:
(e) The Crown may not recover under this part the costs services provided by an approved service delivery organisation under Part 15A.

Section 263 of the Act sets out procedures for promulgating cost recovery rules:

1) The Governor-General may from time to time, by Order in Council made on the recommendation of the Minister, make rules relating to the imposition of levies under this Part.
2) The rules may-
(a) Prescribe the portion of costs of conservation services and fisheries services to be recovered as levies:
(b) Prescribe who must pay levies:
(c) Prescribe how costs are to be apportioned between persons who must pay the levies.

3) *Without limiting anything in subsections (1) and (2), different rules may apply in respect of different classes of persons, stocks, quota management areas, fishery management areas, conservation services, fisheries services, or any combination of them.*
4) *Before making a recommendation under subsection (1), the Minister must-*
   (a) *Be satisfied that the rules to which the recommendation relates comply with the cost recovery principles in section 262; and*
   (b) *Have regard to the extent to which conservation services or fisheries services are wholly or partly purchased or provided by persons other than the Crown.*
5) *Without limiting the Acts Interpretation Act 1924, no order made under this section is invalid because it leaves any matter to the discretion of any person.*

On 10 September 2001 the Governor-General made the Fisheries (Cost Recovery) Rules 2001 ("the Cost Recovery Rules"). Rule 4 deals with the status of rules. Rule 5 provides:

> *The proportion of costs to be recovered from the Commercial Fishing Industry for the fisheries or conservation services specified in the first column of the Schedule is the proportion set out in the second column of that Schedule."*

Rule 6 provides who must pay the levies and the basis for the levy. The Schedule to the Cost Recovery Rules (extract below) provides for the apportionment of costs of fisheries and conservation services. Relevant parts of the Schedule are as follows:

Services	Percentage of Costs to be Borne by Industry	Allocation Between Stocks
2. Research relating to protected species populations where risk to those populations by human intervention has been estimated	A over B, expressed as a percentage, where- A is the risk to the populations posed by commercial fishing in the EEZ of New Zealand B is the total risk of human interventions on the populations	As in Rule 7(2) or (3)
3. Research relating to protected species populations where risk to those populations by human intervention has not been estimated	50%	As in Rule 7(2) or (3)
4. Services (including research) provided to avoid, remedy, or mitigate that portion of the risk to, or adverse effect on, the aquatic environment or biological diversity of the aquatic environment caused by commercial fishing	100%	As in Rule 7(2) or (3)
8. Observer coverage to support stock assessment process and conservation services	100%	As in rule 8
11. Aquaculture services	100%	As in rule 10

3. Interpreting the template used to specify Conservation Services

CSL Programme Section: *CSL projects are grouped into a larger "Programme Section".*

Title: *Project title*

Science Portfolio: *This grouping locates CSL projects within the broader context of the Department's guiding strategic documents. These include the Department's annual "Statement of Intent" document presented to the House of Representatives and "Restoring the Dawn Chorus 2001-2004"[2]. These documents set the Department's 10-year 'National Priority Outcomes' and it's 3-year Strategic Directions. The CSL programme forms part of the Science and Research Unit, managed within the Department's Science, Technology & Information Services Group. The work of this group supports a number of the Department's Strategic Directions. The CSL work programme is part of the "Aquatic protection and restoration" portfolio, one of five portfolios managed by the Science and Research Unit.*

State the Priority Action: *This statement links each CSL project with one of the seven Priority Actions for the "Aquatic protection and restoration" Science Portfolio. For more information see the Science and Research Unit's strategic planning document "Science Counts! - National strategic science & research portfolios, programmes, priority actions - 2002/03 and Beyond".*

Investigation ID:	*Allocated once the project has ministerial approval.*	**Fisheries involved:**	*This is the Department's **preliminary** determination of how costs should be attributed. The Ministry of Fisheries consultation process and "cost allocation" plenary is where these indicative determinations are expressed in terms of fish stocks.*
DOC Key Output:	*Allocated once the project has ministerial approval.*	**CSL contact person:**	*The DOC contact person who will be responsible for project **management** once the project has ministerial approval. See below for the person to contact about technical aspects of this proposal.*
Project reference:	*A new reference number is allocated each time a project is proposed as part of the annual consultation process for conservation services.*	**Consultation period for levy:**	*Not necessarily the end date for the project, but rather the project 'run-time' before it is next consulted on.*
Conservation problem:	*This is a description of the problem to be solved and the information or tools required.*		
Project objectives:	*This section sets out the long-term objectives for the project.*		
Objectives for 2002/2003:	*Priority tasks to be carried out during the current consultation period for the levy (2002/2003 or as listed above).*		

Relevant existing information and tools to be taken into account:
What do we know about the conservation problem described above? This section is particularly relevant to new proposals. For projects which are ongoing, more information is given in the 'project outputs' box below

Recommended design and methods:
An overview of how the project will be designed, and what methods will be used to address the project objectives. This section again is particularly relevant to new project proposals. For ongoing projects see the 'project outputs' box below.

Project outputs:
For ongoing projects only – this is a list of all significant project outputs from the project to date. Outputs can include published papers or reports, scientific papers or reports in preparation or in press, databases, popular articles, seminars, workshops, public lectures, conference oral or poster papers, and any specialised equipment or software to be developed. Outputs from earlier, now completed CSL projects are included here in cases where the current work is an extension of earlier CSL projects.

Outputs required for 2002/2003:
List of all significant project outputs for the current consultation period for the levy. Outputs can include written advice to the Minister, advice required under statute by a Minister, published papers or reports, scientific papers or reports in preparation or in press, databases, popular articles, seminars, workshops, public lectures, conference oral or poster papers, and any specialised equipment or software to be developed.

Expected timeframe for the work and any special operational or reporting requirements:
This is not the same as the "consultation period for levy" dates box at the top of this form. This timeframe is the period over which the Department believes the existing project objective will run before the project will be reviewed (for example by the Bird or Marine Mammal Working Groups). Therefore the later of the two dates is not necessarily the project 'end date'.

Resources required 2002/2003:
Project cost (exclusive of GST) for the current (2002/2003) financial year.

Science providers to be approached for expressions of interest, or indicate if open tender is proposed: *All projects are 'open tender' except in cases where issues of quality, availability, continuity (e.g. methodologies, databases etc.) may compromise achieving project objectives. For example: for ongoing projects, continuing with an existing contractor or 'in-house' researcher; or, for new projects where the proposal is to extend existing work; to commission new work where value-added benefits are clear.*	**DOC contacts for advice on proposal:** *The DOC contact person for **technical** advice.*

[2] Copies of this document available from DOC Science Publishing - science.publications@doc.govt.nz

4. Specifications of Conservation Services

CSL Programme Section: Observer Programme

Title: Observer Sea Days

Science Portfolio: Aquatic Protection & Restoration

State the Priority Action: Identify critical factors limiting the viability of populations of threatened freshwater, estuarine and marine species, communities, ecosystems and ecological processes. Test ways to mitigate such threats and biosecurity risks.

Investigation ID:		**Fisheries involved:**	See Tables 1 and 2 below.
DOC Key Output:		**CSL contact person:**	Reg Blezard Scientific Officer (Briefing) CSL Programme
Project reference:	**OBS 2002/1**	**Consultation period for levy:**	One financial year commencing 1 July 2002.
Conservation problem:	Because of inter-annual ecological and environmental fluctuations, changing fishing practices and changing fishing areas, ongoing monitoring of fishing operations is required to provide reliable information on the levels of interactions between commercial fishing and protected species.		
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 bycatch that will assist in assessment of bycatch mitigation.		
Objectives for 2002/2003:	– To monitor fisheries that are known to interact with protected species that will either: • Enable estimates of protected species captures to be determined • Provide indicative information about the capture of protected species where observer coverage has been absent or negligible, but where captures are likely given the fishing method and areas fished (i.e. 'exploratory' observer coverage) – To debrief all observer trips made by Ministry of Fisheries observers in order to keep a watching brief on protected species interactions in these fisheries.		

Relevant existing information and tools to be taken into account:
Historical patterns of interaction exist from previous years of observer coverage as part of the bycatch databases held by the Ministry of Fisheries.

Recommended design and methods:
The observer days listed below are those required by the Department of Conservation to collect quantitative estimates and other qualitative information on commercial fishing interaction with protected species. In some cases the Ministry of Fisheries requires more observer days for a specific fishery. Where the Ministry of Fisheries intends greater coverage than that required by Conservation Services Plan the procedure is to expend all CSL days before FSP days. Note that the number of observer days in the demersal Ling longline fishery reflects the need to have two observers present on a vessel so that 24 hr fishing operations can be constantly monitored i.e. the actual number of fishing days observed is half the number given in Tables 1 and 2 below.

For observer days required under the Conservation Services Plan the Department of Conservation sets the observers' work priorities, whereas the Ministry of Fisheries sets priorities for observer days levied under the Fisheries Services Plan. There is active co-operation between the Department of Conservation and the Ministry of Fisheries to ensure that maximum value is extracted from all at sea observer days.

Qualitative data is captured by having the CSL Science Officer (Briefing) brief and debrief all observed trips in the Ministry of Fisheries Observer Programme. Numerical estimates of bycatch are made under contracts issued by the Ministry of Fisheries after consultation with the Department of Conservation and thus are detailed in the Ministry of Fisheries Services Plan.

Table 1 Observer coverage for 2002/2003

FISHERY	CSL FUNDED 12 hr DAYS		OF CONCERN	
	Target 2001/2002	Target 2002/2003	Protected species	Fisheries Involved
Hoki Trawl	200	200	Fur seals Seabirds	Hoki nation-wide
Southern Blue Whiting Trawl	100	100	Fur seals Sea lions	FMA6
Hake Trawl	30	30	Fur seals & seabirds	FMA7
Squid Trawl	200	200	Sea lions, fur seals & seabirds	SQU6T, SQU1T
Chartered Pelagic Tuna Longline	120	120	Seabirds Fur seals	FMA1, FMA2 FMA5, FMA7
Domestic Pelagic Tuna Longline	250	250	Seabirds & turtles	FMA1, FMA2
Trawl – Inshore South Island	50	0	Hector's dolphins and penguins	FSA 20, 22
Demersal LingLongline	490	1;600*	Seabirds	Ling nation-wide
Demersal Snapper Longline	0	150*	Seabirds & turtles	FMA1
TOTAL DAYS	**1,440**	**2,650**		

* Denotes new or increased observer levels

Project outputs:

Blezard, R. H. In prep. Report on minimal by-catch of protected species from observed New Zealand iceboats 1994-2001.

Blezard, R. H. In prep. Observations of snapper long-line vessels in the outer Hauraki Gulf, 2001.

Blezard, R. H. In prep. Observations of set-net and inshore trawl fishing operations in the South Canterbury Bight, 2001.

Blezard, R. H. In prep. Report of MFish Observed Trips on vessels fishing for Orange Roughy and Oreos.

Blezard, R. H. In prep. Incidental by-catch of protected species by squid trawlers in southern New Zealand waters, 2001.

Blezard, R. H. In prep. Incidental by-catch of protected species by squid trawlers in southern New Zealand waters, 2000.

Blezard, R. H. In prep. Incidental by-catch of protected species by squid trawlers in southern New Zealand waters, 1999.

Blezard, R. H. In prep. Report on protected species by-catch in the New Zealand scampi fishery 1996-2000.

Blezard, R. H. In prep. Report on the New Zealand / Japan joint venture tuna long-line fishery 1999.

Baird, S.J. 2001. Estimation of the incidental capture of seabird and marine mammal species in commercial fisheries in New Zealand waters, 1999/00. Draft New Zealand Fisheries Assessment Report. 56pp

Baird, S.J. 2001. Estimation of the incidental capture of seabird and marine mammal species in commercial fisheries in New Zealand waters, 1998-99. New Zealand Fisheries Assessment Report 2001/14. 43pp

Bradford, E. 2001. Observer coverage and accuracy of catch estimates. Final Research Report for Ministry of Fisheries Research Project ENV2000/03, Objective 4. 33pp.

Ministry of Fisheries, Department of Conservation. 2001. Review of albatross and petrel interaction with New Zealand trawl and longline fisheries. Draft prepared by the Ministry of Fisheries and the Department of Conservation. 63pp.

Doonan, I. 1998. Estimation of sea lion captures in southern fisheries in 1998. Final Research Report for Ministry of Fisheries Research project ENV9701, Objective 2. 6pp.

Manly, B., Cameron, C. and Fletcher, D. 2002. Longline bycatch of birds and mammals in New Zealand fisheries, 1990/91 – 1995/96, and observer coverage. DOC Science Internal Series 43. 51p.

Manly, B., Seyb, A. and Fletcher, D. 2002. Bycatch of sea lions (*Phocarctos hookeri*) in New Zealand fisheries, 1987/88 to 1995/96, and observer coverage. DOC Science Internal Series 42. 21p.

Manly, B., Seyb, A. and Fletcher, D. 2002. Bycatch of fur seals (*Arctocephalus forsteri*) in New Zealand fisheries, 1990/91 – 1995/96, and observer coverage. DOC Science Internal Series 41. 40p.

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.

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.

Blezard, R.H; Burgess, J. 1999. Observer Reports from squid-jigging vessels off the New Zealand coast 1999. DOC, Conservation Advisory Science Note 255. 7p

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.

Outputs required for 2002/2003:

- Debriefing notes for each observed fishing trip.
- Special reports on particular fisheries interactions with protected species are issued as required. Reports on the snapper longline, ling demersal longline and the domestic tuna fisheries are anticipated outputs from this year's observer coverage.
- Data provided for inclusion in observer database held by MFish.

Expected timeframe for the work and any special operational or reporting requirements:

1 July 2002 to 31 June 2003 – ongoing.

Resources required 2002/2003:

Administrative support	232,122
External contract(s)	1,371,650
Other costs – observer equipment, consumables	75,000
Total	**1,678,772**

CSL Levy contribution:	1,678,772
Crown contribution:	NIL
Total	**1,678,772**

Table 2 At sea cost for proposed observer coverage, 2002/2003.

Fishery	CSL days 2002/03	Daily rate charged by MFish	CSL costs (pro rata on days)	Total cost at sea	Fisheries Involved
Hoki Trawl	200	461	5,660	92,200	Hoki nation-wide
Southern Blue Whiting Trawl	100	461	2,830	46,100	FMA6
Hake Trawl	30	461	849	13,830	FMA7
Squid Trawl	200	461	5,660	92,200	SQU6T, SQU1T
Chartered Pelagic Tuna Longline	120	461	3,396	55,320	FMA1, FMA2, FMA5, FMA7
Domestic Pelagic Tuna Longline	250	711	7,075	177,750	FMA1, FMA2
Trawl – Inshore South Island	0	711	0	0	FSA 20, 22
Demersal Ling Longline: deep sea	1400*	461	39,623	645,400	Ling nation-wide
Demersal Ling Longline: inshore	200*	711	5,660	142,200	Ling nation-wide
Demersal Snapper Longline	150*	711	4,245	106,650	FMA1
TOTALS	2,650		75,000	1,371,650	

* Denotes new or increased observer levels from 2001/2002

Science providers to be approached for expressions of interest, or indicate if open tender is proposed:

Ministry of Fisheries Observer programme, but other suppliers may be considered for specific programmes at the time that the programmes are developed or reviewed.

DOC contacts for advice on proposal:

Reg Blezard
Scientific Officer (Briefing), CSL Programme

CSL Programme Section: **Bycatch Mitigation**			
Title: Advisory Services for the Domestic Tuna Longline Fishery			
Science Portfolio: Aquatic Protection & Restoration			
State the Priority Action: Identify critical factors limiting the viability of populations of threatened freshwater, estuarine and marine species, communities, ecosystems and ecological processes. Test ways to mitigate such threats and biosecurity risks.			
Investigation ID:		**Fisheries involved:**	New Zealand registered pelagic tuna boats fishing in FMA's 1,2 and 9
DOC Key Output:		**CSL contact person:**	Janice Molloy Species Protection Officer
Project reference:	**MIT2002/1**	**Consultation period for levy:**	One financial year commencing 1 July 2002
Conservation problem:	Past observer data show incidental capture of seabirds by pelagic tuna longline vessels. The domestic fleet consists of a large number of boats with numerous new entrants in any given year. It is known that careful fishing practices can dramatically decrease seabird bycatch levels, and the focus of the advisory services is to assist fishers to employ best practice.		
Project objectives:	To employ an advisory officer to assist fishers in the tuna longline fishing employ 'best practice' to reduce seabird bycatch.		
Objectives for 2002/2003:	To employ the current advisory officer for a further year.		

Relevant existing information and tools to be taken into account:

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. More detailed information can be found in the following references.

Baird, S.J. and Bradford, E. (2000) Factors that may have influenced seabird bycatch on tuna longlines in New Zealand waters, 1986-87 to 1997-98. NIWA Technical Report 93, ISSN 1174-2631.

Baird, S.J. (2001) Estimation of the incidental capture of seabirds and marine mammal species in commercial fisheries in New Zealand waters, 1998-99. New Zealand Fisheries Assessment Report 2001/14, April 2001.

Keith, C. 2000. Seabird/fisheries interactions. Final report of advisory officer. DOC, Conservation Advisory Science Note 295.

Recommended design and methods:

Continuation of the current advisory officer's position. This was discussed at the Seabird Technical Meeting held in Auckland on 14th December 2001. This initiative will include the construction of tori lines for new entrant vessels into the fishery. The role of the advisory officer is to liaise with fishers, work on mitigation projects, identify practical measures for reducing seabird bycatch at sea and offer practical advice to fishers.

Project outputs:

Anderson, A., and McArdle, B. In prep. The sink rate of baited hooks during deployment of a pelagic longline from a New Zealand fishing vessel. DoC Science Internal Series.

Keith, C. In prep. Sink rate of baited hooks on New Zealand pelagic tuna vessels. DoC Science Internal Series.

Smith, N.W.McL. 2001. Longline sink rates of an autoline vessel, and notes on seabird interactions. DOC, Science for Conservation 183. 32 p. Available online at: http://csl.doc.govt.nz/SfC183.pdf

Molloy, J.; Keith, C.; Anderson, S. 2000. Solving incidental capture of seabirds on pelagic longline vessels-progress in New Zealand. DOC, Science Poster 30.

Anonymous. 2000. International forum in Auckland for longline fishers – Fishers Forum, 6th to 9th November 2000, Auckland. Seafood New Zealand 8(10): 10-12.

Keith, C. 1999. Tori line designs for New Zealand domestic pelagic longliners. DOC, Conservation Advisory Science Note 248. 14 p.

Molloy, J.; Walshe, K.; Barnes, P. (Comps) 1999. Developmental stages of the underwater bait setting chute for the pelagic longline fishery. DOC, Conservation Advisory Science Note 246. 34 p.

West, I.F., Molloy, J., Donoghue, M.F. and Pugsley, C. 1999. Seabird and marine mammal bycatch reduction though fishing industry funded research: The New Zealand Conservation services Levy Programme. Marine Technical Society Journal 33(2): 13-18.

Smith, N.W.McL. 1999. Longline sink rates on bottom autoline vessels. DOC, Science Poster 23.

Duckworth, K. 1998. Response of tuna longline fishers to seabird scaring lines (tori lines). DOC, Conservation Advisory Science Note 202. 11p.

Nelson, D.I. 1998. Construction of tori lines for domestic longline vessels. DOC, Conservation Advisory Science Note 201. 9p.

Barnes, P., Walshe, K.A.R. 1997. Underwater setting methods to minimise the accidental and incidental capture of seabirds by surface longliners. Report on a prototype device developed by Akroyd Walshe Ltd. DOC, Science for Conservation 66. 21p.

Smith, M., Bentley, N. 1997. Underwater setting methods to minimise the accidental and incidental capture of seabirds by surface longliners. Report on a prototype device developed by MS engineering. DOC, Science for Conservation 67. 9p.

Outputs required for 2002/2003:

- Installation of tori lines on all new entrant vessels and advice to vessel operators of best practice.
- Response to requests for advice from fishers.
- Identification and mitigation of specific problem areas as they arise.
- Annual report summarizing advisory officer's activities.

Expected timeframe for the work and any special operational or reporting requirements:

1 July 2002 to 31 June 2003

Resources required 2002/2003:

Administrative support	13,639
Project costs	85,000
Total	**98,639**

CSL Levy contribution:	98,639
Crown contribution:	NIL
Total	**98,639**

Science providers to be approached for expressions of interest, or indicate if open tender is proposed:	**DOC contacts for advice on proposal:**
Dave Kellian Current Advisory Officer	Janice Molloy Species Protection Officer

CSL Programme Section: Bycatch Mitigation			
Title: Advisory Services for the Snapper Longline Fishery			
Science Portfolio: Aquatic Protection & Restoration			
State the Priority Action: Identify critical factors limiting the viability of populations of threatened freshwater, estuarine and marine species, communities, ecosystems and ecological processes. Test ways to mitigate such threats and biosecurity risks.			
Investigation ID:		**Fisheries involved:**	New Zealand registered pelagic snapper longline vessels in FMA1
DOC Key Output:		**CSL contact person:**	Caren Schröder Scientific Officer, CSL Programme
Project reference:	**MIT2002/2**	**Consultation period for levy:**	Two financial years commencing 1 July 2002
Conservation problem:	Observer data available to date show incidental capture of seabirds by snapper longline vessels. The fleet consists of a large number of principally small boats. It is known from other longline fisheries that careful fishing practices can dramatically decrease seabird bycatch levels, and the focus of the advisory services is to assist fishers to employ best practice.		
Project objectives:	To employ an advisory officer to liaise with fishers in the snapper longline fishery and to work with them to reduce seabird bycatch at sea.		
Objectives for 2002/2003:	– Development of suitable bird bycatch mitigation measures for the snapper longline fleet. – Implementation of mitigation measures and installation of mitigation devices on snapper fishing vessels and advise vessel operators of best practice. – Response to requests for advice from fishers. – Identification and mitigation of specific problem areas as they arise.		

Relevant existing information and tools to be taken into account:

As a result of research and development projects undertaken through CSL as well as 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. These services are aimed at adapting best practices developed in the tuna longline fishery and the concurrent reduction in seabird bycatch to the snapper fishery.

Recommended design and methods:

We recommend the appointment of an advisory officer. This was discussed at the Seabird Technical meeting held in Auckland on 14th December 2001. This initiative will include the construction of mitigation measures for snapper longline vessels. The role of the advisory officer is to liaise with fishers, work on mitigation projects, identify practical measures for reducing seabird bycatch at sea and offer practical advice to fishers.

Project outputs:

New project – not applicable.

Outputs required for 2002/2003:

Annual report summarizing advisory officer's activities and progress on objectives for 2002/2003 above.

Expected timeframe for the work and any special operational or reporting requirements:

1 July 2002 to 31 June 2004

Resources required 2002/2003:

Administrative support	13,639
Project costs	85,000
Total	**98,639**

CSL Levy contribution:	98,639
Crown contribution:	NIL
Total	**98,639**

Science providers to be approached for expressions of interest, or indicate if open tender is proposed: By competitive appointment	**DOC contacts for advice on proposal:** Caren Schröder Scientific Officer, CSL Programme

CSL Programme Section: Bycatch Mitigation

Title: Design of a Trial to test the Effectiveness of Blue Bait in Reducing Bird Bycatch and its Effect on Fish Catch Rates in the Domestic Tuna Longline Fishery

Science Portfolio: Aquatic Protection & Restoration

State the Priority Action: Identify critical factors limiting the viability of populations of threatened freshwater, estuarine and marine species, communities, ecosystems and ecological processes. Test ways to mitigate such threats and biosecurity risks.

Investigation ID:		**Fisheries involved:**	New Zealand registered pelagic tuna boats fishing in FMAs1,2 and 9
DOC Key Output:		**CSL contact person:**	Janice Molloy Species Protection Officer
Project reference:	**MIT2002/3**	**Consultation period for levy:**	One financial year commencing 1 July 2002
Conservation problem:	Past observer data show incidental capture of seabirds by pelagic tuna longline vessels.		
Project objectives:	To design an experiment to demonstrate statistically whether or not blue baits are an effective means of reducing bird bycatch in the domestic tuna longline fishing.		
Objectives for 2002/2003:	To prepare an experimental design (including calculations of the number of set hooks required) to demonstrate statistically significant changes in bird bycatch, attempted bait takes and fishing effectiveness with and without using blue baits.		

Relevant existing information and tools to be taken into account:
In Hawaii blue-dyed baits are used as a means of reducing seabird bycatch. Preliminary tests have been held in New Zealand but a statistically sound study is required to determine whether blue-dyed baits have a significant mitigating effect on seabird bycatch levels and whether the use of blue dyed baits influences fishing effectiveness.

Recommended design and methods:
Using existing data on bird bycatch, attempted take of bait by birds, as well as fish catch will be used to calculate the number of hooks required to demonstrate statistically significant changes in bird bycatch, attempted takes and fishing effectiveness. It is suggested that the design examine decreases in seabird bycatch or attempted takes of 30% and 50% and declines in fishing effectiveness of 0%, 10%, 20% and 30%.

It should be noted that this type of desktop design is unable to consider changes in catch *composition*, but any design should, if possible, allow investigation of such changes.

This project was discussed at the Seabird Technical Meeting held in Auckland on 14th December 2001.

Project outputs:
New project – not applicable.

Outputs required for 2002/2003:
- A report outlining a design as laid out above together with analysis procedures to be used once the design is implemented.
- Data collection system and forms to allow field implementation of the design.

Expected timeframe for the work and any special operational or reporting requirements:
1 July 2002 to 31 December 2002

Resources required 2002/2003:

Administrative support	6,418	CSL Levy contribution:	46,418
Research costs	40,000	Crown contribution:	NIL
Total	**46,418**	**Total**	**46,418**

Science providers to be approached for expressions of interest, or indicate if open tender is proposed: Open tender	**DOC contacts for advice on proposal:** Janice Molloy Species Protection Officer

CSL Programme Section: **Interaction and Sustainability Research**			
Title: The Impact of Commercial and Recreational Fishing on Hoiho (Yellow-eyed Penguin)			
Science Portfolio: Aquatic Protection & Restoration			
State the Priority Action: Identify critical factors limiting the viability of populations of threatened freshwater, estuarine and marine species, communities, ecosystems and ecological processes. Test ways to mitigate such threats and biosecurity risks.			
Investigation ID:		**Fisheries involved:**	Inshore set netting (rig, spiny dogfish, ling, school shark, elephant fish) in FMA3 and FMA5, particularly areas 024, 025, 026, 027, 029 and 030. Gillnet fishery south of Banks Peninsula to Southland.
DOC Key Output:		**CSL contact person:**	Caren Schröder Scientific Officer, CSL Programme
Project reference:	**BRD2002/1**	**Consultation period for levy:**	One financial year commencing 1 July 2002
Conservation problem:	Hoiho (yellow-eyed penguins) are entangled in set netting gear during both commercial and recreational fishing activities. Commercial set netting impacts on the yellow-eyed penguin are focussed around the Moeraki Peninsula, and Stewart Island where set netting is used to obtain bait for use in crayfish pots. The relative importance of fishing related mortality on the Otago Peninsula populations of hoiho has not been established.		
Project objectives:	To investigate the impact of set net fishing on the mortality of hoiho at sea, and develop strategies to reduce this.		
Objectives for 2002/2003:	– To investigate and trial ways of independently observing both recreational and commercial set net fishing operations around the Otago Peninsula, and Moeraki Peninsula. – To gather data on the level of recreational set net activity around the Otago Peninsula, and Moeraki Peninsula. – To compile records and investigate where necessary, levels of commercial set net activity around the Otago Peninsula, and Moeraki Peninsula. – To gather bycatch data and recover carcasses of protected species, if practical, in the course of trailing observer coverage. – To design a statistically robust sampling observer programme for commercial set net operations around the Otago Peninsula, and Moeraki Peninsula.		

Relevant existing information and tools to be taken into account:

The hoiho is endemic to New Zealand and classified by IUCN as 'vulnerable'. The number of birds and their breeding success appears to fluctuate widely (McKinley, 1998). At sea, Hoiho have frequently been caught in near-shore set nets (Taylor, 2000). Yellow-eyed penguins can dive to over 128m and have been caught in set nets fishing in water down to 140m. They also feed between 5 and 34km offshore. This makes them vulnerable to a range of set net fisheries. Darby and Dawson, (2000) found that nearly a quarter (42) of the 185 carcasses collected voluntarily by researchers, members of the public and officers of government departments were drowned in set nets. Of these 42 birds, 90% were recorded as being drowned during commercial set net fishing, and two-thirds were adult birds.

Taylor (2000) recommended as a research priority that a study be done on the impact of fishing techniques on Hoiho populations. Also in the Species Recovery Plan for Hoiho, McKinley (2000), set objective 6 of the recovery work plan as follows: to identify the proportion of adult and juvenile mortality resulting from fishing activity and develop strategies to reduce this.

Darby and Dawson (2000) recommended the development of "an onboard observer programme to collect data on when and where bycatch occurs, in which fisheries and at what rates...Undertaking [an] observer programme in Otago/Southland waters would be an excellent first step in quantifying penguin bycatch, and identifying potential solutions".

Establishing an independent observer programme for inshore fisheries is more difficult than for deep sea fishing operation, where vessels are larger and fishing trips longer. However, it has been successfully done (Starr and Langley, 2000).

Information on fisheries interactions:

McKinley B. 2000. Hoiho (Megadyptes antipodes) Recovery Plan 2000-2005. DOC, Threatened Species Recovery Plan, 35. 28p.

Starr, P. and Langley A. 2000. Inshore Fishery Observer Programme for Hector's Dolphins in Pegasus Bay, Canterbury Bight, 1997/98. DOC, Published Client Report on Contract 3020. 28p.

Taylor, G.A. 2000. Action Plan for Seabird Conservation in New Zealand. Part A: Threatened Seabirds. DOC,

Threatened Species Occasional Publication no. 16. 234p
Darby, J.T. and Dawson, S.M. 2000. Bycatch of yellow-eyed penguins (*Megadyptes antipodes*) in gillnets in new Zealand waters 1979-1997. Biological Conservation 93: 327-332
Melvin, E.F., Parrish, J.K. and Conquest, L.L. 1999. Novel tools to Reduce Seabird Bycatch in Coastal Gillnet Fisheries. Conservation Biology. 13: 1386-1397.

Information on Hoiho:
Moore, P.J. 1999. Foraging range of the Yellow-eyed penguin *Megadyptes antipodes*. Marine Ornithology 27: 49-58.
McKinley, B. 1998. *Megadyptes antipodes*. In: Penguin conservation assessment and management plan. (Report from workshop held 8-9 September 1996, cape Town, South Africa) Ellis, S., Croxall, J.P. and Cooper, J. (eds), IUCN/SSC Conservation Breeding Specialist Group, Apple Valley, USA. 89-94.
Moore, P.J. and Wakelin, M.D. 1997. Diet of Yellow-eyed Penguin *Megadyptes antipodes*, South Island, New Zealand, 1991-1993. Marine Ornithology 25: 17-29.
Moore, P.J. 1997. Yellow-eyed Penguin - a study of foraging habits. DOC, Science and Research Unit Poster.
Moore, P.J., Wakelin, M., Douglas, M.E., McKinlay, B., Nelson, D. and Murphy, B. 1995. Yellow-eyed penguin foraging study, south-eastern New Zealand, 1991-93. DOC, Science & Research Series, 83.

Recommended design and methods:

- Investigate practical ways to establish an observer programme to investigate the bycatch of hoiho (and other protected species) in commercial inshore set net fisheries around the Otago Peninsula and Moeraki Peninsula (see Starr and Langley, 2000).
- Establish on a trial basis and where practical, observers to investigate commercial set net fishing operations around the Otago Peninsula, and Moeraki Peninsula, and if possible Stewart Island.
- Investigate levels of activity and where practical observe recreational set netting activity in areas around the Otago Peninsula and Moeraki Peninsula.

Project outputs:

New project – not applicable.

Outputs required for 2002/2003:

- Report detailing options for establishing an inshore observer programme for the inshore set net fisheries around the Otago Peninsula, and Moeraki Peninsula.
- Report on the results of any preliminary observer activity and management issues resulting from observing both commercial and recreation set netting around the Otago Peninsula, and Moeraki Peninsula.

Expected timeframe for the work and any special operational or reporting requirements:

1 July 2002 to 31 June 2004.

Resources required 2002/2003:

Administrative support	6,418	CSL Levy contribution:	23,209
Research costs	40,000	Crown contribution:	23,209
Total	**46,418**	**Total**	**46,418**

Science providers to be approached for expressions of interest, or indicate if open tender is proposed:	**DOC contacts for advice on proposal:**
Open tender	Caren Schröder Scientific Officer, CSL Programme

CSL Programme Section: Interaction and Sustainability Research

Title: Assessment of Potential Survival of Bycaught Birds Classified as Released Alive. The Development of Euthanasia Criteria and Protocols of Fatally Injured Seabirds and Relevant Observer Training.

Science Portfolio: Aquatic Protection & Restoration

State the Priority Action: Identify critical factors limiting the viability of populations of threatened freshwater, estuarine and marine species, communities, ecosystems and ecological processes. Test ways to mitigate such threats and biosecurity risks.

Investigation ID:		**Fisheries involved:**	Commercial trawl and longline fisheries throughout New Zealand
DOC Key Output:		**CSL contact person:**	Dr. Barbara Maas CSL Programme Manager
Project reference:	**BRD 2002/2**	**Consultation period for levy:**	One financial year commencing 1 July 2002

Conservation problem:	Currently seabirds subject to bycatch are categorised into two classes, namely 'dead', and 'released alive'. Approximately 17% of incidentally caught birds fall into the latter category. Estimating the survival potential of these birds is necessary to assess the full extent of the impact commercial fishing has on New Zealand seabird populations. Assessing the morbidity in birds caught alive thus has sustainability implications. Releasing a mortality injured bird is not an appropriate mitigation strategy.
Project objectives:	Estimating the survival potential of bycaught seabirds 'released alive' and developing protocols to assist in decision making in the field.
Objectives for 2002/2003:	– Review existing data on bycatch injuries in birds and relate them to accepted clinical outcomes for such injuries. – Review and develop criteria, which permit a prediction of survival outcome in the field. – Review and develop euthanasia protocols appropriate for different species of seabirds.

Relevant existing information and tools to be taken into account:

Observer data available to date show incidental capture of seabirds in all commercial trawl and longline fisheries. Once it is known that birds caught alive have sustained fatal injuries, their release back into the wild is no longer acceptable. Thus a euthanasia protocol for observers to humanely dispatch such animals will be developed.

Imber, M. J. 1994. Report on a tuna long-lining fishing voyage aboard Southern Venture to observe seabird by-catch problems. Science and Research Series. No. 65, Department of Conservation, Wellington.

Recommended design and methods:

– Review existing data on bycatch injuries in birds and relate them to accepted clinical outcomes for such injuries.
– Review and develop criteria, which permit a prediction of survival outcome in the field.
– Review and develop euthanasia protocols appropriate for different species of seabirds.

Project outputs:

New project - not applicable.

Outputs required for 2002/2003:

– Report on bycatch injury assessments and the development of criteria to predict morbidity.
– Field manual for predicting morbidity outcomes and detailing euthanasia protocols.
– Training in the use of morbidity prediction and euthanasia practices.

Expected timeframe for the work and any special operational or reporting requirements:

1 July 2002 to 31 March 2003

Resources required 2002/2003:

Administrative support	4,011	CSL Levy contribution:	29,011
Research costs	25,000	Crown contribution:	NIL
Total	**29,011**	**Total**	**29,011**

Science providers to be approached for expressions of interest, or indicate if open tender is proposed: Open tender.	**DOC contacts for advice on proposal:** Dr. Barbara Maas CSL Programme Manager

CSL Programme Section: **Interaction and Sustainability Research**			
Title: **Evaluation of the Impact of Fisheries Bycatch on the Black Petrel of Great Barrier Island**			
Science Portfolio: Aquatic Protection & Restoration			
State the Priority Action: Identify critical factors limiting the viability of populations of threatened freshwater, estuarine and marine species, communities, ecosystems and ecological processes. Test ways to mitigate such threats and biosecurity risks.			
Investigation ID:		**Fisheries involved:**	
DOC Key Output:		**CSL contact person:**	Caren Schröder Scientific Officer, CSL Programme
Project reference:	**BRD 2002/5**[3]	**Consultation period for levy:**	One financial year commencing 1 July 2002
Conservation problem:	The total population of black petrels (*Procellaria parkinsoni*) numbers about 5000 birds. This species listed as a vulnerable threatened species by IUCN, 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. Black petrel is at risk from long line fishing. Over 11 black petrels have been observed or reported caught since 1993. In 2000, two black petrels were observed caught on domestic longliners (Robertson, Bell and Scofield, 2002). The observer coverage in the domestic fishery was very poor in 1999-2000 with less than 0.5 percent of hooks and 0.8 percent of sets observed. This could equate to black petrel deaths of the order of 400.		
Project objectives:	This study will investigate adult mortality, breeding success and recruitment in relation to fisheries interactions.		
Objectives for 2002/2003:	– To determine breeding success in the sample of long-term study burrows. Causes of breeding failure, such as predation or disappearance of pairs to be noted. – To determine a population estimate by extrapolating from the grid areas to the main Mount Hobson breeding area. – To undertake a mark/recapture programme earlier in the breeding season to determine pre-breeder survival and age of first return and age of first breeding – To continue the annual census of the black petrel population via burrow monitoring and the banding of adults and fledglings to establish adult mortality, breeding success and recruitment. Additional tasks include trailing dummy transmitters, (for eventual satellite tracking of birds) and increased night banding during the entire breeding season. – To confirm the breeding status during each visit.		

Relevant existing information and tools to be taken into account:

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.

The black petrel population on Great Barrier Island has been monitored since the 1995/96 breeding season (Bell and Sim 1998a, 1998b, 2000a, 2000b, 2000c). However after discussions with CSL, interested parties, stakeholders and the fishing industry, extensions to the original programme objectives were suggested. The programme has been extended to include a) pre-breeding (Nov/Dec) and b) to attempt to achieve a more precise estimate of adult survival by including an assessment of the foraging range of the species. This information is required to help assess overlap with fishing operations.

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.

Robertson, C.J.R., Bell, E. and Scofield, P. Autopsy report for seabirds killed and returned from New Zealand fisheries, 1 October 2000 to 30 September 2001. DOC Science Internal series (Draft 13 April 2002) 74p. Department of Conservation, Wellington.

[3] This project was listed in the appendix as CSL BRD 2001/3 in the 18/1/02 Draft Conservation Services Plan 2002/2003 released 18/01/02. It was considered in that Draft to have been a project that had previously been consulted on for the 2002/2003 year, and therefore only appeared in the summary financial table and in the old format in the appendix. It has subsequently been discovered not to have been consulted on for three years (see the approved version of the 2001/2002 Conservation Services Plan), and so is now listed here in the main body of this revised Draft 2002/2003 Plan as a project to be formally consulted on.

Recommended design and methods:
Discussions at the Seabird Working Group meeting (28th August 2001) endorsed the need to expand the project. The expanded project for 2002/2003 involves: a pre-breeding trip to Great Barrier Island in November/December; additional night work throughout the entire breeding season; and a preliminary trial of dummy satellite transmitters.

Project outputs:

2000/2001 funding year:

Hunter, C. M., Scofield, R. P., Fletcher, D. and Bell, E. In press. Assessing conservation status of the Black Petrels (*Procellaria parkinsoni*) in New Zealand. Conservation Biology.

Hunter, C., Fletcher, D., Scofield, P. 2001. Preliminary modelling of black petrels (*Procellaria parkinsoni*) to assess population status. (Contract 3092) DOC Science Internal Series 2, 42 p. Available online at: http://csl.doc.govt.nz/dsis2.pdf.

1999/2000 funding year:

Bell, E.; Sim, J. 2000a. Surveying and monitoring of black petrels on Great Barrier Island 1999/2000. (Contract 3018) 20 p. Available online at http://csl.doc.govt.nz/cs13018.pdf.

1998/99 funding year:

Bell, E.; Sim, J. 2000b. Surveying and monitoring of black petrels on Great Barrier Island 1998/99. (Contract 3089) 24p. Available online at: http://csl.doc.govt.nz/cs13089.pdf.

1997/98 funding year:

Bell, E.; Sim, J. 2000c. Surveying and monitoring of black petrels on Great Barrier Island 1997/8. (Contract 3085) 24p. Available online at: http://csl.doc.govt.nz/cs13085.pdf.

1996/97 funding year:

Bell, E.; Sim, J. 1998. Survey and monitoring of black petrels on Great Barrier Island 1997. DOC, Science for Conservation 78. 18p.

1995/96 funding year:

Bell, E.; Sim, J. 1998. Survey and monitoring of black petrels on Great Barrier Island 1996. DOC, Science for conservation 77. 17p.

Outputs required for 2002/2003:
Annual report describing all field activities and achievement towards project objectives.

Expected timeframe for the work and any special operational or reporting requirements:
1 July 2002 to 31 June 2004

Resources required 2002/2003:

Administrative support	7,541
Research costs	47,000
Total	**54,541**

CSL Levy contribution:	27,271
Crown contribution:	27,271
Total	**54,541**

Science providers to be approached for expressions of interest, or indicate if open tender is proposed:
Elizabeth Bell
Wildlife Management International Limited
Wellington (current contractor)

DOC contacts for advice on proposal:

Caren Schröder
Scientific Officer, CSL Programme

CSL Programme Section: Interaction and Sustainability Research			
Title: The Impact of Fisheries By-Catch on the New Zealand Sea Lion – Auckland Islands			
Science Portfolio: Aquatic Protection & Restoration			
State the Priority Action: Identify critical factors limiting the viability of populations of threatened freshwater, estuarine and marine species, communities, ecosystems and ecological processes. Test ways to mitigate such threats and biosecurity risks.			
Investigation ID:		**Fisheries involved:**	Trawl fishery for squid in SQU1T and SQU6T
DOC Key Output:		**CSL contact person:**	Dr. Barbara Maas CSL Programme Manager
Project reference:	**MAM 2002/1**	**Consultation period for levy:**	Three financial years commencing 1 July 2002[4]
Conservation problem:	The New Zealand sea lion is a species found in the area between the Cook Strait, Campbell Island, Macquarie Island, and the south east of the South Island. The range for this species is centred around the Auckland Islands, with the main breeding colonies on Dundas, Enderby and the Figure of Eight Islands. In recent years population estimates for sea lions were calculated from pup production counts. In the last 10 years Royal Forest and Bird Protection Society and Environment and Conservation Organisations of NZ Inc. have calculated that around 650 sea lions have been killed. Sea lions have also been reported drowned in the orange roughy, scampi, and southern blue whiting fishery around the Auckland Islands and in the Jack mackerel fishery at the edge of the Snares shelf. 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, as well as pup survival and recruitment parameters for use in the age structured population model developed by a technical working group of stakeholders.		
Project objectives:	– To measure annual pup production for the New Zealand sea lion (*Phocarctos hookeri*) on the Auckland Islands. – To provide estimates of female reproductive and survival parameters, and estimates of pup survival and recruitment parameters. – To provide inter-annual comparisons of age-specific life history parameters. – To investigate the foraging ecology of the sea lion in so far as it relates to the Auckland shelf squid trawl fishery.		
Objectives for 2002/2003:	– To measure pup production on the Auckland Islands. – To resight tagged/branded adult females to provide estimates of parameters (survival and reproductive rate) for use in an age-structured model. – To resight marked animals of other age/sex classes to provide estimates of survival rate, and other life history parameters for use in an age-structured model. – To replace tags of adult females tagged prior to 1993/94. – To tag pups to provide estimates of parameters (survival and recruitment) for use in an age-structured model. – To investigate pup growth in relation to maternal characteristics (size, age, body condition, reproductive history) and foraging/attendance behaviour. – To examine diet in New Zealand sea lions utilising scat analysis and dietary fatty acid techniques. – To further evaluate the efficacy of flipper tagging, hot branding and transponder technology as permanent markers of New Zealand sea lions.		
Relevant existing information and tools to be taken into account: Little is known about the population dynamics of this species. The present population estimate is calculated using annual pup production and then, using female reproductive and juvenile survival parameters. This is modelled to yield an overall population estimate, assuming the population is in equilibrium. The sea lion mortality event in January 1998 is likely to have disrupted this equilibrium, and the development and acceptance of a specific age-structured model is crucial for the proper long term conservation management of this species. Annual estimates of pup production, and survival and fecundity schedules are essential inputs to the population modelling.			

[4] Last year an almost identical project (MAM2001/1) was consulted on for a period to the end of the 2002/2003 fishing season. However, a re-costing and refocusing of this project have become necessary and it is therefore being re-consulted on again this year.

Recommended design and methods:

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

Two marking methods will be used on pups - double flipper tags and a Permanent Implantable Transponder (PIT) tags. 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 an electronic "reader" unit. Both flipper tags and PIT tags are known to be lost, reducing the power of statistical estimates, however, ongoing evaluation of rates of loss will permit the accurate correction of parameter estimates derived from these data.

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

Studies of dietary composition will involve scat analysis and dietary fatty acid techniques. Sampling will be conducted through the breeding season and during the period the squid fleet is operating around the Auckland Islands.

Project outputs:

CSL funded outputs:

Dickie, G. and Dawson, S. M. In press. Age and reproduction in New Zealand Fur Seals and New Zealand sea lions. Canadian Journal of Zoology.

Childerhouse, S., Dix, B., and Gales, N. 2001. Diet of New Zealand sea lion *Phocarctos hookeri* at the Auckland Islands. Wildlife Research 26:839-846.

McNally, N., Heinrich, S. and Childerhouse, S. 2001. Distribution and breeding of New Zealand sea lions on Campbell Island. New Zealand Journal of Marine and Freshwater Research 28: 79-87.

Childerhouse, S. and Gales, N. 2001. Fostering behavior of New Zealand sea lion *Phocarctos hookeri*. New Zealand Journal of Zoology. 28:189-195

Breen, P. A., and Kim, S. W. 2001. Quick guide to using the sea lion model. Unpublished contract report, DOC, Conservation Services Levy Programme. 4pp.

Breen, P. A., and Kim, S. W. 2001. Documentation of a model for estimating population dynamics of Hooker's sea lions and evaluating their interaction with the arrow squid fishery. Draft document for the Hooker's Sea Lion Technical Working Group. Unpublished contract report, Conservation Services Levy Programme. 34pp.

Wilkinson, I., and Childerhouse, S. 2001. Sealion Research project – summary for 2000/02. Presentation at CSL Marine Mammal Working Group meeting, 22 November 2001, Wellington. Note: documentation of presentation was sent out to all stakeholders along with meeting minutes.

Gales, N and Fletcher, D. 1999. Abundance, distribution and status of New Zealand sea lion, *Phocarctos hookeri*. Wildlife Research 26: 35-52.

Wilkinson, I. S. & Childerhouse, S.J. 1999. Population studies of the New Zealand sea lion. Poster. Department of Conservation, Wellington, New Zealand.

Childerhouse, S. 1998. New Zealand sea lion: research programme. Science Poster 12. Department of Conservation, Wellington, New Zealand.

Childerhouse, S. and Gales, N. 1998. The historical and modern distribution and abundance of the New Zealand sea lion *Phocarctos hookeri*. New Zealand Journal of Zoology 25:1-16.

CSL related outputs:

Clark, P., Duignan, P.J. and Wilkinson, I. Submitted. Ultrastructural characteristics of cells from the blood of the New Zealand sea lion (*Phocarctos hookeri*). Comparative Haematology.

Crocker, D., Gales, N. and Costa, D. In press. Swimming speeds and foraging strategies of New Zealand sea lions. Journal of Zoology, London.

Duignan, P., Dupont, C., Cousins, D., Gibbs, N., McLachlan, S., Collins, D. and Murray, A. 2001. Tuberculosis in New Zealand pinnipeds. Poster. Veterinary Conservation Biology, Wildlife Health and Management in Australasia, 2-6 July, Taronga Zoo, Sydney, Australia. Proceedings p 284-285. Produced by Australian Veterinary Association Conference Organising Service, Kingston, ACT, Australia.

Stratton, M., Duignan, P., Forester, N., Gibbs, N., Lumsden, J., O'Toole, P., Alley, M. and Gales, N. 2001. New Zealand sea lion mass mortality: Investigating the role of potentially pathogenic bacteria. Poster. Veterinary Conservation Biology, Wildlife Health and Management in Australasia, 2-6 July, Taronga Zoo, Sydney, Australia. Proceedings pp 279. Produced by Australian Veterinary Association Conference Organising Service, Kingston, ACT, Australia.

Wilkinson, I., Childerhouse, C., Duignan, P. and Gulland, F. 2000. Infanticide and Cannibalism in the New Zealand sea lion. Marine Mammal Science 16(2): 494-500.

Costa, D. and Gales, N. 2000. Foraging energetics and diving behaviour of lactating New Zealand sea lions, *Phocarctos hookeri*. Journal of Experimental Biology 203: 3655-3665.

Duignan, P.J., Gales, N., Alley, M., Hunter, J.E.B., Fenwick, S., Garthwaite, I. 1999. New Zealand sea lion mass mortality event, January/February '98: II, Review of diagnostic tests (Poster). Society for Marine Mammalogy, Annual Conference, Maui, U.S.A., Nov. 29- Dec. 3, 1999. p 50.

Wilkinson, I. S., Childerhouse, S. J., Duignan, P. J., Gulland, F. M. D. 1999. Infanticide and Cannibalism in the New Zealand sea lion. Science Poster 27. Department of Conservation, Wellington, New Zealand.

Gales, N. and Childerhouse, S. 1999. Field observations and sampling regime. In: Baker, A. (ed.) Unusual mortality of the New Zealand sea lion, *Phocarctos hookeri*, Auckland Islands, January-February 1998. p. 8-19.

Costa, D., Gales, N. and Crocker, D. 1998. Blood volume and diving ability of the New Zealand sea lion *Phocarctos hookeri*. Physiological Zoology 71: 208-213.

Gales, N. and Mattlin, R. 1998. Fast, safe field-portable gas anaesthesia for otariids. Marine Mammal Science 14 355-361.

Donoghue, M. 1997. Conservation Services Levies – Mitigation of Marine Mammal By-catch. Seafood New Zealand 5: 31-32.

Gales, N. and Mattlin, R. 1997. Summer diving behaviour of lactating New Zealand sea lions, *Phocarctos hookeri*. Canadian Journal of Zoology 75: 1695-1706.

Peat, N. 1997. Sea lions: pride of the sea. New Zealand Geographic 33: 88-105.

Outputs required for 2002/2003:

- Annual summary reports on each summer field season in the Auckland Islands
- Annual technical reports containing estimated annual pup production for the New Zealand sea lion (*Phocarctos hookeri*) on the Auckland Islands.
- Annual progress report toward estimates of female reproductive and survival parameters, and estimates of pup survival and recruitment parameters.
- Update database on re-sighting of marked animals of other age/sex classes for use in the age-structured model.
- Progressive replacement of tags on adult females marked prior to 1993/94.
- Tagging of a sample of pups to provide estimates of parameters (survival and recruitment) for use in the age-structured model each year.
- Prior to the end of the project provide peer-reviewed publications on:
  - inter-annual comparisons of age-specific life history parameters.
  - foraging ecology of the sea lion in so far as it relates to the Auckland shelf squid trawl fishery.
  - pup growth in relation to maternal characteristics (size, age, body condition, reproductive history) and foraging/attendance behaviour.
  - the diet in New Zealand sea lions utilising scat analysis and dietary fatty acid techniques.
  - to further evaluate the efficacy of flipper tagging and transponder technology as permanent markets of New Zealand sea lions.

Expected timeframe for the work and any special operational or reporting requirements:
1 July 2002 to 31 June 2005

Resources required 2002/2003:

Administrative support	47,976	CSL Levy contribution:	346,976
Research costs	299,000	Crown contribution:	NIL
Total	**346,976**	**Total**	**346,976**

When applying the formula to determine the proportion of costs to be borne by the Crown, 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. There are therefore no costs to be borne by the Crown.

Science providers to be approached for expressions of interest, or indicate if open tender is proposed:	**DOC contacts for advice on proposal:**
Dr. Ian Wilkinson SRU Science Group, DOC (current researcher)	Dr. Barbara Maas CSL Programme Manager

CSL Programme Section: **Interaction and Sustainability Research**			
Title: **New Zealand Sea Lion Pup Production Measurement – Campbell Island**			
Science Portfolio: Aquatic Protection & Restoration			
State the Priority Action: Identify critical factors limiting the viability of populations of threatened freshwater, estuarine and marine species, communities, ecosystems and ecological processes. Test ways to mitigate such threats and biosecurity risks.			
Investigation ID:		**Fisheries involved:**	Trawl fishery for squid in SQU1T and SQU6T
DOC Key Output:		**CSL contact person:**	Dr. Barbara Maas CSL Programme Manager
Project reference:	**MAM 2002/2**	**Consultation period for levy:**	One financial year commencing 1 July 2002
Conservation problem:	Campbell Island contains the only other population outside of the Auckland Islands for New Zealand sea lion. The size and dynamics of this population is critical to the overall survival of the sea lion and its risk status. It is also possible that sea lions which breed on the Campbell Islands are caught in Auckland Islands fisheries, given that they are known to travel to the Auckland Island shelf. With a history of past mis-identification of sea lions as fur seals by observers it is not possible to say that no Campbell Island sea lions have ever been drowned in the fisheries around Campbell Island. The last estimate of pup production at this site was obtained in the 1997/98 season when 98 pups were tagged and a further 24 were found dead. This figure of 122 pups has been used in all MALFIRM calculations.		
Project objectives:	To estimate for one year only (2002/2003) the annual pup production on Campbell Island.		
Objectives for 2002/2003:	As above.		

Relevant existing information and tools to be taken into account:
In 1997/98 an attempt was made to census pups at Campbell Island, but the line transect census technique used was found to be inappropriate for measuring pup production because breeding animals were highly dispersed through steep terrain and impenetrable vegetation. The survey was further curtailed by a disease outbreak in January 1998 (McNally, N., Heinrich, S. and Childerhouse, S. 2001. Distribution and breeding of New Zealand sea lions on Campbell Island. New Zealand Journal of Marine and Freshwater Research 28: 79-87).

Recommended design and methods:
Census methods and timing of the survey will take into account recommendations by McNally et al. (2001). The proposed survey intends to census pups in April/May when they move from inland areas to coastal bays, and are more accessible for counting and tagging. Multiple visits to sites around the island will allow tagging of pups on several occasions at each location. All pups will be double flipper-tagged, and PIT tagged. Simultaneous mark-recapture experiments will be conducted at key localities on several occasions during the period of the census.

Project outputs:
New project – but closely linked to MAM 2002/1 and to the 1997/98 project, 3B(i).

McNally, N., Heinrich, S. and Childerhouse, S. 2001. Distribution and breeding of New Zealand sea lions on Campbell Island. New Zealand Journal of Marine and Freshwater Research 28: 79-87.

Outputs required for 2002/2003:
- Technical report containing estimated annual number and distribution of pups, and an analysis of weight and length of pups for the New Zealand sea lion (*Phocarctos hookeri*) on Campbell Island.
- Update database on re-sighting of previously tagged animals.

Expected timeframe for the work and any special operational or reporting requirements:
1 July 2002 to 31 June 2003

Resources required 2002/2003:

Administrative support	12,034
Research costs	75,000
Total	**87,034**

CSL Levy contribution:	87,034
Crown contribution:	NIL
Total	**87,034**

When applying the formula to determine the proportion of costs to be borne by the Crown, in the case of the Campbell Island population of the New Zealand sea lion all of the risk of human intervention is attributable to commercial fishing. There are therefore no costs to be borne by the Crown. Please note that more than half the research costs involved arise from vessel charter.

Science providers to be approached for expressions of interest, or indicate if open tender is proposed:	**DOC contacts for advice on proposal:**
Dr. Ian Wilkinson, SRU Science Group, DOC (current researcher, extension of Auckland Island sea lion work)	Dr. Barbara Maas CSL Programme Manager

CSL Programme Section: **Interaction and Sustainability Research**

Title: **Determination of Differentiating mDNA Markers in West Coast South Island Fur Seal Populations**

Science Portfolio: Aquatic Protection & Restoration

State the Priority Action: Identify critical factors limiting the viability of populations of threatened freshwater, estuarine and marine species, communities, ecosystems and ecological processes. Test ways to mitigate such threats and biosecurity risks.

Investigation ID:		**Fisheries involved:**	All trawl fisheries in FMAs 3, 4, 5, 6, 7
DOC Key Output:		**CSL contact person:**	Dr. Barbara Maas CSL Programme Manager
Project reference:	**MAM 2002/3**	**Consultation period for levy:**	One financial year commencing 1 July 2002

Conservation problem:

Between 1990 and 2000 Royal Forest and Bird Protection Society and Environment and Conservation Organisations of New Zealand Incorporated have reported that over 10,000 fur seals have been estimated to have drowned in trawl fisheries around New Zealand (see table below).

About half of these deaths occurred on the West Coast of the South Island.

Due to current lack of knowledge it is impossible to identify the breeding rookeries from which individual fur seals subject to incidental bycatch originate. Therefore, it is not possible to disassociate the effects of commercial fishing bycatch in current fur seal population studies from environmentally driven fluctuations.

The Department has conducted population dynamics studies on three West Coast South Island rookeries since 1990. Modelling has shown that environmental fluctuations render the sustainability of these populations extremely vulnerable to damage from bycatch (Best and Starfield, submitted). Therefore it is vital to quantify this effect from field data.

Numbers of fur seals **estimated** caught in the trawl fisheries – table extracted from Royal Forest and Bird Protection Society and Environment and Conservation Organisations of NZ Inc. - taken from their second round submission on the Draft Conservation Services Plan 2002/2003

Fishing Year	West Coast Hoki fishery	Bycatch rate West Coast Hoki (deaths/trawl)	Hoki elsewhere	Hoki fishery Total	Other fisheries	Estimated Total	Reference
1999/00	561	0.073	163*	724	328	1052	Baird 2001a
1998/99	215	0.03	405*	620	508	1128	Baird 2001b
1997/98	1032	0.13	196	1230	295	1534	Baird, 1999
1996/97	772	0.077	215	990	250	1237	Baird, 1999
1995/96	1289	0.13	301	1590	520	2110	Manly et al, 99
1994/95	333	0.034	315	650	425	1073	Manly et al, 99
1993/94	253	0.026	204	460	700	1157	Manly et al, 99
1992/93	299	0.039	264	560	528	1091	Manly et al, 99
1991/92	142	0.020	79	210	363	584	Manly et al, 99
1990/91	116	0.013	270	390	15	401	Manly et al, 99
1989/90	342		?	?	114	456	Baird, 1994
1988/89	800-900		?	?		1000+	Baird, 1994
Total	**6121**			**7424**	**4046**	**12,852**	

* The fur seal captures for the non-West Coast South Island hoki fishery differ from Baird's estimates because we have used all the data available. Baird did not estimate total deaths where observer coverage was less than 10 percent of all tows in an area.

Baird, S.J. 2001a. Estimation of the incidental capture of seabird and marine mammal species in commercial fisheries in New Zealand waters, 1999/00. Draft New Zealand

	Fisheries Assessment Report. 56pp Baird, S.J. 2001b. Estimation of the incidental capture of seabird and marine mammal species in commercial fisheries in New Zealand waters, 1998-99. New Zealand Fisheries Assessment Report 2001/14. 43pp Manly, B. F. J., Seyb, A. and Fletcher, D. J. 2002. Bycatch of Sea Lions *(Phocarctos Hookeri)* New Zealand fisheries 1987/88 to 1995/96, and observer coverage. DOC Science Internal Series 42. 21p. 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. J. (Comp.) 1994. Nonfish Species and Fisheries Interaction Working Group Report. N.Z. Fisheries Assessment Working Group Report 94/1. (Unpublished report held in NIWA library, Greta Point, Wellington.) 54p.
Project objectives:	To identify unique mDNA genetic markers from existing pup tissue samples collected from three West Coast South Island study rookeries with respect to pup tissue samples collected from other New Zealand rookeries.
Objectives for 2002/2003:	To identify mDNA genetic markers found in the fur seal pup tissue samples and relate these to the sample collection site.

Relevant existing information and tools to be taken into account:
Population studies on the West Coast South Island breeding rookeries since 1990.

Best, H. and Starfield, A. M. (submitted). Likely effects of periodic climatic warming events and fisheries by-catch on fur seals breeding on the West Coast of South Island, New Zealand. Manuscript submitted to Marine Mammal Science - 10th April 2002. 34p.

Best, H. 2001. Fur seal research programme, West Coast, South Island, New Zealand, 1990-2001. Presentation at CSL Marine Mammal Working Group meeting, 22 November 2001, Wellington. Note: documentation of presentation was sent out to all stakeholders along with meeting minutes.

Lento, G. M., Haddon, M., Chambers, G. K., and Baker, C. S. 1997. Genetic variation, population structure, and species identity of Southern Hemisphere fur seals, *Arctocephalus spp.*, J. Heredity 88: 202-208.

Recommended design and methods:
Seek unique mDNA genetic markers from existing tissue samples collected on the three West Coast South Island study rookeries.

Project outputs:
New project – not applicable.

Outputs required for 2002/2003:
Report describing the genetic investigation and evidence for any unique genetic markers related to fur seal breeding rookeries.

Expected timeframe for the work and any special operational or reporting requirements:
1 July 2002 to 31 June 2003

Resources required 2002/2003:

Administrative support	9,627	CSL Levy contribution:	69,627
Research costs	60,000	Crown contribution:	NIL
Total	**69,627**	**Total**	**69,627**

Science providers to be approached for expressions of interest, or indicate if open tender is proposed: Open tender	**DOC contacts for advice on proposal:** Dr. Barbara Maas CSL Programme Manager

CSL Programme Section: Interaction and Sustainability Research

Title: Establishment of Hector's Dolphin Population Boundaries on South Island West and South Coasts by Genetic Analysis

Science Portfolio: Aquatic Protection & Restoration

State the Priority Action: Identify critical factors limiting the viability of populations of threatened freshwater, estuarine and marine species, communities, ecosystems and ecological processes. Test ways to mitigate such threats and biosecurity risks.

Investigation ID:		**Fisheries involved:**	Amateur and commercial set netters in FMA3, 5 and 7
DOC Key Output:		**CSL contact person:**	Dr. Barbara Maas CSL Programme Manager
Project reference:	**MAM 2002/4**	**Consultation period for levy:**	One financial year commencing 1 July 2002

Conservation problem:	A recent analysis of South Island Hector's dolphin population structure and dispersal rates confirmed three regionally isolated populations (Pichler and Baker 2000 see below). Two coastal areas however were missing from this analysis, Porpoise Bay and Okarito. This work would assign Hector's dolphins in Porpoise Bay and Okarito into the South Island regional population structure and thus inform management units required for the species' effective management.
Project objectives:	To determine for Hector's dolphins in Porpoise Bay and Okarito what their relationship is with the rest of the Hector's dolphin, South Island regional population structure.
Objectives for 2002/2003:	– To collect swab samples from Hectors dolphins in Porpoise Bay and Okarito. – To extract mDNA from the swab samples and compare with exiting records to investigate regional population affinities.

Relevant existing information and tools to be taken into account:

Pichler, F.B. and Baker, C. S. 2000. Loss of genetic diversity in the endemic Hector's dolphin due to fisheries-related mortality. Proc. R. Soc. Lond. B 267: 97-102.

Pichler, F.B. 2002. Genetic assessment of population boundaries and genetic exchange in Hector's dolphin. DOC, Science Internal Series 44. 37p.

Pichler, F.B.; Dawson, S.M.; Slooten, E. and Baker, C. S. 1998. Geographic Isolation of Hector's Dolphin Populations described by Mitochondrial DNA Sequences. Conservation Biology, 12. 676-682.

Pichler, F.B. and Baker, C. S. 2000. Genetic variation and population structure of Hector's dolphins along the South Island's West Coast. DOC. West Coast Technical Report Series No. 4.

Recommended design and methods:

Skin swab samples from the Porpoise Bay and Okarito populations will be collected. Preliminary estimates indicate that at least 50 samples will be required from each population. DNA will be extracted from these swabs and the fragment of mDNA that defines the known Hector's dolphin haplotypes will be sequenced. These sequences will then be added into the existing database of South Island Hector's dolphins.

Project outputs:

New project – not applicable.

Outputs required for 2002/2003:

- Sequencing of haplotypes to be added to existing database of South Island Hector's dolphins.
- Project report presenting and interpreting sequencing results with respect to other regional South Island populations.

Expected timeframe for the work and any special operational or reporting requirements:

1 July 2002 to 31 March 2003

Resources required 2002/2003:

Administrative support	1,605	CSL Levy contribution:	5,802
Research costs	10,000	Crown contribution:	5,802
Total	**11,605**	**Total**	**11,605**

Science providers to be approached for expressions of interest, or indicate if open tender is proposed: Dr Franz Pichler University of Auckland (extension of earlier work)	**DOC contacts for advice on proposal:** Dr. Barbara Maas CSL Programme Manager

APPENDIX - 1

Projects Consulted in Previous Conservation Services Plans

PLEASE NOTE: The following projects have been consulted in previous Conservation Services Plans and are included here for completeness of information only.

1. Marine Mammal Carcass Recovery Project

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

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

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

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

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

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

Note that this project was consulted for three years in 2001/2002

Cost Estimate: (provision for up to 80 specimens)

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

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

Background:
Before this project started in 1995/96, the bodies of most of the marine mammals incidentally taken in commercial fishing operations were dumped at sea, thus losing the opportunity to collect a considerable amount of valuable biological data related to species, age, sex, reproductive status and other physiological parameters. The data collected through this project will provide a profile of the population taken as by-catch, and will generate essential information on the impact of commercial fishing on marine mammals.

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

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

Note that this project was consulted for three years in 2001/2002

2. Seabird Carcass Recovery Project

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

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

Project Objectives:

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

Objectives for 2001/2002 to 2003/04:

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

Note that this project was consulted for three years in 2001/2002

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

Cost Estimate: (provision for up to 850 specimens)

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

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

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

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

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

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

Note that this project was consulted for three years in 2001/2002

3. Monitoring of Protected Seabird Bycatch

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

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

Project Objectives:

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

Objectives for 2001/2002 through to 2003/04:

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

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

Cost Estimate:

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

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

Background:

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

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

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

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

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

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

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

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

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

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

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

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

Objectives for 2001/2002:

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

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

Cost Estimate:

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

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

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

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

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

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

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

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

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

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

APPENDIX – 2

Rationale for increased levels of observer coverage in the demersal ling longline fishery

The aim of increased coverage of the ling longline fishery is to establish statistically robust estimates of seabird captures. Observer reports to date have established that 29% of seabirds observed caught in longline operations between 1996-97 and 1999-00 were caught in ling longline operations. Most of the seabirds returned for identification were petrel species and 85% of the total seabirds observed caught were categorised as "at risk".

Data[1] on ling longline observer coverage is summarised in the table below. The reported observed seabird bycatch for ling longline fisheries is based on the assumption that all hooks recorded by the observers were observed, and this cannot be verified. Total effort data for these areas require further investigation, therefore all data presented should be taken as being preliminary. Should a lesser number of hooks have been observed, than the estimates of required coverage made here will be falsely low.

Observer coverage in ling longline fishery, 1997-2001:

fishing year	fishing days targeted by the ling fleet	% observer coverage*
1996/97	3,111	1%
1997/98	2,864	4%
1998/99	2,737	4%
1999/00	2,483	6%
2000/01	2,209	10%

* observed days as % of total fishing days

The analysis which supports the need for 1600 observer days in the ling longline fishery necessarily assumes that the observed vessels provide a representative set of seabird kills. The coefficient of variance (CV) of estimated seabird kill, from observer data in any one-year ranges between 70-140%, consequently the upper 95% confidence limit of the kill could be 150% to 200% higher than the estimate based on the average catch for the year.

The table below gives observed accidental catch of seabirds in the ling longline fishery for September years from 1997-2001, and for each year gives estimated total kill, with an upper confidence bound.

Observed and estimated total seabird kill:

fishing year	observed sea bird kill	% cover	estimate of kill based on proportion of days observed	upper 95% confidence bound for sea bird kill
1997	4	1%	296	-
1998	16	4%	432	1,232
1999	89	4%	2,047	4,896
2000	191	6%	3,080	7,957
2001	505	10%	4,958	15,179

Preliminary modelling of the available data shows that despite the limited coverage which gives large error bounds for total catch, **there is a highly significant increasing trend** for catch over this time period. The best estimate of the trend (using a Poisson regression of captures on the end date of the trip, adjusting with an offset for length of trip) is of a compounding 86% annual increase in kill. The lowest annual increase consistent with the data (at the lower 95% confidence level) is about 22% annual increase.

Estimates of sample size required to achieve better estimates of seabird kill are given in the table below. With a target CV of 20%[2], power analysis of the present data suggests minimum observer coverage of around 20 trips per year (each averaging about 40 days). Note that 800 observed days (or 1,600 observer days @ 12 hours) equates to 36% observer coverage, based on 2000/01 total fishing effort for ling of 2,209 days.

[1] All data extracted from the MFish Observer Programme database.
[2] A 20% CV on an estimated bycatch of say 1000 seabirds means that we are 95% confident that the true bycatch lies somewhere between 600 and 1400.

This figure of 800 x 24hr observed days is based on a simple random sample of trips, with an estimated coefficient of variation of 100% in the observed seabird kill, and about 70 total trips (averaging 40 days per year), based on the values in the currently available data.

Estimates of required sample size to give a target CV of 20% for a simple random sample of trips:

	observed estimate of CV in kill data		
	0.8	**1**	1.2
total no. of (40 day) trips in the total fishery	sample size required (number of observed trips)		
50	13	17	21
70	14	**19**	24
90	14	20	26

Note that a target CV of 20% implies 95% confidence bounds of 40% to 50%. This analysis assumes that observed bycatch data represent a random sample of all the trips. This is an oversimplification and does not reflect reality. Because only some boats can take observers, variability in kill between trips is probably underestimated. Consequently, the resulting estimate of required observer coverage is a conservative estimate and should be understood as minimum requirement.

These are initial results based on limited data. Further research, using more extensive data could be pursued. The approach used by Manly et al[3] for a study on bycatch in tuna longlining is likely to be useful. At this stage, however, the recording of relevant information in the fishery itself is insufficient to allow us to follow such approach.

Smaller longline vessels

Around 40 boats are operating in the ling longline fishery, a high proportion of which are small vessels which in most cases are not surveyed to take observers. Since 1997, observers have consistently covered the same 3-4 large deep-sea vessels at different times of the year, frequenting different areas, i.e. there is negligible observer data on the smaller inshore fishery.

Given the practical difficulties of getting observers onboard vessels we have decided to opt this year for an exploratory approach for the inshore fishery. By allocating 200 of the 1600 observer days to smaller inshore longline vessels (i.e. 200, 12 hr observer days), the aim is to gain experience from managing these observer days and to use the data gathered to assess the extent of bird bycatch on smaller vessels to better inform next year's decision making.

[3] Bryan F.J. Manly, B. F. J., Cameron, C., and Fletcher, D. J. 2002. Longline bycatch of birds and mammals in New Zealand fisheries, 1990/91-1995/96, and observer coverage. DOC Science Internal Series 43. 51 p.