NON-COMMERCIAL FISHERIES

PROPOSED PROJECTS FOR 2005/06

Code	Title	Priority
AKI2005/01	Intertidal shellfish monitoring in the Auckland Fisheries Management Area	High
BCO2005/02	Abundance of blue cod in Paterson Inlet (BCO 5)	High
BCO2005/04	Stock assessment of blue cod	High
BUT2005/01	Stock assessment of butterfish	High
EEL2005/02	Management of customary eel fisheries	High
EEL2005/03	Estimation of the national mortality of eels associated with hydro passage and waterway clearance	High
REC2005/01	Estimation of recreational harvest of priority fish stocks	High
REC2005/02	Marlborough Sounds recreational fishing survey	High
REC2005/03	Rock lobster recreational catch estimates	High
REC2005/04	Survey of marine recreational fishing in selected areas	High
REC2005/05	Intertidal shellfish around Banks Peninsula	High
REC2005/06	Monitoring recreational fishing effort and catches in QMA 1	High
REC2005/07	Monitoring scallops populations in the Kaipara Harbour	High
SNA2005/04	Selectivity of recreational catches in SNA 1	High
TOH2005/01	Distribution and abundance of toheroa on Ninety Mile Beach	High

Project: Intertidal shellfish monitoring in the Auckland Fisheries Management Area

Project Code: AKI2005/01

Start Date: 1 October 2005

Completion Date: 30 September 2006

Vessel Use: None

Overall Objectives:

1. To determine the distribution, abundance and size frequency of intertidal shellfish on beaches closed to shellfish gathering and on beaches that may in future be candidates for closure and/or are subject to heavy collecting pressure in the Auckland Fisheries Management Area.

Specific Objectives:

1. To determine the distribution, abundance and size frequency of pipis (*Paphies australis*), cockles (*Austrovenus stutchburyi)*, scallops (*Pecten novazelandiae*) and tuatua (*Paphies subtriangulata*) at beaches, to be determined, during the 2005/2006 fishing year. The target coefficient of variation (c.v.) of the estimate of absolute abundance is 20 %.

2. To provide a report reviewing data on trends in abundance and size frequency of intertidal shellfish surveyed at selected beaches over the period 1992 to 2004, and provide advice on the future monitoring and methodology.

Note:

The beaches that will be surveyed for Objective 1 will be determined after consultation with local stakeholders.

Rationale:

General

Intertidal shellfish resources in the Auckland, Northland and Bay of Plenty areas are extensively exploited by commercial, customary and recreational fishers. The condition of the intertidal shellfish resources available only to recreational and customary harvest have been the subject of concern for several years. The main species of concern are pipis (*Paphies australis*), cockles (*Austrovenus stutchburyi*) and tuatua (*Paphies subtriangulata*) around the Auckland area, and in Northland and western Bay of Plenty. More recently concerns have been expressed about the state of intertidal scallops (*Pecten novazelandiae*) in some areas. Some estimates of recreational harvest are available for QMA1. There is no quantitative information on the level of customary harvest.

The management of intertidal shellfish beds open to the public aims to provide for controlled use of shellfish resources to meet the sustainable needs of customary and recreational harvesters,

using the tools provided by the Fisheries Act 1996. These tools include daily bag limits, size limits, seasonal closures, customary authorisations, management areas (taiapure/Mataitai) and temporary closures. The depletion of some shellfish beds has led to the introduction of some temporary closures, under s 186A of the Fisheries Act 1996. Temporary closures to shellfish harvesting have already been put in place at Cheltenham, Karekare, Eastern, Coromandel West Coast and Mt Maunganui beaches.

The monitoring of the distribution and abundance of the popular intertidal shellfish resources in the Auckland Fisheries Management Area has been critical in supporting management actions. There is a significant interest by tangata whenua and other non-commercial stakeholder interest in the monitoring programme in order to understand the extent of the available resource, whether these resource are being harvested sustainably, and what management initiatives are required to ensure longer term sustainability. Information on the size of the resource and trends in distribution and abundance are essential for continued management of these resources. MFish continues to use this information as the basis for discussions with stakeholders. For example the results of the survey of Waikawau Bay on the western Coromandel Peninsula being undertaken in AKI2004/01 will be used to review the current closure of this area beyond 2006.

The management of beach closures have been undertaken through an informal contract between tangata whenua, the local community, community boards, local authorities, Regional Councils, the Department of Conservation and the Ministry of Fisheries. Part of this agreement is that MFish will provide for the scientific monitoring of selected beaches. This monitoring information is essential in trying to understand how shellfish resources respond to the closures. The information will be used to decide when the harvesting bans might be removed, and it will help determine what other local controls could be implemented. Tangata whenua, in accordance with customary practices, do not support the resumption of harvesting where shellfish beds are depleted, irrespective of what the causes of that depletion may be.

In conjunction with stakeholders, the Ministry has determined criteria for removing beach closures in terms of the minimum size and abundance desired for each species. For instance, for cockles and pipi the decision rule is for a size of 30 mm and 50 mm respectively, or greater, at a density of 25 per m^2 or more. The Ministry therefore requires on-going surveys to monitor the distribution and abundance of popular shellfish resources at key sites in order to provide information on the changes in these parameters over time and as an indication of the effects of the closures.

There are a variety of environmental and social factors that will also apply to the management of intertidal shellfish on a regional and local (bed) basis. These factors will impact on the level of harvesting that can be sustained. Environmental conditions may have a role to play in causing localised depletions of shellfish. These conditions can include water pollution, sedimentation, toxic algae events and/or climatic change. The Hauraki Gulf Forum, comprised of territorial local authorities, regional councils, central government agencies and representatives of tangata whenua, is currently funding research into the possible environmental causes of intertidal shellfish depletion in the Hauraki Gulf.

In late 2004 a review of issues relating to the depletion of populations of selected infaunal bivalve species in the Hauraki Gulf was conducted for the Hauraki Gulf Forum, to which the Ministry contributed. The review recognised that the most extensive survey data on shellfish in the Gulf is derived from the Ministry of Fisheries Intertidal Shellfish Monitoring Programme. However the review noted that the data set was subject to some limitations due to changes in

methodologies and species surveyed. Overall, the majority of sites surveyed showed decreasing trends in intertidal infaunal bivalve abundance. Given these comments, there is a need to prepare a compilation of all the information obtained from the surveys since 1992, and to review the methodology and make recommendations on future monitoring requirements.

This project is a continuation of a monitoring programme that was started in 1992. Given the pressure of recreational and customary harvest on shellfish resources at selected beaches, the continuation of the monitoring programme is a high priority for input into various management options.

Objective 1

This objective will determine the distribution, abundance and size frequency of pipis (*Paphies australis*), cockles (*Austrovenus stutchburyi*), scallops (*Pecten novazelandiae)* and tuatua (*Paphies subtriangulata*) at selected beaches during the 2005/2006 fishing year. The target coefficient of variation (c.v.) of the estimate of absolute abundance is 20 %. Previous surveys have provided abundance estimates as numbers of shellfish. Additional information for population estimates should include biomass estimates in additions to numbers of shellfish for each species. The survey method would be a two phase stratified random design.

Objective 2

This objective would provide a summary report of trends in distribution, abundance and size frequency of pipis (*Paphies australis*), cockles (*Austrovenus stutchburyi*) and tuatua (*Paphies subtriangulata*) at selected beaches from the beginning of the monitoring programme in 1992. Previous research programmes on monitoring the shellfish beds have described changes in selected shellfish beds for 2002 and 2003 (AKI2003/01) but there has been no review prepared collating all the data from all previous surveys into one consolidated report. Based on this review, advice would be provided on the future monitoring programme and methodologies. Data from previous surveys would be available from previously published research reports, and from the MFish database. This review should take note of the findings of "*A Review of Issues Related to Depletion of Populations of Selected Infaunal Bivalve Species in the Hauraki Gulf Marine Park*" prepared for the Hauraki Gulf Forum in 2003.

Cost Recovery Information:

This project is 100% Crown funded.

The project is estimated to cost between $50,000 - $100,000

Project: Abundance of blue cod in Paterson Inlet (BCO 5)

Project Code: BCO2005/02

Start Date: 1 October 2005

Completion Date: 30 September 2006

Vessel Use: Subject to tender

Overall Objectives:

1. To estimate the relative abundance of blue cod (*Parapercis colias*) in Paterson Inlet.

Specific Objectives:

1. To estimate the relative abundance of blue cod in Paterson Inlet.

2. To collect otoliths and biological information from all blue cod collected during the survey.

3. To estimate the age structure of blue cod in Paterson Inlet.

Rationale:

General

The national diary surveys of marine recreational fishing found blue cod to be the second most frequently landed finfish species nationally, and the most frequently landed species in the South Island.

Paterson Inlet has long been prized for its fisheries, in particular, blue cod. The Inlet supported a commercial hand line fishery from dinghies from the 1920s to the 1050s. Since 1992, commercial fishing has been prohibited in Paterson Inlet. Paterson Inlet is the second largest recreational blue cod fishery, following the Marlborough Sounds, and is very important to tangata whenua. On the basis of the results of a five-year (1993-98) diary survey, blue cod, scallops, and paua are the three main fisheries within Paterson Inlet. According to the survey, 54% of the fishers target blue cod. Since this time, the scallop fishery has been temporarily closed, to allow stocks to recover from a disease event, so blue cod has taken on even greater importance as a target species.

Because of the popularity of recreational fishing for blue cod in Paterson Inlet, and on the recommendation of the Paterson Inlet Working Group, the daily bag limit for blue cod was reduced from 30 to 15 per person per day in the early 1990s. Recently, most of Paterson Inlet was declared a mätaitai reserve. A marine reserve has also been declared in the waters around Ulva Island.

There is no detailed information about the blue cod populations in Paterson Inlet. A standardized potting survey will provide, for the first time, regionally and temporally

comparable information on blue cod relative abundance, biology (eg sex ratio and size at maturity) and size/age structure.

It is proposed that an initial survey of the relative abundance of blue cod in Paterson Inlet is undertaken in early 2006. It is envisaged that further surveys will be undertaken in the future (every third year) and a time series of relative abundance indices will be developed as a means to monitor the status of blue cod stocks in this area and gauge the effectiveness of the current and future management regime. Recreational regulations for blue cod in Paterson Inlet will be based on the results of the surveys. This project is therefore assigned a high priority.

It is envisaged that the new marine reserve could serve as a useful control (non-fished area) for these surveys.

Objectives 1 – 3

The survey will be based the methodology developed during blue cod potting surveys in other areas, including Marlborough Sounds and Banks Peninsula.

Cost Recovery Information:

This project is 100% crown funded.

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

Project: Stock Assessment of blue cod

Project Code: BCO2005/04

Start Date: 1 October 2005

Completion Date: 30 September 2006

Vessel Use: oooo

Overall Objectives:

1. To assess the status of blue cod (*Parapercis colias*) in BCO 3, BCO 7 and Dusky Sound.

Specific Objectives:

1. To age otoliths and calculate the age structure of catches of blue cod made during previous potting surveys in Marlborough Sounds (BCO2001/01, BCO2003/01), off north Cantebury (BCO2004/02), around the Banks Peninsula (BCO2001/02, BCO2004/01), off north Otago (BCO2004/03) and in Dusky Sound (BCO 2000/01).

2. To estimate fishing mortality (F) for blue cod in each area and survey.

3. To investigate the relationship between sex ratio (ie. proportion of females) and F using the information obtained from each area/time stratum.

4. To estimate female-spawner-biomass and yield-per-recruit ratios corresponding to estimated Fs in each area using models that incorporate the relationship between sex ratio and F derived under specific Objective 3.

Rationale:

General

Blue cod is the third most frequently landed species by recreational fishers nationally (behind snapper and kahawai), and the most frequently landed species in the South Island. Blue cod is an important species for Maori customary fishers, but the catch is unknown. Annual recreational take was estimated, during the 1999/2000 survey, to be 752 t in BCO 3 and 288 t BCO 7. The commercial landings for these two Fishstocks were reported to be169 t and 39 t in 2002/03, respectively.

Tagging experiments reveal that most blue cod have a restricted home range, and that this species is likely to comprise several largely independent substocks that are subject to localized depletion. Blue cod populations in BCO 7 and BCO 3 are currently monitored using relative biomass indices generated by cyclical potting surveys (every third year). Whilst potting surveys appear to be a good tool for monitoring relative biomass of blue cod in the surveyed areas, the survey catch rates do not provide any indication as to the level of depletion prior to each survey series.

The aim of this project is to estimate mortality rates, based on the age structure of the survey catch, in each of the survey areas, and to evaluate these using yield-per-recruit and spawner-biomass-per-recruit models. By comparing populations exploited at different rates, this study will also allow for evaluation of the impacts of fishing on life-history of blue cod and for the determination of exploitation indices e.g. sex ratio, age/size-at-maturity/sex change etc.

Owing to the philopatric behaviour of blue cod and their susceptibility to localized depletion, bag limits may vary between sub-regions within an FMA e.g. BCO3. Whilst previous bag limits have been determined somewhat arbitrarily, this project should provide improved understanding of stock status as well as information necessary to estimate minimum size/ F combinations that optimise catch. Such information may also be used to determine target levels of effort reduction and in conjunction with recreational bag frequencies will provide a scientific basis for setting bag limits. This project has a high priority.

Objectives 1 and 2

Annual growth zones in blue cod otoliths are easy to read and have previously been validated. Each survey area is stratified spatially to reduce the CVs of the relative biomass estimate and to investigate spatial patterns in size composition. The age structure within each spatial stratum should therefore be weighted according the relative biomass in that stratum when calculating the overall age structure for each area and survey.

Survey CPUE and size composition data are available on MFish databases as well in the final reports/Fishery Assessment Reports for the above projects. The collection of otoliths was only included as a project objective in the 2003 and 2004 projects. NIWA did however opportunistically collect otoliths during earlier surveys and access to those collected during the 2000 and 2001 projects will have to be negotiated with them.

Objective 3 and 4

Although blue cod are protogynous hermaphrodites, previous surveys have revealed that fishing pressure generally results in male dominated populations. Regardless of the mechanism, this phenomenon could lead to the situation where recruitment (and hence productivity) becomes limited by the number of eggs produced. Spawner-biomass-per-recruit ratios should therefore be based on female spawner biomass and models used to estimate this should include sex ratio at age. Models used to predict the relationship between female spawner-biomass-per-recruit and fishing mortality (F), should incorporate the relationship between female proportion-at-age and F.

Cost Recovery Information:

This project is 100% crown funded.

The project is estimated to cost between $50 — $100,000.

Project: Stock status of butterfish

Project Code: BUT2005/01

Start Date: 1 October 2005

Completion Date: 30 September 2007

Vessel Use: oooo

Overall Objective:

1. Measuring localised depletion in butterfish stocks between Kaikoura and Banks Peninsula.

Specific Objectives:

1. To compare abundance, age structure and mortality of butterfish in areas of high and low use between Kaikoura and Banks Peninsula.

2. To investigate possible indicators of localized depletion by comparing biological characteristics of populations with high and low rates of mortality.

Rationale:

General

Butterfish is an important recreational fishery, particularly along the east coast of New Zealand. The recreational fishery in QMA 3 (East Coast SI) is particularly important as it is substantially larger (65 tonnes) than the commercial fishery (3 tonnes). The recreational fishery for butterfish in QMA 3 forms the mainstay of set net fishery close inshore and is relatively accessible in an area where fishing is influenced by highly variable weather conditions. The customary harvest, although not quantified, is likely to be very important. The recreational catch in QMAs 1, 2, 5 & 7 is of similar magnitude to the commercial fishery in these areas.

Butterfish have a patchy distribution around most of NZ, restricted to rocky coastlines with shallow seaweed beds on which they feed, in depths to 40 m. Butterfish spawn from July to March, and it is presumed that there is limited dispersal as larvae settle quickly from the plankton into shallow weed beds. The maximum recorded age is 11 years, but longevity could be up to 15 years. The biological characteristics of butterfish make it susceptible to localised depletion as a result of fishing.

Recreational fishers in QMA 3 have, for some time, been concerned about localised depletion of butterfish along the east coast of the South Island. Stocks boundaries (QMAs) for butterfish were set mainly based on existing FMAs, knowing that very much smaller QMAs would have been required to prevent local depletion. However, the information to determine these smaller QMAs was not available.

MFish currently does not have a tool to monitor butterfish stocks. Given the large number of variables determining catch rate of butterfish (i.e. other than abundance) it is unlikely that fishery independent catch rates would adequately reflect abundance. The purpose of this project is to determine whether simple biological indicators of exploitation level can be identified, on which management decision can be based. It is envisaged that such indices (if identified), monitored by repeat surveys, will form the basis for localised voluntary bag limit adjustments. Since indices being investigated will take several years to respond to changes in exploitation rate, survey frequency will probably be >4years.

Owing to the large number of variables influencing butterfish catchability, simple survey indices of catch rate are unlikely to reflect abundance. The success of this project therefore depends on the ability of multi-panelled gill nets, set over a range of depths, to measure population size and age structure. If this pilot study is successful, it may be expanded to cover butterfish in other stocks and areas.

Objective 1

To investigate the sensitivity of biological indicators to fishing pressure it is necessary to sample populations with contrasting rates of exploitation. Although levels of exploitation will ultimately be determined according to age structure, age structure is not known *a priori.* Sampling areas of high and low use is therefore likely to improve sampling efficiency.

Assuming that butterfish were vulnerable to local depletion, one would expect to find differences in abundance and biological parameters between areas of high and low use. In order to disentangle natural spatial variability, several sights of both high and low use will need to be sampled. Any sample design to measure catch rates and biological traits from discrete localities will need to take cognisance of the fact that the size composition of butterfish naturally increases with depth. Nets should therefore be set to cover a range of standard depths.

Objective 3

Potential indicators of localized depletion include *inter alia* age structure, sex ratio age-at-maturity and age/size structure of males. Being herbivorous reef fish, butterfish are generally taken with gill nets. Given that gill-nets are highly selective with regards to fish size, and that this is likely to influence indicator estimates, scientific collection with multi panel nets consisting of equal proportions of various mesh sizes, will be necessary. Although butterfish are protogynous hermaphrodites, primary males do occur. The size/age of males is nevertheless likely to be more sensitive to fishing than that of females.

Cost Recovery Information:

This project is 100% crown funded.

The project is estimated to cost between $100,000 — $150,000.

Project Title: Management of customary eel fisheries

Project code: EEL2005/02

Start Date: 1 October 2005

Completion Date: 30 September 2006

Vessel Use: None

Overall Objectives:

1. To assess the present status of eel stocks in the Waipaoa River catchment for customary fisheries management purposes.

Specific Objectives:

1. To determine the present species composition and size frequency of eels in the Waipaoa River and main tributaries.

2. To determine the current age structure, growth rate and sex composition of eels in the Waipaoa River and main tributaries.

Note:

This project will be subject to a review of a current project *EEL2003/02 – Assessing the eel stocks in Lake Repongaere and prioritising other eel stocks in the Whanaua a Kai, Te Aitanga a Mahaki iwi rohe.*

Rationale:

General

The commercial eel fishery is a moderate volume fishery of around 850 t per year spread throughout the North and South Islands, and the Chatham Islands. The fishery targets both species of eel found throughout New Zealand, the shortfin *Anguilla australis* and the longfin *A. dieffenbachii*. The South Island fishery was introduced into the QMS in October 2000, the Chatham Island fishery in October 2003, and the North Island fishery from 1 October 2004.

There are no estimates of recreational harvest at the stock level. Recreational harvest is limited to a daily bag limit of six eels. Eel are very highly valued by Maori. Historically eels constituted a very important food source. There is no quantitative assessment of the current level of customary harvest. For the introduction of North Island eels into the QMS from 1 October 2004, an allowance of 120 tonnes has been made for customary use and 95 tonnes for recreational harvest.

Many individual iwi and hapu have specific interest in eel stocks within their rohe. They may wish to assess the status of the eel stocks within their rohe to better manage the customary fishery and for any commercial fishing that might occur. Maori particularly prefer larger eels and in some of the main stem river fisheries larger eels suitable for customary use are no

longer available. Characterisation of the eel stocks within selected waterways within the rohe will assist in management of eel fisheries at a local level and will also be of assistance in evaluating stock strategies at the level of a stock.

In the absence of any stock strategies or Fisheries Plans for eels, the Ministry will support research projects that will provide some assessment on local eel populations for customary management purposes.

A current project *EEL2003/02 – Assessing the eel stocks in Lake Repongaere and prioritising other eel stocks in within the Whanaua a Kai, Te Aitanga a Mahaki iwi rohe* has established a successful partnership between Maori elders, landowners, scientists, iwi researchers and the Maori community to undertake research on the eels stocks in Lake Repongaere and to prioritise other eel fisheries within the Waipaoa River catchment. The current project is assessing the current species, size and age composition and growth rate of freshwater eels in Lake Repongaere to provide a reference point for any future monitoring of the population and management of the customary fishery.

In addition, the current project proposes to undertake a mapping exercise to assess and prioritise other eel populations in the Waipaoa River catchment within the Te Aitanga a Mahaki iwi rohe. Five key customary fishing areas have been identified which are the subject for assessment under this present research proposal.

The vision of Te Aitanga a Mahaki and the communities of the Waipaoa River are to ensure that that the eel resource is managed sustainably and remains a taonga for their mokopuna. It is hoped to continue the recording and utilising of Maori knowledge alongside scientific information to improve the understanding of cultural values and improved sustainable management of customary eel fisheries.

The undertaking of the objectives for this project would require the involvement and utilisation of the skills and knowledge of members of the Whanaua a Kai, Te Aitanga a Mahaki iwi.

Objective 1

This objective is designed to determine the species composition and size composition of eels in the Waipaoa River and main tributaries. This information will assist in management of the customary fishery where the size of eels is of critical importance to meet customary needs.

Objective 2

This objective will determine the age structure, growth rate and sex composition of the eel population in the Waipaoa River and main tributaries. The size and age composition of juvenile eels (< 300 mm) would be determined to provide evidence of any intermittent recruitment, and also be an index of future recruitment into the "adult" fishery (i.e. tuna of sufficient size for harvest for customary purposes).

Cost Recovery Information:

This project is 100% Crown funded.

The project is estimated to cost between $50,000 - $100,000.

Project: Estimation of the national mortality of eels associated with hydro passage and waterway clearance.

Project code: EEL2005/03

Start Date: 1 October 2005

Completion Date: 30 September 2006

Vessel Use: None

Overall Objectives:

1. To estimate the collective mortality of (a) migratory eels at hydro dams throughout New Zealand, and (b) resident eels in waterways where sediment and aquatic weeds are periodically removed.

Specific Objectives:

1. For hydro dams with upstream populations of eels, to estimate the turbine mortality of both species and sexes of eels during their attempted downstream migration.

2. For waterways that are managed for sediment and aquatic macrophyte accumulation, estimate the New Zealand-wide mortality of eels associated with these practices.

Note:

This project is subject to a review of project *EEL2003-01 Non-fishing mortality of freshwater eels*.

Rationale:

General

The commercial eel fishery is a moderate volume fishery of around 850 t per year spread throughout the North and South Islands, and the Chatham Islands. The fishery targets both species of eel found throughout New Zealand, the shortfin *Anguilla australis* and the longfin *A. dieffenbachii*. The South Island fishery was introduced into the QMS in October 2000, the Chatham Island fishery in October 2003, and the North Island fishery from 1 October 2004.

There are no estimates of recreational harvest at the level of a stock. Recreational harvest is limited to a daily bag limit of six eels. Eel are very highly valued by Maori. Historically eels constituted a very important food source. There is no quantitative assessment of the current level of customary harvest. For the introduction of North Island eels into the QMS from 1 October 2004 and allowance of 120 tonnes has been made for customary use and 95 tonnes for recreational harvest.

It is not known if the current catch levels and TACs (North Island TACs effective from 1 October 2004) for either species are sustainable or at levels that will allow the stock to move to towards a size that will support the MSY. TACs for the North Island eel stocks have been

set under s 14 of the Fisheries Act 1996 which allows TACs to be set using an alternative management strategy where the application of an MSY approach is not applicable to a particular fish stock. Eel stocks are severely impacted by other anthropogenic (non-fishing) activities including habitat destruction and modification, blockage to upstream fish passage and direct mortality through the effects of hydro-electric turbines and drainage clearance. MCY cannot be readily estimated for each eel stock because of the inability to include estimates of non-fishing mortality and the division of a single biological stock into several management units.

A current project *EEL2003-01 Non-fishing mortality of freshwater eels* has assessed the feasibility of the assessing the mortality of eels from hydro-electric turbines and drainage clearance.

The Ministry needs to take into account other sources of mortality when assessing the status of eel stocks within New Zealand. Quantification of the mortality of eels due to non-fishing activities would contribute to such assessments. In addition, quantification of mortality due to hydro-electric turbines and drainage clearance will provide additional information to advocate for improved management practices for hydro-electric dams and drain clearance operations.

Objective 1

This objective will estimate the turbine mortality of both species and sexes of eels during their attempted downstream migration. Research on downstream fish passage would suggest that there is a 100% mortality of large longfin females attempting to pass through hydro-electric turbines. To achieve this objective existing information will be used to predict the likely mortality of eels should they enter turbines in their endeavours to migrate to the sea. A national inventory of dams is available, together with mortality models that use characteristics of each dam. GIS-based habitat models are available that can be used to estimate likely eel populations, and the proportion of each population that will become migratory each year.

Objective 2

This objective will estimate the New Zealand-wide mortality of eels associated with the practice of removing sediment and aquatic macrophytes from small streams and drains. Direct observations show that eels die as a result of being removed from the water in the process drain clearance. The feasibility study has suggested that this can be quantified by making direct observations on drain clearing operations at selected localities. For waterway management practices, a database has been compiled of the regional extent of various types of managed waterway (natural river channel, canals, drains, stockwater races etc). To estimate mortalities associated with stream clearing operations, it would be necessary to obtain additional regional information on the type and frequency of stream clearing, carry out actual observations of the frequency of eels stranded on banks, and evaluate numbers of eels before and after stream cleaning operations. Ideally, a number of such operations would be evaluated in several of the major Regional Council districts where stream clearing is practised (e.g. Southland, South Canterbury, Waikato). While extrapolation to the whole of the country will probably provide more indicative than absolute data, a significant outcome would be the opportunity to highlight the national extent of the potential mortality of eels associated with inappropriate stream clearing practices.

Cost Recovery Information:

This project is 100% Crown funded.

The project is estimated to cost between $50,000 - $100,000.

Project: Estimation of recreational harvest in priority fish stocks

Project Code: REC2005/01

Start Date: 1 July 2005

Completion Date: 30 September 2007

Vessel Use: None

Overall Objectives:

1. To estimate the recreational harvest of snapper in SNA8.

Specific Objectives:

1. To develop and test using a pilot programme an alternative methodology to the national telephone diary survey to estimate then recreational harvest of snapper in SNA8 during 2005/06.

2. Based on the results of Objective 1, to estimate the recreational harvest of snapper in SNA8 from 1 October 2006 to 30 September 2007.

Note:

This is a two-year project. Objective 2 will proceed subject to review of Objective 1 by the Marine Recreational Fisheries Working Group.

Rationale:

General

SNA 8 is the second largest snapper fishery in New Zealand, extending from North Cape along the west coast of the North Island to Wellington. Total commercial landing were 1555 t in 2002/03. Based on the 2004 port price the commercial fishery was worth approximately $6.7 million. The non-commercial allowance for SNA 8 is 560 t. The estimate of recreational harvest for SNA 8 from the 1999/2000 national telephone/diary survey was 661 t.

The estimation of the recreational harvest for all fish stocks is a high priority for recreational fisheries research. Estimates of recreational harvest are required for allocation decisions when setting or adjusting TACs. Accurate estimates are also required for stock assessment purposes for some key fishstocks such as snapper. The recreational catch of key finfish stocks has been obtained from two national telephone/diary surveys conducted in 1996 and 2000. An additional survey for 2001 has also given harvest estimates for 2000/2001 using the same overall methodology. The results of these surveys have raised concerns as to the accuracy of the harvest estimates using the telephone/diary methodology. For many fishstocks the national diary surveys have produced harvest estimates that are possibly only accurate to an order of magnitude. For some fishstocks, e.g. SNA8, a recreational harvest of much greater accuracy is required. The accuracy of marine recreational harvest estimates is of

critical importance for the management of fisheries where the recreational harvest is significant in relation to the total allowable commercial catch. An estimate of the recreational harvest of snapper in the Hauraki Gulf (REC2002/03) and the wider SNA1 area (REC2004/01) is currently being undertaken using an aerial – access approach. This project would also use an alternative methodology to the telephone/diary method. This project is of high priority in order to more accurately assess the recreational harvest of snapper in SNA 8 for stock assessment and allocation purposes.

The project will be undertaken in a two-stage process, the development and testing of the survey design in the first year, followed by a full survey to estimate the recreational harvest in SNA 8 the following year.

Objective 1

The current project estimating the recreational harvest of snapper in the Hauraki Gulf is using the aerial-access approach, which appears to be a suitable methodology for the type of fishery in the Gulf which is predominantly from small trailer boats launched from boat ramps. On the west coast (SNA8) the recreational fishery has a much larger component of shore based fishing methods, such as surfcasting and kite fishing, that may be less amenable to aerial observation. The present aerial-access methodology being used in the Hauraki Gulf may not be directly transferable to the west coast. Accordingly this objective would undertake a pilot survey during the summer of 2005/06 to assess what changes might be necessary to adapt the methodology to the west coast fishery.

The survey design and feasibility will be reviewed by the Marine Recreational Fisheries Working Group before undertaking Objective 2.

Objective 2

Based on the results of Objective 1, this objective is designed to estimate the marine recreational harvest of snapper in SNA8 for the fishing year 1 October 2006 to 30 September 2007.

Cost Recovery Information:

This project is 100% Crown funded.

The project is estimates to cost between $750,000 - $ 1,000,000.

Project: Marlborough Sounds recreational fishing survey

Project Code: REC2005/02

Start Date: 1 July 2005

Completion Date: 30 September 2006

Vessel Use: None

Overall Objectives:

1. To characterise the recreational fishery in the Marlborough Sounds and estimate the recreational harvest of key species.

Specific Objectives:

1. To determine the areas fished and catch per unit effort for the recreational fishery in the Marlborough Sounds from 1 October 2005 to 30 September 2006.

2. To estimate the recreational harvest of key species in the Marlborough Sounds from 1 October 2005 to 30 September 2006.

Rationale:

General

The Marlborough Sounds, including the outer Sounds area, supports a highly valued recreational fishery for blue cod, snapper and scallops and other species. Blue cod is the most significant fishery. For BCO7 the recreational harvest from the 1999/2000 national telephone/diary survey was in the range of 230 to 347 tonnes. The majority of this harvest would be from the Marlborough Sounds and outer environs. The commercial TACC for the whole of BCO 7 is 70 tonnes with landings in 2002/03 of 39 tonnes. Few blue cod are taken by commercial fishers in the Marlborough Sounds. It is not known if the combined recreational and commercial catches for BCO 7 are sustainable or if they are at levels that will allow the stock to move towards a size that will support the MSY.

Blue cod have declined substantially in the Marlborough Sounds. A fishery independent cod potting survey indicate that the Marlborough Sounds blue cod population appears to have roughly halved between 1995-96 and 2001. Catch rates were highest in the outer Marlborough Sounds in both surveys. The blue cod fishery is under increasing pressure as recreational fishing effort increases and gear technology improves. Anecdotal evidence from stakeholder groups suggests that many areas of the Marlborough Sounds are suffering localised depletion. To address these concerns, the recreational bag limit has been substantially reduced. In 1992/93 the bag limit was reduced from twenty fish to twelve, and further reduced to three fish in 2003.

A characterisation study of recreational fishing was carried out in 1999 using a diary survey. This study identified areas fished, species caught, methods used and catch per unit effort.

Blue cod, snapper and scallops were the key fin fish and shellfish species targeted by fishers. This project would repeat the 1999 characterisation study in 2005/06 and examine any changes that have occurred in the fishery. Of particular interest is any increased targeting of finfish species that may have occurred in response to the decrease in the blue cod daily bag limit.

The estimation of the recreational harvest for all fish stocks is a high priority for recreational fisheries research. Estimates of recreational harvest are required for allocation decisions when setting or adjusting TACs. Accurate estimates are also required for stock assessment purposes for some key fishstocks such as snapper. The recreational catch of key finfish stocks has been obtained from two national telephone/diary surveys conducted in 1996 and 2000. An additional survey for 2001 has also given harvest estimates for 2000/2001 using the same overall methodology. The results of these surveys have raised concerns as to the accuracy of the harvest estimates using the telephone/diary methodology. A harvest estimate of recreational species taken by fishers in the Marlborough Sounds is of high priority given the value of the fishery and the declining state of the blue cod stocks.

This project is required for continued monitoring and management of the recreational fishery in the Marlborough Sounds and is of high priority given the declining state of the blue cod stocks. Project *BCO2005/04 Stock assessment of Blue Cod* will complement this project.

Objective 1

This objective is to determine the areas fished, species caught, methods used and catch per unit effort for the recreational fishery in the Marlborough Sounds during the period 1 October 2005 to 30 September 2006 and to compare this information with the survey undertaken in 1999. The objective would specifically look for any changes in targeting of finfish species following the reduction in the recreational daily bag limit for blue cod.

Objective 2

This objective is designed to estimate the marine recreational harvest of key species in the Marlborough Sounds for the fishing year 1 October 2005 to 30 September 2006. Previous estimates of recreational harvest using the telephone/diary methodology have not produced reliable absolute estimates of recreational harvest. Harvest estimates for recreational species in the Marlborough Sounds, particularly for blue cod, are required using alternative methodologies. It is not known what alternative methodology might be cost effective in providing harvest estimates for the Marlborough Sounds because of the nature of the fishery. This objective seeks to estimate the recreational harvest of key species in the Marlborough Sounds for the fishing year 1 October 2005 to 30 September 2006.

Cost Recovery Information:

This project is 100% Crown funded.

The project is estimated to cost between $100,000 - $200,000.

Project: Rock lobster recreational catch estimates

Project Code: REC2005/03

Start Date: 1 October 2005

Completion Date: 30 September 2006

Vessel Use: None

Overall Objectives:

1. To estimate the recreational harvest of rock lobsters (*Jasus edwardsii*) in CRA 2.

Specific Objectives:

1. To estimate the recreational harvest of rock lobsters (*Jasus edwardsii*) in CRA 2.

2. To estimate the catch and effort of rock lobster recreational fishers in CRA 2.

Note:

This project would depend on the results of project *REC2003/02 to design an alternative method to the telephone diary system for estimating the recreational catch of rock lobsters.*

Rationale:

General

Rock lobsters are a high valued species caught all around the North and South Islands, Stewart Island, and the Chatham Islands. The total TACC for all areas (2003) was 2683.6 t. Rock lobsters are a highly valued customary and recreational fishery. The extent of the customary harvest has not been quantified. The CRA 2 fishery has a TACC of 236.1 t (landings 205.7 t in 2002-03), and a non-commercial allowance of 216.5 t. Based on 2004 port prices, the commercial fishery landings in 2002-03 was worth approximately $6.32 million.

The recreational catch of rock lobsters by fish stock has been obtained from three regional surveys (South Region 1991-92, Central 1992-93 and North 1993-94), and two national telephone/diary surveys of recreational harvest for the period 1995/1996 and 1999/2000. An extension of the 1999/2000 telephone/diary survey has provided an estimate for 2000/2001. However there has been concern expressed about the reliability of these recreational catch estimates for some stocks. The estimates of recreational harvest for CRA 2 from the regional survey was 123 or 95 t for 1993 and 138 t from the 1996 survey. The survey undertaken in 1999/2000 gave a harvest estimate of 235.9 t and 241.4 t for the 2000/01 roll over national diary survey. These estimates cause uncertainty in the assessment of stock size and stock status. The two national surveys of recreational fishers using the telephone and diary methodology have produced a small number of diarists who report catching rock lobsters. The low number of diarists is not sufficient to provide reliable estimates of total catch. Improvement of the recreational catch estimates is a high priority in those stocks where

recreational fisheries take a large proportion of the total catch (TAC) and/or where more accurate estimates of recreational harvest are required for stock assessment. The National Rock Lobster Management Group (NRLMG) has recognised the lack of reliable estimates of non-commercial removals from rock lobster fisheries as an impediment to management of rock lobster stocks and ensuring the sustainable utilisation of stocks in the longer term.

This proposal is dependent on a review of a current project *REC2003/02 To design an alternative method to the telephone diary system for estimating the recreational catch of rock lobsters.* It is possible that the methodology derived from this research might limit the methodology to only one fish stock. Therefore priority needs to be given to fish stocks with the most urgent need for a more accurate estimate of recreational harvest. CRA 2 has been identified as a priority fish stock.

This project is high priority because of the urgent need to improve the estimates of recreational harvest of rock lobsters for CRA 2.

Objective 1

This objective would estimate the recreational harvest of rock lobster in CRA 2. This Objective would apply the methodology derived from project *REC2003/02 to design an alternative method to the telephone diary system for estimating the recreational catch of rock lobsters.*

Objective 2

This objective would estimate the catch and effort of recreational rock lobster fishers in CRA 2. The establishment of a time series of catch and effort data over time is a valuable tool for assessing the quality of fishing and providing trends that can provide input into stock assessment. This objective would seek to begin a time series of catch and effort or some index of effort that could be used in some years when exact catch and effort is not measured.

Cost Recovery Information:

This project is 100% Crown funded.

The project is estimated to cost between $500,000 - $1,000,000.

Project: Survey of marine recreational fishing in selected areas

Project Code: REC2005/04

Start Date: 1 October 2005

Completion Date: 30 September 2006

Vessel Use: None

Overall Objectives:

1. To characterise the recreational fishery in selected areas for management purposes.

Specific Objectives:

1. To determine areas fished, species targeted and caught, methods used and the catch-per-unit-effort for the recreational fishery in selected areas.

2. To profile the recreational fishing population.

Note:

This project is for research to be undertaken in a selected area that might be the subject of specific management requirements. This is a contingency place holder project to be used where a specific management requirements cannot be identified within the current 12 – 18 month planning process prior to the commencement of projects form 1 October 2005. An area may be selected in consultation with stakeholders depending on the particular management requirements.

Rationale:

General

Recreational fishing activity occurs throughout the inshore area around the whole coastline of New Zealand. Fishing activity is influenced by a number of factors including influenced by weather, availability of fish, geographical features and population. Given the wide extent of fishing activity there are no detailed characterisations of fishing in all areas. Where there is a management requirement for detailed information on recreational fishing activity in a specific area, research has been undertaken as appropriate. However given the timing of the planning and purchase of the Ministry of Fisheries Research Services, it is sometimes not possible to identify in advance all areas where a characterisation of recreational fishing activity is required.

Objective 1

This objective will characterise recreational fishing activity in specific geographical areas in relation to areas fished within the areas, species caught, methods used and the demographics of fishers.

Objective 2

This objective is designed to collect information on the demographics (age, sex, location of residence etc) of the recreational fishers within an area. This information will provide a profile of the recreational fishing population which will be important when evaluating the impact of various management proposals on recreational fishing.

Cost Recovery Information:

This project is 100% Crown funded.

The project is estimated to cost between $50,000 - $100,000.

Project: Intertidal shellfish at Banks Peninsula

Project Code: REC2005/05

Start Date: 1 October 2005

Completion Date: 30 September 2006

Vessel Use: None

Overall Objectives:

1. Characterise the harvest and relative abundance of selected intertidal shellfish species at selected sites at Banks Peninsula Area (FMA3).

Specific Objectives:

1. Characterise the recreational harvest of selected intertidal shellfish species at selected sites at Banks Peninsula during the 2005/2006 fishing year.

2. Summarise existing information on abundance and size frequency of these species at these sites and compare the level of recreational harvest with this information.

Note:

The species and sites to be examined under objectives 1 and 2 will include subtidal fringe/intertidal shellfish such as mussels, cooks turbans and catseyes at sites between Talyor's Mistake and Lyttelton Harbour. The species and sites will be specified after consultation with local stakeholders and tangata whenua.

Rationale:

General

Beaches around the major metropolitan centers in New Zealand have been subject to varying degrees of harvesting by non-commercial fishers over recent years. In the Auckland area, the problem of local depletion was recognized in the early 1990's and an annual survey of selected beaches was begun in 1992. There are now observations that some depletion may be occurring around Banks Peninsula, which is located close to the major metropolitan area of Christchurch. The management of intertidal shellfish beds open to public access aims to provide for the controlled use of shellfish resources to meet the sustainable needs of customary and recreational harvesters, using the tools provided by the Fisheries Act 1996. These tools include daily bag limits, size limits, seasonal closures, customary authorizations, management areas (taipure/Mätaitai) and temporary closures.

There is increasing concern about the state of intertidal shellfish resources at some specific areas around Banks Peninsula that are subject to non-commercial harvest. Before any management can be considered for intertidal shellfish beds, information on the recreational harvest and abundance of selected shellfish species at priority beaches is required to determine the scale of the problem and provide estimates of existing population parameters. This will provide baseline

information against which any future surveys can be assessed. This information will be used to monitor any population changes following any temporary closures or used as information for implementing a temporary closure.

This project is of high priority to begin a survey to characterize the non-commercial harvest of shellfish around banks Peninsula, and to summarise existing information on abundance and size frequency of these species at different sites.

Objective 1

Observations from Honorary Fisheries Officers and stakeholders point to significant reductions in the biomass of shellfish from recreational harvest on some beaches in the Banks Peninsula area, particularly at the most accessible beaches such as Taylor's Mistake, close to Christchurch. This objective would undertake a survey to characterize the non-commercial harvest of shellfish around Banks Peninsula, with a view to selecting specific sites of importance for any future surveys and monitoring requirements.

Objective 2

This objective would summarize existing information from various sources (e.g University studies, other beach surveys) on abundance and size frequency of shellfish at sites available, and compare this information with information obtained from the characterisation study.

Cost Recovery Information:

This project is 100% Crown funded.

The project is estimated to cost between $50,000 - $100,000.

Project: Monitoring recreational fishing effort and catches in QMA 1

Project Code: REC2005/06

Start Date: 1 October 2005

Completion Date: 30 September 2008

Vessel Use: None

Overall Objectives:

1. To monitor recreational fishing in QMA 1.

Specific Objectives:

1. To index relative recreational fishing effort at key boat ramps in QMA 1.

2. To test the predictive model of recreational fishing effort in the Hauraki Gulf, east Northland, and the Bay of Plenty (developed in SNA2002/01) using the new data, and to refine the model if necessary.

3. To develop an index of relative recreational catch in key fishstocks (SNA 1, KAH 1) for inclusion in stock assessment models.

Note:

This project is subject to review *REC2002/02- Objective 3 To develop an ongoing index of fishing effort for estimating the recreational harvest in the Hauraki Gulf,* and *REC2004/08 - Indicies of recreational fishing effort*. This project would be a three year project.

Rationale:

General

QMA 1, being close to the largest population centre in New Zealand, supports substantial commercial and recreational fisheries with the most important species for recreational harvest being snapper, kahawai and kingfish. The estimation of the recreational harvest for all fish stocks is a high priority for recreational fisheries research. Estimates of recreational harvest are required for allocation decisions when setting or adjusting TACs and for input into stock assessment for some key fish stocks. The key focus of recreational fisheries research since 1992 has been to generate reliable point estimates of harvest. The recreational catch of finfish in QMA 1 has been determined from a regional telephone diary survey undertaken in 1993-94 and from two national telephone/diary surveys conducted in 1996 and 1999/2000. An additional survey has also given harvest estimates for 2000/2001 using the same overall methodology.

It is recognised that fishing effort and harvest probably vary over a range of temporal scales in response to prevailing social, economic and environmental conditions, and it is not possible to conduct annual surveys of recreational harvest. Because the various telephone-diary

estimates of harvest were made using different approaches that can reasonably have been expected to produce widely different estimates, our current knowledge of between-year variability in recreational harvest is poor. This is likely to be an issue for fishstocks where the recreational catch is a substantial proportion of total removals (e.g., SNA 1, KAH 1). In the absence of being able to estimate the recreational harvest of key finfish in QMA1 each year, it is important to be able to monitor recreational fishing over time, in years where there will be no point harvest estimate. This objective is of high priority for monitoring recreational fishing for key fish stocks in QMA 1.

Objective 1

This objective would apply the methodology developed in *REC2002/02 Objective 3 - To develop an ongoing index of fishing effort for estimating the recreational harvest in the Hauraki Gulf.* As part of this objective, cost-effective web camera systems have been installed at two key boat ramps in the Hauraki Gulf, and these are used to collect data on boat traffic each minute, 24 hours a day. These data can be used to generate relative indices of boat ramp traffic, which is probably a reliable proxy for the number of fishing trips taking place over given time periods. Even though they were established to provide an "ongoing" index, however, the web-cams will be maintained under project *REC2002/02* only until April 2005 (although a further extension till 30 November 2005 has been proposed as part of *REC2004/01*, as have two additional systems for east Northland and the Bay of Plenty). An extension of the life of these systems is, therefore, proposed, in keeping with the original objective. Most of the cost associated with these cameras arises from their installation, although there are some costs associated with routine maintenance and data transmission.

Objective 2

Continuing the web-cam programme in the Hauraki Gulf, east Northland, and the Bay of Plenty, will provide new data on fishing effort and environmental conditions for the predictive model of fishing effort developed under project SNA2002/01. This will allow a "test" of the current model predictions (i.e., can fishing effort on particular days of given weather conditions be reliably predicted?) and, if necessary, further refinement of the model taking the new data into account.

Objective 3

This objective is designed to develop an index of relative recreational catch for key fish stocks, SNA1 and KAH1 for inclusion in stock assessment models. If fishing effort is the major driver of recreational catch, then it should be feasible to develop an index of (relative) recreational harvest from the index of fishing effort and some proxy for overall average catch rate. Such an index would undoubtedly have considerable uncertainty, but this should decrease over time as more data on the relationship between catch rate and environmental conditions become available.

Cost Recovery Information:

This project is 100% Crown funded.

The project is estimated to cost between $100,000 - $150,000.

Project: Selectivity of recreational catches in SNA 1

Project Code: SNA2005/04

Start Date: 1 October 2005

Completion Date: 30 September 2006

Vessel Use: None

Overall Objectives:

1. To determine the selectivity and post-release mortality of snapper targeted by recreational fisheries in SNA 1.

Specific Objectives:

1. To determine the selectivity of recreational catches for snapper in SNA 1.

2. To determine the size and condition of snapper returned to the water by recreational fisheries in SNA 1.

Rationale:

General

SNA 1 is the most important recreational Fishstock in New Zealand; the landed recreational catch is estimated to be >2000 t. The SNA1 stock is assessed and catch levels set using an age structured model. Accurate estimates of total catch (commercial + recreational) are therefore essential to robust stock assessment and management. Although the commercial catch is thought to be accurately reported, the diary surveys, previously used to estimate recreational take, are not considered accurate. Alternative methods, combining boat ramp surveys, over flights and video monitoring, are currently being trailed for estimating recreational harvest.

Recreational anglers fish close to the coast where they catch large numbers of snapper that are smaller than the minimum legal size (MLS). Many of these die, as a result of barotrauma and hook injury, when released. Quantifying release mortality is therefore essential to estimating total recreational removals. This project is consequently assigned a high priority.

Objectives 1 and 2

REC 2003/02 will investigate recreational discard proportions and mortality using daily diaries recording size and hook position of snapper released by anglers during the 04/05 fishing season. The proportion and number of snapper released by recreational anglers each year will depend on a number of variables, including: year class strength, juvenile growth and the seasonal distribution of fishing effort. Hook position, an important determinant of post-release survival, is largely influenced by hook size and type. It is therefore necessary to

continue this survey over several years to obtain realistic estimates of both the proportion of the recreational catch that is released and the proportion of released fish that die.

Methodology for this project will essentially follow that of REC 2003/01, but will include recommendations made by both Snapper and Recreational Working Groups upon reviewing the results of REC 2003/01.

Cost Recovery Information

This project is 100% Crown funded.

The project is to cost between $50,000 - $100,000.

Project: Distribution and abundance of toheroa on Ninety Mile Beach

Project Code: TOH2005/01

Start Date: 1 October 2005

Completion Date: 31 March 2007

Vessel Use: None

Overall Objectives:

1. To determine the distribution of toheroa (*Paphies ventricosa*) beds, and the abundance and size structure of toheroa on Ninety Mile Beach.

Specific Objectives:

1. To determine the distribution of toheroa beds, and the abundance and size structure of toheroa on Ninety Mile Beach. The target coefficient of variation for the estimates of absolute abundance is 20 %.

Note:

The duration of this project will be 18 months, 1 October 2005 to 31 March 2007. This is to allow the successful tenderer to report the results of the survey to the Shellfish Fishery Assessment Working Group in February-March 2006. The Ministry of Fisheries recognises the importance of the toheroa resource to customary fishers. The successful tenderer will consult with and involve tangata whenua in the conduct of this research project.

Rationale:

General

Toheroa represent an important Maori customary fishery and have historically also supported commercial and recreational fisheries of importance in Northland. Annual surveys of Muriwai, Dargaville and areas of Ninety Mile Beach were used to estimate the availability of toheroa during the 1960s. By 1967 the estimated stocks of toheroa on Northland beaches had become so low that the annual season for picking was closed to the public. Results from these surveys also showed that recruitment was highly variable and that the populations suffered large scale natural mortalities of both adults and juveniles. In 1993 surveys conducted in the north found only one animal of legal size. Recent anecdotal information suggests that the abundance of toheroa may have increased. Projects TOH9801 and TOH1999-01 have provided an updated assessment of the distribution and abundance of toheroa for Dargaville and Ninety Mile Beach, respectively.

The survey conducted in March 2000 (TOH1999-01) showed that the population size of toheroa over 14 mm (but under 75 mm) was 51.6 million (c.v. 19.8%), the highest abundance ever recorded from the beach. Only 1 million (c.v. 40.6%) were 75 mm or greater, with only 2 animals over 100 mm in length. Most of the population was composed of juveniles of less than 40 mm in length. On-going monitoring of this cohort would be invaluable in assessing whether this large recruitment event will translate into high adult toheroa abundance over the medium

term. In addition, estimates of abundance may shed some light on what post-recruitment factors (sources of mortality) are operating to keep adult population densities to low levels, relative to historical abundances.

Since 2000, there has been on-going and seemingly an increased harvest of toheroa from Ninety Mile Beach for customary fishing purposes. There has also been an initiative by local Maori to enhance the fishery by re-establishing toheroa in areas where beds once existed. There has been considerable discussion by tangata whenua about the increased use of the resource and the appropriate management of the customary harvest. MFish Compliance staff have undertaken regular patrols in the area to assist in ensuring that customary harvest is appropriately authorised and kaitiaki are supported where their efforts are aimed at sustaining the resource. As recently as September 2004, representatives of tangata whenua have met to discuss a proposal to stop issuing customary authorisations for the toheroa resource given concerns about the potential impact of such harvesting on the sustainability of the resource. A more recent estimate of toheroa abundance at Ninety Mile Beach is required to assist in management discussions about the nature and extent of future customary harvest.

Objective 1

This survey would provide an updated assessment of the distribution and abundance of toheroa on Ninety Mile Beach.

Determination of the population size structure may provide an indication of the health of the toheroa population and whether there is any evidence that the 2000 recruitment pulse has translated into high adult toheroa abundance. Spatial and size information will assist kaitiaki in managing the resource available for customary harvest.

Cost Recovery Information

This project is 100% Crown funded.

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