The Mimiwhangata Marine Investigation Progress Report August 2002

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Mimiwhangata deep reef sponge and Gorgonian fans *photo by Roger Grace*

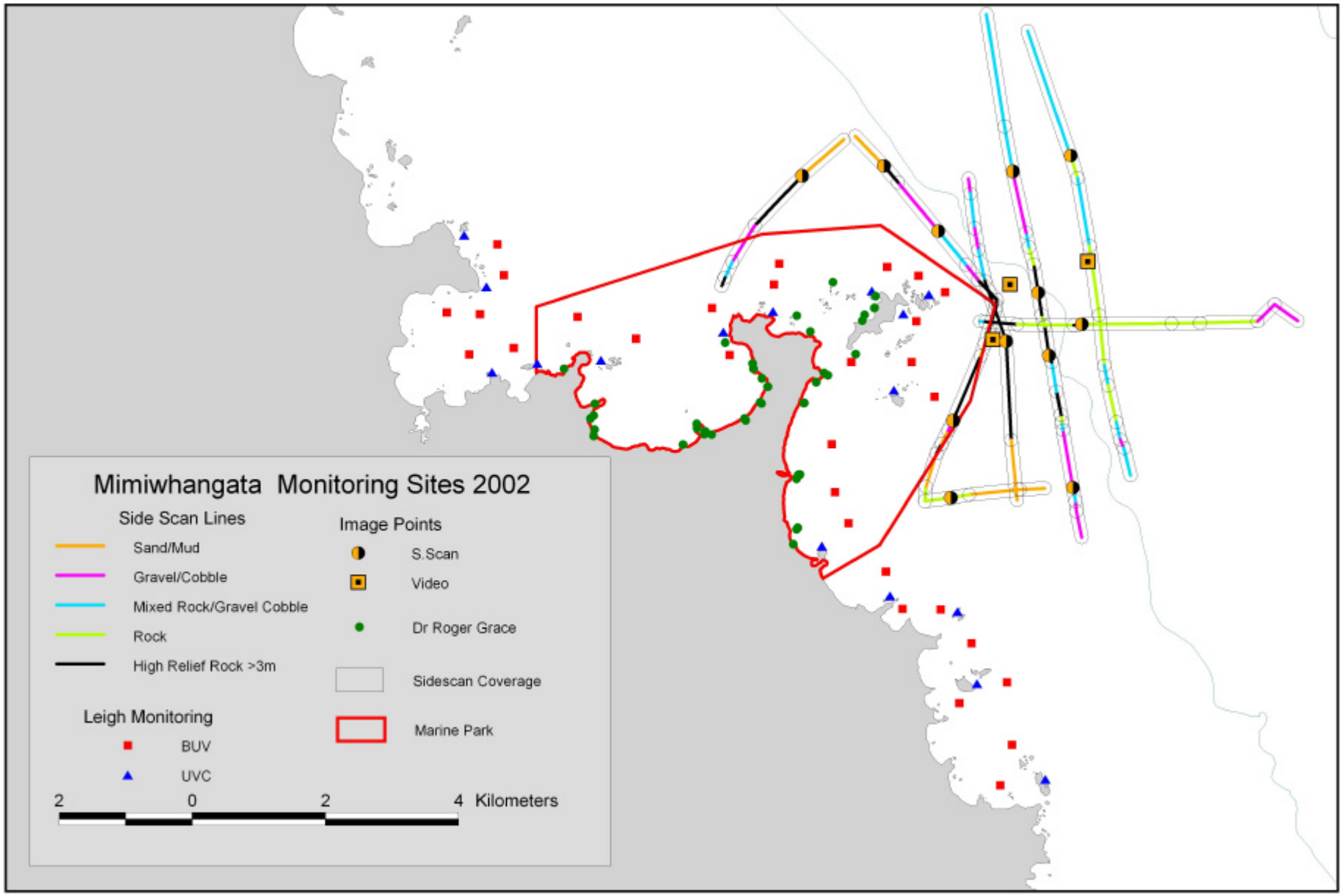

Figure 1 Survey sites

Summary

This report gives a description of marine survey work that has been commissioned by the Department of Conservation at Mimiwhangata. The aims of the investigation are to examine the effectiveness of the current regime of protection of the Marine Park and to update the biological information on the species and habitats of the area. A further aim is to update the survey methodology used to allow comparison with the full spectrum of current and future research on our coastal marine environments which focuses on testing the impacts and benefits of marine protection

The preliminary findings of the three studies indicate that the Marine Park concept as implemented at Mimiwhangata has fallen short of protecting the marine species and habitats of Mimiwhangata, despite the very positive intentions and aims of the people who developed the original Marine Park concept. A comprehensive fish survey undertaken by the Leigh laboratory team this year found no significant difference in diversity and abundance of most fish species between sites inside and outside the Park. Snapper numbers were overall low compared with other study sites and also showed no real difference between in and outside of the Park. There is evidence that in some species and habitats there has been continued decline. It is likely that recreational fishing is now the major impact on Mimiwhangata marine species, as commercial fishing was discontinued in 1994. Habitat information of the Mimiwhangata reef habitats has now been extended to 4 km offshore. This work indicates that the inshore reefs of Mimiwhangata extend out to 4 km offshore and form a significant area of biodiversity rich and important deep reef habitat.

Introduction

The marine area of Mimiwhangata has been the subject of considerable scientific interest since the early 1970's. For over a decade up until 1986 extensive habitat and species monitoring programmes were set up and developed. This work is well documented, (see references). This early work along with public consultation that took place, established that Mimiwhangata was an extremely good example of Northland's northeastern coastal environment. Also exceptional educational and recreation values were identified in this earlier work. After a lengthy process the Marine Park was set up in 1984 with fishing restrictions established under the Fisheries Act.

Now 18 years later there is much anecdotal evidence that the Marine Park concept used at Mimiwhangata has not worked, due to difficulties of enforcing the rules, understanding the rules or possibly the effectiveness of this approach to marine protection in general. This investigation attempts to provide a sound scientific basis for the consideration of these issues and future planning for marine protection and conservation.

A Brief History of the Marine Park

A complex history preceded the present status of Mimiwhangata Marine Park. The area has a long and important pre-European history of cultivation, establishment of headland pa, and even a sizeable massacre. The coastal resources were intensively used and managed by the tangata whenua of the area.

More recent history saw the land purchased by New Zealand Breweries, later to become Lion Breweries, in the 1960's. Initial intentions of the Breweries were to establish an international golf course, prestigious hotel, and exclusive coastal playground for the world's rich and famous. But the Chairman of Directors, Sir Geoffrey Roberts, had a different idea. He saw Mimiwhangata as something of immense value to New Zealander's and far too valuable to squander on an extravagant international playground. He commissioned a series of reports on the ecology, archaeology, and marine life of the area, and encouraged the Breweries to investigate ways of opening up the property as a farm park, as a gesture of goodwill to the people of New Zealand, and to link this to a marine park in the adjacent waters.

In 1975 a trust was set up, consisting of Government and University officials, planners, and representatives of the owners, to administer the property, and to follow up moves towards the creation of a coordinated land and sea park. A monitoring programme, funded by the Breweries, was established in 1976, to follow long-term changes in marine life as an aid to management of a future marine park. Lion Breweries generously opened up their property to the public as a Farm Park in December 1980, but numerous political and administrative obstacles to the Marine Park proposal appeared. Basically the people of Northland were suspicious of the Breweries motives and would not accept their genuine offer to manage a coordinated land and sea park, freely available to the people of New Zealand, at no cost to the Nation. An Environmental Impact Report was produced, with a lot of public discussions and consultation, and was duly audited by the Commission for the Environment. The audit recommended that administration of the Park complex be handed over to the Bay of Islands Maritime and Historic Park Board.

Frustrated by years of efforts to establish the Park concept, Lion Breweries finally decided to swap Mimiwhangata for a piece of Crown-owned real estate in Wellington, and Mimiwhangata passed into public ownership.

The marine monitoring programme showed that, following opening of the park to the public, many abuses of fishery regulations occurred. Many sack loads of kina were taken away from newly accessible areas, and the incidence of illegal removal of oysters sky-rocketed. Despite these problems, the Marine Park was finally established in 1984. Commercial fishing was immediately reduced to long-lining and cray-potting, which was allowed to continue for another 10 years. The Marine Park allows recreational fishing and shell fishing for types of marine life which can stand some fishing pressure, but prohibits the taking of species which would be depleted rapidly even by a small amount of fishing. The intention of the somewhat complex fishery regulations was to tightly control recreational fishing to certain methods and species, and to protect everything else. *(see Appendix 1)*

In 1994 the DoC Park Ranger tried to bring a prosecution through MinFish over illegal removal of paua from the Marine Park. This opened up a can of worms. Legal interpretation of the Fishery Regulations showed that, although certain species could be taken by certain methods, due to problems with drafting the regulations other marine life was NOT protected. This situation created confusion and concerns around the effectiveness of the Marine Park, and its regulations have been commonly considered unenforceable. Effectively what we have now is a Marine Park in which no commercial fishing has occurred since 1994, but recreational fishing continued with limited but

unenforceable controls. Thus we have an opportunity to test the effects of recreational fishing in the absence of commercial fishing.

The Marine Survey Projects

The overall aims of the investigation are threefold and organized in three studies:

1. Directly compare the present state of the marine habitat and species with the monitoring regime and data from the 70's and 80's. ***Repeat of Historic Monitoring*** *Dr Roger Grace*

2. 'Calibrate' the historic method and data to a modern approach to monitoring key species that would also be comparable with current similar research in marine reserves and control (non marine reserve) areas. ***Auckland University Fish Survey*** *Leigh Lab*

3. Extend basic survey work to areas which were not extensively studied in the 70's and 80's particular the deeper areas offshore from the current Marine Park boundary. ***Deep Reef Survey Project*** *Vince Kerr & Dr Roger Grace*

Repeat of Historic Monitoring *Dr Roger Grace*

Project Description

For some years prior to the establishment of the Trust in 1975, the owners of the property were conscious of the potential of Mimiwhangata as a recreational resource of national importance. Awareness of its value was strengthened by detailed studies carried out in the area. The Mimiwhangata Marine Monitoring Programme, commissioned by the Trust, was established in Winter 1976. The Programme was designed to provide long-term stocktaking information on the marine resources, particularly popular edible species, to facilitate their management and conservation. The earlier detailed survey of the marine resources, presented in the Marine Report (1973), provided essential background information on which to base the design of the Monitoring Programme. Location of each sampling station was influenced by the following considerations:

known established beds of popular shellfish;
ease of access from land or sea;
likely focal points of activity for visitors to Mimiwhangata;
range of habitats suitable for each species.

The locations of permanent monitoring stations are indicated on the map in this report (Fig. 1.).

Although initially carried out on a regular basis, monitoring became more irregular and intermittent through the early 1980's, and the last comprehensive monitoring was in 1986. Since that time no formal monitoring was carried out until 2001 - a gap of approximately 17 years!

Monitoring of intertidal sites was carried out in winter 2001, then a full survey of intertidal and subtidal sites occurred in summer 2002.

Sampling Methods

Rock oysters
Rock oysters were monitored by **two methods:**

1) Photographic transects.
A metric measuring tape was laid in a straight line between permanent markers at each end of the transect. Photographs were then taken covering 0.5 metre intervals along the tape. Direct comparison of individual oysters between sampling times was possible by this method. The total area covered by each of these transects varied from 1.0 square metre for a 3-metre transect, to 1.7 square metre for a 5-metre transect.
2) Counting transects.
A metric tape was laid in a straight line in a specified direction from one of the photographic transect markers. In a one-metre wide strip parallel to the tape, counts were made of the following categories of dead oysters:

(i) Dead oyster, but with upper valve of shell still attached to the basal shell at the hinge. Inferred cause of death is natural
(ii) Fresh white base shell exposed. Indicates recent death and is typical of artificial removal
(iii) Basal shell exposed as in (i) above, but weathering of shell surface indicates that death did not occur recently
(iv) Basal shell exposed as in (i) and (ii) above, but heavy weathering indicates that death occurred quite some time ago, generally more than six months previously

Tuatuas
At each station, samples were taken at intervals down the beach, usually 5 metres apart. Each sample consisted of a quadrat (small defined area, usually 1 square metre) which was dug over and passed through a sieve to separate the tuatuas, which were then counted. This gave quantitative information on the distribution of tuatuas down the beach.

Sampling was continued into the sublittoral area off the beach by diving, to a distance of 200 metres from the marker at the top of the transect. Sublittoral samples were generally dug by hand, and only in the early sampling periods was an attempt made to sieve the sand underwater. Sieving underwater proved to be very difficult because of surge caused by waves approaching the beach.

Growth of tuatuas was monitored by measuring about 150 individuals from the densest part of the tuatua bed. Shift in the mode (most frequent length) of tuatuas between sampling times reflected the growth of the tuatua population.

Sea Urchins
Intertidal sea urchins.
All sea urchins were carefully removed from the pool, counted and individually measured across their width. All sea urchins were replaced in the pool, giving them sufficient time to attach firmly to the rocks before the tide returned.
Sublittoral sea urchins.
Sea urchins were measured from the same stations as fishes. A sample of 50 sea urchins was collected from a small specified area on or near the fish transect. Care was taken to collect all the

sea urchins from a small area, rather than collecting only the large conspicuous specimens (Fig. 2). Each sea urchin was then measured. After measurement, all urchins were returned to the area from which they were collected.

Scallops
A 100-metre transect line was laid out in a specified direction from the zero point. The sea bed was carefully examined in an estimated 2-metre wide strip on each side of the transect line; a total area of 400 square metres. Scallops were collected, and on board the boat were counted and measured across their greatest width. They were then returned to the general area of the transect.

Crayfish
Crayfish were counted at the same stations as reef fishes. A 50-metre transect line was laid out in a specified direction from the zero mark. The rocky sea bed was carefully examined in an estimated 5-metre wide strip on each side of the transect line. Crayfish were identified as either red or green, (packhorse crayfish) type and counted, distinguishing "undersize" crayfish from those large enough to be legally taken for food.

Fishes
Fifty-metre transects were set up as for crayfish counts. Fishes were counted within an estimated 5-metre strip on either side of the transect line.

Results and Discussion

Oysters
Rock oyster populations declined in the late 1970's and early 1980's due to a lack of recruitment of larvae. In the late 70's Pacific oysters appeared on the scene, having spread naturally from their introduction to the Mahurangi Harbour in the early 1970's. It is not clear whether Pacific oysters had any influence over the native rock oyster.

The situation is little changed in 2002, with many oyster transects now being devoid of any oysters at all.

Illegal removal of rock oysters jumped dramatically shortly after the Farm Park was opened to the public in 1981, with 560 oysters taken from 12 localities in the 1981-82 season. Exploitation declined to 20 oysters from 4 locations in 1985-86. In winter 2001, 8 oysters were removed from one site, and in summer 2002 about 50 oysters were taken near the eastern end of Rimariki Island, and 4 from a site near Ngahau.

It seems incidence of illegal removal of oysters peaked immediately after the public gained easy access to Mimiwhangata Coastal Park, but settled down to a low level after that. The major decline in oysters in the late 70's and early 80's seems not to be influenced directly by humans.

Sea urchins
Kina populations in intertidal pools fluctuate within apparently natural limits. Changes seem to relate to the detailed topography of individual pools, influencing the ease with which urchins migrate out of, or into, particular pools. In some pools urchins numbers have stayed almost static over the

years. In general, it appears that recruitment to most pools is through settlement of planktonic larvae. When urchins reach a critical size, dependent largely on pool topography, they migrate out of the pool and join their subtidal cousins.

The only pools in which taking of urchins appears to have influenced numbers are on the intertidal rocks around Okupe Island.

The slow spread of subtidal urchins at the expense of the adjacent kelp forest has continued. It is now known that this spread of urchins, which is a widespread phenomenon throughout Northland, the Hauraki Gulf and the Bay of Plenty, is related to a broad regional effect of over fishing of crayfish and snapper.

At Pa Point, in the early 1980's it was noted that kina were beginning to reduce the kelp forest (*Carpophyllum flexuosum*). By summer 2002 this kelp forest had completely gone, where in the mid 1970's a lush tall dense forest of kelp occurred. The ecological changes brought about by the loss of the kelp have been dramatic. The rock at Pa Point is now covered in a thin layer of silt, urchins and two species of starfish are abundant, and thousands of the invasive parchment worm inhabit every rock crevice.

The monitoring programme showed that subtidal kina sizes are very site specific, with the mean size of urchins at a particular site remaining very stable over a long time period.
There has been very little exploitation of subtidal kina throughout the years of monitoring.

Tuatuas
In the early 1970's a large settlement of juvenile tuatuas appeared on Mimiwhangata Beach. A small bed of moderate-sized tuatuas was present at the southern end of Mimiwhangata Beach in the mid 1970's, but these died out apparently because they spent too much time at a high level on the beach.

A much larger bed of slightly smaller tuatuas persisted for many years in the northern half of Mimiwhangata Beach. They numbered in the millions (roughly 10 million in 1976), but slowly their numbers dropped as the individuals grew. By 1986 they were approximately 11 years old, mostly 55 to 60mm long, and numbered approximately 0.8 million individuals.

Although there have been intermittent small settlements of tuatua larvae over the years since 1975, none has been sufficiently large to replenish the spectacular bed of shellfish that was present from the late 70's to the mid 80's. In recent year's tuatua have been difficult to find on Mimiwhangata Beach, although some people still find a few for a feed. Occasional individual tuatuas may be seen, however, on any of the sandy beaches in the area.

Crayfish
Numbers of juvenile red crayfish steadily increased on several transects during the first few years of the monitoring programme, but did not flow on to a noticeable increase in legal sized crays as they reached a takeable size.

Adult red crayfish numbers fluctuated within normally expected limits under conditions of moderate fishing pressure. Crayfish populations are very site-specific, and some of the transects regularly

have crayfish on them, whereas some others have never supported crayfish since the start of the monitoring programme in 1976.

Numbers of red crayfish on the transects in 2002 seem similar to the numbers present in the 1970's and 80's. It is notable that the numbers of legal and larger crayfish are low and have not shown improvement over the monitoring period.

Green crayfish (packhorse) occurred in small numbers on a few transects in the 70's and 80's and were observed to be declining over this period. Anecdotal records in the period prior to the 1970's of this species describe much higher numbers. By 2002 they were absent from all transects. From a biodiversity perspective this raises a particular concern for the packhorse crayfish species, especially so because the Mimiwhangata coastal reefs are typical of the Northeastern coast and have enjoyed a level of protection for this species that other areas haven't had namely the banning of commercial take since 1994.

Mussels
There is a great variation in settlement of young green-lipped mussels from year to year, and they vary in their choice of settlement localities. Larger mussels occur at a few known sites around Mimiwhangata, but their numbers fluctuate greatly from year to year.

One of the most persistent populations of mussels is around low-tidal rocks near the eastern end of Ngahau Beach. Small numbers are often present at the stream outlet at Ngahau, and sometimes on the rocks east of the beach.

The rocks below the Lodge on Okupe Beach sometimes have small numbers of mussels. Low tidal rocks south of Komakoraia Island sometimes support good numbers of mussels.

In summer of 2002, the best numbers of mussels around 60 to 70mm long were present east of Ngahau, with a smaller but still good population south of Komakoraia Island.

Scallops
In the history of monitoring, scallops have never been a feature of the Mimiwhangata area. At the start of monitoring small numbers of large scallops (eg. 120mm) occurred in the coarse sand sediments between Rimariki Island and the mainland. These rapidly declined and scallops have been rarely seen at Mimiwhangata since then, despite extensive searching on several occasions. The situation remains the same in 2002.

Fishes
The number of species of fishes on the transects has fluctuated from year to year, but commonly is in the range of 14 to 26 species. For an unexplained reason species numbers were low in 1984 (15 to 18 species), but picked up again in 1986 (22 to 26 species). In 2002 species numbers were about average (14 to 24 species).

Settlement of juveniles varies from year to year, and from species to species. In 1986, for example, recruitment of juvenile red moki was the worst on record, with only four juveniles seen on a total of

10 transects. In contrast, the 1981 season produced 19 juveniles on only four transects. In 2002, a total of 21 juveniles were seen on nine transects.

Overall there has been no obvious trend of fish numbers detected from the counts on the fish transects. It is important to note that the visual diver method used here is known to be inadequate for the monitoring of snapper because the larger fish from legal size upwards are diver shy, (Willis, Millar, & Babcock, 2000). An indication of juvenile numbers however can be made with this method. In the 2002 survey snapper were only seen on one transect. This was a group of six 20cm long fish. The observations of 2002 contrast with the records of the 70's and the early 80's where juvenile snapper were consistently seen and groups or schools of larger snapper were occasionally seen. The anecdotal history preceding the 70's that is recorded in the 1982, *Mimiwhangata Marine Park Environmental Impact Report*, describes large snapper being frequently seen and caught at Mimiwhangata and that commercial trawling in close , long lining and set netting was having a significant impact on the snapper in the period leading up to 1970.

Auckland University Fish Survey *Leigh Lab*

Project Description *(taken from Denny & Babcock 2002)*
A comprehensive fish survey was carried out at the Mimiwhangata Marine Park, Northland, in April 2002 to provide baseline data of fish abundance within and outside the Marine Park. Two survey methodologies were used; baited underwater video (BUV) and underwater visual census, (UVC,) carried out by divers with scuba. BUV is a superior method for surveying heavily targeted species such as snapper, *Pagrus auratus*, while UVC is better at giving a picture of the overall fish assemblage. Results from this survey were compared with previous fish surveys at the Poor Knights Islands Marine Reserve, Cape Brett, and the Mokohinau Islands. See figure 1 for survey sites. Report: (Denny & Babcock 2002)

Results and Discussion
There was no significant difference between the mean maximum numbers of snapper per BUV inside and outside the Mimiwhangata Marine Park, with almost identical numbers in both areas. Mimiwhangata had fewer and smaller fish than either Cape Brett or the Mokohinau Islands, possibly due to high fishing pressure. This area is easily accessible to fishers from Tutukaka and from launching sites in Whangaruru/Oakura and is heavily fished during holiday periods (P. Bendle, pers. com.). Alternatively, this difference may be due to basic habitat variation.

There was no significant difference in snapper size inside and outside the Marine Park. The average snapper size at Mimiwhangata was similar to Cape Brett and was lower than at the Mokohinau Islands and the Poor Knights. Out of the 126 snapper measured, 117 were under the legal minimum size of 270 mm. This is similar to Cape Brett and the Mokohinau Islands where the majority of snapper are well below the minimum legal size.

Snapper are the most heavily targeted recreational fish species throughout northeastern New Zealand. Where no-take marine reserves are in place, and enforced, the recovery of this species has been dramatic, both in size and number (Table 6). Thus we should expect that if the Mimiwhangata gear and species restrictions were in any way effective at protecting snapper, there would be more numerous and larger snapper inside the Marine Park. Since this is decidedly not the case, we must

conclude that partial restrictions on gear and species are ineffective. For example, snapper are easily taken on unweighted lines, a practise preferred by many experienced anglers. Thus, restricting the use of weighted lines in the Marine Park is unlikely to protect snapper.

Paradoxically, fishing pressure may even be higher within the Marine Park than outside it as there is a perception that, in the absence of commercial fishing, fish are larger and more plentiful in Marine Parks. In addition, Marine Parks are often placed in areas that are pleasant to fish in, and consequently heavily utilised. Thus, Marine Park status and fishing gear restrictions at Mimiwhangata may, in fact, result in exactly the opposite pattern to the one intended. This possibility is supported by comparisons of snapper size and density at non-reserve sites in the region.

Table 1. Northeastern New Zealand sites surveyed with BUV to assess relative snapper, *Pagrus auratus*, abundance and the reserve:non-reserve snapper ratio. Note that MR is no-take marine reserve, MP is marine park, and MK is the Mokohinau Islands, a non-reserve island control for the Poor Knights.

Location	Year est	Reserve BUV mean	Non-reserve BUV mean	Reserve:non-reserve ratio	Reference
Leigh MR	1975	9.38	3.81	2.5	Willis (2001)
Hahei MR	1992	6.77	1.63	4.15	Willis (2001)
Long Bay MR	1995	3.7	0.33	11.2	Ward & Babcock (2002 unpub. data)
Poor Knights MR	1998	19.6	6.6 (MK)	2.96	Denny (2001 unpub. data)
Tawharanui MP	1981	6.46	3.10	2.09	Willis (2001)
Mimiwhangata MP	1982	4.4	5.0	0.88	Denny & Babcock (2002 this report)

Species that are targeted by spearfishers were seldom observed using UVC. For example, no blue cod, three undersize snapper, and two porae were observed. This is quite a contrast from Ballantine et al. (1973) who noted that large snapper (15-20 lbs) were relatively common at Mimiwhangata. Spearfishing, a common activity at Mimiwhangata (P. Bendle pers. com.) that tends to reinforce avoidance behaviour in fishes, may account for the fact that such low numbers of these species were observed.

The BUV found that pigfish, leatherjackets, and trevally were significantly more common in the Marine Park than in the adjacent control areas. Although Marine Park fishing regulations may protect these species, the Rimariki Islands (or Wide Berths) in the centre of the Marine Park may simply represent a better habitat than adjacent shallower, and more sheltered coastal waters. Rimariki Island projects further out to sea than the rest of the Park and is likely to be influenced by a different current regime and a higher level of wave exposure that the rest of the Park. As expected, planktonic feeders, such as demoiselles and trevally were more numerous in this area. This finding is consistent with the fact that these species are more common at offshore islands like the Poor Knights and Mokohinau, or on the mainland sites with 'offshore' physical characteristics (e.g Cape

Brett). However, the significant results found for demoiselles, and sweep must be treated with caution as these species are planktivorous and do not seem to be attracted to the bait container. Unsurprisingly, both methods found that deep reefs around Rimariki Island had significantly more leatherjackets, as this is their preferred habitat (Ayling 1981).

The level of species richness at Mimiwhangata is much lower than at the other surveyed areas where 40 species were recorded at Cape Brett, 49 at the Poor Knights, and 43 at the Mokohinau Islands. The lower number of species recorded at Mimiwhangata may be because this region is not as heavily influenced by the East Auckland Current (EAC) as the other 3 surveyed areas. However, oceanic water from the EAC may occasionally impinge on the Mimiwhangata coast bringing with it low numbers of subtropical species that are more characteristic of the offshore islands.

As expected, the reef fish assemblage at the Mimiwhangata Marine Park most closely resembled that of Cape Brett with a predominantly mainland composition. There was a relative paucity of subtropical species such as those that characterise the Poor Knights and Mokohinau Islands. Only 31 species were observed in this survey compared to 50 species recorded by Ballantine et al. (1973). Possible reasons for this different include seasonal differences, time spent in the field, or that an increase in fishing in the past 30 years has caused a general decline in fish numbers. For example, Ballantine et al. (1973) conducted fieldwork over a 4-month period in spring/summer in 1972/1973; in this survey, fieldwork was conducted over 4 days in autumn 2002. Sampling methodologies may also be responsible. In the quantitative 20x20 quadrats of 1972/1973 (Ballantine et al. 1973) only 34 species were recorded, very similar to the number of species recorded here.

There was a significant difference in the overall fish assemblages within and outside the Marine Park. However, of the 12 most abundant species, leatherjackets, and goatfish were significantly more common in the Marine Park, and other less common species were also more abundant there, for example, black angelfish, and sandagers wrasse. Other species were more common outside the Marine Park, for example, spotties and butterfish; however none of these differences were significant.

This survey provides a comprehensive baseline survey of the reef fish both within and outside the Mimiwhangata Marine Park. This survey represents an important step forward in the scientific monitoring of marine reserves since it is the first time that a design including control areas has been set up before Marine Reserve gazettal. If the Mimiwhangata Marine Park (or part thereof) receives full marine reserve status, there will be scientific data available to assess the effectiveness of the reserve in protecting the reef fish assemblage. In addition, this work will aid in understanding the effect (or lack of it) of partial protection on demersal reef fish by comparing it with concurrent surveys at the Poor Knights Islands Marine Reserve, Cape Brett, and the Mokohinau Islands.

Deep Reef Survey Project *Vince Kerr & Dr Roger Grace*

Project Description

In January 2002 an initial survey was conducted at Mimiwhangata. An area of approximately 4km square offshore to the East of Rimariki Island was surveyed. The methods employed were side scan sonar habitat mapping, remote video and single beam sonar. Images from the side scan sonar were analyzed and coded into five basic habitat/substrate types. (mud and sand, gravels and cobble,

mixed rock and gravels, low relief rock and high relief rock). This information was entered into a GIS system at the Department of Conservation to produce the map in Figure 1. Images from the video 'ground truthing' at three sites in the survey area are being analyzed for species composition and habitat descriptions.

Preliminary Results and Discussion

In the 1980's Dr Roger Grace and Wade Doak explored with scuba dives out to the edge of what we now refer to as the deep reef at Mimiwhangata. Their dives went to approximately 40m depth and 1 km off shore which is approximately the existing boundary of the Marine Park. They were very impressed by the richness of this sponge dominated habitat and commented that it could well extend further to the east into deeper waters. They also commented that these deeper reef habitats could play a very important role in the ecology of the Mimiwhangata marine area and that they were biologically very rich.

The current survey effort as indicated in the figure 1 map shows that the reef structure does extend a significant distance, 4km offshore to the east of Rimariki Island and covers an area in a north to south direction of several km's. Depths at the eastern edge of the survey area were up to 72m, 4 km offshore. Analysis of the side scan images of the survey show significant areas notably in the center part of the survey area that are characterized by high relief rocky reef, (defined as having vertical dimensions in excess of 3 meters). Side scan images showed that these reefs are highly featured with cracks, guts and protruding rock structures.

Analysis of the video drops in three sites in this survey reinforced the interpretations made of the side scan sonar images. The general rough broken structure of the high relief rocky reef and low relief rock structures were evident. While analysis of the diverse encrusting life on these reefs is still in progress, it is clear that these deep reefs are very rich in biodiversity with a huge array of sponge species dominating the encrusting community with other notable species of gorgonian fans, soft corals and black coral identified. The quantities and species composition of fish identified in the video footage are consistent generally with the descriptions of the Leigh lab work. The overall impression of fish abundance was that it was far less than what would be expected for a habitat of this type. Two observations were notable. A Foxfish, *Bodianus sp.*, a subtropical species occasionally seen at the Poor Knights Islands was identified. This species has not previously been recorded at Mimiwhangata. Also snapper, *Pagrus auratus* were not seen in the video footage. Total recorded video time on the three reef sites was approximately 1.5 hours. The design of the video survey was targeted at habitat description and is not suitable for quantitative analysis of fish abundance.

Further work is in progress to update the habitat maps of the entire Mimiwhangata marine area. Habitat maps that were done for the inshore areas of Mimiwhangata in the 70's and 80's were state of the art work in marine survey. These maps are being converted to current GIS systems and combined with the maps being generated from the deep reef study to make one continuous map connecting these areas. This work will assist greater understanding of Mimiwhangata as a system comprised of a complex of habitats ranging from rugged rocky reef to soft bottom substrates. The importance of the deeper reef areas in supporting the marine life of the shallow areas, is a crucial area of investigation and consideration for future planning of Mimiwhangata and potential marine

reserve design. This survey has established that Mimiwhangata has a significant deep offshore biodiversity rich reef complex associated with its valuable and diverse shallow coastal marine area.

Where to From Here

At the time of writing, (August 2002), the Department is seeking to hear from the community and stakeholders of Mimiwhangata on their views on the future planning and management for the marine area of Mimiwhangata.

Technical reports will soon be available for the deep reef study and the update of historic monitoring at Mimiwhangata. The Leigh lab report to the Department can be obtained by contacting Vince Kerr, at the Department of Conservation, Conservancy Office, Whangarei.

As part of the national marine biodiversity effort to establish a network of marine conservation areas, the Department will examine the technical information, iwi, community and stakeholder input and will consider proposing marine reserve status for the Mimiwhangata area over the current year.

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Appendix 1

From Mimiwhangata Marine Report 1984, p13

The following is a summary of the special Fisheries Regulations for the Mimiwhangata Marine Park.

COMMERCIAL FISHING
All commercial fishing is prohibited except that potting for rock lobster and longlining shall be permitted until 1st October 1993.

RECREATIONAL FISHING

Methods:

Amateur fishermen may use only the methods of unweighted single hooked lines, trolling, spearing and handpicking, to take those species of fish and shellfish specified in the list below. Potting for rock lobsters is also permitted providing that only one pot per person, or party, or boat is used.

Permitted list:

Fin fish	Barracouta	
	Mackerel (all types)	
	Billfish (all types)	Piper (garfish)
	Blue maomao	Shark (all types)
	Flounder (all types)	Snapper
	Grey mullet	Sole
	Yellow eye mullet	Tarakihi
	Gurnard	Trevally
	Kahawai	Tuna (all types)
	Kingfish	
Shellfish	Common kina	Scallop
	Green-lipped mussel	Tuatua
	Rock lobster	

Other species:

All other species of finfish, shellfish, and other marine life are totally protected.