Whangarei Harbour Marine Application

Te Wahapu O Whangarei Terenga Paraoa

March 15, 2002

Application by Kamo High School

Developed by the Year 13 Geography classes 1990 -2002 and supporters

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15th March 2002

Compiled by Vince Kerr and the Kamo High School Year 13 Geography Class.

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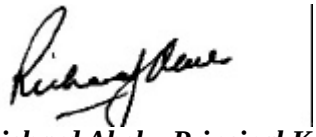
Foreword

In 1990, Kamo High School geography students, inspired by Dr Bill Ballantine - world authority on marine reserves - decided to advance a proposal for a marine reserve in Whangarei Harbour. This work would in part fulfill the requirements of their classwork, but they also wanted to do something for the environment that would make a difference. Since that early beginning, successive geography classes have continued with the proposal, building on the work of their peers from the previous year.

The students have spent a great deal of time discussing the proposal with the public, tangata whenua and key group leaders. They have gathered vital information to support the areas which have been proposed, using skills learned in class.

This is a unique proposal. No other school in New Zealand has ever embarked on such an ambitious project. All of the geography students of Kamo High School who have contributed to the development of this proposal can be justifiably proud of their efforts. This reserve will contribute in no small measure towards safeguarding an important piece of New Zealand's environment for people to enjoy far into the future.

Figure 1: Kamo High School students, Waikaraka



Richard Abel – Principal Kamo High School

Figure 2: Kamo high students, Waikaraka reserve area in background

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1. Summary

- **This application formally notifies the intention of the Kamo High School to apply for a marine reserve in the Whangarei Harbour, consisting of three areas; (1) Motukaroro, also known as Passage Island and Aubury Island, (2) Waikaraka and (3) Motumatakohe, also known as Limestone Island).**

- The application is the result of over 10 years of investigation of the Harbour system by the applicant to identify appropriate areas for protection.

- It is for a totally protected or 'no-take' marine reserve.

- Marine reserves should not and generally do not affect navigation in any way. To ensure this, the possible future need for the Portland Cement Company to dredge the channel area to the east of Motumatakohe Island has been provided for with a special provision in this application.

- The application document contains information on the history of this proposal and the processes undergone to consult with key stakeholders (including tangata whenua) and the wider public.

- This consultation has demonstrated widespread support from interested parties and the wider public for the establishment of a marine reserve in this area.

- Also described in this document are compromises or changes which have been made over the years in response to concerns expressed throughout the consultation process.

- Information is presented on the special, unique or representative features to be found in the three proposed areas. The likely implications of reserve establishment for existing human usage and the wider harbour ecosystem are discussed.

- The applicant refers to the New Zealand Government Biodiversity Strategy's stated objection to establish a representative network of marine protected areas in New Zealand.

- The application concludes with a number of management recommendations which include the formation of an advisory committee (including tangata whenua, local residents amd representatives of conservation, recreation and scientific interests) to assist the Department of Conservation in managing the reserve.

Anyone who wishes to make a submission supporting, or objecting to, this application should do so in writing by no later than May 15, 2002. Objections and submissions should be sent to:

The Director General
C/- The Conservator
The Department of Conservation
PO Box 842, Whangarei

A copy is required to be sent to:
Whangarei Marine Reserves
C/- Kamo High School
P.O. Box 7137,
Kamo,Whangarei

See Appendix 6 for a submission form.

2. Introduction

2.1 Application for a marine reserve

This is an application by the Kamo High School Year 13 Geography Class to establish a marine reserve in Whangarei Harbour, consisting of three areas: Motumatakohe, (Limestone Island), Motukaroro, (Passage Island) and Waikaraka.

It includes a description of the location and extent of the proposed marine reserve, the background to the application and an assessment of the effects that reserve creation may have on existing users.

This application has been prepared using the Department of Conservation's *Marine Reserves – A Guide for Prospective Applicants (1994) guideline.*

2.2 Purpose of marine reserves

S.3 of the Marine Reserves Act 1971 (MRA) establishes the general purpose of marine reserves as the preservation *"for the scientific study of marine life, areas of New Zealand that contain underwater scenery, natural features, or marine life, of such distinctive quality, or so typical, or beautiful, or unique, that their continued preservation is in the national interest"*.

S.3 also provides that, once created, marine reserves shall be preserved as far as possible in their natural state; that their marine life shall, as far as possible, be protected and preserved and that their value as natural habitat for marine life shall as far as possible be maintained.

2.3 Process for establishing a marine reserve

Marine reserves are established by an Order-in-Council made by the Governor-General, following the process set out in S.5 of the Marine Reserves Act (1971) (MRA). This process begins with consultation with the Director General of the Department of Conservation, public notification and the lodging of this formal application. The notification of this application and the details of the process are included in Appendix 1.

2.4 Role of the Department of Conservation

Under the Act, Kamo High School will refer any objections to the application to the Director General of the Department Conservation, who then forwards them to the Minister of Transport and the Minister of Fisheries for consideration on whether the objections should be upheld. If objections are upheld the application does not proceed. Kamo High School has the right as applicant to answer the objections in writing within three months of the notification of this application.

The Ministers may also consider any submissions in support of the application which have been included in the applicant's answer to objections. Such submissions in support may be relevant to the public interest to which the Minister is required to have regard (S.5(6)(e) MRA).

2.5 Responses invited

Any person may object to, or support, this application. All objections or submissions in support must be received within two months of notification of this application.

Anyone wishing to object or make a submission in support of this application must do so in writing by no later than **May 15, 2002**. See Appendix 6 for a submission form.

Objections and submissions should be sent to:

The Director General

C/- The Conservator, Department of Conservation, PO Box 842, Whangarei

A copy of your submissions are required to be sent to the applicant:

Whangarei Marine Reserves

C/- Kamo High School

P.O. Box 7137

Kamo, Whangarei

3. The Application

This marine reserve application includes three separate areas within the Whangarei Harbour. These are:

- An area of mangroves at Waikaraka on the northern coast of the harbour.
- An area surrounding and extending to the south of Motumatakohe (Limestone Island).
- The waters surrounding Motukaroro (Passage Island), opposite Marsden Point.

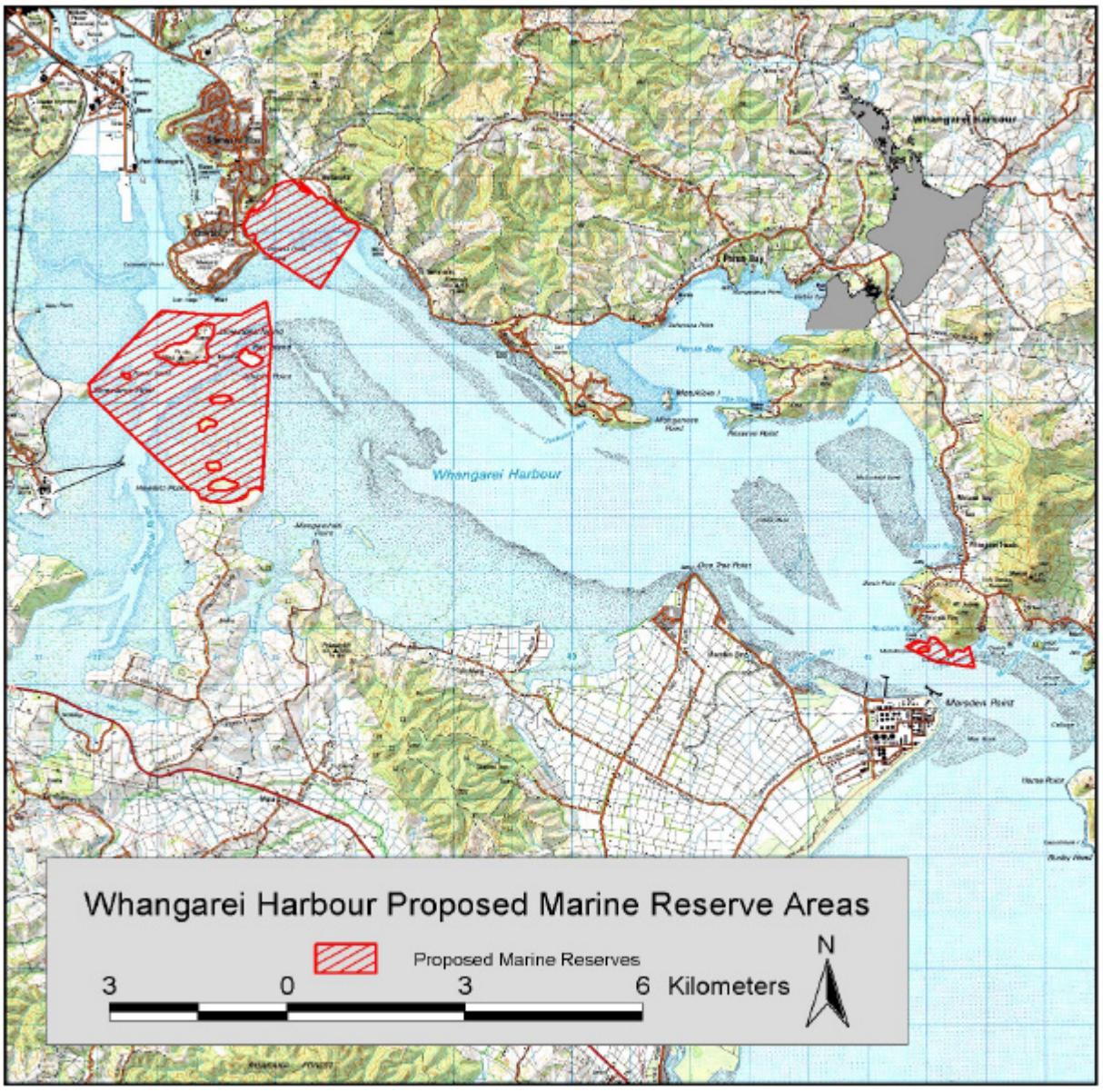
3.1 The Applicant

This application for an Order-in-Council under the Marine Reserves Act 1971 to establish a marine reserve that includes three areas within the Whangarei Harbour (Motumatakohe, Waikaraka, and Motukaroro), is formally lodged by Kamo High School on behalf of its Year 13 geography students.

3.2 Location

The three areas included in this application are all within the Whangarei Harbour system and are indicated on the map in Figure 3. Details of the boundaries are discussed in 3.4 and marker positions are listed in Appendix 3.

Figure 3: Whangarei Harbour Proposed Marine Reserve Areas



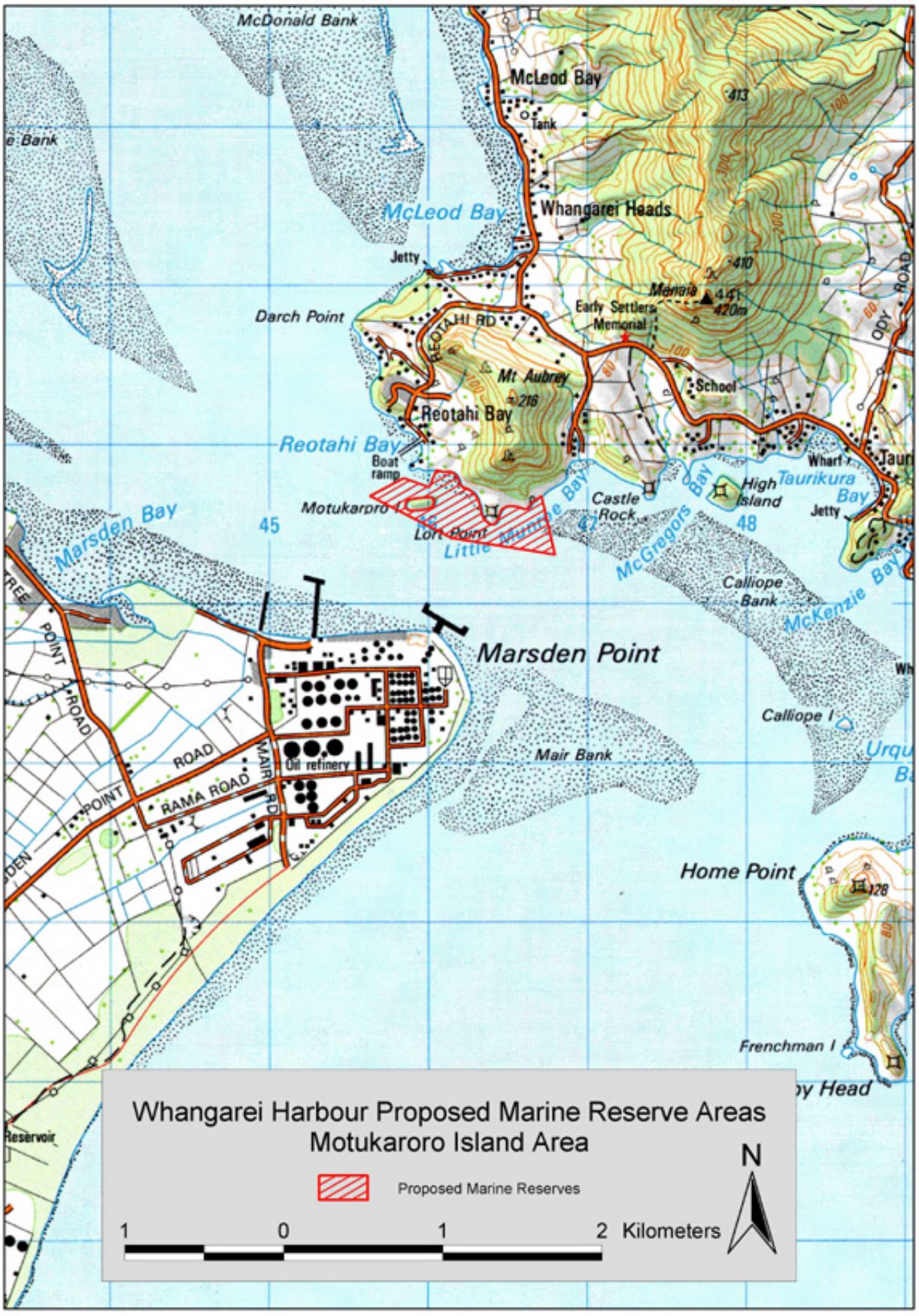


Figure 4: Motukaroro proposed reserve area

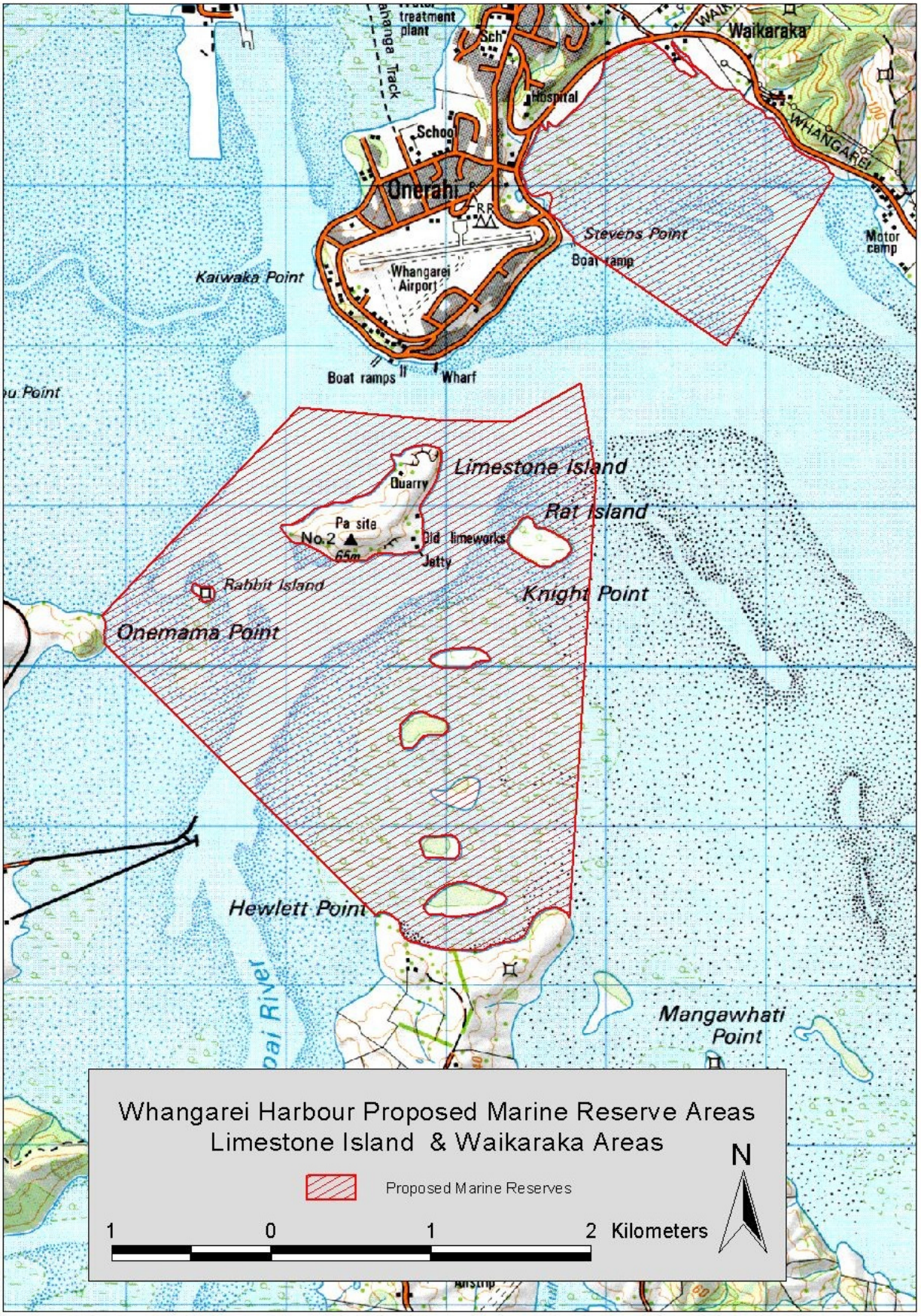


Figure 5: Limestone Island and Waikaraka proposed reserve areas

3.3 Name

The name of the proposed reserve is the Whangarei Harbour Marine Reserve.

3.4 Boundaries

Figure 3: Whangarei Harbour. An overall view of the harbour showing the locations of the boundaries and relative size for the proposed areas.

Figure 4: Motukaroro (Passage Island). The seaward boundaries of this area cannot be established using posts as the outer depths make it impractical. The channel boundary is marked by existing buoys. The present G.P.S location of the buoys has been used to define the channel boundary for this application. The western-most part of the boundary is located by aligning a shore post with the isolated danger marker which then links with a rock before rejoining the main shoreline. The shore boundary is defined as Mean High Water Spring, (MHWS). Note that the local fishing wharf at Reotahi has been excluded from the reserve.

Figure 5: Waikaraka. This area is marked from a boat ramp on the eastern edge and goes out in a straight line to the edge of the channel, where it then turns back into a landmark on the other side of the bay at Stephen's Point. The channel marker is a fixed red and white post. The shore boundary is defined as MHWS with the exception of where private titles adjoin the boundary in which case the boundary is defined as the reserve boundary. (A further exception is proposed for allotment 451 on the western end of the proposed reserve area. For this parcel of private land which extends beyond the MHWM; the reserve boundary will be defined as the title boundary. See 6.5, 8.3 and Appendix 3 for further details relating to this and other properties adjoining the reserve.

Figure 5: Motumatakohe (Limestone Island). This area is roughly triangular and encloses Motumatakohe and its nearby islands. The boundary extends from Onemama Point in the west to the south side of the main channel between Motumatakohe and Onerahi. Following this channel line, the reserve boundary turns to the south to include Rat Island, reaching Hewlett Point. The boundary then follows the coast west before connecting back to Onemama Point. The shore boundaries of the Hewlett and Onemama Points are determined by the title boundaries of private title adjoining the reserve at these two points. The shore boundaries of Motumatakohe and its nearby islands are defined as MHWS.

3.5 Objectives

The Whangarei Harbour Marine Reserve's main objectives are:

1. To protect and maintain the marine ecosystem at the highest possible level, so marine life can flourish.
2. To conserve, protect and enhance the greatest possible variety of marine life, ranging from the rare to the typical or representative.
3. To establish a marine reserve of high recreational value.
4. To form a link in a national network of marine reserves.
5. To raise public awareness of our relationship to and responsibility for our coast and marine life.
6. To establish suitable areas for scientific study.
7. To establish marine reserve areas that represent the values of the inner and outer harbour habitats.
8. To raise the public's awareness and understanding of marine biodiversity conservation.
9. To develop reserve areas which complement and are contiguous with land reserves already in place, thus creating a connected sequence of protection from land to marine habitats.
10. Protect a sequence of mangrove and mudflat habits and channel areas.
11. Protect a unique rocky reef habitat near the harbour entrance.

4. Application Background

4.1 Origin of the Proposal

In 1990 a group of Kamo High School Year 13 geography students, led by teacher Warren Farrelly, decided to investigate the establishment of a marine reserve in Whangarei Harbour with the aim of creating something permanent to benefit future generations.

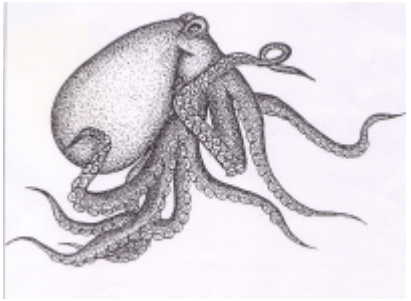


Figure 6: Student drawing of Octopus

Concern about the ongoing damage to Whangarei Harbour's marine environment had been growing for years and continues to be expressed by, among others, the Department of Conservation and the Royal Forest and Bird Society. Since 1990, geography students have continued to study the increasing depletion and pollution of marine life in the harbour.

The following essay by student Samara Sutherland sums up the thinking that led to the early proposals and this current application.

"Surrounded by a vaster expanse of water than any other nation, New Zealand has the opportunity to lead the world in marine conservation … There needs to be an area set aside for the undisturbed continuation of marine life. If nothing is left intact, how can we even assess the extent of the damage that has taken place? The idea isn't to exclude people, in fact, it is quite the opposite. We want a place where our children can stand in the mangrove mud, touch the kelp, feel the spikes of the crayfish and watch the schools of fish swim by, instead of just reading about these experiences in books and seeing them on television. In short, marine reserves are all about people co-operating to preserve a small part of the natural environment for themselves and their grandchildren to enjoy."

4.2 Consultation & Investigation

Since 1990, the applicant has engaged in a wide range of consultation and study of the proposed reserve areas in this application. Iwi Maori, the

general public, recreational and commercial users, Govt. departments and a comprehensive list of affected parties have been contacted and consulted. Highlights of this work are summarized in Appendix 2.

Proposals have been produced and distributed in the community in the years 1993, 1994, 1998 and 2001.

A series of public opinion surveys were conducted from 1993 – 2001 and are discussed in 4.2.1. See Appendix 7 for survey results.

Throughout the consultation and investigation process the Year 13 geography classes have gained approval in principle from many organizations, notably including:

- Department of Conservation
- Royal Forest and Bird Society
- Northland Port Corporation
- ACI Glass NZ Ltd.
- Friends of Limestone Island

Public consultation throughout the last decade has revealed a strong level of support for these proposed areas from all sectors of the community.

During 2001-02 the applicant has focused on updating stakeholders on the peparation of this application. A series of meetings was held with Northland Port Corp, Northland Regional Council, Portland Cement Works and DoC on details of boundaries. Presentations and consultation took place with the Resource Management Unit of Ngatiwai Trust Board, Ngatikahu and Te Parawhau & Te Waiariki hapu. Meetings were held with DoC and NRC officers through the year.

In Nov / Dec 2001, 700 copies of the proposal update were distributed in the community calling for submissions on the proposal. Detail of the final stage of pre-statutory consultation is summarized in Appendix 2.

4.2.1 Public Opinion Surveys

To make a marine reserve a success in any part of New Zealand it is vital to achieve and maintain extensive community support. This is nowhere more true than in a location such as the inner Whangarei Harbour, which forms an integral link between local residents and the water which surrounds them.

Monitoring of general public response to this marine reserve proposal has stretched across 9 years (1993-2001) and over 3000 questionnaires.

Surveys were distributed in a number of different ways:

- To the Kamo High School population, students and teachers
- To the letterboxes of Reotahi, Onerahi and Waikaraka residents
- To local shops in areas surrounding the proposed reserve areas
- To the Northland Regional Council for members of the general public to access
- Collection posts were placed at the Onerahi Post Office, Onerahi Public Library and the Whangarei Central Library.

The results of this work have been overwhelmingly positive, with 80% of survey respondents expressing support for the establishment of marine reserves in the Whangarei Harbour. Various questions were asked about all three of the proposed reserve areas. There were no questions asked that received an overall negative response. Further details are included in Appendix 7.

General results

Over half of 3338 respondents from 1993–2001 believe that marine reserves are **vital** to protect New Zealand's heritage. Less than **one percent** consider marine reserves to be unnecessary in New Zealand.

This is an overwhelmingly positive response, indicating a high level of public awareness of the need for protection and enhancement of the marine environment.

This result is supported by a study of communities affected by marine reserves or marine reserve proposals (Wolfenden, Cram & Kirkwood, 1995), which describes nearly 94% community support for the establishment of marine reserves in New Zealand.

Over 80% of respondents visit the waters around Whangarei Harbour either often or occasionally; however, while more than a third believe that marine life in the harbour has declined greatly in recent years, no-one was prepared to state decisively that it has not.

The applicant acknowledges possible bias in the above information towards younger respondents (from Kamo High School) and those predisposed to proactively support reserve formation. However, the sample size is extremely large (over 3000).

Social impact assessments undertaken *after* reserve establishment (e.g. McCraw & Cocklin, 1997) show a pattern of initial opposition replaced by growing support; in other words, communities warm more and more to the idea of marine reserves the more they are exposed to them.

This bodes well for the current proposal, given the strength of support *already* present in the Whangarei community and demonstrated in the survey results.

The support that accrues *after* reserve establishment is nowhere better demonstrated than at the Cape Rodney – Okakari Point (Leigh) marine reserve, which now has almost unanimous support from homeowners and strong support from visitors and local businesses (Cocklin & Flood, 1992).

Concerns raised in public consultation

Despite the strong overall support for the proposal, a small number of concerns were expressed along with the many positive comments made about the proposals.

- People wanted to know how the reserve boundaries would be defined and the reserve enforced
- Some were concerned about the loss of recreational fishing at Motukaroro and Motumatakohe
- Others raised the issue of the proximity of the reserves to a potential marine hazard, namely Marsden Pt Oil Refinery.

4.2.2 Specific issues and concerns

Commercial Fishing and Charter Operators

In June 2000, the applicant met with the Northland Fisheries Liaison Committee. Twenty-six people representing the full spectrum of commercial fishermen, charter operators, Iwi, and government agencies were in attendance. The meeting expressed general support for the marine reserve proposal and the work that the students had done. Some criticisms were raised over the handling of the proposal and the long timeframes which had eventuated. There were *no* objections recorded concerning any adverse effects of the proposal on commercial fishing interests or fish stocks.

In a recent meeting with commercial flounder fishermen of the Whangarei Harbour concerns were expressed about the degree to which the Waikaraka and Motumatakohe proposed reserve areas would impact upon effective fishing area in the Whangarei Harbour. These concerns have been researched by the applicant and are further discussed in 6.2.

Reotahi Bay, Wharf and Motukaroro

Two specific concerns about this proposed reserve area emerged from the public consultation detailed in 4.2.1:

- The current use of the Reotahi wharf for recreational fishing (particularly by children)
- The preferential use of Motukaroro by fishermen as an anchorage under certain conditions.

The applicant's response was to exclude the Reotahi Bay wharf area from the proposed reserve. As the anchorage area at Motukaroro is central to the proposed protection scheme, it cannot be excluded.

Small numbers of local recreational fisherman have voiced concerns over losing access to fishing near Motukaroro. The applicant believes however that this is a minority opinion, based on the extensive surveys it has done. The survey results include the support from the Outboard Motor Club, expressed in 1998 despite opposition from some individual members. The club expressed

concerns about increasing fishing pressure on the area witnessed in recent years.

Implications for recreational fishing and small boat anchorage in the proposed reserves are further discussed in 6.2 and 8.2 respectively.

Motumatakohe area

Throughout the survey period (1993-2001) a small number of individuals have continued to object to the loss of fishing access to the 'hole' which lies to the west of Motumatakohe, despite majority support for the current proposal (see 4.2.1).

The applicant has examined various boundary alternatives, as discussed in 4.2.2; maps of the options investigated can be found in Appendix 4. However, the retention of the 'hole' is deemed necessary by the applicant in order to satisfy the main objectives of this proposal, as listed at the beginning of this section.

Implications for the few recreational fishers to be affected by the inclusion of this 'hole' are discussed in Sec. 6.2.

4.2.3 Tangata Whenua Consultation

The Whangarei Harbour, Terenga Paraoa, has a long and very complex history of Maori settlement. Three northern tribes - Ngatiwai, Ngapuhi and Ngati Whatua - settled around its shores, in productive valleys and along the coast. At times there has been fighting, at times peace and co-operation.

The hapu of these tribes who are the tangata whenua, tangata moana of the harbour are: Te Waiariki, Ngati Korora, Te Uriroroi, Te Parawhau, Te Ngati Kahu o Torongaro, Ngati Hau, Te Tarewa, Ngati Pukenga, Ngati Wairoa, Ngai Tu (hukea), Te Whui ki Whangarei, and Ngati Hao.

Figure 7: Crab, Waikaraka

Consultation with Ngatiwai Trust Board

In 1991, when the proposals were first discussed, the Ngatiwai Trust Board was approached for input as the local organization representing tangata whenua.

However it wasn't until Trust Board chairman, the late Witi McMath, was sure the students were willing to work on a serious proposal that they were referred to the Board's Resource Management Unit, with whom they worked from 1993.

While the Motukaroro proposal was finished in 1992, a visit by Dr. Bill Ballantine in 1993 prompted students to expand their original proposal to include two more areas - Waikaraka and Motumatakohe.

As additional information for these areas was being collated, several discussions took place between students and Ngatiwai Trust Board representatives. Each year Ngatiwai made suggestions that helped the proposal along.

Towards the end of 1995, the first edition of the proposal was completed and the Ngatiwai Resource Management Team agreed to review it. This session was videoed by the students and is held at the Geography Department of Kamo High School. The video focuses mainly on the role of the Resource Management Act and the Treaty of Waitangi.

During 1996 the Ngatiwai Trust Board expressed interest in sponsoring the proposal through to Government on the applicant's behalf. Student Scott Linklater also researched and wrote *'Maori Tradition in Relation to Marine Reserves'*, from the point of view of his Iwi, Te Roroa. He presented this document to the Ngatiwai Trust on their second visit. Although this document was not written from a Ngatiwai perspective, they recommended that it should be included in the updated proposal (see 6.1).

In 1997 the proposed Deepwater Port at Marsden Point dominated discussions. Both parties agreed that the Ngatiwai submission against the Port would take precedence over completing this proposal. KHS also agreed to present evidence during the Ngatiwai Submission to the Commissioners of the Hearing.

This hearing took place in July 1997 and was attended by four students speaking on behalf of KHS. They were congratulated by the Commissioners on their work and asked general questions concerning the marine reserve proposal. They were also asked *"Should the proposed Port go through? How will it impact on the proposed marine reserve?"* The answer was based on an entry in the supporting evidence entitled *''The Effects of the Proposed Deepwater Port on the Marine Reserve Proposal – Hypothesis"*(Ngatiwai Trust Board 1997).

The Resource Management Unit of the Ngatiwai Trust Board put forward a lengthy submission calling for restoration of the natural values and the mauri of the harbour system, supported by the Kamo High marine reserve group, conservationist Wade Doak and Vince Kerr, lecturer of Northland Polytechnic's Environmental Management Programme. These submissions in support of Ngatiwai argued for the importance of establishing marine reserves and a significant 'mitigation fund' for harbour restoration if the proposed forestry port was granted consents (Ngatiwai 1997).

Following the hearing, Ngatiwai Trust Board contacted the applicant with the news that the combined hapu group 'Nga Kaitiaki O Whangarei Terenga Paraoa' had formed to manage the Northland Port Corp. Forestry Port Mitigation Fund. At the time Ngatiwai Trust Board believed that this would be the appropriate tangata whenua organisation to fulfill the role of sponsor.

In February 2000 a hui was held with KHS students and the Ngatiwai Trust Board. Up for discussion was the effect of the new port on the marine reserve, how customary fishing rights will affect the reserve areas and how these areas will be policed. These were Ngatiwai's major concerns about the proposal, although the Board was supportive of the overall intention and objectives of the proposal.

In 2001 further discussions with Ngatiwai took place and a formal presentation of the updated proposal took place. Representatives of the Ngatiwai Resource Management Unit continue to express concerns about the difficulties of advancing their aims to re-establish traditional management of the moana, but have been supportive of the aims of the marine reserve proposal for the Harbour.

On Dec 6th 2001 a meeting was held in the offices of Ngati Kahu with representatives of Te Waiariki, Te Parawhau and Te Patuhareke. The proposal and aims were presented. General support for the conservation aims was expressed, as was emphasis on the traditional mana of the hapu groups present over the waters of the Harbour. It was stressed that traditional management and use was extensive and involved the entire Harbour. All present strongly supported the need for the hapu of the Harbour to work closely together in future on management and conservation concerns. This meeting ended with each representative wishing to consider the proposal further with their people. Discussion with the Harbour's hapu groups continued to the time of application. The applicant's recommendations on issues affecting Iwi are detailed in 6.1 and 8.5.

4.2.4 Boundary investigation and justification

The following list of considerations was developed early on in the process of identifying marine reserve boundaries.

The boundaries shall:

- Protect a wide range of mud-flat and mangroves habitats
- Protect the spawning and feeding fish inhabiting the mangroves and surrounding waters
- Be clearly identified by existing markers and have shore boundaries which are as simple and practical as possible and clearly marked
- Include a wide variety of water depths, encompassing a full range of habitats and marine life
- Combine with land reserves at Motukaroro and Motumatakohe to establish a full sequence of protected habitats spanning terrestrial and marine environments.

Boundary issues regarding the three proposed reserve areas and their resolution follow. See Appendices 2 & 3 for details of recent boundary consultation and co-ordinates.

Motukaroro

The first issue raised was over the location of Motukaroro Island's boundaries was the requirements to Northland Port Corp.'s dredging operation. Dredging would not normally be allowed within a marine reserve. Northland Port Corp. needs, at times, to dredge the main channels so that bigger ships can enter the Harbour. Discussion (see Appendix 2), has resulted in boundaries both groups can agree on which exclude the skipping channel from the marine reserve.

The other main issue concerned the marking of the boundaries. Initially it was thought that existing channel markers attached to the bottom by chains could be used. However, questions arose over whether or not this would be appropriate for the legal definition of the boundry.

In consultation with Northland Port Corp. it was decided that floating navigation marks were inappropriate due to the requirement to move them for inspection on a regular basis (marine reserve boundaries must be fixed). As an alternative arrangement it was decided to use the current G.P.S locations of the navigation markers. Northland Port Corp., Northland Regional Council and Department of Conservation staff have assisted the applicant with the collection and mapping of G.P.S. data for boundary markers. This data is included in Appendix 3.

Waikaraka

No significant issues have arisen over the placement of boundaries for the Waikaraka reserve area.

Motumatakohe

A change since the 2000 draft proposal sees the channel lying between Motumatakohe and Rat Island included in the marine reserve boundary. In consultation with the Department of Conservation, the applicant has learned that it is possible to allow maintenance dredging to continue in the channel by including a provision in the Order-in-Council that establishes the marine reserve.

For explanation of the rationale behind this decision and the likely implications for commercial interests, see 6.4.

Recreational fishing

Two possible variations for the marine reserve boundary on the western side of Motumatakohe were investigated following the return of survey forms and after discussion with local fishing interests, as detailed in 4.2.2.

Maps of the considered variations are included in Appendix 4. The applicant believes potential ecological gains for the entire reserve system will produce benefits for these fishermen to outweigh the inconvenience of losing one fishing location. See 6.2 for further discussion of likely impacts upon local recreational interests.

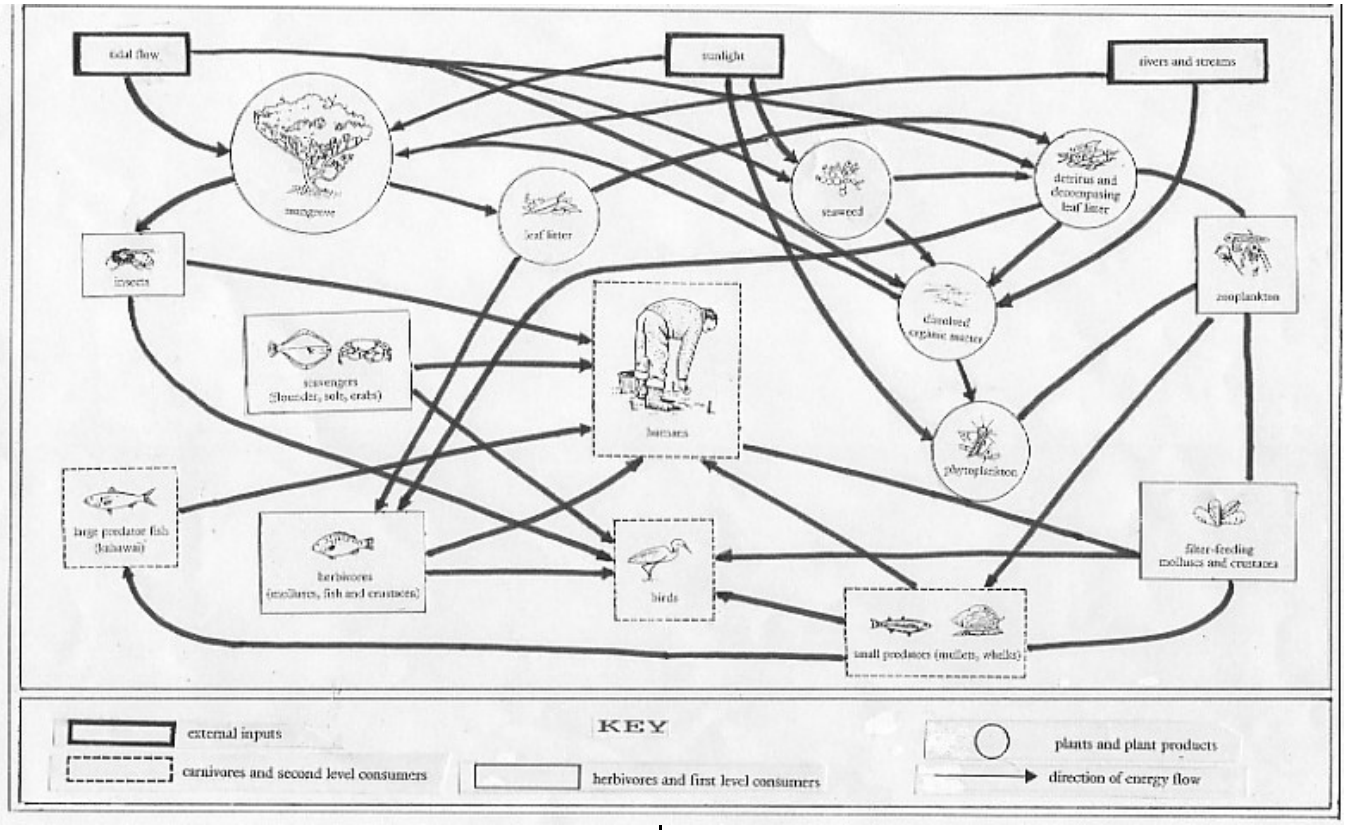


Figure 8: Food Chain at Waikaraka marine reserve area

5. Values and significance of the proposed marine reserve

5.1 Natural values of Whangarei Harbour

5.1.1 The natural processes of Whangarei Harbour

The natural values of Whangarei Harbour are among the most important in Northland waters. These waters are vital for the life cycle of many fish coming in to the sheltered inner Harbour waters, as juveniles and/or adults.

The physical oceanography of the harbour is described in Northland Harbour Board's 1986 report, *Whangarei Harbour Study*. In this report the Motukaroro reserve area is described as in the 'lower harbour'. (See figure 15 for a map of the harbour divisions described here.) This part of the harbour is described as a well mixed part of the estuary with a stable entrance and bathymetry. Current flows are significant and fastest velocities are reached in the shipping channel. Bottom sediments are similar to beach sands of Bream Bay.

The Waikaraka area is described as in the 'middle harbour' area . Salinity and water temperatures are similar to Marsden Point. Ebb and flow speeds are similar and current velocities are approximately half of what they are at Marsden Point. Sediments are made up of fine to medium sands and are derived from the drainages that flow into the harbour and the Portland Cement sediments.

The Motumatokohe reserve area straddles the division between 'Upper and Middle' areas of the harbour. Current flows in the Upper harbour are less than the middle generally, but at times of flood higher velocities of fresh water occur on the surface. Sediments are fine sands and mud and are predominantly derived from Portland Cement sediments. Water from the Upper harbour areas generally flows down the harbour with the falling tide, with much of it returning again with the rising tide.

The three proposed areas of this application provide a full sequence of harbour habitats ranging from lower harbour mud-flats, shell banks and channel edges, mangroves, and the subtidal holes and channels of Motumatakohe to the middle harbour intertidal mud flats and mature mangrove of Waikaraka. Lastly Motukaroro is an ideal example of lower harbour rocky reef and channel edge environment.

Each of the habitats in the sequence has its own communities of marine life. (see Appendix 5). All are highly productive and play significant ecological roles in the harbour system.

5.1.2 Proposed ecological effects of conservation and restoration in Whangarei Harbour

- Marine life will return to and flourish in the area as a result of the restoration of the marine ecosystem around Motumatokohe and its nearby islands, Motukaroro and the Waikaraka mangroves and mud flats.
- The marine reserve areas at Motumatakohe and Motukaroro will provide a unique, protected ecological sequence of habitats, from forest to subtidal marine areas.
- Some marine life is likely to spill out of the protected areas into the rest of the harbour.
- The marine reserve areas will help to maintain and enhance learning opportunities leading to the better understanding of the ecology of the harbour and dynamics of restoration.
- The marine reserve areas will ensure the preservation of marine life for the enjoyment of future generations.
- The marine reserve areas will provide important monitoring opportunities.

5.2 Values of the three proposed marine reserve areas

The three areas of this application make up a system and an ecological sequence of marine habitats. They will work to protect areas of each habitat and they will support each other and the whole system. In marine systems habitats and their communities are highly connected. This is especially important in harbours. There are many examples of fish that we commonly see using the various habitats of the harbour at different times. There is also much interdependence that we cannot easily see such as larval dispersal, plankton enrichment and migration of freshwater species.

5.2.1 Motukaroro Island

Motukaroro Island is situated approximately 25 kilometres down the harbour from Whangarei City, opposite Marsden Pt, and is an extension of the rocky shore of the northern part of the harbour. It has a narrow channel on its northern side with moderate-flowing water that is sheltered from the wind.

The intertidal species of Motukaroro are listed in Appendix 5 .

The seabed surrounding Motukaroro is rocky with large areas of kelp, providing a haven and feeding ground for an unusually high diversity of fish including scorpion fish, kelp fish, red mullet, snapper, red moki, john dory, blue maomao, kingfish, spotty and leatherjacket (see Appendix 5). Located on the westward point you can find a large fragile environment of filter feeders, including anemones and sponges, whose brilliant array of colours provide a spectacular dive.

On the Marsden Pt side, the waters are deeper, wider and swifter. The habitat surrounding Motukaroro generally are very rich in diverse species. The number of fish species is very high compared to most mainland rocky reef sites. See Appendix 5 for species list. A student drawing of the subtidal zonation of Motukaroro island is included shown in figure 18.

Figure 9: Student drawing - representing subtidal area of Motukaroro at approximately 10 meters

A unique tidal action and habitat

Because Motukaroro is situated in the narrows of a considerable funnel shaped landform, the outgoing tide in particular produces dramatic velocities. The effects of this tide give the proposed reserve a lot of its character.

At peak flow, water from the outgoing tide careens past and into the western end of Motukaroro. Bottom sediment is swept away and even coarse sand is bowled along by the force of the considerable current. It is the strength of this tidal flow that scours and deepens the bottom here (see Fig. 14).

Drogue (surface floats) studies carried out by the applicant show that the outgoing tidal flow comes from the shallow muddy coves that make up McLeod and Parua Bays. This water contains a rich soup of nutrients, which sustain the abundant anemones and filter feeders on the western underwater slope of Motukaroro. The colour and brilliance of the marine life on this slope is stunning ; few sites anywhere in New Zealand can match it.

Outgoing water, coming from the inner and southern side of the harbour, streams past the south side of Motukaroro as a separate flow. This flow does not appear to have an impact on the waters surrounding Motukaroro.

Benefits for ecosystem and community

A large tidal flow from the sea and inner harbour ensures a good supply of nutrients in the deep waters around Motukaroro, promoting varied and healthy marine life.

The nutrients in the tidal flow produce a rich growth of minute plants (phytoplankton). These feed animal plankton, larval fish and shellfish, which in turn feed the larger fish. These interrelationships make Motukaroro a very interesting dive site; you can see a lot of things close to shore which you would normally have to go far off the coast to see.

Recreational and educational opportunities at Motukaroro

The proposed marine reserve would maintain, if not enhance, recreational and educational activities, not only in the short but very definitely in the long-term. Its close proximity to Whangarei city makes Motukaroro an asset to tourism as the island is more accessible than other marine reserves such as the Poor Knights Islands. Motukaroro is only 150 metres off Reotahi Bay making it much easier to study, photograph and observe.

5.2.2 Waikaraka

Figure 10: Student drawing

The proposed marine area at Waikaraka is almost entirely mangrove forest with associated intertidal mud flats and a subtidal channel edge. (See figures 11 and 15) To the seaward side, the mangroves are mature and large. They become smaller as you move near the shore. The area is readily accessible due to the closeness of roads on its southern and western sides.

Mangroves: a very special habitat

The species *Avicennia Marina* var. *Resinifera* extends from the tropics to further south than any mangrove species in the world. Its habitat range stretches from the north of the North Island to Raglan Harbour on the West Coast and Ohiwa Harbour on the East. In the far north it may grow to large trees, while in the extreme south of its range it generally grows as stunted bushes, sometimes no more then 30 cm high.

Mangroves are the only trees which will grow in areas regularly covered by sea water, growing in quiet waters where the mud or sand is fairly stable and plants can take root.

Mangroves are the architects of their own environment:

- They keep the channels clean and deep.

- They prevent erosion by building the banks around them.

Mangrove forests are one of nature's most highly productive zones. The gently flowing waters and mud surrounding their pneumataphores (roots) are home and nursery to many organisms; fish and shellfish as well as worms, crabs, shrimps and cockles. Fish like snapper, trevally, kahawai, kingfish and mackerel spend important parts of their lives among mangroves; thereby contributing to the replenishment of fish stocks in the harbour. The trees also provide shelter and food for a wide variety of bird life using the marine area.

Figure 11: Waikaraka aerial photo

Benefits for ecosystem and community

Mangroves can be studied, explored and developed in a multitude of ways. They can be made accessible to anyone and everyone, as boardwalks already established throughout the North demonstrate. A reserve at Waikaraka would create an extremely valuable resource for scientific, educational and conservational interests while avoiding adverse impacts on most current recreational uses of the Harbour. The ease of access of this site is another asset.

Recreational and educational opportunities at Waikaraka

Recreational and educational activities are likely to be maintained and enhanced. Being so close to Whangarei City means visitors and students already have easy access to Waikaraka. Non-exploitative recreational activities such as kayaking and sight seeing would be enhanced by this proposal, and as demonstrated by public consultation (detailed in 4.2.2) there is already widespread support for the protection of this unique habitat from exploitation.

A marine reserve focused on the protection and enhancement of existing mangrove habitat would have an extremely important role to play in public awareness and education schemes.

5.2.3 Motumatakohe

Figure 12: Motumatakohe

The proposed reserve area around Motumatakohe represents a unique assembly of upper harbours habitats. The area is dominated by Motumatakohe itself which creates a division of the main channel and the Mangapai channel. The area of subtidal habitat within these channels is significant in size. The channels bend around Matakohe island and include some deeper areas where the channels converge. The subtidal channel areas join with extensive intertidal flats. These soft bottom mud and sand habitats vary from nearly clean sand to fine mud. There are also areas of shell banks. Benthic species found in these environments are listed in Appendix 5.

The southern part of the reserve area also includes a unique area of tidal flats that merge into young mangroves and a variety of salt marsh habitats around the tiny islands of this area. This area is relatively undisturbed by human activities and supports myriads of marine animals that many sea birds and larger fish feed upon.

The waters around Motumatakohe host such species as leatherjacket, eagle ray, snapper, flounder, grey mullet, snapping shrimp and stalkeye mud crabs, which make use of the mangroves and mudflats for nourishment and breeding.

The intertidal habitats of the Motumatakohe reserve are important feeding areas of a number of rare and endangered native birds, a list is included in Appendix 5. A marine reserve would provide protection for the continued productivity of these delicate marine habitats.

Figure 13: Motumatakohe reserve area aerial photo

Benefits for ecosystem and community

Intertidal areas and islands

The proposed marine reserve area around Motumatakohe includes a complex array of mudflats, limestone shoreline, sand/peat spit islands and channel edges, with six small islands lying to the south west, south and south east. See figure 15 for a habitat description map showing major habitat divisions, (Mason & Ritchie 1979).

Knight Island is the northernmost island and is closest to Limestone Island. Four unnamed sand islands form a chain south of Knight Island to Hewlett Point, while a fifth lies between Hewlett Point and Mangawhati Point, at the entrance of Skull Creek. Rat or Pirate Island lies to the east of Knight Island. The smaller islands are sand humps with *salicornia* (glasswort) beds, saltmarsh and some grass, which may be covered by water during high spring tides. Mangroves surround the islands.

These islands have been identified and registered as Sites of Special Wildlife Interest, and ranked of Outstanding Wildlife Value (Ogle, 1982). 'Outstanding' is the highest wildlife ranking and is given to habitats considered of national or international importance.

Southern black-backed gulls breed on the unnamed islands. Pied stilt and other waders may also breed there.

Recreational and educational opportunities at Motumatakohe

Motumatakohe (Limestone Island) is conveniently situated in Whangarei Harbour, making it relatively easy for visitors to access. It is a popular area for the whole range of harbour activities; see 6.3 for a full description of these.

5.3 Scientific Studies of the Area

Each year dating back to 1990 (for Motukaroro) and 1993 (for Waikaraka and Motumatakohe), the Kamo High School Year 13 Geography students have visited the proposed marine reserves. Numerous dives on snorkel and scuba have been completed at the Motukaroro site. These have been observational in nature, with the students learning about the habitat and marine life to be found there. Accounts of these investigations appear in 5.5. Several Department of Conservation biologists have joined in these dives and were impressed with the diversity of marine life around the island.

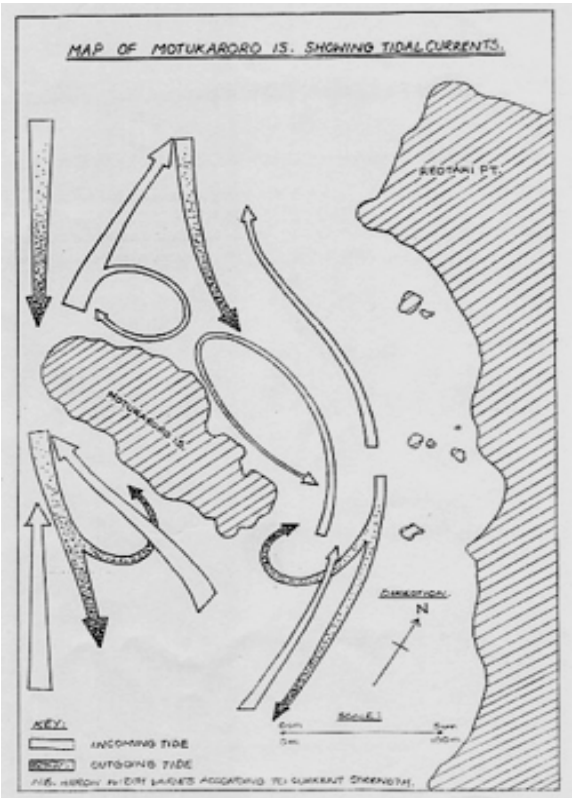


Figure 14: Tidal currents around Motukaroro

In 1996 the KHS class completed a study of the currents around Motukaroro Island. This study was undertaken by observing floats and dyes released at nearby points at various times in the tide cycle. The results of this work illustrated the special nature of Motukaroro's position in the harbour. Results of this work are discussed further in 5.2.1 and illustrated in Fig. 14.

Other notable diving records of the class and teacher Warren Farrelly include an underwater sighting of Orca, and discovery of a rare and little studied Spanish lobster, *Scyllarus aoteanus* (see 5.5).

In addition to biological investigation, the applicant has developed a series of surveys to study community reactions to the proposal. This survey effort is the largest of its kind yet completed in New Zealand and is reported on in 4.2.1.

Other Scientific Studies

Auckland University

For over two decades Auckland University has brought students to the outer reaches of the Whangarei Harbour for marine studies field work. The island of Motukaroro has always featured in these studies. Dr. Bill Ballantine has featured photos of the ecological zonation of the intertidal slopes of the island in many of his slide shows and lectures. See Figures 9 and 18 for an example of KHS students' illustrations of the habitats at Motukaroro.

Historic ecological studies

Whangarei Harbour and its environs has been the subject of considerable study since the early seventies. Early work was based on developing an understanding of the impacts of industrial and urban developments in Whangarei City, Marsden Pt, Whangarei Port and Portland Cement Works. This work is best summarized in the 1986 *Whangarei Harbour Study (draft).* This report has fourty scientific works listed in its bibliography and offers a comprehensive description of harbour habitats, changing processes and detailed descriptions of biological communities. Amongst this early work there are important studies by the Ornithological Society of New Zealand and the NZ Wildlife Service; a local group of the Ornithological Society retains a consistent annual monitoring effort of bird use of the Harbour. A MAF study (Mason & Ritchie, 1979) was notable for its map of the harbour's soft sediment shellfish communities and study of fish diet in the harbour. (See figure 15) This period of time was also an active period of investigation into mangrove habitats and ecology in Northland. Two publications (Northland Harbour Board, 1984 and Nature Conservation Council, 1984) summarise information particular to Whangarei Harbour and are listed in the reference section of this application. A significant subtidal survey was carried out at Motukaroro in 1990 by Dr F. Brook as part of the Department of Conservation's coastal resources inventory program. This work is referenced as *Brook 2001* in this document and is incorporated into the species lists of Appendix 5.

Based on knowledge established in the 1980s, the Northland Regional Council has in place an annual water quality monitoring program which targets physical parameters in the harbour system. There is now a need to update ecological and biological knowledge of the harbour systems. The comparison of present with historic data will increase understanding of how impacts of the last twenty years have affected Harbour ecology. This understanding, in turn, will be helpful in setting priorities for restoration work in the future and for better targeting of monitoring and research efforts.

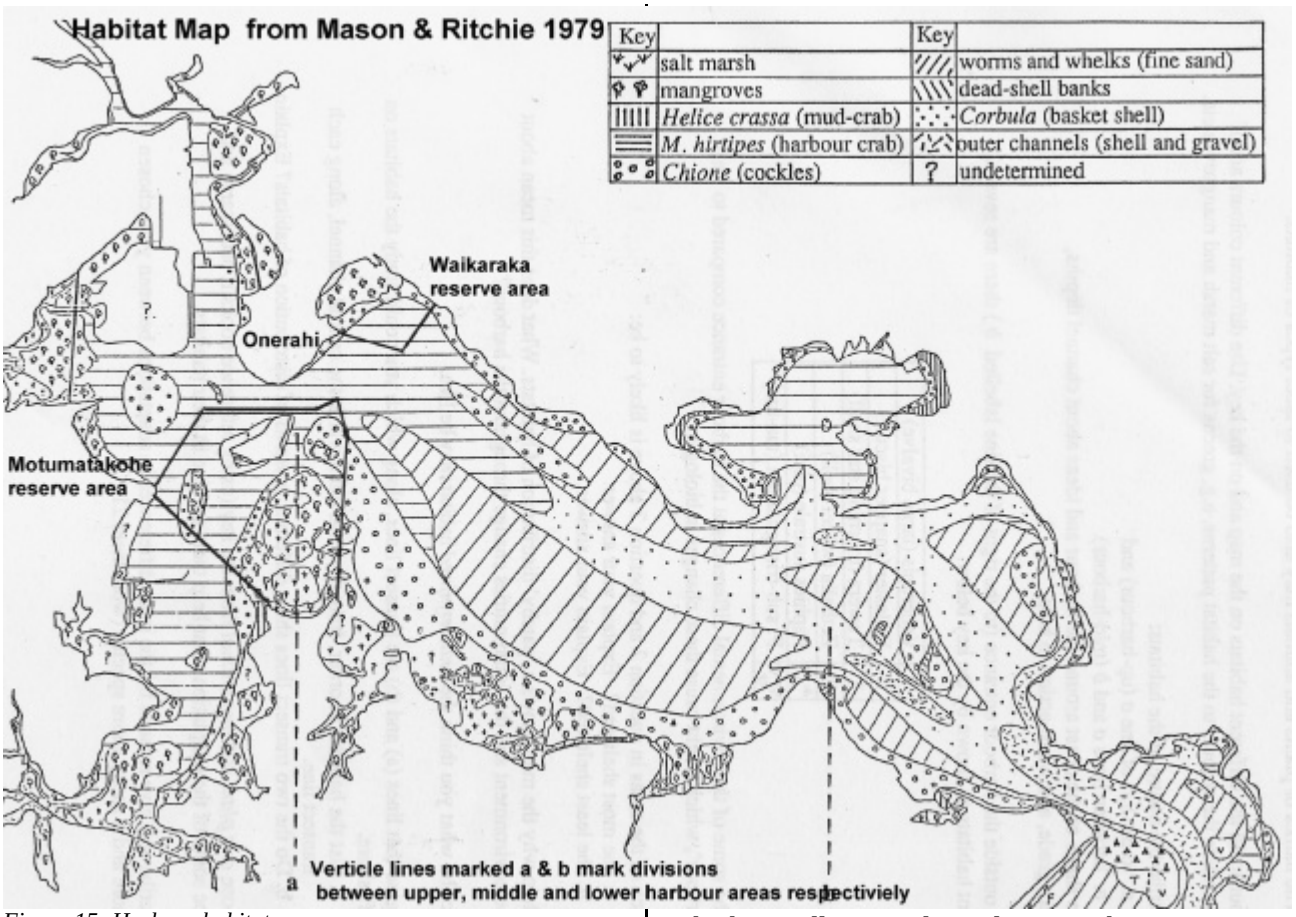


Figure 15: Harbour habitat map

5.4 Cultural Values

5.4.1 Cultural values of Whangarei Harbour

To the Maori people the harbour is a source of kai (food); therefore they regard it as precious.

Restoring the mauri of Whangarei Harbour

Since European settlement various development activities have adversely affected the water quality of the harbour. Maori have been very concerned about any loss of water quality because it reduces fish numbers and injures the mauri (spirit of the harbour). It is the objective of the marine reserve to protect marine species and allow the system to rebuild itself. This will help restore the mauri. The establishment of the reserve areas will mean that 5% of the harbour (including the waters around Motumatakohe, Motukaroro and Waikaraka) will no longer be a source of kai, however the aim is that the other 95% will be able to provide more kai than it is able to at present. The three proposed marine reserves are in critical areas of the harbour, all near industrial sites: in being designated as marine reserves they will act as a further incentive to improve water quality.

See also 6.1 for Maori tradition in relation to marine reserves in general.

5.4.2 Cultural values of Motumatakohe

Matakohe - Limestone Island - has played an extremely significant part in both Maori and European history in the Whangarei area, despite its barren appearance at present (currently being restored by the Friends of Matakohe-Limestone Island Society). The island, as the largest upper-harbour island in New Zealand, occupies an ideal strategic position for both defence and economic (and now environmental) activities.

Motumatakohe was gifted to the Whangarei City Council by the Golden Bay Cement Company in 1989, along with the wish that the island should

"become a showpiece of Whangarei Harbour and a pleasure to resident and tourist alike."

For an excellent journey through the relationship in history of both Maori and European to Motukohe – Limestone Island, see G.M. Clark's (2001) book, *More than Just a Little Island: a History of Matakohe-Limestone Island.*

5.5 Educational Values and Student Experiences

The Wet Library Concept

An account of snorkeling at Motukaroro by a Kamo High School student follows.

"Recently our seventh form geography class, like many in the past, had the privilege of snorkeling at Motukaroro. We were amazed at what we saw, being among many fish and marine life. Even with about 20 of us splashing around in the water the fish were not afraid and we could observe them closely.

Our task for the day was to identify at least eight fish and several seaweed types. Our initial thoughts were "How on earth were we going to find eight different fish?" But as soon as we put our heads in the water we knew this would not be a problem.

The abundance of fish at Motukaroro was spectacular, but how long will it last? The idea of a "wet library" for future students and scientists to study and observe marine life seems like a simple and vital idea to be put into action in our harbour. If marine reserves are put in place at Motukaroro, Waikaraka, and Motumatakohe other students will be able to observe and study fish in their natural environment. This is not just an educational experience but a life experience.

Our class is worried that in the future others will not be able to experience what we have. Exchange students for example, that come to New Zealand and study here for a year, need these wet libraries. Many come from land locked countries where they never experience the wonders of the ocean, something that we as New Zealanders take for granted."

Rare and nearly unstudied lobster species found at Motukaroro

Local divers and marine scientists have frequently commented on the uniqueness of Motukaroro's marine life, but like many special places on the Northland coast Motukaroro has many secrets as yet undiscovered.

While study diving at Motukaroro, teacher Warren Farrelly and students noticed that Spanish lobsters were consistently smaller than average. Warren commented to the students that this was unusual and not experienced in Northland waters before. The students noticed more differences and sent photos down to NIWA specialist Dr Alison MacDiarmid for identification. Dr MacDiarmid replied:

"Thanks so much for the photo of the small spanish lobster (enclosed) and the description of its location…It is Scyllarus aoteanus. *Almost nothing is known about its growth, reproduction, abundance or distribution so anything you know or could find out would be of value. Drs. John Booth (also at NIWA here in Wellington) and Rick Webber (at Te Papa) as well as myself would continue to be interested in any information you might have."*

Shoreline gardens and underwater forests at Motukaroro

An account of rocky shore studies at Motukaroro by a Kamo High School student follows.

"The natural gardens of seaweed that grow as floral borders right around our coastline are as diverse and spectacular as the finest gardens on land.

Part of our classroom syllabus was to examine a rock during our field study. Best observed underwater, we discovered these natural gardens of seaweed are a delight waiting to be revealed to anyone prepared to cruise slowly through the shallows with mask and snorkel. Though composed solely of algae, these gardens display rich combinations of colour and form.

Later, examining our rocks, we were able to identify many remarkable and extraordinary organisms. Securely anchored by clinging holdfasts and buoyed by air-filled bladders, the fronds of the seaweed are arranged to catch as much sunlight as possible.

Like forests on land, these dark retreats provide both food and shelter for many mobile animals:

grazing snails, nimble crustaceans and the juvenile forms of many species of fish."

A foreign exchange student's opinion

"The sea is amazing. I am from a land locked country with many people. We don't have many opportunities to go swimming, diving or do anything else to do with the water…Before I came here I saw the sea just once in my life, but the European Sea is really different. People here live in harmony with nature.

What surprised me a lot were the natural beaches without damage made by people. When I got the opportunity to go snorkeling with my Geography class I went and things I saw there were unbelievable…Around the rocks under the water there are so many different little fish and shellfish and other animals I have never heard about. I have never seen anything like this. Honestly, I think people should take opportunities and have a look at the underwater world because life is all around."

Mirka Klenova, Slovakia

6. Implications for Tangata Whenua, Current Users and Other Groups

6.1 Tangata whenua issues

A major part of the vision of this marine reserve proposal is the recognition and development of the special relationship local Iwi and hapu have with the Harbour and its ecology. It is acknowledged that the processes leading to the establishment and management of reserves are guided by Te Tiriti O Waitangi. Following from the principles of the Treaty, we acknowledge Iwi interest in customary management of the harbour and its resources. The applicants would be eager to support local Maori initiatives to set up a traditional management area within the harbour. Our proposal is offered in good faith to this kaupapa.

Throughout the development of this proposal Ngatiwai has expressed strong support for the conservation intention in proposing marine reserves for Whangarei Harbour (see 4.2.3 for details of tangata whenua consultation).

Tangata whenua have been deeply concerned for decades over the degradation the harbour has experienced due to sedimentation, pollution, dredging and exploitation of an ever diminishing kaimoana resource. This view was strongly articulated by kaumatua and kuia on the Patuharakeke Marae during the hearings for the Northland Port Corp. Forestry Port (1997) (see 4.2.3).

Balancing the support in principle for the marine reserves proposal, Ngatiwai and tangata whenua in general have been consistent in their concerns and reservations about the Marine Reserve Act and the impacts of reserves on their exercise of rangitiratanga and kaitiakitanga.

The limitations which the Marine Reserve Act imposes on the exercise of customary fishing by tangata whenua, as provided for by Te Tiriti O Waitangi, is a fundamental issue often raised.

In the last two years, several Whangarei tangata whenua groups have been working on planning for customary fishing management under the Kaimoana Fishing Regulations (Fisheries Act 1998). Concerns have been expressed that establishment of the proposed marine reserves could pre-empt development of these customary fishing management plans under the Kaimaoana fishing regulations. It is also important to note that the concern goes far beyond the context of the provisions for the customary management under the Kaimoana regulations. Iwi of the Whangarei Harbour have vivid memories of the richness and importance of the harbour. Their customs, knowledge and use of the harbour were sophisticated ecologically and spiritually and extended to the open sea and the catchment's streams and wetlands. Clearly the impacts of the last century on the harbour have brought much sadness and sense of loss to them.

Given this history of the Harbour, it is easy to understand the reluctance expressed by some Iwi Maori consulted to forgo the ability to harvest marine life within any marine reserve, and specifically the three areas proposed. The applicant wishes to acknowledge the positive manner in which all the hapu groups have considered this proposal, its conservation aims and the challenges it poses for them. The

applicant's position is that the potential gains for the harbour and its people outweigh the loss of harvesting access to 5% of the harbour area. However, this balance is dependent on continuing progress being made by all concerned to respect the mana of the hapu of the Whangarei harbour and their kaitiaki function.

The applicant believes that the proposed reserve offers many benefits for Iwi to consider, and will enhance traditional approaches to protecting resources from over-use. A network of marine reserves in Northland will help to restore some of the spectacular abundance of marine life Northland and Whangarei Harbour once enjoyed. The applicant is committed to supporting Iwi Maori by seeking assurances from the Department of Conservation and the future supporter's group of the marine reserve if established. In order to give effect to the intentions stated here the applicant recommends the following:

- That in all matters pertaining to the future management of the reserve, the traditional and customary interests and kaitiaki responsibilities of the combined hapu of the Whangarei harbour are recognized and supported by practical means.
- That the Department, in giving effect to the point above, establish an advisory committee for the reserve with the hapu being fully represented (see 8.5).
- That the future supporters group for the marine reserve inform and involve tangata whenua fully in their activities.
- That the future supporters group for the marine reserve and the Department of Conservation actively support the combined hapu of the harbour to re-establish their kaitiaki role and to establish customary management area(s) under the Kaimoana Customary Fishing Regulations (1998).

Maori tradition in relation to marine reserves

Hutia to rito o te harakeke

Kei hea te korimako e ko

Ka rere ki uta ka rere ki tao

Ki mai ki au

He aha te mea nui o te ao

He tangata, He tangata, He tangata

If you remove the central frond from the flax

Where does the bellbird gain its sustenance?

You ask

What is the greatest thing on this earth

I say,

It is people, it is people, it is people.

Figure16: Butterflyperch, Motukaroro

In 1998, Kamo High student Scott Linklater went back to his whanau in Hokianga to learn more about the tikanga. Scott came back to class with the following story from his whanau.

"Reihana Paniora of Te Roroa tribes spoke to me of rules like rahui to protect toheroa at the Waimamaku river mouth.

'From very early times our people not only looked to the river and the sea as a source of food, but protected and conserved it. The placing of a rahui on the gathering of seafood following the loss of life at sea, or to guard against overexploitation of our reefs, is still practiced today.'*Rahui was the placing of a pole into a seabed or resource, meaning that the resource was prohibited. This was very tapu and breaking it was 'on a person's head'; in other words, disregarding the tapu could bring disastrous consequences.*

Another way in which the Maori people maintained resources was not to take any more kaimoana than needed or only take the large and not the small. This was described by Rere Pumipi, also of the Te Roroa people, as 'only enough kai

to feed the family and not too much so that it is sometimes wasted'.

The Maori people knew there were special times for different fish. Each fish or shellfish had its own time to be harvested. The old Maori people could tell when to go out and get their kaimoana by looking at which trees were flowering or whether or not the fish were swimming upstream or downstream in a river. Mullet in the Waimamaku area, for example, were never caught whilst swimming up the river but were caught when they traveled downstream, ensuring the fish were able to spawn upstream and continue the population.

Seafood was also valued highly by Maori because tradition recalls that the mauri (lifeforce) that created them was the same force which in turn created themselves. Hence, mankind is linked to all living things in a spiritual sense or whakapapa wairua. This explains the Maori attitude towards conservation of natural resources. The gathering of kaimoana is necessary for 'ora tinana' and 'ora wairua', the wellbeing of the body and spirit."

Why marine reserves will help to sustain kaimoana

In these times the children of Tangaroa are subjected to immense pressure from advanced technology. We even use satellites (G.P.S) to assist us in locating remote reefs, which once offered protection to fish stocks. For these reasons, in a modern society where two cultures pursue fish for both money and sport, it would seem appropriate to offer marine life some form of complete sanctuary, where populations can develop with normal age and relationship structures and be enjoyed by young and old. In this fashion the New Zealand coastal environments of the future can fulfill their traditional role in our cultures.

6.2 Fishing Interests

Fishing and Marine Reserves

Some marine reserve proposals in New Zealand have come up against strong opposition from fishing interests. Opposition to this proposal by recreational fishermen in pre-statutory consultation has been limited but represents a view that establishment of a marine reserve in their area is unacceptable because they are losing access to their fishing grounds.

Can the proposed marine reserve areas adequately compensate fishermen, both recreational and commercial, for any perceived impact upon their interests – or even actually improve fishing in the harbour?

The applicant's view is that the proposed 'no-take' zones will lead to benefits for fishermen both indirect and direct.

The benefits for actual fish stocks will come from protection and enhancement of major food sources and nursery areas. The increase in marine life and especially fish numbers and size is there for all to see in New Zealand's own pioneering marine reserves. At Leigh and the Poor Knights Islands, monitoring over time has shown how productive marine reserves can be. Studies have shown that snapper, *Pagrus auratus,* are 6 times more common in than outside the reserve, while spiny lobster, *Jasus edwardsii,* is 1.6 times more abundant and has a bigger average carapace size than outside the reserve (110mm and 94mm respectively). (Babcock et. al. 1999)

Recent studies have shown that fish populations suffer genetically if heavy fishing pressure keeps skimming off the older fish. This means that younger fish, with genes untested by the shifting demands of the environment, have the predominant effect at spawning time. Reserves such as Cape Rodney – Okakari Point at Leigh, now show us what a snapper population should look like. Big old fish really challenge the youngsters for access to food, (Cole, Ayling & Creese 1990).

For invertebrates that humans exploit, reproductive success depends on population density. Studies by Leigh Marine Laboratory scientists have shown that scallops, paua, and kina need to live in high densities for successful spawning. Paua and kina are free spawning animals, which release egg and sperm into the sea; whether fertilisation occurs is essentially a numbers game. The Leigh studies have shown that if mass spawning animals are fished to low levels where adults are too far apart, reproductive success is endangered and population crashes may occur.

More specifically in the interests of fishermen, there is growing evidence from scientific work of positive effects of increased spawning from the larger size of individual fish in reserves and direct

effects of 'spill-over' of fish from the reserves into adjacent fishing areas. Dr. Callum Roberts, international expert in marine ecology, has published a summary and analysis of world research on marine reserves. He offers the following summary in his book (Roberts & Hawkins, 2000).

"There is compelling evidence that protecting areas from fishing leads to rapid increases in abundance, average body size, and biomass of exploited species. It also leads to diversity of species and recovery of habitats from fishing disturbance."

Fisherman will rightfully ask for hard local evidence of the 'spill-over' effect. The applicants agree that there is a pressing need to test the benefits of reserves across the full range of our local marine habitats. This proposal does exactly that in setting aside a small area of the harbour (5%) to test the contribution a protected area can make. Dr. Roberts has concluded the following on evidence for the 'spill-over' effect:

"Spill-over, the movement of marine animals out of reserves, is one of the two main mechanisms through which reserves can enhance fisheries. The rate of spill-over varies among species and reserves, and depends on the mobility of animals, degree of compliance with the reserves, time since reserve creation, intensity of fishing around the reserve, the edge to area ratio of the reserve, and whether or not habitat is continuous across reserve boundaries. There is circumstantial evidence for spill-over from studies of movements of exploited species, and direct evidence of increased catches close to boundaries from a growing number of studies. The most compelling evidence for spill-over is 'fishing the line', the change in fishing patterns following reserve creation where fishers preferentially fish close to reserve boundaries."

Dr Callum's statements on the benefits of 'spill-over' are supported by 154 published scientific reports from New Zealand and overseas listed in the biography of his book. Further supporting Dr Callum's work are two major international reviews and consensus statements on the subject:

1. (Murray et al. 1999) completed by 19 leading international marine scientists
2. (Lubchenco & AAAS, 2001) which released the following statement:

Leading Marine Scientists Release New Evidence that Marine Reserves Produce Enormous Benefits within Their Boundaries and Beyond:

150 leading Marine Scientists call for the immediate establishment of networks of Marine Reserves to replenish depleted seas

Overview Summary

Reserving areas such as those proposed has positive benefits not only for fishers 'fishing the line', but for the entire harbour system. Aside from benefits a 'no-take' area may offer in terms of actual fish populations, reserves provide an opportunity for the collection of data from natural populations, enabling estimates of rates of natural mortality, growth and recruitment. This data is critical for modelling fished populations, and providing information of considerable value to the fishing industry.

Commercial Fishing Interests

Recently the applicants met with a group of commercial fishermen from the Harbour. This meeting was called by the fishermen so that they could ask questions about the proposal and state their views on its merits.

The group said that they were still considering their final position on the proposal, but they were at this time able to clearly express general concern that the Waikaraka and Motumatokohe reserves were a significant part of the area they fished and that the establishment of the marine reserve would hurt them in their fishing activity. Opinions were also expressed that these areas may in fact not be suitable areas in which to establish a marine reserve because of existing impacts on the habitats, and that areas at Takahiwai would be more suited to the marine reserve concept. No reservations about impacts for commercial fishing in the Motukaroro proposed area were expressed.

Following this meeting the applicant has had consultations with Ministry of Fisheries staff and gathered the catch data that is available for the statistical area which Whangarei Harbour is a part of. Analysis of this data suggests that the tonnage for the entire statistical area for flounder are not great and that the Whangarei Harbour catch

represents only a part of this amount. It follows that the proposed reserve areas, covering approximately 5% of the Harbour, will have only a minor impact on the commercial fishing that takes place. It is believed the benefits associated with the establishment of the marine reserve outweigh any difficulties in making the transition to having the reserve areas unavailable for netting flounder and, to a lesser degree, grey mullet.

The applicant does not accept the view that the areas at Takahiwai are more suited to a marine reserve. The Takahiwai area is a middle to lower harbour site and lacks the complex channels and subtidal areas that are found at Motumatakohe.

Charter Operators

Five charter operators whose operations involved Whangarei Harbour were provided with the November 2001 proposal and followed up with phone conversations. Four of the operators focus primarily on recreational fishing in the outer harbour or off the open coast. One operator runs sight seeing cruises as well as fishing excursions in the upper harbour area. No written submissions were received in the pre-statutory submissions. Comments which were received tended to echo those from recreational fisherman about loss of access to fishing in the marine reserve areas. It is the applicants view that there will be no adverse impacts on these charter operators.

Recreational Fishing Interests

Local fishermen were concerned about -

- The loss of specific, popular and/or particularly accessible fishing spots;
- Losing *any* access to fishing in the harbour.

All three of the areas proposed are used recreationally for fishing. While seemingly not the most important Harbour areas for recreational fishing, the reserve areas are considered very important to local residents who regularly fish there.

The proposed area at Waikaraka is a mangrove ecosystem. It is a prime fish nursery and a favoured spot of wading birds. Because of its physical environment, the area is not extensively fished. One local resident was very concerned over losing fishing access to the channel area where they set nets for bait fish and kahawai. There is some infrequent set-netting on the outside of the mangrove area within the proposed boundary of the reserve.

As with Waikaraka, much of the proposed reserve area at Motumatakohe is mud-flat and patches of mangroves.

At Motumatakohe small amount of fishing takes place at a hole to the west of the island. Loss of access to this fishing spot will affect a small group of local fishermen. The decision to retain this 'hole' within the reserve area was taken in accordance with the vast majority of canvassed public opinion. The 'hole' is an integral part of this habitat system, an area which many fish use during various parts of the tide and feeding cycle. To omit this area from the reserve would, to a high degree, defeat the purpose of the reserve because many species move between the deeper subtidal areas and other habitats at various times.

The loss of fishing access to the proposed Waikaraka and Motumatakohe reserve areas is offset by the fact that all other local fishing spots in the channels and channel edges around these two reserve areas will remain open to recreational fishing. Therefore, recreational fishing activity will be generally able to continue in the upper harbour. Social research has shown that fishermen have been much more supportive of marine reserves after they have experienced the changes that take place after establishment (McGraw & Cocklin, 1997). Based on this experience with other marine reserves, it is expected that these remaining fishing areas will improve over time (Callum & Hawkins, 2000). New possibilities for fishing arise in the proximity of the reserve due to the 'spill-over' effect.

A recent study (Roberts et al., 2001) of marine reserves in Florida and St Lucia offers strong support for recreational fishery benefits.

"In Florida, reserve zones in the Merritt Island National Wildlife Refuge have supplied increasing numbers of world record-sized fish to adjacent recreational fisheries since the 1970s. In St Lucia, within 5 years of creation, a network of five small reserves increased adjacent catches of artisinal fishers by between 46 and 90%. Our study

confirms theoretical predictions that marine reserves can play a key role in supporting fisheries."

Motukaroro Island is frequently fished by recreational fishers. The waters around Motukaroro, close to the entrance of the harbour, are very important habitats for many species of fish. The fish stock in this area has been severely depleted in recent years, and unless reserves are put in place this overall trend is likely to continue.

As a result of the public consultation detailed in 4.2.1 and 4.2.2, and the observation of children fishing from the Reotahi Bay wharf by Kamo High School students, this wharf area has been excluded from the proposed Motukaroro reserve area to minimize impacts on local recreational fishing interests. It is the applicant's view that it is not possible to remove the shoreline leading to Lort Point, and Lort Point itself (which is a popular shore fishing site), because it would compromise the purpose of the reserve. The reef habitats at Lort Point form a habitat unit with the reef of Motukaroro Island, and omitting the shoreline reefs would negatively affect the already relatively small proposed marine reserve size.

It is important to note that there was wide public support for the reserve at Motukaroro, including support from recreational fishing representatives (including the Outboard Motor Club; see 4.2.2).

6.3 Non-extractive Recreational Interests

General Recreation

In a marine reserve, no hand gathering, fishing, spear fishing of any species (flora or fauna) is allowed. All other recreational activities should be unaffected or enhanced by the marine reserve status. Currently, activities such as diving, boating and scenic viewing, bird watching and biological studies take place throughout the harbour, in addition to water skiing, kayaking and windsurfing activity at Motumatakohe.

In other marine reserves around New Zealand new recreational activities are appearing all the time, centered around the increase in marine life that results from the restoration of a natural ecosystem. These activities tend to be in the education and ecotourism sectors: examples are nature interpretation, school camps, glass-bottom boat businesses and large numbers of people who come simply to watch fish in their natural environment.

Divers

Motukaroro

The proposed reserve at Motukaroro will be a valuable and unique dive location, not only for scuba divers but also for people who snorkel. With the extraordinary colours of the anemones, sponges and fish life it is already a very popular dive spot. If and when a marine reserve is established, more divers may be expected to use the area.

Slack water at the top and bottom of the tide makes for easy diving; however, divers need to be very wary of strong water movements at other times. At the top of the tide clear outer harbour waters are more likely to be found around the island; the big disadvantage at this time is the increased likelihood of nearby commercial shipping movement and propeller noise. Underwater this is noticeable.

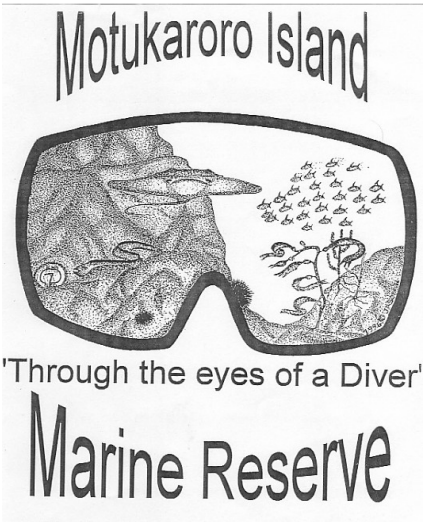


Figure 17: Student illustration

Any diver swimming out from Reotahi Bay, on the northern edge of the harbour, to Motukaroro needs to be ready to avoid recreational vessels. These vessels often travel fast across the water and their crews have difficulty spotting surface swimming divers. Minimising risks to the public engaging in diving activities is discussed in 8.2.

Motumatakohe and Waikaraka

Although underwater visibility is generally poor in these two locations, it will be possible to observe marine life in the shallows once the reserve is established. As the pioneering New Zealand reserve near Leigh has demonstrated, once fish stocks in a reserve are replenished it becomes possible not only to *dive* successfully in shallow areas; wading in the shallows and even observing fish from rocks or the shore can become a popular and immensely rewarding activity.

6.4 Commercial Interests and Navigation

The applicant has made a commitment to avoid adverse impacts on navigation, port management or dredging interests in the Whangarei Harbour. No part of the main navigation channel of the harbour is included in the marine reserve areas. A segment of the secondary channel referred to as the Mangapai channel has been included in the proposed Motumatakohe reserve area. Portland Cement Works is the only commercial user of this side channel, and currently has a 40,000 tonne, 5 metre draft coastal freighter operating on demand on all tides. 80% of the output of the facility is handled by this ship. The present use of the channel has not required dredging in the last 15 years.

The decision by the applicant to include the Mangapai channel between Motumatakohe and Rat Island in this marine reserve application was made in 2001 despite the fact that maintenance dredging could potentially be required in this area. The Mangapai channel has not been dredged in the last 15 years. Driving the need for inclusion of the channel area in the marine reserve is the ecological argument that many species of marine life (especially fish) will regularly move from the channel and its edges to the shallow and intertidal areas of the proposed reserve and back to the channel at low tide. Where possible it is important to protect these deeper areas, despite potential intermittent disturbance from dredging.

Based on advice from the Department of Conservation, the applicant recommends attaching a condition to the Order-in-Council that will establish the Whangarei Harbour marine reserve. This condition will permit maintenance dredging in the Mangapai Channel off the Southern side of Motumatakohe, subject to any necessary resource consents being obtained. Through this mechanism, the applicant's view is that the ecological function of the reserve will be enhanced while Portland Cement Works and any future commercial user will retain unimpaired ability to navigate the Mangapai channel. See 3.4 for details of boundaries in the Motumatakohe reserve area. The applicant's view is that the marine reserve status of the Motumatakohe area will not affect the business of Golden Bay Cement Corporation.

No submissions have been returned to date identifying concerns from the other commercial users of the Harbour. Northland Port Corp. actively assisted students in establishing the Motukaroro boundaries.

The Northland Harbourmaster has given the applicant a statement expressing no concerns about adverse effects of the proposed marine reserve areas on port management or navigation. Details of his recommendations for marking boundaries are in 8.2.

6.5 Adjoining landowners

The impact of the proposed reserve on adjoining landowners will be negligible. To fulfill the consultation required with the notification process, the applicants have obtained from the Department of Conservation and the Whangarei District Council title maps and a list of all ratepayers owning properties close to the proposed reserve areas. A copy of this application has been sent to all ratepayers notifying them of the application and inviting submissions.

The foreshore of the Motukaroro reserve area is a scenic reserve vested in the Whangarei District Council, gazetted 1994. The island known as Motukaroro is owned by Northland Port Corp.

Waikaraka reserve area is defined by a shore marker at Stephen's Pt on its southwestern shore. The boundary then follows the MHWS along Beach Rd to the north and east. Near Stephen's Pt there is a private title, Allotment 451, which extends beyond the MHWS. The title boundry of Allotment 451 forms the marine reserve boundary for this section of the shore; see 3.4 and Appendix 3 for map inset. From allotment 451, Beach Rd

follows the shore towards the Waikaraka stream. Along this stream and extending to the eastern shore reserve boundary there are a number of private titles on the shore. The boundary of the reserve area along these properties is defined as the legal boundary for each title, (see Appendix 3). The mangrove area itself is a designated Wildlife Refuge, gazetted 1962.

The Motumatakohe reserve area has a short shore boundary at Onemama Pt and at Hewlett Pt. Both of these land points are in private title. These shore boundaries are defined by the legal boundaries of the respective titles. On Motumatakohe there is one small section on the island owned by Northland Port Corp.; the remainder of the island is a Scenic Reserve vested in the Whangarei District Council, gazetted 1999. The marine reserve boundary surrounding Motumatakohe is defined by the MHWS. The low-lying sand islands lying to the south of Motumatakohe are all in Crown ownership and gazetted as Wildlife Refuge Areas, 1962. The shore reserve boundary of the islands lying to the south of Motumatkohe are defined as MHWS.

In addition to immediately adjoining landowners mentioned above, there are approximately 100 residents within 100 metres of the reserve boundary along the Beach Rd section of the proposed Waikaraka marine reserve. The establishment of the reserve does not confer any rights of access onto or across private land by the Department of Conservation or the public, and should not otherwise interfere with the owner's rights or obligations. The applicant notes the potential for the proposed reserve to have positive benefits for homeowners, such as the increased provision of council services in the area, and the potential for the reserve to increase property values. Such effects have been reported in suburbs around the Karori Wildlife Sanctuary in Wellington, and the Cape Rodney- Okakari Point marine reserve at Leigh. Some local businesses have noted that they may benefit from increased visitation to the area.

Whangarei District Council

Whangarei District Council maintains roads along the foreshore, and owns reserve areas adjoining all three of the marine reserve areas. Consultation with the City Council has not identified significant concerns regarding the effect of the proposed reserve on Council operations. The applicant has indicated to the Council no opposition to the continued discharge of stormwater from local suburbs or roads into the area of the reserve.

Maori Land

Title searches have indicated that there are no blocks of Maori-held land adjoining the three marine reserve areas.

Mining and Aquaculture

The applicant has been advised by the Northland Regional Council that no interests in mining or aquaculture exist in the area of the proposed reserve.

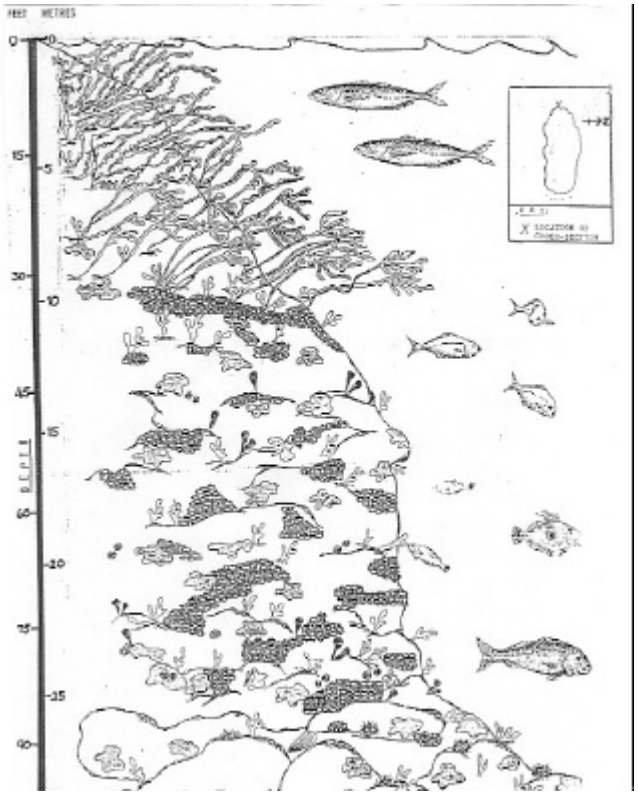
Resource Consents

The applicant has been advised by the Regional Council that there are no resource consents current or pending that would be affected by the proposed marine reserve areas.

6.6 Scientific Interests

The waters around Motukaroro have been the preferred site for rocky shore zonation studies by students from Auckland University, Kamo High School and other schools for over two decades.

Figure 18: Zonation at Motukaroro



This area has been described by Dr. Bill Ballantine (see Appendix 9) as an extremely interesting and valuable habitat. Establishment of a marine reserve here will enhance the quality of

this significant habitat for generations of students and researchers to come.

In a similar way, the establishment of reserves in the mangrove and mudflat upper harbour habitats of Waikaraka and Motumatakohe creates the opportunity for students and researchers to study important and interesting habitats. The extra advantage of the three reserve areas is that they are easily and safely accessible to Northlanders, thus making them ideal sites for scientific study.

Benefits made possible by these reserve areas of interest to scientific study are listed below:

- Changes in marine life, marine populations and ecology which occur after all harvesting is stopped can be studied.
- Research opportunities are provided for scientists studying marine life.
- The reserve area at Motumatakohe allow the study of a marine habitat which is in a sequence with protected land areas.
- A Wet Library is established, whereby school students extend class work by studying under water in a natural environment.
- The reserves create the potential for a better understanding of impacts upon the Whangarei Harbour eco-system, from the starting-point of as natural a state as possible.
- The creation of readily accessible and strategically located monitoring sites.

Marine reserves are internationally recognized for their key role in preserving biodiversity in the sea (Murray et.al., 1999) - a goal to which New Zealand has international obligations, (NZ Biodiversity Strategy 2000). Comprehensive information on the benefits to biodiversity protection will be the major aim of future monitoring in the reserve areas.

See 5.1.1 for the natural processes of the wider harbour system. The sequence of reserve areas of this application offer a unique opportunity to study interactions between habitat areas and effects of reserve design on the overall harbour system.

6.7 Educational Interests

There are FORTY-FIVE educational institutions within easy driving distance of the three proposed reserve areas – evidence for the potential positive implications for educational interests from this marine reserve proposal.

The three areas of this application offer a highly accessible and unique educational opportunity to schools, universities and the local Polytechnic. It is anticipated that many private individuals and groups will also take an interest in the development of the reserves and the harbour's restoration.

Throughout the consultation process the proposal has had strong interest shown from educational institutions as far afield as Otago University (see Appendix 8).

The applicant believes that a marine reserve at Motukaroro Island would become an excellent ecosystem for study by other school groups. Plans are being made by the Kamo High School Year 13 Geography class to develop a website, telling the story of the development of the marine reserves and especially the study of Motukaroro's unique ecology.

See 5.2 and 5.5 for existing educational values of the three areas and past experiences of Kamo High School students.

Figure 19: Kamo High School students,

Motumatakohe

6.8 Conservation Interests

The proposal has enjoyed strong support from local conservation groups and is supported by the Northland Conservation Board. It is the applicant's view that the establishment of the

Whangarei Harbour marine reserve is a crucial milestone for marine conservation in Northland.

Northland has had no new marine reserves created in over ten years. It is time to move forward with efforts to protect marine life and habitats in Northland and Whangarei Harbour. It has been demonstrated during the development of this application that there is widespread interest in conservation in the community. The establishment of this marine reserve allows this interest to be expressed and nurtured.

7. Justification

7.1 Meets Purposes of Marine Reserves Act (S.3)

Marine Reserves Act 1971 (MRA) declares that marine reserves have, *"the purpose of preserving, ….. for the scientific study, areas of New Zealand that contain underwater scenery, natural features, or marine life, of such distinctive quality or so typical, or beautiful, or unique that their continued preservation is in the national interest."*

The proposed marine reserve areas at Motukaroro, Motumatakohe, and Waikaraka satisfy these purposes in that they all contain underwater scenery, natural features and marine life typical and some cases unique of Whangarei Harbour and North Island East Coast estuaries.

The Waikaraka area will be the first habitat of its kind protected as a marine reserve in Northland. A marine reserve area such as this one proposed offers the first chance in Northland to study a mangrove system that is not also fished. The reserve will also allow better understanding of the ecological role of mangroves. The area has excellent access for schools and other researchers to carry out investigations.

The proposed reserve area at Motumatakohe protects a habitat area that is important in many ways. The intertidal areas and channels surrounding Motumatakohe have long been recognized as very important marine habitats for shorebirds. Motumatakohe itself is the largest island in an upper harbour position in Northland. Surrounding the island are significant upper harbour tidal flat and subtidal channel habitats. There now exists an ideal opportunity to moniter any changes occurring in these habitats in the absence of harvesting of marine life. Questions about the role of these upper harbour habitats in the harbour's ecology could be addressed through marine reserve status. The Motumatakohe area is also readily accessible to large numbers of people and offers ideal opportunities for scientific study.

The reserve at Motukaroro provides protection for a wide diversity of marine life; a deep hole close to the western end of the island has been included because of the unique abundance of marine life in the area. The special combination of, under water topography, influence of harbour currents, and position near the mouth of the harbour makes this island rocky reef habitat a biodiversity hotspot. This proposed area is ideal for study of a sheltered rocky reef habitat and is readily accessible. The site also provides an ideal lower harbour monitoring site for marine life of the harbour system.

The proposed three marine reserves in the Whangarei Harbour would make a significant contribution to the Government's objective of establishing a marine reserve network incorporating representative examples of the full range of habitats and ecosystems found in New Zealand's marine environment (DoC 1995).

The establishment of this marine reserve is in the national interest as it provides an opportunity, for comparison with unprotected areas, to separate the effects of fishing from the ecological effects of other processes. It is therefore vital to establish marine reserves that are typical of much larger areas so that the results of this research are widely applicable (Ballantine, 1991). By improving our knowledge in this way marine reserves contribute to better management of the marine environment.

7.2 Meets Other Legislative Criteria

Under the provisions of the Marine Reserves Act 1971 (MRA) the applicant has sought advice from the Department of Conservation, Northland Regional Council and the Ministry of Transport on legal matters relating to:

- uses of the marine area which might affect the establishment of the proposed marine reserve areas.

- effects that the proposed marine reserve could have on existing uses or potential uses under the Resource Management Act 1991.
- any of the other legislation involved with the coastal marine area.

The applicant has been advised by the Northland Regional Council that:

- The entire seabed of the proposed marine reserve areas is vested in the Crown and administered by the Department of Conservation pursuant to S.9(a) Foreshore and Seabed Endowment and Revesting Act 1991.
- There are no existing or pending permits for reclamation in the areas of the proposed marine reserve.
- There are no mining, sand or shingle extraction licenses involved, existing or pending in the areas of the proposed marine reserves.
- There are no sewerage or significant stormwater outfalls in the areas of the proposed marine reserve;
- There are no specific designations or conditions imposed by the Northland Regional Council Coastal Plan that are in conflict with the establishment of the proposed marine reserve.
- There are no navigation restrictions or hazards created by the establishment of the proposed marine reserve;
- There is one legal mooring in the proposed Waikaraka marine reserve area which is a pile mooring. The establishment of the marine reserve will not affect the use of this mooring;
- There are no applications for marine dumping in the sea in or near the proposed marine reserve.

The applicant has been advised by the Harbour Master of the Northland Regional Council that there are no concerns relating to navigation or port management raised by establishment of this marine reserve.

Recommendations for the establishment of marker buoys are discussed in 8.3.

The applicant has been in in consultation with the Maori Land court and is unable to identify any 'Maori Land titles' within 100 metres of the boundaries of the proposed marine areas.

7.3 Has Widespread Support

This proposal has enjoyed widespread support from the community through out its development dating back to a 1994 draft proposal which was the first publicly circulated document for the three areas. The results of the extensive public surveys carried out by the applicant from 1993-2001 have been summarized in 4.2.1.

Throughout the development process, the applicant has been supported by the region's government agencies, most notably through advice from the Department of Conservation, Northland Regional Council and the Ministry of Fisheries.

Major Northland businesses have contributed to the proposal: Northland Port Corp. with development of the boundaries and mapping, Portland Cement Works with definition of boundaries and ACI Glass with financial support. The project has also received a C.O.G.S. grant.

There have been some opposition to earlier proposal from recreational and commercial fisherman. The applicants reponses to this opposition is discussed in 6.2.

Tangata whenua have generally been in support of the concept of the proposal and its aims. Over the years of consultation with Iwi, however, issues have been raised over involvement in management of the marine reserve areas and how the proposal will affect plans they may have to exercise customary fishing interests.

8.0 Proposed Management

8.1 Level of Protection

As the objective of this application is to protect typical examples of the marine environments of a Northland East Coast harbour and the unique habitats surrounding Motukaroro, no extraction or disturbance of marine life (other than for approved scientific and management purposes) would be permitted within the marine reserve.

This is in keeping with Department of Conservation policy and S.3(2) of the Marine Reserves Act 1971 (MRA) which states:

"Marine reserves will be so administered and maintained under the provisions of this act that -

(a) they shall be preserved as far as possible in their natural state.

(b) the marine life of the reserves shall as far as possible be protected and preserved.

(c) the value of marine reserves as the natural habitat of marine life shall as far as possible be maintained".

With the establishment of the marine reserve all fishing and harvesting will be prohibited, but diving and all other nonextractive activities which do not damage the marine environment will be encouraged.

8.2 Public Access, Navigation and Anchoring

S.3(2)(d) of the MRA further states:

"Subject to the provisions of this Act and to the imposition of such conditions and restrictions as may be necessary for the preservation of the marine life or for the welfare in general of the reserves, the public shall have freedom of access and entry to the reserves, so that they may enjoy in full measure the opportunity to study, observe and record marine life in its natural habitat."

The nearest boat ramp to Motukaroro is a half tide ramp at Reotahi Bay. There are also ramps at Marsden Pt and Parua Bay in the vicinity of Motukaroro. The use of these facilities, launching and navigation of boats through the proposed marine reserve - including the transport of marine life caught outside the reserve would be unaffected.

Small boat anchoring at Motukaroro

Recreational users of these waters need to be, at all times, aware of the considerable tidal water movements.

Anchoring in the back eddy area to the south of Motukaroro on an outgoing tide ensures protection from the current. Unfortunately, anchoring there causes damage to the prolific and colourful sponges that cover the bottom rocks. Also, the close proximity of the commercial shipping lane makes this a less than ideal anchorage. A less damaging anchorage is available just off the south-eastern (outer harbour) end of the island, on the coarse sand/broken shell bottom.

On an incoming tide, the sheltered water is on the west end of the island. Then the best anchorage is to be found on the sand/gravel botom of the northern edge. Anchorage is also possible to the immediate west of Motukaroro, but this site should again be avoided because of the considerable damage likely to be done to organisms cloaking the bottom rocks.

In the future, anchoring around some areas of Motukaroro may need to be restricted as the numbers of users increase. This issue will have to be addressed once the reserve is established.

It is unlikely that there will ever be any need to restrict anchoring at the Waikaraka and Motumatakohe reserve areas, so access to these areas will in no way be affected by the proposed marine reserve.

8.3 Identification of Boundaries

Refer to Figs. 3, 4, 5 and Appendix 3 for details of proposed boundary locations, G.P.S. co-ordinates and suggested markers. Marking of the boundaries is not expected to be difficult. The Motukaroro reserve area utilizes three channel markers. Two new buoys off Reotahi Pt will be needed to mark the wharf area excluded from the reserve to enable fishing. For the Motukaroro reserve area two shore markers will also need to be erected. At Waikaraka, two shore markers are required and one existing channel marker is utilized. For the Motumatakohe reserve area all points will utilize existing navigational markers with the exception of two shore markers required on each of Hewlett and Onemama Pts.

No difficulty is anticipated regarding the boundary surrounding Allotment 451 near Stephen's Pt at the Waikaraka reserve area. The boundary of this small area could be marked specifically. Please refer to Appendix 3 for a map of Allotment 451.

The Harbour Master of the Northland Regional Council has advised that opportunity be given him to assist with the design of all markers and signs associated with the proposed marine reserve areas. The Harbour Master stressed that, while there should be no problems marking the boundaries, it is vital that any signage not interfere with the complex existing navigation marker system in Whangarei Harbour.

See also 3.4 for descriptions of the boundaries and 4.2.4 for boundary issues raised in the consultation process.

8.4 Enforcement Matters

It is the Department of Conservation's policy to ensure that compliance and law enforcement within each marine reserve is effective (DoC 1995).

It is the applicants hope that the community in general, tangata whenua and the advisory committee for the reserve will wish to assist the Department of Conservation with enforcement. There is provision in the Act for the appointment of honorary rangers. This could prove to be effective in a populated area like the Whangarei harbour.

Upon establishment of the reserve the Department of Conservation will arrange for the reserve boundaries to be defined on a Survey Office Plan with Land Information N. Z; (LINZ). The office of the Navy hydrographer will be requested by the Department to include the marine reserve boundaries in the relevant navigation charts and the nautical almanac.

8.5 Committee

In the case of some existing marine reserves, advisory committees have been established to enable the local community to have input into management issues. The applicant recommends that such a committee would be appropriate in this instance. It is expected that there will be significant interest in management of the reserves from tangata whenua, and the various interest groups of the harbour.

Accordingly, if this application is successful, the applicant recommends that the Minister appoint an advisory committee for the proposed reserve under section 56 of the Conservation Act 1987. The applicant also welcomes the participation of the Northland Conservation Board on the advisory committee.

The applicant would like to recommend that the tangata whenua, tangata moana of the harbour are fully involved and represented on the reserve advisory committee. The committee should also include representatives from local residents, conservation and recreation groups, and scientific interests. Finally, because of the history of this proposal, it is recommended that the committee establish a process for selecting two students from the Whangarei district each year as committee members.

8.6 Scientific Study and Monitoring

It is the Department of Conservation's policy to encourage appropriate scientific research in marine reserves (DoC 1995). Organizations such as universities, Crown research institutes, government agencies and individuals may conduct scientific research in marine reserves provided they first obtain the necessary approvals from the Director-General of Conservation and in *some situations* the Director-General of Fisheries.

Monitoring currently carried out by Department of Conservation and external researchers in New Zealand is summarized in the recent publication, *National Overview of Biological Monitoring in New Zealand's Marine Protected Areas* (McCrone 2001). Any monitoring carried out by DoC in the proposed marine reserve will focus on management issues such as the preservation and rehabilitation of the marine life and ecosystems, and the impacts of visitor use (DoC 1995).

Since the proposed marine reserve will provide the only opportunity to investigate marine ecosystems in a fully protected environment within easy reach of Whangarei City, it is anticipated that it will attract considerable scientific interest from schools, Northland Polytechnic and professional organizations involved in marine research in the Northland region (including NIWA, DoC and Ministry of Fisheries). An important role of the committee is to advise DoC in its management of the marine reserve (see 8.5). The applicant recommends that the committee take on the responsibility of

promoting and coordinating programmes of scientific research and monitoring.

It is anticipated that Iwi will take an active interest in the study and monitoring activities. In previous public meetings, most notably at the Proposed Marsden Point Forestry Port Hearings, Iwi expressed strong interest in being involved in all aspects of the restoration of the Harbour's natural values (Ngatiwai, 1997).

8.7 Education and Interpretation and safety

Marine reserves help to raise general awareness of the ocean, its various life forms and its overall need for protection. In this way the proposed reserve areas at Motukaroro, Waikaraka and Motumatakohe would be a model for further reserves.

Given the limited opportunities that exist at present for increasing understanding of marine conservation in the region, the applicant believes that the proposed reserve will provide a much-needed focus for educating school groups, local residents and visitors about the features and values of this part of the Northland, and about marine conservation in general.

The applicant is accordingly prepared to assist the Department of Conservation with the interpretation at the three sites. In addition, the applicant is keen to continue to develop interpretative and education materials, and to work with the Department of Conservation.

Submissions have been received by local residents pointing out the potential hazards for inexperienced people diving or snorkeling at Motukaroro. These hazards are discussed in 6.3. It is suggested that there could be signage at the sites giving appropriate cautions on local conditions. Pamphlets could also be available at the site.

Beyond these measures, it is the applicant's position that users of the marine reserve are responsible for their own safety just as they are using all parts of the Harbour and the coastal marine area.

See 5.5 for discussion of educational values of the reserve areas, and 6.7 for implications of the Whangarei Harbour marine reserve for educational interests.

Acknowledgements

By Warren Farrelly
Kamo High Year 13 Geography teacher

To the many Year 13 geography students who made major contributions. Work was completed as a team effort. Each year a new group of students would take it over and advance it somewhat. They also consulted widely, listened then integrated new ideas in to their work. So many of these students were willing to front this work in their own time and do more than could ever be asked of them. The students had help from some people that they considered real treasures:

Foremost was **Dr. Bill Ballantine** , who encouraged the first tentative enquiry from the students and then, in a series of visits, ignited this project and the students. His input was considerable. He was also awesome in the way he presented information to the students. The man is an international treasure.
Wade Doak was also a very important influence. He provided insight and suggestions that few others could match. His life long passion for the ocean's inhabitants, his knowledge of how it all fits together and functions made him a student favourite. They rated him the New Zealand equivalent of Jacques Cousteau.
Hori Parata, the late Witi McMath and the Ngatiwai Trust Board Resource Management Unit. Hori made them work and question what they were doing. Time and again he displayed a depth of knowledge that made the students very aware they were just starting an educational journey that he had fully mastered. He provided a framework that ensured they had to consider and include Treaty of Waitangi issues and the management of the Harbour. More than anyone else, he put the students on the spot. His rigour made the students grow what they were doing and better think it through. Hori was unique in that the students were not able to compare him to anyone else they knew of.
Vince Kerr brought with him a knowledge of the technical aspects of getting an application together and working with the Department of Conservation. This part of the work had stumped the students. He also was dedicated and enthusiastic about the need for marine reserves.

Special thanks also go to:
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Past Kamo High School Students. Samara Sutherland - continued support, and Jessica Kerr – editing (both class of 1998).

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Appendices

Appendix 1: Copy of the formal Notice of Intention to Apply for a Marine Reserve at three areas in the Whangarei Harbour and Process for establishing a marine reserve

Notice under S.5 Marine Reserves Act 1971

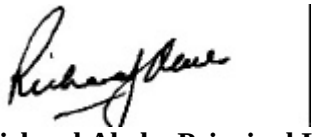
Pursuant to Section 5 of the Marine Reserves Act 1971, Kamo High School hereby gives notice of its intention to apply for an Order-in-Council declaring three areas of sea and foreshore around Motumatakohe, (Limestone Island), at Waikaraka and around Motukaroro, (Passage Island) as a marine reserve, and to be known as "Whangarei Harbour Marine Reserve".

A plan of the proposed marine reserve showing all tidal waters coloured blue and the boundaries and the extent of the areas sought to be declared a marine reserve together with a full copy of the application may be inspected free of charge at the Department of Conservation office in 149-151 Bank St., Whangarei (Northland Conservancy) during ordinary office hours or by writing to the applicant whose address is given below. Copies of the application are also available at the Whangarei Public Library, Kamo High School, Northland Polytechnic Library, Northland Regional Council Office, and the Whangarei District Council Office.

Any person or organisation may object to the making of the Order-in-Council by specifying the grounds of the objection in writing and submitting it to the Director-General, Department of Conservation, whose address for service is Department of Conservation, PO Box 842, Whangarei within two months from the date of the first publication of this notice and also serving a copy on the applicant whose address is: Whangarei Harbour Marine Reserve C/- Kamo High School, P.O. Box 7137, Kamo, Whangarei.

The date of the first publication of this notice is **March 15, 2002**.

The period for submitting objections closes May 15, 2002.
This notice of intention to apply for a marine reserve is given by the applicant, Kamo High School.



Richard Abel – Principal Kamo High School
Applicant

The Statutory Process for Establishing a Marine Reserve **(see S.5 of the Marine Reserves Act 1971 for detail).**	
Application is made to the Director-General of Conservation (DG)	
Application Satisfies the Marine Reserves Act 1971	Application does not satisfy the Marine reserve Act: application does not proceed
Public notification of intention to apply for an Order-in-Council declaring the area a marine reserve. Anyone owning an estate or interest in land adjoining the proposed reserve any local authority with jurisdiction over the area, any local authority with control of the foreshore in the area, the Secretary of Transport and the DG of Fisheries notified in writing by the applicant.	
2 month objection period	
1 month for the applicant to answer the objections	
DG refers the application, objections and *any answer* to objections to the Minister of Conservation.	
Before considering the application the Minister of Conservation considers objections and the applicant's answers to them (if supplied).	
Where the DG is the applicant the Minister of Conservation may call for an independent report.	
Minister decides whether or not to uphold any objections; applicant and objectors notified in writing of the Minister's decision and the grounds for it.	Any objection upheld: application does not proceed
If no objections upheld Minister of Conservation considers the application and whether to declare the area a MR will be in the best interest of scientific study and will be to the benefit of the public.	Minister not satisfied application meets the purpose of the Act: application does not proceed.
If the Minister of Conservation is satisfied the application meets the purpose of the Act the concurrence of the Ministers of Fisheries and Transport is sought.	Concurrence is withheld: application does not proceed
If concurrence is obtained the Minister of Conservation recommends the Governor-General make an Order-in-Council to establish the marine reserve.	
Order-in-Council is made and notified in the Gazette. Order declaring the marine reserve comes into force 28 days after notification.	

Appendix 2: Consultation Record 1990 – 2002

Chronology of Consultation 1990 - 2000

1990 - The idea for the marine reserve put forward by the Year 13 Geography class. Potential confirmed. Dr Bill Ballantine talked to the class about writing a proposal for the waters surrounding Motukaroro Island. Class visited and videoed the area. First visit to Ngatiwai Trust Board, who supported the idea in general but wanted to see a written proposal.

1991 - Bill Ballantine lectured class; the inclusion of Waikaraka and Motumatakohe suggested. Motukaroro video given commentary. After considerable negotiation Northland Port Corp. began to support the reserve. Proposal viewed by thousands at Sport North Expo.

1992 - Big steps taken towards getting the proposal written. Proposal promoted on TV (Wild Track). Bill Ballantine's annual visit. Significant comments and requests made by Ngatiwai Trust Board.

1993 - Won "Young Conservationist's Award" from Northland Conservancy, Department of Conservation. First meeting with Northland Port Corp. held to discuss boundaries for the Motukaroro reserve area. First proposal completed for Motukaroro.

1994 - Won "Tearaway Shield" for Conservation from Tearaway Magazine. Second video made of Motukaroro. Work begun on other two proposals. Further approaches to Ngatiwai. Received $6000 grant from ACI Glass for production of the proposal.

1994 - First proposal for all three areas completed. Copies circulated in the community and to interested parties including Ministry of Fisheries, local District and Regional Councils, Northland Port Corp., Portland Cement Works and DoC.

1995 – Continued consultation with Ngatiwai Trust Board. Proposal finished and photocopied. First "Captain Crab" booklet made. Received another grant of $2000 from ACI Glass.

1996 – Proposal reviewed. Ministery of Fisheries and many others provided written praise/criticism of proposal. Second crab booklet produced. Further work with Ngatiwai Trust Board. DoC published a guide for marine reserve applicants, prompting further reworking of proposal.

1997 – Relationship established with Ngatiwai Trust Board to take the proposal through. Received $1215 grant from ACI Glass. Students presented their views on marine reserves at the Patuharakeke Marae, Takahiwai Marae as part of a Ngatiwai and local harbour Iwi challenge to Northland Port Corp.'s proposed deep-water port. Ngatiwai expressed support for the marine reserve proposal in their submission. Meeting with Northland Port Corp. to discuss boundaries at Motukaroro and other reserve areas.

1998 - $1000 grant received from the New Zealand Refining Co. Further liaison with DoC and consultation with Ngatikahu Environmental liaison officer. Second edition produced and extensively reviewed; boundary changes included the exclusion of the wharf and shore area at Reotahi Bay and some minor changes to the channel edge boundaries as recommended by the Northland Port Corp. Proposal distributed widely in the community and directly to interested parties. Surveys and assessment continued.

1999 – Further help with proposal from DoC, Outboard Boating Club, and a $1200 grant from C.O.G.S. (Community Organizations Grants Scheme). Second edition reformatted and additions begun.

2000 – Rare Spanish lobster found in the Whangarei Harbour. Met with the Northland Fisheries Liaison Group. Received advice on reformatting and further development of proposal from the Department of Conservation.

Consultation 2001 - 2002

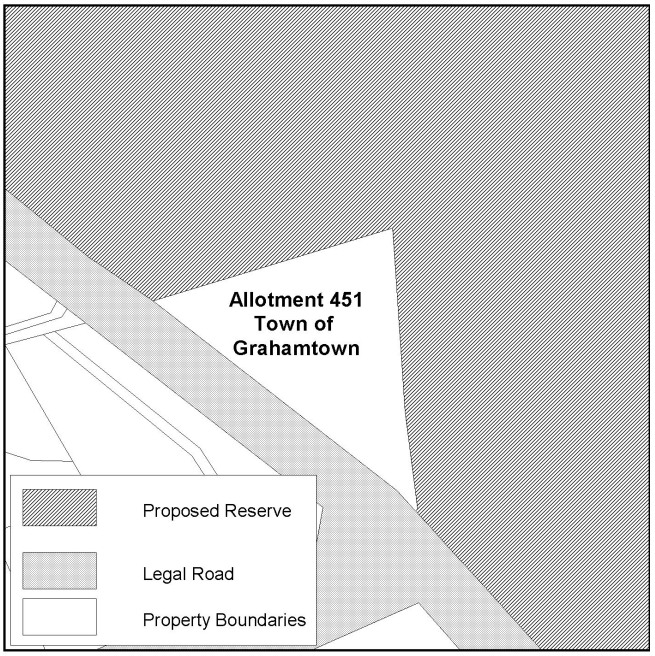
Date of consultation	Party consulted
February 2001	Senior Policy Analyst, Northland Regional Council
March 2001	Senior Policy Analyst, Northland Regional Council; Project Manager, Northland Port Corporation; Pilot Boat, Northland Port Corporation
April 2001	Coastal Planning Officer, Northland Regional Council
May 2001	Pilot Boat, Northland Port Corporation
June 2001	Coastal Planning Officer, Northland Regional Council
12 June 2001	Ngatiwai Resource Management Unit, Ngatiwai Trust Board
27 June 2001	Ngatiwai Resource Management Unit, Ngatiwai Trust Board
10 October 2001	Ngatiwai Resource Management Unit, Ngatiwai Trust Board
10 October 2001	Ngatiwai Resource Management Unit, Ngatiwai Trust Board
17 October 2001	Policy Manager Ministry of Fisheries; Technical Support Officer Department of Conservation, Northern Regional Office
8 November 2001	Hui: Ngatiwai Trust Board
21 November 2001	Friends of Limestone Island
4 December 2001	Various Whangarei hapu
6 December 2001	Hui: Ngati Kahu representatives from Te Waiariki, Te Parawhau and Te Patuharekeke present Mailing of Proposal completed
6 December 2001	Golden Bay Cement
12 December 2001	Northland Regional Council
21 December 2001	Proposal / poster drop to Whangarei Public Library and Environment Centre Ngatiwai Resource Management Unit, Ngatiwai Trust Board contacted
22 December 2001	Proposal drop to households in Reotahi / Waikaraka
9 January 2002	Whangarei District Council contacted
14 January 2002	Proposal drop to households in Onerahi
19 January 2002	Reel Passion Charters contacted Ngatiwai Resource Management Unit, Ngatiwai Trust Board
24 January 2002	Proposal drop to households in Onerahi/ Waikaraka
25 January 2002	Whangarei Harbour Commercial Fishers Group (Moana Pacific Fisheries)
29 January 2002	Magic Charters contacted
30 January 2002	Ngatiwai Resource Management Unit, Ngatiwai Trust Board contacted, meeting arranged for 8 February
31 January 2002	Manaia Vision Project – presentation to meeting
1 February 2002	Whangarei Harbour Cruises, Whangarei Heads Charters and Funfish Charter Connection (left message) contacted
5 February 2002	Ministry of Fisheries

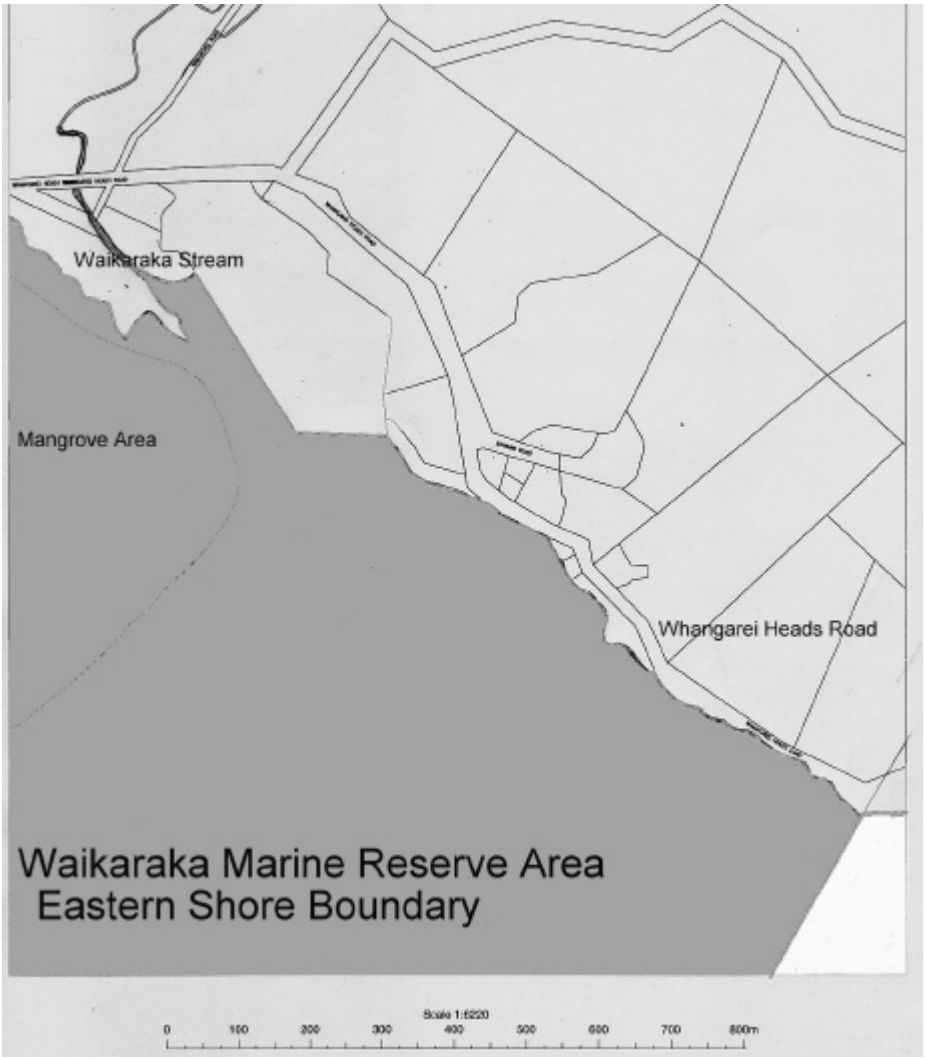
Appendix 3: Boundary Data

BUOY NAME	DESCRIPTION	TYPE	SIGN	EASTING	NORTHING
Waikaraka					
Stephen's Pt.Front	Existing Channel Marker	Leading	Beacon	2635748	6601998
Stephens Point East Shore	May require new shore marker	Leading	Beacon	2634794	6602653
Western shore marker	New shore marker required	Land marker		2636422	6603068
Motumatakohe					
Shellbank West	Existing navigational marker	Leading	Beacon	2634938	6601179
Wellington Rock	Existing navigational marker	Port Hand	Beacon	2634840	6601767
Limestone	Existing navigational marker	Port Hand	Beacon	2633931	6601535
Limestone	Existing navigation marker	Leading	Beacon	2633083	6601610
Limestone	Existing navigation marker	Port Hand	Beacon	2634411	6601527
Hewlett Pt land shore marker	New shore marker required	Land marker		2633555	6598435
Hewlett Pt land shore marker	New shore marker required	Land marker		2634773	6598426
Onemama Pt shore marker	New shore marker required	Land marker		2631846	6600308
Onemama Pt shore marker	New shore marker required	Land marker		2631864	6600135
Motukaroro					
No, 15 Buoy (NPC)	Existing navigation marker	Starboard Hand	Buoy	2646789	6595304
No.17 Buoy (NPC)	Existing navigation marker	Starboard Hand	Buoy	2646140	6595407
New buoy, Reotahi Pt	New buoy to establish			2645839	6595783
Reotahi Pt shore marker	New shore marker required	Land marker		2646045	6595836
New buoy, Reotahi Pt	New buoy to establish			2645999	6595727
Passage Is.rocks to Nth	Existing navigation marker	Isolated Danger	Beacon	2645628	6595671
Eastern shore boundary	New shore marker required	Land marker		2646706	6595661

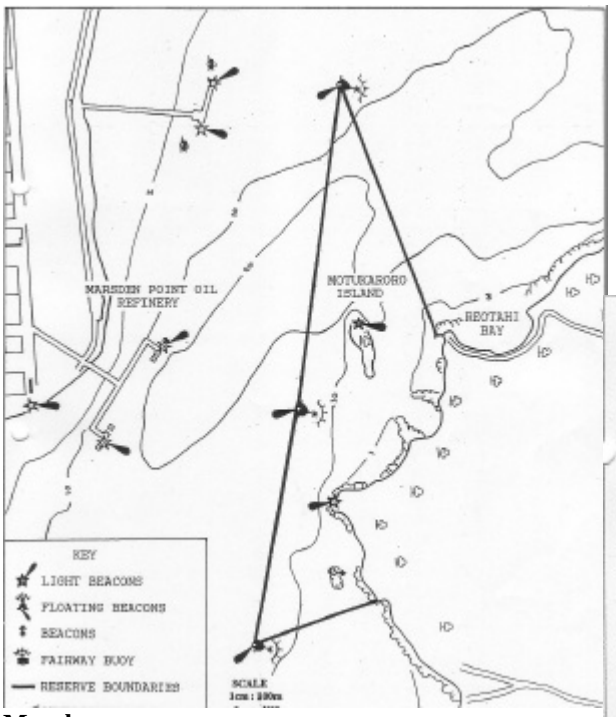
Boundary Detail for Allotment 451 and Waikaraka eastern shore boundary

Figure: 20

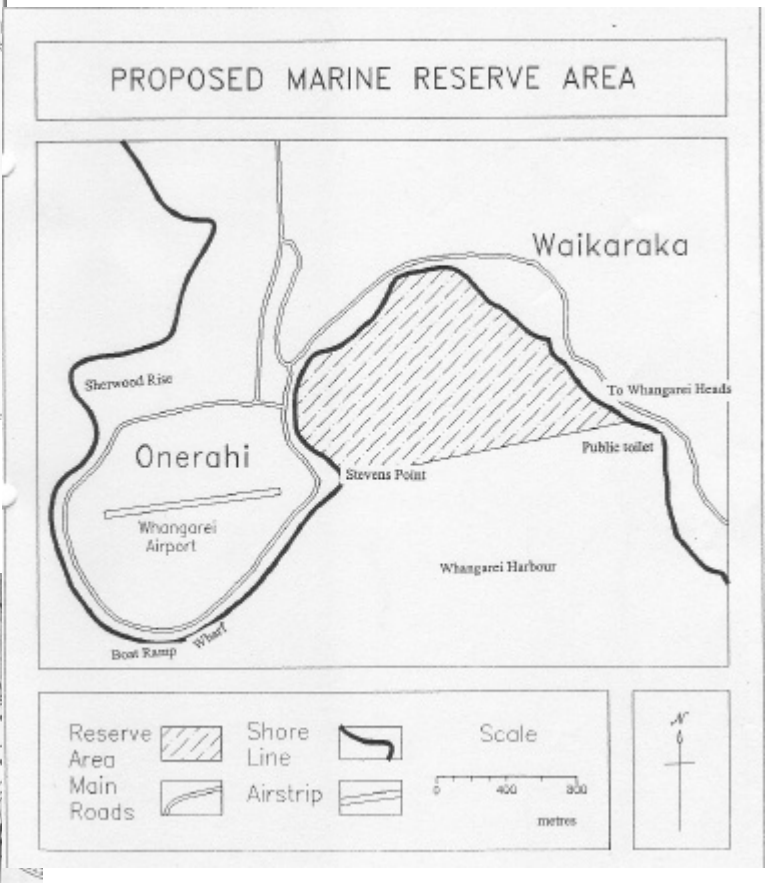




Appendix 4: Previous Boundary Maps (1997 proposal)



Motukaroro



Waikaraka

Motumatakohe

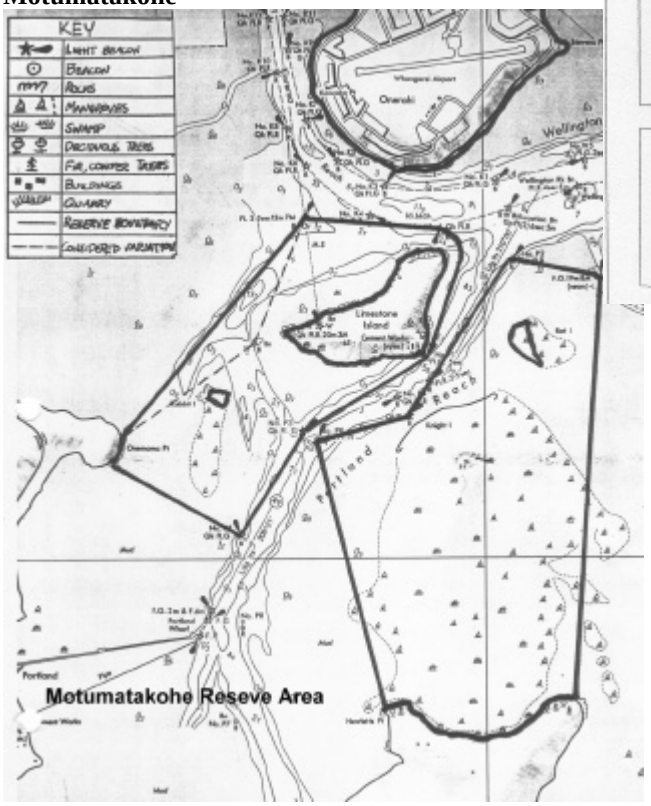


Figure : 21

Appendix 5: Species Lists

Soft-shore Benthic Communities

(Source: Technical Report No. 4: *Soft Shore Investigations,* Whangarei Harbour Study 1984)

*	Species present in the Waikaraka area
**	Species present in the Motumatakohe area
(none)	Species observed at other Harbour survey sites

Amphineura
Amaurochiton glaucus * **
Ischnochiton maorianus
Notoplax violacea

Gastropoda
Amphibola crenata **
Baryspira australis
Bulla quoyi
Cominella adspersa
C. glandiformis * **
C. maculosa *
Diloma subrostrata * **
Melagraphia aethiops
Notoacmea helmsi
Pleurobranchaea maculata
Turbo smaragda
Xymene plebius * **
Zeacumantus lutulentus **

Bivalvia
Atrina zelandica
Chione stutchburyi * **
Crassostrea gigas
Crassostrea glomerata
Dosinia subrosea
Macoma liliana * **
Mactra ovata * **
Modiolarca impacta **
Nucula hartvigiana **
Paphies australis **
Solentellina nitida * **
Theora lubrica

Crustacea
Alpheus richardsonii **
Calianassa filholi * **
Chamaesipho columna **
Cyclograpsus lavauxi **
Elminius modestus **
Halicarcinus whitei * **
Helice crassa **
Ligia novaezealandiae
Lysosquilla spinosa
Macrothalmus hirtipes * **
Notomithrax minor **
Ovalipes catharus
Pagurus novizealandiae
Pontophilus australis **
Upogebia danai

Annelida
Abarenicola assimilis
Boccardia polybranchia **
Glycera americana **
Nicon aesturiensis *
Pectinaria australis **
Pomatoceros cariniferus
Prionospio pinnata
Thelepus spectabilis

Echinodermata
Coscinasterias calamaria
Echinocardium australe

Coelenterata
Actinothoe albocincta **
Anthopleura aureoradiata **

Nemertea
Unidentified Nemertean sp. *

Pisces
Trypterygium varium * **

Rocky shore species (Motukaroro)

no mark	Species recorded in proposed Motukaroro reserve area, Technical Report No. 7: *Rocky Shore Investigations: Part I*, Whangarei Harbour Study 1984
*	Algal species observed by Brook (2001) at Motukaroro, (field work completed in 1990)
**	Algal species from 6 sites Parua Bay to Urquarts Bay, observed by Brook (2001) at Motukaroro, (field work completed in 1990)

Amphineura
Acanthochitona zelandica
Amaurochiton glaucus
Cryptoconchus porosus
Ischnochiton maorianus
Notoplax violacea
Sypharochiton pelliserpentis

Ascidians
Asterocarpa coerulea *
Cnemidocarpa bicornuata *

Gastropoda
Buccinulum linea
Cantharidus purpuratus
Cominella virgata
Diloma bicanaliculata
Haustrum haustorium
Lepsiella scobina
Littorina unifasciata antipodum
Melagraphia aethiops
Melanerita atrimentosa
Notoacmea pileopsis
Onchidella nigricans
Thais orbita
Turbo smaragda

Bivalvia
Crassostrea glomerata (alive)
Crassostrea glomerata (dead)
Xerostrobus pulex

Crustacea
Chamaesipho brunnea
Chamaesipho columna
Elminius modestus
Epopella plicata
Petrolisthese elongates

Coelenterata
Anthopleura aureoradiata
Isactinia olivacea
Isactinia tenebrosa

Echinodermata
Asterina regularis

Algae
Apophloea sinclairii
Bostrichia arbuseula
Carpophyllum angustifolium
C. aff. angustifolium
C. flexuosum (large and small) * **
C. maschalocarpum * **
C. plumosum
Codium convolutum
Corallina officinalis 'paint'
C. officinalis 'turf'
Cystophora retroflexa
C. torulosa
Durvillaea antarctica
Ecklonia radiata * **
Hormosina banksii
Landsburgia quercifolia
Leathesia difformis
Lessonia variegate
Liagora harveyana
Ralfsia verrucosa
Sargassum johnsoni
Sargassum aff. johnsoni
Sargassum sinclairii *
Xiphophora chondrophylla

Tubeworms
Pomatoceros caeruleus

Porifera
Cliona celata
Didemnum candidum
Microciona coccinea

Bryozoans
Beania magellanica
Watersipora cucullata

Lichens
Lecania sp.
Ochrolechia sp.
Xanthoria parietina

Fish species

*	Species noted in KHS (1997) survey of Motukaroro
#	Species noted in Brook (2001) study of Motukaroro (field work completed in 1990)
##	Species from 6 sites Parua Bay to Urquarts Bay, noted in Brook (2001) study of Motukaroro (field work completed in 1990)
**	Species noted in Mason & Ritchie (1979) survey of Whangarei Harbour
***	Species noted in Mason & Ritchie (1979) survey of Motumatakohe

Arripis trutta (kahawai) ** ***
Centroberyx affinis (golden snapper) *
Parablennius laticlavius (crested blenny) # ##
Pseudocaranx dentex (trevally) ** *** ##
Decapterus koheru (koheru) ** #
Trachurus novaezelandiae (jack mackerel) ** *** #
Seriola lalandi (kingfish / northern kingfish) *
Cheilodactylus spectabilis (red moki) * # ##
Chironemus marmoratus (hiwihiwi / kelpfish) * # ##
Conger verrauxi (common conger eel) ##
Dasyatis brevicaudatus (short-tail stingray) ***
Engraulis encrasicolus (anchovy) ***
Girella tricuspidata (parore) ** # ##
Gobiopsis atrata (black goby) #
Kyphosus sydneyanus (silver drummer) *
Notolabrus celidotus (paketi / spotty) * ** # ##
Notolabrus fucicola (banded wrasse) # ##
Pseudolabrus miles (scarlet wrasse) # ##
Latridopsis ciliaris (blue moki) *
Parika scaber (leatherjacket) * *** # ##
Lotella rhacinus (rock cod) * ##
Aldrichetta forsteri (yelloweye mullet) **
Mugil cephalus (grey mullet) ** ##
Upeneichthys lineatus (goatfish) * ** # ##
Gymnothorax prasinus (yellow moray) #
Myliobatis tenuicaudatus (eagle ray) ** ***
Pempheris adspersus (bigeye / bullseye) * # ##
Parapercis colias (blue cod) # ##
Rhombosolea leporina (yellow belly flounder) **
Chromis dispilus (demoiselle) # ##
Scorpaena cardinalis (scorpionfish) *
Scorpaena papillosus (dwarf scorpionfish) # ##
Scorpis lineolatus (sweep) # ##
Scorpis violaceus (blue maomao) # ##
Caesioperca lepidoperca (butterfly perch) * # ##
Caprodoon longimanus (pink maomao) ##
Pagrus auratus (snapper) * ** *** #
Hippocampus abdominalus (sea horse) #
Optivus elongatus (slender roughy) # ##
Chelidonichthys kumu (red gurnard) **
Forsterygion flavonigrum
(yellow-black triplefin) # ##
Forsterygion lapillum (common triplefin) # ##
Forsterygion malcomi (banded triplefin) # ##
Forsterygion varium (variable triplefin) # ##
Grahamina capito (mottled triplefin) ##
Notoclinops segmentatus (blue-eyed triplefin) #
Obliquichthys maryannae
(oblique-swimming triplefin) # ##
Ruanoho decemdigitatus (long-finned triplefin) # ##
Ruanoho whero (spectacled triplefin) # ##
Genyagnus monopterygius (spotted stargazer) ##
Zeus faber (john dory) * ** # ##

Bird species associated with the Waikaraka and Motumatakohe marine habitat areas

(**Source: Pers. com. Vincent Kerr & Dr. Ray Pierce, 2001**).

*	Cat. C (vulnerable)
**	Cat. O (occurs overseas; considered equivalent to C threatened)
***	Cat. B (endangered)
#	Cat. A (critically endangered)

(Source: Molloy, J. & Davis, A., 1994)

Alcedinidae

Halcyon sancta (kingfisher)

Anatidae

Anas platyrhynchos (mallard)

Ardeidae

Ardea novaehollandiae (whitefaced heron)

Egretta sacra sacra (reef heron)

Charadriidae

Vanellus miles novaehollandiae (spur-winged plover)

Charadrius bicinctus (banded dotterel) *

Charadrius obscurus (New Zealand dotterel) ***

Anarhynchus frontalis (wrybill) ***

Pluvialis fulva (Pacific golden plover)

Haematopodidae

Haematopus ostralegus finschi (South Island pied oystercatcher)

Haematopus unicolor (variable oystercatcher) *

Hirundinidae

Hirundo tahitica (welcome swallow)

Laridae

Larus dominicanus (black-backed gull)

Larus novaehollandiae (red-billed gull)

Motacillidae

Anthus novaseelandiae (New Zealand pipit)

Phalacrocoracidae

Phalacrocorax varius (pied shag)

Phalacrocorax sulcirostris (little black shag)

Phalacrocorax melanoleucos (little pied shag)

Phalacrocorax carbo (black shag)

Procellariidae

Puffinus gavia (fluttering shearwater)

Rallidae

Rallus philippensis (banded rail)

Recurvirostridae

Himantopus himantopus leucocephalus (pied stilt)

Scolopacidae

Limosa lapponica baueri (eastern bar-tailed godwit)

Calidris canutus (lesser knot)

Numenius phaeopus (whimbrel)

Spheniscidae

Eudyptula minor (little blue penguin)

Sternidae

Sterna striata (white-fronted tern)

Sterna caspia (Caspian tern) **

Sterna nereis davisæ (New Zealand fairy tern) #

Sulidae

Sula bassana serrator (Australian gannet)

Threskiornithidae

Platalea leucorodia regia (royal spoonbill)

Appendix 6: Whangarei Harbour Marine Reserve Submission Form

Submission Form

Whangarei Harbour Marine Reserve Application

Name / Iwi / Group:_____

Address:_____

Your submission

Please give your reasons for supporting or opposing the application. Feel free to attach extra information if you wish. Send your submission to the following address:

Director General, C/- The Conservator, Department of Conservation, PO Box 842, Whangarei

You are required to send a copy to the applicant:

Whangarei Harbour Marine Reserve, C/- Kamo High School, P.O. Box 7137, Kamo, Whangarei

Appendix 7: Public opinion surveys

Motukaroro Questionnaire

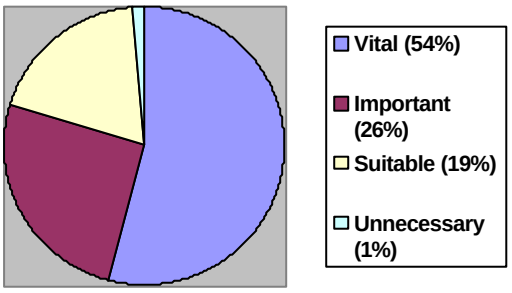
Motukaroro Survey

In addition to the general survey effort from 1993-2001, on two occasions (1994 & 1998) Kamo High School students met with the Outboard Motor Club based in Parua Bay near the proposed reserve area. In 1998 the Outboard Motor Club circulated a story about the reserve proposal and the KHS survey forms to all its members.

The Motukaroro questionnaire, drafted when the other two reserve areas had not yet been added to this proposal, contained four general questions about Marine Reserves and Whangarei Harbour in addition to two questions concerning the Motukaroro reserve area.

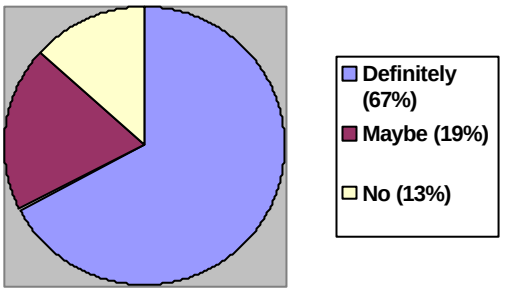
- Only 4% of 3343 respondents believed that recreational activities would not benefit from the establishment of a marine reserve around Motukaroro Island.
- An equally small percentage of respondents did not want protection for the marine habitat around Reotahi Bay, with almost two-thirds expressing definite support for the proposed protection scheme.

Do you believe Marine Reserves are:



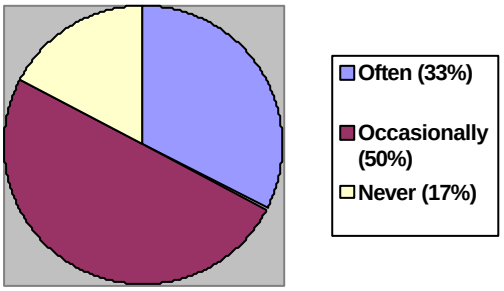
Total Surveys 3338

Do you feel that Marine Reserves could benefit Northland?



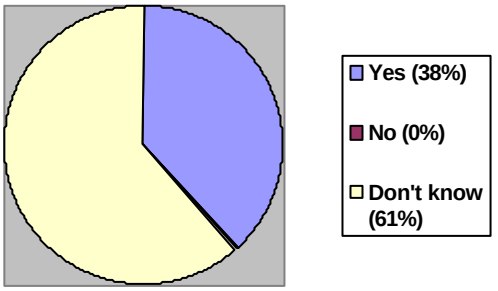
Total Surveys 3338

How often do you visit the waters around the Whangarei Harbour?



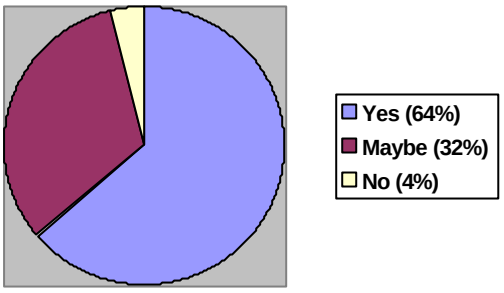
Total Surveys 3338

Has marine life greatly declined in the Whangarei Harbour?

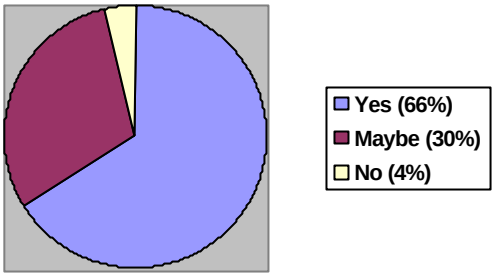


Total Surveys 3338

Would you like to see a Protected Area around Reotahi Bay?



Do you think recreational activities such as diving, snorkelling and fishing will benefit from a Reserve around Motukaroro Island?



Figures 22: Motukaroro Survey results

Total Surveys 3338

Total Surveys 3343

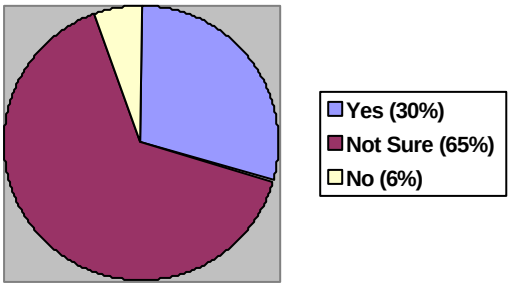
Waikaraka Questionnaire

Waikaraka Survey

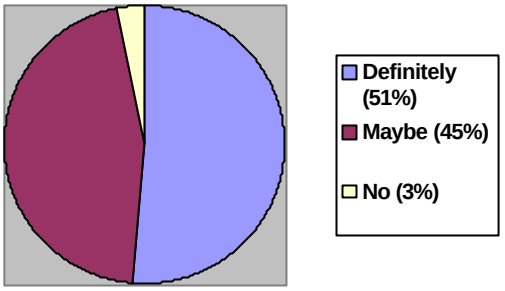
786 completed surveys for the Waikaraka area were received from the Outboard Boating Club, Onerahi and Parua Bay Yacht Clubs and the general survey effort.

- In line with the applicant's belief that existing recreational usage in this area is minimal and would certainly not be adversely affected by the establishment of a marine reserve, 70% of survey respondents never used the proposed reserve area and only 10% described themselves as regular users.
- Although there was a high level (65%) of uncertainty expressed about whether the mangrove habitat in question was treated badly at present, over half of respondents definitely thought that it needed protection of some kind.
- There was strong support for the establishment of a marine reserve at Waikaraka.
- This increase in positive response suggests that respondents, while possibly unfamiliar with the specific habitat in question, were aware of the wide range of potential benefits of marine reserves - beyond simple protection of habitat.

Do you feel that this area of Mangroves is treated badly?



May this area need protecting?

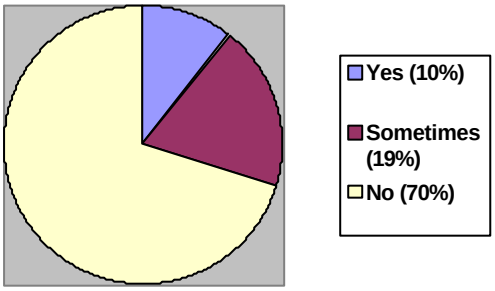


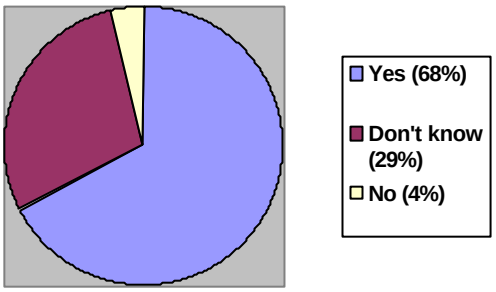
Total Surveys 2559

Total Surveys 2558

Do you use this area for recreational use eg. fishing?

Would you approve of a Marine Reserve at Waikaraka?





Figures 23: *Waikaraka Survey results*

Total Surveys 2559

Total Surveys 2558

Motumatakohe Questionnaire

Motumatakohe Survey

Three questions were asked concerning the Motumatakohe proposed reserve, with the number of respondents ranging from 2962 to 2968 over the period 1993-2001.

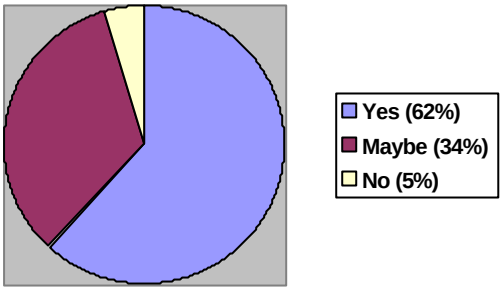
- The survey results demonstrate overall support for a complementary land and sea reserve system at Motumatakohe was high.

In the 1994 public survey there was an option for respondents to choose to remove the 'hole' on the west side of Motumatakohe. There was very little support for remaoval of the "Hole" option.

Over 90% of survey respondents never or occasionally used the proposed area occasionally or never, indicating that while a reserve would have little adverse impact on current recreational use there may have been a lack of familiarity with the area among respondents in general.

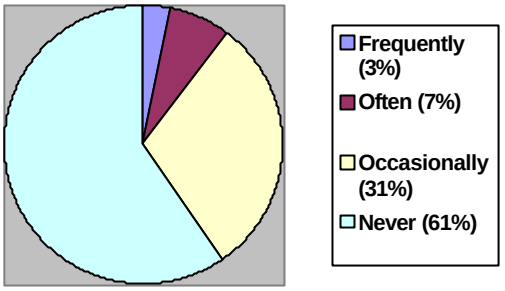
- The survey demonstrates the effect which specific information on the habitat to be protected, and likely ecological gains of reserve establishment, can have on public willingness to endorse some form of habitat protection.

Motumatakohe is a land reserve, do you consider that this area would be enhanced further with a Marine Reserve?



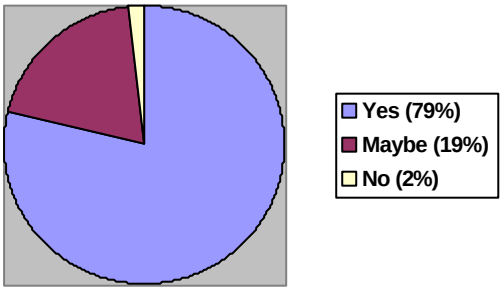
Total Surveys 2964

Do you use Motumatakohe or its surrounding waters for any type of activity. eg. fishing, diving?



Total Surveys 2962

The proposal area is a shallow water area where wading birds feed and some fish species breed. It is also an extensive mangrove habitat. Do you think that such an area is worth protecting?



Figures 24: Motumatakohe Survey results

Total Surveys 2968

Note: The following excerpt accompanied the public opinion surveys whose results are detailed above.

AIM OF THIS PROJECT

At present only a small portion of New Zealand's coastline is protected by marine reserves. Kamo High School seventh form geography students hope to preserve more of this diverse coastline. Our aim is to encourage the creation of a unique marine reserve around Motumatakohe (Limestone Island) and its smaller surrounding islands, situated within Whangarei Harbour.

We, the students, are taking on this important task as we genuinely believe that the environment today needs marine reserves in order to protect and retain the full wonder and colour of New Zealand's marine life. The Marine Reserve project fits into the coastal management topic in our bursary syllabus.

With the support of Friends of Motumatakohe, The Department of Conservation, tangata whenua, Royal Forest and Bird Protection Society, Outboard Boating Club Whangarei and the public, we hope to turn Motumatakohe's waters into a “no take” marine reserve. This would prohibit hand gathering, fishing or

disturbance of any species (both flora and fauna). A "no take" marine reserve comes in under the 1971 Marine Reserves Act.

This proposal aims to provide a description of the proposed marine reserve around Motumatakohe, and a discussion of how it would affect activities in the area.

As well as aiming to provide you with information about the issues, we invite you to let us know whether or not you support our proposal and any way in which we can improve it.

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Appendix 8: Examples of comments and submissions received

Conservation Groups, Department of Conservation, June 15th, 1990

"This sounds like an exciting idea to us"

Northern Branch Royal Forest and Bird Society

"We congratulate you on your continued efforts to achieve this worthwhile objective."

Greenpeace N.Z., August 28th, 1997

"The long term goal of Greenpeace is to designate 10% of N.Z.'s coastline as reserve sites."

Ocean Ecology Trust, August 27th, 1997

"We would be most happy to support your actions for the marine reserves in Whangarei Harbour."

Sea Keepers, November 5, 1995

"Very impressed with the work you have done."

Forest and Bird Protection Society of N.Z., March 27th, 1997

"We certainly do support your proposal to establish marine reserves."

Local Government, Mayor Whangarei District Council

"Mr Semenoff is in support of students who are interested in topics such as this."

Government Agencies - House of Representatives, March 12th, 1997

"extraordinary worthwhile project in the best interests of preserving the natural environment."

Ministry of Commerce, September 19th, 1997

"preserving the area is in the national interest."

University of Waikato, September 16th, 1997

"the presence of a marine reserve in the Whangarei Harbour area would add considerably to our interest in research and possibly taking field trips to the area."

Auckland University, August 20th, 1997

"We support marine reserves in New Zealand. The Motukaroro Island site is particularly suitable given its diverse ecosystem and interesting geology."

Otago University, August 25th, 1997

"This sounds like a very exciting project and I hope it is successful."

Canterbury University, August 20th, 1997

"We wish you the best of success with the proposals."

Golden Bay Cement, November 26th, 1993

"We are happy to participate in this project through the provision of assistance with printing costs."

New Zealand Refining Company Ltd, October 24th, 1997

"would therefore support the objectives of your committee."

Appendix 9: Testimonials

A 'Wet Library' for Whangarei - Wade Doak, author/diver/photographer

This marine reserve proposal for Whangarei harbour is a milestone in the history of coastal conservation. By seeking to protect a sequence of related habitats within a harbour ecosystem we gain far more than with the ad hoc process to date, whereby we have only set aside a meagre one per cent of our enormous coastline for future generations.

These young people of Kamo High School seeking a secure tomorrow for the sea remind us that marine reserves were intended for scientific purposes. We must realize that this should include, most importantly, high school level studies. All students in New Zealand need access to a local marine reserve as part of their education.

Just as we take for granted the availability of libraries, parks, reserves and green spaces as essential amenities, so on an ocean planet the generation preparing to take over responsibilities should have access to untrammeled blue spaces. I hope every high school in New Zealand will demand a similar facility within their area. This could be a worthwhile millennial goal. Hitherto, it is only our limitations as land dwellers that have blinded us from such a perspective as to the importance of the sea world.

Motukaroro – Dr. Bill Ballantine, University of Auckland

Local people have a special feeling for their own area, but sometimes it is helpful for outsiders to emphasize the unique nature of some feature, such as Motukaroro.

The whole Whangarei Heads area is famous for its geological and human history, its scenic beauty and the great variety of its marine habitats. More than 30 years ago I was introduced to these delights by the late Bill Delph, a man of wide interests, and Betty, his wife, who still paints its scenery in her delightful water colours. Each year since I have been back with parties of marine biology students from the University of Auckland. The highlight of every visit is the day at Motukaroro, where the south shore so elegantly demonstrates the zonational pattern of life between tide marks.

The north side of the island is a typical shore, with a jumble of rocks basking in the sun and complexly covered with patches of marine life, bedrock and blocks, gullies and pools, sand and stones. On the southern side, however, the rock face is so uniform and geometrically simple that the brightly coloured zones of lichens, barnacles, oysters and seaweed's appear like painted bands paralleling the water line and running up into the coastal forest that crowns the island.

On hundreds of shores around the world I have never seen a place that shows so clearly the basic patterns of marine life.

It is a privilege to be asked by the students of Kamo High School to support their efforts to protect and conserve the marine life round Motukaroro. I commend their initiative and urge all citizens of the region to join them in ensuring that this small jewel remains in its pristine state for the appreciation and education of their children and forever.

- Leigh Marine Laboratory, June 28th 1992

Waikaraka - Des Ogle, Onerahi resident/conservationist

Various species of mangroves border the coastline of many countries, ranging from 35 degrees north of the equator to 40 degrees south. Mangal forests have been instrumental for centuries in providing much of the livelihood and commodities for indigenous people occupying coastal zones.

Over recent years the destruction of worldwide mangal areas for commercialization has slowly brought about an awareness of the trees' importance within our regions and harbours; so much so that there is now an "International Society for Mangrove Ecosystems," as well as a "Japanese International Association," both formed for the worldwide protection of the specie.

In New Zealand, past generations of Europeans have regarded the trees as an unsightly nuisance. As a consequence, many of our mangal forests have become stop-banked and converted into farmland, with some areas filled with harbour dredging and converted into industrial zones or simply used as a rubbish tip from which pesticides, weedicides and residues from heavy metals have leached out into our harbour waterways.

A survey taken in 1984 revealed that the total mangrove estate in New Zealand had shrunk to 18,350 hectares. Because of the importance of mangrove ecology to fisheries and shoreline bird-life, there has been increasing public awareness of the urgent need to preserve what is left of our mangal estate.

In 1992 the Kamo High School Geography students began working on a proposal to have the Waikaraka mangrove area declared a marine reserve. The area is visible to all road traffic that passes by, is readily seen by tourists on incoming aircraft and, as a reserve, would be complemented by the Waimanahanga and Awaroa mangal forests.

As a marine reserve, Waikaraka will continue to carry out all the functions that occur within mangrove ecosystems. Its future protection as a marine reserve would be of immense value to the Harbour environment it borders.

I regard it as a great privilege to support the Geography classes' efforts.

The need for marine reserves – a unique opportunity for Whangarei Harbour (Student Essay)

Marine reserves were slow to get started. They are now being promoted more vigorously, but what of the future? Are we just going to get a few more now and then, when local enthusiasm manages to overcome general inertia? Or will it be possible to start using principles, to start making sensible policies and to go for a real system of reserves in the sea?

In New Zealand everyone is welcome to view, appreciate and study the richer and more natural marine life that develops in reserves like the Leigh Marine Reserve. We can be proud of the fact that the twin principles - "no take" and "all welcome" - have already been adopted, and have proved practical and popular.

Marine conservation is about 100 years behind our efforts on land and there is still a lot to be done. Everyone must remember that marine reserves are not a complicated way of deciding who should catch what, but rather a basic tool for the conservation of marine life.

Although the three proposed marine reserves will help protect and restock marine life within the harbour, they are but three areas of the larger harbour ecosystem. As an ecosystem it is a specialised one, where fish come into the sheltered waters of the harbour at various stages of their life. It is a nursery for juvenile fish. It is as much in the fisherman's long term interests as anyone's that significant numbers of mature fish are allowed passage and perhaps refuge in the sheltered waters of the harbour.

Unfortunately, improved methods of fishing are presently stripping the harbour of its fish. For instance, monofilament set nets or gill nets are being used. These are smaller versions of the wall-of-death nets which raped the seas and oceans of so much of its life. Many, many New Zealanders have protested against this form of fishing because of its indiscriminate killing of dolphins and marine life. It is likely that nets used

within this harbour are doing the same to adult fish, consequently reducing the numbers of juvenile fish. This, coupled with other improved fishing methods like jigging, is giving fish populations little chance.

It is important for the whole harbour ecosystem to function well. One part of this is for fish to live and breed naturally. Even fish like blue maomao and big eye, that sieve nutrients from the water for their food, are important links in the food chain as the body waste they produce helps sustain reef fish, scallops and crabs.

The proposed reserves should become ideal places for further study to make these links better known, with comparisons being made to non-protected harbour areas. This sort of information, once available, should make it possible to better manage the total harbour ecosystem.

This gives even more strength to the need for these Marine Reserves.