ANTARCTIC FISHERIES

PROPOSED PROJECTS FOR 2005/06

Code	Title	Priority
ANT2005/01	Fishery characterisation of the toothfish fishery	High
ANT2005/02	Aspects of the biology of fishes in the toothfish fishery	High
ANT2005/03	Stock assessment of toothfish	High
ANT2005/04	Ecosystem modelling of the Ross Sea	High
ANT2005/05	Population estimation for non-target fish species in Antarctic fisheries	High
ANT2005/06	Seabird and marine mammal interactions with Antarctic fisheries	Medium
OBS2005/02	Research Observer Services – Antarctic Fisheries	High

Project: Fishery characterisation of the toothfish fishery

Project Code: ANT2005/01

Start Date: 01 November 2005

Completion Date: 30 December 2006

Vessel Use: None

Overall Objectives:

1. To characterise the 2005/06 toothfish fishery in the Ross Sea.

Specific Objectives:

1. To characterise the 2005/06 toothfish fishery in the Ross Sea, including:

    - description of the catches and effort in the 2005/06 fishery;
    - determination of the age composition of the toothfish catch;
    - determination of the age composition of the rattail catch;
    - description of the tagging programmes in the fishery; and
    - updating the standardised CPUE analysis.

Note:

The final scope of this project and the specific objectives will be determined after the October 2005 meeting of the CCAMLR Working Group on Fish Stock Assessment (WG-FSA).

Depending on the extent of activity by New Zealand fishers in the 2005-06 summer, some of the specific objectives may need to focus on CCAMLR areas other than the Ross Sea.

Rationale:

General

Toothfish are the major finfish resource currently exploited in the Southern Ocean, with only krill exceeding the catch in recent years. There are two species of toothfish, both with a circumpolar distribution.

Patagonian toothfish *Dissostichus eleginoides* are generally found north of 65° S and Antarctic toothfish *Dissostichus mawsoni* generally south of 65° S, although there is overlap in some areas, notably in the northern Ross Sea, on the South Orkney/Antarctic Peninsula and on the southern Kerguelen Plateau. The fishery in Antarctic waters is managed through the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR).

Longline and trawl fisheries have begun and continue to be developed by the United Kingdom, France, Australia, New Zealand, South Africa and others both inside EEZ waters and in other CCAMLR waters. In recent years, permits have been approved for New Zealand companies to fish in the Ross Sea (CCAMLR Sub-area 88.1 and Sub-area 88.2). In more southerly waters, *D. mawsoni* forms a greater proportion of the catch. In the most recent seasons the number of countries participating in the fishery has risen to approximately ten and the effort has risen dramatically.

CCAMLR has recommended a number of research priorities for toothfish to be undertaken by member countries including a focus on the provision of accurate catch and effort statistics and descriptions of exploratory fisheries that will inform the development of stock assessment.

The project will depend on co-operation of the New Zealand industry, international collaboration, and observer-collected data and will integrate with projects carried out by other CCAMLR member countries. This integration and co-ordination is undertaken by the Ministry of Fisheries Science Group and does not form a part of this research programme.

This research is necessary because:

- Toothfish support a valuable fishery in the Ross Sea;
- Age compositions of the catch and fishery characterisation are key inputs for the developing stock assessments for toothfish in the Ross Sea and assessment of non-target fish catch stock status;
- The project has been identified as integral in the Antarctic Fisheries Medium Term Research Plan;
- If this project does not go ahead, the development of the stock assessment for toothfish and assessment of the stock status of non-target fish in the Ross Sea will be delayed; and
- New Zealand has an international obligation to provide science outputs to CCAMLR as a result of our involvement in the exploratory fishery for toothfish.

Within this context, this research project is considered a high priority.

Objective 1

Annual characterisations of the toothfish fishery in the Ross Sea have been conducted since 1999. This work will build on previous work and be updated with data from the most recent fishery, 2005/06. Specific items to be incorporated into the characterisation include but are not limited to:

- description of the catches in the 2005/06 fishery;
- determination of the age composition of the toothfish catch;

- determination of the age composition of the rattail catch;
- description of the tagging programmes in the fishery; and
- updating the standardised CPUE analysis.

A preliminary standardised CPUE analysis was carried out on the 5 years of data from 1998-2002, refined in 2003 and further refined in 2004. Analyses were carried out using the entire data set, and the main boats/main grounds. As more years' data are collected and the fishing pattern becomes more consistent between years the technique may be useful for monitoring abundance. The index could also usefully be further refined, in particular the incorporation of lost fishing gear data into the model, gear developments, research sets versus exploratory sets and other data improvements that should further explain the variance observed.

Outputs are expected to include age-length keys for use in the toothfish stock assessment and optimisation of the catch sampling design for observers for future seasons.

Additional information on Antarctic fishery characterisation can be obtained from the outputs of ANT2002/01, ANT2002/02, ANT2004/04 and NZFAR2003/43.

Cost Recovery Information:

This project is 100% Crown funded.

The project is estimated to cost between $0 - $50,000.

Project: Aspects of the biology of fishes in the toothfish fishery

Project Code: ANT2005/02

Start Date: 01 November 2005

Completion Date: 30 December 2006

Vessel Use: Subject to tender

Overall Objectives:

1. To further explore the biology of fishes captured in the toothfish fishery.

Specific Objectives:

1. To describe aspects of the biology of toothfish in the Ross Sea.

2. To describe aspects of the biology of rattails in the Ross Sea.

3. To describe aspects of the biology of skates in the Ross Sea.

4. To describe aspects of the biology of other specified non-target fishes in the Ross Sea.

Note:

The final scope of this project and the specific objectives will be determined after the October 2005 meeting of the CCAMLR Working Group on Fish Stock Assessment (WG-FSA).

Depending on the extent of activity by New Zealand fishers in the 2005-06 summer, some of the specific objectives may need to focus on CCAMLR areas other than the Ross Sea.

Rationale:

General

Toothfish are the major finfish resource currently exploited in the Southern Ocean, with only krill exceeding the catch in recent years. There are two species of toothfish, both with a circumpolar distribution.

Patagonian toothfish *Dissostichus eleginoides* are generally found north of 65° S and Antarctic toothfish *Dissostichus mawsoni* generally south of 65° S, although there is overlap in some areas, notably in the northern Ross Sea, on the South Orkney/Antarctic Peninsula and on the southern Kerguelen Plateau. The fishery in Antarctic waters is managed through the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR).

Longline and trawl fisheries have begun and continue to be developed by the United Kingdom, France, Australia, New Zealand, South Africa and others both inside EEZ waters and in other CCAMLR waters. In recent years, permits have been approved for New Zealand companies to fish in the Ross Sea (CCAMLR Sub-area 88.1 and Sub-area 88.2).

In more southerly waters, *D. mawsoni* forms a greater proportion of the catch. In the most recent seasons the number of countries participating in the fishery has risen to approximately ten.

CCAMLR has recommended a number of research priorities for toothfish to be undertaken by member countries including a focus on the target and non-target fish species biology, especially where it will better inform fishery/ecosystem interaction issues and estimating productivity and abundance of the target stocks.

The project will depend on co-operation of the New Zealand industry, international collaboration, and observer-collected data and will integrate with projects carried out by other CCAMLR member countries. This integration and co-ordination is undertaken by the Ministry of Fisheries Science Group and does not form a part of this research programme.

This research is necessary because:

- Basic biological information is required to underpin stock assessments for toothfish in the Ross Sea, the Ross Sea effects of fishing model and assessment of non-target fish catch stock status;

- The project has been identified as integral in the Antarctic Fisheries Medium Term Research Plan;

- If this project does not go ahead, the development of the stock assessment for toothfish, the Ross Sea effects of fishing model and assessment of the stock status of non-target fish in the Ross Sea will be delayed; and

- New Zealand has an international obligation to provide science outputs to CCAMLR as a result of our involvement in the exploratory fishery for toothfish.

Within this context, this research project is considered a high priority.

Objectives 1, 2 and 3

The biology of the fishes captured in the Ross Sea has been explored, but additional detailed research is still required.

For toothfish, age and growth are moderately well known, and stock structure and feeding are currently being explored. Additional research into movement, spawning and feeding are likely to be required. Subject to funding this will include use of novel techniques to determine fish movement at both short and medium time scales, habitat use and spawning behaviour.

For rattails, age and growth have been explored. An understanding of feeding, age at maturity, age validation and diet are the next research priorities. Subject to funding, standard techniques will be applied to improve our understanding of rattail biology and ecology.

For skates, initial methods for ageing are being explored. Further ageing work, revision of estimates of age at maturity, species identification guides, description of movement patterns and an understanding of feeding is likely to be required. Subject to funding, standard techniques will be applied to improve our understanding of skate biology and ecology.

For other species such as morid cods and icefish very little is known. Observers have collected a variety of specimens for some of these species. Initial estimates of age and growth are required, as are detailed species identification guides. Research into feeding and age at maturity are the next priorities.

One key output of this programme will be improved species identification guides for observers.

Additional information on aspects of the biology of toothfish, skates and rattails can be obtained from the outputs of ANT2002/01, ANT2002/02, ANT2004/04 and NZFAR2003/43.

Cost Recovery Information:

This project is 100% Crown funded.

The project is estimated to cost between $0- $50,000.

Project: Stock assessment of toothfish

Project Code: ANT2005/03

Start Date: 01 July 2005

Completion Date: 30 December 2006

Vessel Use: None

Overall Objectives:

1. To develop and refine stock assessment approaches for toothfish in the Ross Sea.

2. To assess the status of toothfish stocks in the Ross Sea.

Specific Objectives:

1. To undertake an updated assessment for the Ross Sea toothfish stock based on data up to the end of the 2005/06 fishery.

2. To develop a decision rule for the Ross Sea toothfish fishery based on a tag recapture programme.

3. To further develop the toothfish stock assessment for the Ross Sea as required.

Note:

The final scope of this project and the specific objectives will be determined after the July 2005 meeting of the CCAMLR Working Group on Stock Assessment Methods (WG-SAM).

Rationale:

General

Toothfish are the major finfish resource currently exploited in the Southern Ocean, with only krill exceeding the catch in recent years. There are two species of toothfish, both with a circumpolar distribution.

Patagonian toothfish *Dissostichus eleginoides* are generally found north of 65° S and Antarctic toothfish *Dissostichus mawsoni* generally south of 65° S, although there is overlap in some areas, notably in the northern Ross Sea, on the South Orkney/Antarctic Peninsula and on the southern Kerguelen Plateau. The fishery in Antarctic waters is managed through the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR).

Longline and trawl fisheries have begun and continue to be developed by the United Kingdom, France, Australia, New Zealand, South Africa and others both inside EEZ waters and in other CCAMLR waters. In recent years, permits have been approved for New Zealand companies to fish in the Ross Sea (CCAMLR Sub-area 88.1 and Sub-area 88.2).

In more southerly waters, *D. mawsoni* forms a greater proportion of the catch. In the most recent seasons the number of countries participating in the fishery has risen to approximately ten.

CCAMLR has recommended a number of research priorities for toothfish to be undertaken by member countries including a focus on the provision of estimates of productivity and abundance of the target stocks.

The project will depend on co-operation of the New Zealand industry, international collaboration, and observer-collected data and will integrate with projects carried out by other CCAMLR member countries. This integration and co-ordination is undertaken by the Ministry of Fisheries Science Group and does not form a part of this research programme.

This research is necessary because:

- Toothfish support a valuable fishery in the Ross Sea;
- Toothfish stock status is poorly known and a stock assessment is necessary to determine if the current levels of removals will maintain the stock at or above CCAMLR defined limit reference points;
- The project has been identified as integral in the Antarctic Fisheries Medium Term Research Plan;
- If this project does not go ahead, we can not determine if the current levels of removals will maintain the stock at or above CCAMLR defined limit reference points; and
- New Zealand has an international obligation to provide science outputs to CCAMLR as a result of our involvement in the exploratory fishery for toothfish.

Within this context, this research project is considered a high priority.

Objectives 1, 2 and 3

To date, the toothfish stock(s) in the Ross Sea have been assessed by analogy to South Georgia using a generalised yield model. This approach is unsatisfactory and alternate approaches have been explored and need to be further developed and refined.

The approach that is currently favoured is a tag-recapture programme and a Jolly-Seber estimator. One of the elements this research programme will be to develop a decision rule for the Ross Sea toothfish fishery based on that tag-recapture programme. The decision rule should explicitly link the number of fish tagged to the catch taken from the fishery. The approach should consider the modelled risk to the stock at a variety of catch levels in comparison with the information likely to be obtained from the proposed catch level.

Alternate methods have also been explored, such as fishing vessel based acoustics and a fisher conducted research longline survey. These alternate approaches require further development. With respect to the longline survey, one approach that requires further exploration is the evaluation of the power of research sets at a variety of time-scales.
A stock assessment approach based on tag recapture data has recently been developed for Antarctic toothfish in the Ross Sea. Catch, catch-per-unit-effort, proportions-at-age in the catch, and New Zealand vessels tag-release and tag-recapture data from Subarea 88.1 have been included in the preliminary model using the generalised stock modelling software CASAL v2.06.

The first assessment run considered the Ross Sea 88.1 fishery as a single fishery, with a single selectivity curve. That run suggested that better spatially structured fisheries data would substantially improve fits, as the observed proportions-at-age in the catch were clearly fitted poorly. The second scenario parameterised the fishing selectivity by shifting the selectivity to the left or right based on the mean depth fished in each year. That produced better fits to the age data, but they were still not adequate. In the third scenario, Subarea 88.1 was considered to be made up of five independent fisheries, based on SSRU stratifications (i.e., 88.1A–G, 88.1H, 88.1I, 88.1J/L, and 88.1K). While that scenario was expected to be similar to that for the depth-shifted scenario, fits to the observed proportions-at-age data showed strong evidence of poor fit. It appears likely that such simple spatially structured models may not be adequate to model the Antarctic toothfish population. More complex models, accounting for size or age structured differences in the population, movements (migrations), fishing behaviour, and the adequacy of the homogeneity assumptions of the tag rate will need to be explored.

The approach should be refined based on WG review (both domestic and international). An updated stock assessment should be provided incorporating available data from the 2005-06 fishery.

Additional information on approaches to stock assessment of toothfish in the Ross Sea can be obtained from the outputs of ANT2002/01, ANT2002/02 and ANT2004/04.

Cost Recovery Information:

This project is 100% Crown funded.

The project is estimated to cost between $150,000 - $200,000.

Project: Ecosystem modelling of the Ross Sea

Project Code: ANT2005/04

Start Date: 01 July 2005

Completion Date: 30 December 2006

Vessel Use: None

Overall Objectives:

1. To explore the Ross Sea toothfish fishery at an ecosystem level.

Specific Objectives:

1. To further develop the Ross Sea effects of fishing model based around the toothfish fishery for the Ross Sea.

2. To investigate the possible consequences of different management strategies and climate variability for selected parts of the ecosystem.

3. To make recommendations for future research to decrease uncertainty in the model.

Note:

The final scope of this project and the specific objectives will be determined after the July 2005 meeting of the CCAMLR Working Group on Ecosystems Methods and Monitoring (WG-EMM).

Rationale:

General

Toothfish are the major finfish resource currently exploited in the Southern Ocean, with only krill exceeding the catch in recent years. There are two species of toothfish, both with a circumpolar distribution.

Patagonian toothfish *Dissostichus eleginoides* are generally found north of 65° S and Antarctic toothfish *Dissostichus mawsoni* generally south of 65° S, although there is overlap in some areas, notably in the northern Ross Sea, on the South Orkney/Antarctic Peninsula and on the southern Kerguelen Plateau. The fishery in Antarctic waters is managed through the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR).

CCAMLR has recommended a number of research priorities for toothfish fisheries to be undertaken by member countries including the determination of fishery/ecosystem interaction issues and in particular any impacts of such interactions on estimating productivity and abundance of the target stocks.

Fisheries impact not only on the target species but also on other parts of the ecosystem both directly (from incidental by-catches) and indirectly (altering the species composition and dynamics within the ecosystem). CCAMLR has adopted an ecosystem approach, which imposes obligations on New Zealand to explore the effects of fishing in the Ross Sea.

It is proposed that in the medium term an ecosystem model be developed for the Ross Sea to assist in determining the effects of various approaches to fisheries management in that area.

The project will depend on co-operation of the New Zealand industry, international collaboration, and observer-collected data and will integrate with projects carried out by other CCAMLR member countries. This integration and co-ordination is undertaken by the Ministry of Fisheries Science Group and does not form a part of this research programme.

This research is necessary because:

- CCAMLR has adopted an ecosystem approach to fisheries management;
- The fisheries effects on the ecosystem in the Ross Sea are unknown;
- The project has been identified as integral in the Antarctic Fisheries Medium Term Research Plan;
- If this project does not go ahead, we can not determine if the Ross Sea fishery is having adverse effects on the ecosystem in the Ross Sea; and
- New Zealand has an international obligation to provide science outputs to CCAMLR as a result of our involvement in the exploratory fishery for toothfish.

Within this context, this research project is considered a high priority.

Objectives 1, 2 and 3

Ecosystems are complex webs of interdependence between organisms whose populations depend on each other as well as on the physical environment. Humans interact with marine ecosystems; we compete with other species for the resources that such ecosystems support. CCAMLR requires that we take this interdependence into account when making decisions. An effects of fishing model of the Ross Sea ecosystem has begun to be developed as a part of project ANT2004/05.

Ecosystem interactions can occur at a number of different levels but one of the more dominant ways that species are interdependent is through the food web.

Basic trophic modelling is a first step towards improving our understanding of how ecosystem food interactions affect the partitioning of the available resources between (for example) fish, marine mammals, seabirds and humans. Climate variability may alter physical factors that limit the basic "carrying capacity" of the ecosystem on which all organisms depend.

An ecosystem based approach to fisheries management dictates that we accept the consequences of this natural variability by adjusting fisheries management strategies accordingly. Basic trophic modelling can help to elucidate the consequences of changes in carrying capacity on different parts of the ecosystem.

This project will extend the pilot study, translate information on food web interdependence into terms relevant to resource managers and show where further information is needed to improve the model. The key output is informed insight into the potential vulnerabilities of the Ross Sea ecosystem resulting from fisheries effects.

Additional information on ecosystem modelling in the Ross Sea can be obtained from the outputs of ANT2004/05.

Cost Recovery Information:

This project is 100% Crown funded.

The project is estimated to cost between $0 - $50,000.

Project: Population estimation for non-target fish species in Antarctic fisheries

Project Code: ANT2005/05

Start Date: 01 July 2005

Completion Date: 30 December 2006

Vessel Use: None

Overall Objectives:

1. To develop population estimates for the main non-target fish species caught incidentally in Antarctic fisheries.

Specific Objectives:

1. To review methods to develop population estimates for the main non-target fish species caught incidentally in the Ross Sea toothfish fishery.

2. To summarise existing data available for the development of population estimates for the main non-target fish species caught incidentally in the Ross Sea toothfish fishery

3. To describe a research programme to obtain population estimates for the main non-target fish species caught incidentally in the Ross Sea toothfish fishery.

Note:

The final scope of this project and the specific objectives will be determined after the July 2005 meeting of the CCAMLR Working Group on Stock Assessment Methods (WG-SAM).

Rationale:

General

Toothfish are the major finfish resource currently exploited in the Southern Ocean, with only krill exceeding the catch in recent years. There are two species of toothfish, both with a circumpolar distribution.

Patagonian toothfish *Dissostichus eleginoides* are generally found north of 65° S and Antarctic toothfish *Dissostichus mawsoni* generally south of 65° S, although there is overlap in some areas, notably in the northern Ross Sea, on the South Orkney/Antarctic Peninsula and on the southern Kerguelen Plateau. The fishery in Antarctic waters is managed through the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR).

Longline and trawl fisheries have begun and continue to be developed by the United Kingdom, France, Australia, New Zealand, South Africa and others both inside EEZ waters and in other CCAMLR waters. In recent years, permits have been approved for New Zealand companies to fish in the Ross Sea (CCAMLR Sub-area 88.1 and Sub-area 88.2). In more southerly waters, *D. mawsoni* forms a greater proportion of the catch.

CCAMLR has adopted an ecosystem approach, which imposes obligations on New Zealand to undertake research to allow populations of non-target fish species caught incidentally in the fishery to be maintained above specified proportions of their virgin biomass.

CCAMLR has recommended a number of research priorities for toothfish fisheries to be undertaken by member countries including a focus on the provision of estimates of productivity and abundance of the non-target stocks.

The project will depend on co-operation of the New Zealand industry, international collaboration, and observer-collected data and will integrate with projects carried out by other CCAMLR member countries. This integration and co-ordination is undertaken by the Ministry of Fisheries Science Group and does not form a part of this research programme.

This research is necessary because:

- The stock status for the main non-target fish species caught incidentally in the Ross Sea toothfish fishery is unknown;
- The project has been identified as integral in the Antarctic Fisheries Medium Term Research Plan;
- If this project does not go ahead, we can not determine if the Ross Sea fishery is having adverse effects the main non-target fish species caught incidentally in the Ross Sea; and
- New Zealand has an international obligation to provide science outputs to CCAMLR as a result of our involvement in the exploratory fishery for toothfish.

Within this context, this research project is considered a high priority.

Objectives 1, 2 and 3

This will be a pilot study that explores the feasibility of developing population estimates for non-target fish species caught incidentally in the toothfish longline fishery in the Ross Sea. A variety of methods should be considered based on existing knowledge of the species biology and data already collected from the exploratory fishery.

Additional information on approaches to the development of population estimates for the main non-target fish species caught incidentally in the Ross Sea toothfish fishery can be obtained from the outputs of ANT2002/01, ANT2002/02 and ANT2004/04.

Cost Recovery Information:

This project is 100% Crown funded.

The project is estimated to cost between $0 - $50,000.

Project: Seabird and marine mammal interactions with the Ross Sea toothfish fishery

Project Code: ANT2005/06

Start Date: 1 November 2005

Completion Date: 30 December 2006

Vessel Use: None

Overall Objectives:

1. To describe seabird and marine mammal interactions with the toothfish fishery in the Ross Sea.

Specific Objectives:

1. To describe seabird abundance and distribution in the Ross Sea in relation to fishing effort.

2. To describe the nature and extent of seabird interaction with fishing activity in the Ross Sea.

3. To describe marine mammal abundance and distribution in the Ross Sea in relation to fishing effort.

4. To describe the nature and extent of marine mammal interaction with fishing activity in the Ross Sea.

Note:

The final scope of this project and the specific objectives will be determined after the October 2004 meeting of the CCAMLR Working Group on Incidental Mortality Associated with Fishing (WG-IMAF).

Depending on the extent of activity by New Zealand fishers in the 2004-05 summer, some of the specific objectives may need to focus on CCAMLR areas other than the Ross Sea.

Rationale:

General

Toothfish are the major finfish resource currently exploited in the Southern Ocean, with only krill exceeding the catch in recent years. There are two species of toothfish, both with a circumpolar distribution.

Longline and trawl fisheries have begun and continue to be developed by the United Kingdom, France, Australia, New Zealand, South Africa and others both inside EEZ waters and in other CCAMLR waters. In recent years, permits have been approved for New Zealand companies to fish in the Ross Sea (CCAMLR Sub-area 88.1 and Sub-area 88.2).

This project compliments the wide range of mitigation research currently underway in co-operation with fishers and Australian researchers within the Ross Sea. One use of the outputs of the project is in review of a risk assessment that currently allows daylight setting in the Ross Sea (the current assessment is based on old seabird data derived from an earlier version of this project). A reassessment of that risk of incidental seabird mortality will result from this project. That reassessment will either increase, maintain or decrease assessed risk levels in 88.1 and will result directly in management change for all participants in the fishery. CCAMLR has identified this type of review as a priority in redesigning observer work programmes.

This research is necessary because:

- CCAMLR has adopted an ecosystem approach to fisheries management;
- The potential for cumulative effects of the fishery on seabirds and marine mammals are uncertain and subject to regular review;
- The project has been identified as integral in the Antarctic Fisheries Medium Term Research Plan;
- If this project does not go ahead, we can not determine if the Ross Sea fishery is having adverse effects on the ecosystem in the Ross Sea; and
- New Zealand has an international obligation to provide science outputs to CCAMLR as a result of our involvement in the exploratory fishery for toothfish.

Within this context, this research project is considered a medium priority.

Objective 1

To date no incidental seabird captures have been observed on the New Zealand vessels involved in the Ross Sea toothfish fishery (direct observer coverage has been ~99% of all sets and ~45% of all hauls). However, in 2003/04 the first seabird mortality was observed in the Ross Sea fishery on a vessel from another CCAMLR country. Seabird presence and abundance at the species level has been recorded in considerable detail by observers. CCAMLR uses seabird distribution information to determine the 'risk' level attributed to various fisheries for seabird/fishery activities based on at sea distribution data. This project would involve updating the earlier similar analysis based on CCAMLR and Ministry of Fisheries observer data. Any modelling of recent tracking data that suggests certain species do/do not forage in the Ross Sea should also be documented as a part of the analysis.

Objective 2

Observer data provide considerable detail about the behaviour of seabirds when observed near vessels. These data should be synthesised into a descriptive characterisation of the nature and extent of seabird interaction with fishing activity in the Ross Sea.

Objectives 3 and 4

Marine mammal observations from fishing vessels and interactions with fishing vessels are relatively rare in the Ross Sea. In 2003/04 a single whale was observed caught and killed. Available fisher and observer data should be synthesised to provide a descriptive characterisation of marine mammal abundance and distribution in the Ross Sea in relation to fishing effort, and the nature and extent of seabird interaction with fishing activity in the Ross Sea.

Additional information on description of seabird and marine mammal interactions with the toothfish fishery in the Ross Sea can be obtained from the outputs of ANT2002/02.

Cost Recovery Information:

This project is 100% Crown funded.

The project is estimated to cost between $0- $50,000.

Project: Research Observer Services – Antarctic Fisheries

Project Code: OBS2005/02

Start Date: 1 July 2005

Completion Date: 30 September 2006

Vessel Use: Deployments on commercial fishing vessels

Overall Objectives:

1. To collect specified data describing Antarctic fisheries for Antarctic fisheries research.

2. To collect specified data describing the effects of fishing in Antarctic fisheries.

Specific Objectives:

1. To collect data to characterise the toothfish longline fishery.

2. To collect biological data about toothfish as directed in the toothfish fisheries.

3. To describe the catch including discards in the toothfish fisheries.

4. To collect biological data about non-target fish species as directed in the toothfish fisheries.

5. To collect data describing the interaction between the toothfish fishery and the Antarctic ecosystem.

Observer Services Required:

700 days required for Antarctic fisheries in the Ross Sea and 290 for toothfish fisheries in other areas in 2005/06. See the rationale section below for further details of the sampling plans.

These days are '**industry requested services'** and are directly cost recovered from permit holders. They are included here to help with medium term observer programme planning. Both CCAMLR Scientific Observers and Ministry of Fisheries Observers are required to be placed on vessels in these fisheries.

Note:

The services specified in the sampling plan are subject to ongoing review and revision by the Ministry, the Antarctic Fisheries Stock Assessment Working Group and directions from the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR). There are no separate Department of Conservation sea days planned for the Ross Sea fishery.

The Ministry of Fisheries will review the decisions of CCAMLR and its members to optimise observer services in the toothfish fisheries prior to the exact number of Antarctic observer days for 2005/06 being confirmed.

The services detailed in this plan relate to New Zealand deployed Ministry of Fisheries observers on New Zealand flagged vessels in CCAMLR fisheries. The deployment of CCAMLR observers on New Zealand flagged vessels and the deployment of Ministry of Fisheries observers, as CCAMLR observers on the vessels of other CCAMLR members are not covered by this plan.

Rationale:

General

In the toothfish fishery observer data represent a very detailed quantification of catch on a set-by-set basis available to scientists. Observer data are independent of the fishery and accordingly provide valuable insight into fishery dynamics through time. Observers collect catch effort data, biological data and biological specimens for a variety of science purposes. Observer data often provide the only source of detailed biological information about fish in Antarctic fisheries.

History

The Antarctic fisheries observer programme since 2001/02 is detailed in Table 1 below.

	2001/02		**2002/03**		**2003/04**		**2004/05**	**2005/06**
	Plan	**Actual**	**Plan**	**Actual**	**Plan**	**Actual**	**Plan**	**Proposed**
Ross Sea	-	307	-	575	600	521*	700	**700**
Other	-	-	-	153	200	0*	290	**290**
Total	-	307	-	728	800	521*	990	**990**

*All requests from industry were met in full.

Table 1: Observer sea days planned and sea days achieved from 2001/02 – 2004/05, and proposed sea days for 2005/06.

Alterations to sampling plans and additional data requests will be by way of a *request for the collection of samples* or *a request for the collection of data*.

Sampling Plan for 2005/06

For *Dissostichus* spp.:

- 700 days in the Ross Sea target longline fishery
- 290 days in other target longline fisheries

At least one sample per day is required, preferably one sample per line (in co-operation with the CCAMLR Scientific Observer) for target species.

Direct observation of hooks for incidental mortality and non-target fish catch observation should be ~99% for setting operations and ~45% for hauling operations (again, in co-operation with the CCAMLR Scientific Observer).

The biological samples required in the target fisheries are detailed in the Observer Biological Manual, the CCAMLR Scientific Observer manual and the annual requests of CCAMLR.

The sampling priorities in this fishery are the full and accurate quantification of the catch, seabird interactions with the fishery, the biological sampling of target species (e.g. Antarctic and Patagonian toothfish), the biological sampling of non-target species (e.g. rattails and skates), collection of biological specimens as requested, conversion factor data and other sampling as notified to the Observer Programme. Alterations to sampling plans and additional data requests will be by way of a *request for the collection of samples* or *a request for the collection of data*.

Biological specimen collection

D. mawsoni & *D. eleginoides* stomach samples from juvenile and sub-adult toothfish (<100 cm TL) to complement existing samples.

Tissue sample and parasite sample collections for testing genetic differentiation in 'stocks' of *D. mawsoni* are needed from the Ross Sea.

Continuing collection of *D. mawsoni* otoliths are required for annual age-length keys and for international otolith microchemistry research.

Vertebral columns with intact caudal thorns for ?*Amblyraja georgiana*, large skates of both sexes and small females a priority with 70 specimens required in total.

Skate size at maturity data and stomach samples from any landed specimens.

Length frequency data, otoliths and stomach samples from morid cods and icefish to be collected.

Rattail random length frequency data for at least 20% of the catch, and a sub-sample of otoliths to be collected for age-length keys.

Cost Recovery Information:

The Antarctic fisheries observer services are **industry requested services** and costs will be recovered direct from fishers for the 990 days requested.