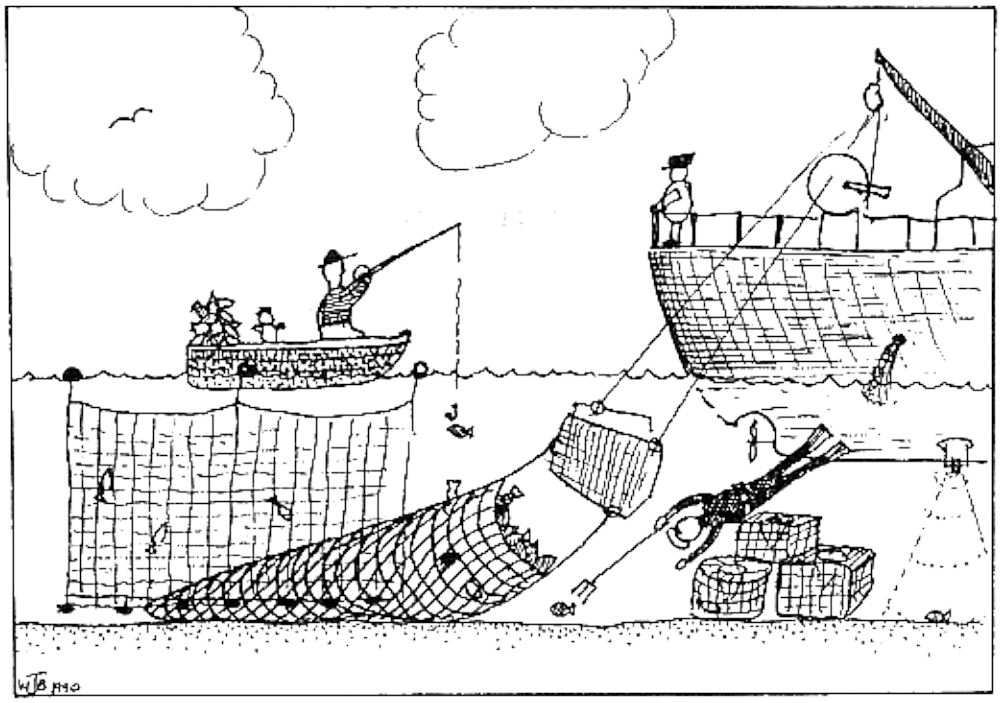
Proceedings and Notes of Northland Pilot

Design of a Network of Marine Reserves in Northland
Northland Expert Group

September 15, 2003

Compiled by V. Kerr for Northland Conservancy Community Relations



First adult : "The fishing's not what it used to be."

Second adult: "No, it must be the greenhouse effect,
the government,
the foreigners,
the pollution, etc."

Small child : "Daddy, where do the fish go to have their babies?"

First adult: "Shut up and cut more bait!"

Last fish:"Aaaaarrh !" (expires)

Foreword

This proceedings brings together the brief for the Northland pilot, a presentation on the process by Kathy Walls, NRO DoC and the notes and minutes from the three meetings of the expert group. This collection tracks the work of the pilot up until the first draft of the expert group report and recommendations which was completed in June 2003.

The purpose of this proceedings collection is to make available in one place the various bits of information that came forth in the running of the pilot. This process was the first of its kind, and therefore in every real way had to invent "rules for working" as it went along. The group also had to cope with the demanding challenge of sorting out what were science questions that could be examinined versus opinions or policy or issues aspects that end up being the business of government or management decisions based on judgements of what is known. Figure 1

The report and recommendations of the expert group are still in preparation. The first draft of the report was released to the expert group for peer review, with external review also being done by Bill Ballantine. A draft II of the report which has considered the peer review and made suggested changes is with the expert group and DoC's MCU for consideration at present, (Sept 03). It is anticipated that a final report will be completed once all changes considered and approved by the expert group members. The various drafts and peer review comments preserved as "tracking changes" have been kept for further study; held at Northland Conservancy. The various peer review and editorial comments from the report process form an important collection of questions, suggestions and issues that have come from the pilot project building on the intial work of the expert group meetings reported on here.

Vince Kerr for the Expert Group and Northland Conservancy

Contents

Note: You can use this contents as hyperlinks by ctrl/clicking on them

Working Brief

Explanation: the brief to the first meeting consisted of the following: a paper was prepared by V.Kerr and distributed to the group before the meeting, a presentation was given by Kathy Walls that is recorded in the minutes of the first meeting. Interim maps and descriptions of the biogeographic regions and Northland coastal units were also presented to the group at this time. These appear in the Appendix 1 of this collection.

Northland Marine Reserve Network Design Project Brief

V. Kerr, Consultant to Northland Conservancy, DoC May 2002

Introduction:

Northland Conservancy's strategy for the promotion of a network of marine reserves is moving into a new phase which will be characterised by greater stakeholder involvement in marine reserve site selection and establishment. There will also be more emphasis drawn to the overall benefits of an emerging network of marine reserves. These efforts require a clear science based guideline that can be used in the consultative processes with stakeholders.

Aim of project:
To prepare a scientific guideline for the establishment of a network of "no-take marine protection areas" for Northland waters.

The guideline will be used to facilitate two levels of communication and understanding: (1) The principle level: description of network principles, identification of design criteria, and description of benefits. (2) The implementation level: guidelines, recommendations and, and definition of "local planning scale" criteria, examples and goals.

Expert group brief first meeting - Principles Level Network Guideline and use of 'Near Shore classification system'

The idea of this first meeting is that the expert group will make recommendations on the production of a network design guideline for Northland waters, initially focusing on the 'principle level'. The group will evaluate the usefulness of the DoC 'near shore marine classification system' and other tools and research information presently available. It is intended that a recommendation can be made from the first meeting that will clarify what work is required to complete a guideline at the principle level and at the implementation level if possible, and who and what information would be best to be involved in the task.

Clearly the first outcome of this meeting will be the communication between the agencies and projects represented in the expert group and how they relate to and can inform marine conservation initiatives. We'll move on from there.

A possible outline of the principle level guideline is offered here for discussion and a starting point.

I The ecological principles of a Network of Marine reserves

II Ecological information available to the design process and its role

III Definition of the network design parameters
An indicative list of parameters is: (taken from Ballantine 99, and others)

1. Statement of goal for initial network extent e.g. 10%
2. Time line for network stages for completion e.g. 5yr 5%, 10yr 10% initial goal/timeline
3. Representation at specified scales bio-geographical, ecological/habitat units
4. Special considerations to Northland impacts of currents, spawning areas, nursery areas, fisheries issues
5. Replication
6. Identification of special and unique areas
    a. The special case of offshore islands
7. Size of units considerations
    a. Working with the challenge of social/political drivers for small areas in harbours or on near coastline
    b. Working with the challenges of using larger areas offshore
8. Intervals or spatial considerations:
    a. Ecological parameters identified and represented in a 'rule(s) of thumb' design criteria understandable by laypeople
    b. Optimisation of Rec. fishing opportunities
    c. Optimisation of or allowance for cultural management requirements in adjacent areas

IV Description of benefits of the a network approach for Northland

Notes:

Explanation and assumptions supporting this approach:

This project is based on the science based principle that a network of no-take marine protection areas sitting along side best efforts in fisheries management is the preferred option for biodiversity protection. In addition to achievement of the biodiversity goal there is a list of other direct and indirect benefits. This design guideline is based on the no-take versions of marine protection because their role in the network function is clear and consistent. In scientific terms the no-take network forms a *control* for all other management or exploitation activities. Development or promotion of the no-take network guideline does not necessarily conflict or replace any fisheries management strategies or customary management options. The no-take network is best understood as, in addition to and supportive of all other management.

The project is also designed to be compatible with the present policy and legislative environment where MPA mechanisms and Govt. agencies roles are undergoing review etc. In this environment an assumption is made that proceeding now with a guideline will only be supported further in due course with developments in Ocean's Policy and legislative review of the MR Act.

Reference cited:

Ballantine W.J., 1999, MARINE RESERVES IN NEW ZEALAND:
THE DEVELOPMENT OF THE CONCEPT AND THE PRINCIPLES,
Published as pages 3-38 in the Proceedings of an International Workshop on Marine Conservation for the New Millenium , Korean Ocean Research and Development Institute, Cheju Is.. (available at http//:www.marine-reserves.org.nz)

Record of Expert Group Meeting 1

NORTHLAND MARINE RESERVE NETWORK DESIGN PROJECT.

SUMMARY of meeting at Northland Conservancy, 2 July 2002.
Note taker: Roger Grace
Participants:

Kathy Walls, DOC, Northern Regional Office
Vince Kerr, Consultant to DOC, Northland Conservancy
Roger Grace, Consultant to DOC, Northland and Auckland Conservancies
Mark Morrison, NIWA
Martin Cryer, NIWA
Tony Seymour, Northland Regional Council
Russ Babcock, Auckland University, Leigh Marine Laboratory
Gerry Rowan, Northland Conservator (early part of meeting only)

Assistance with maps etc:

Terry Conaghan, DOC, Northland Conservancy

Observers:

John Gumbley, DOC, Waikato
Karla Sivaguru, DOC, Auckland Conservancy
Tony Beecham, DOC, Northland Conservancy

Apologies:

Lew Ritchie, Northland Conservation Board, and ex Ministry of Fisheries

Assigned scribe:

Roger Grace J

1024 Vince Kerr made a few opening remarks and introduced Gerry Rowan, Northland Conservator for the Department of Conservation.

Gerry Rowan gave a brief overview of the marine environment of Northland. There has been little progress so far in creation of marine reserves partly because of community perceptions. We need more information to get out to the community showing why we need marine reserves and their benefits. The public is not sufficiently aware of the need for marine reserves, and in general we need to do better on marine conservation.

1030 Vince Kerr explained his role as a contractor to the Department of Conservation, to push for marine reserves in the Northland Conservancy. He is bringing together many elements to make marine conservation happen, and is working towards a network of marine protected areas in Northland. Where is the scientific information to guide the decision process to proceed towards a

network? This meeting of "marine experts" is an attempt to address the lack of readily available scientific information.
Kathy Walls is the official spokesperson for the Department of Conservation at this meeting. At the end of the day an attempt will be made to pull the concept together to use in some practical form and a protocol will be established for use of the information.

1041 Kathy Walls gave a powerpoint presentation entitled **"Towards a network of Marine Protected Areas for New Zealand: Developing a system for site selection".**

Not many MPA's have been created in NZ yet. There are several at various stages partway through the process. In many cases community groups feel there has not been adequate consultation. This is not a satisfactory situation. We seem to be going through a lot of "head bashing" for each and every marine reserve proposal. This may be reduced if we can get the public involved at an early stage in the selection of sites.

There is a general ignorance of the marine environment and the changes going on such as reduction in abundance of some species. Involving the public at the earliest possible stage in working towards marine protected areas might remove some of the anxiety of the public.

We are attempting to achieve a systematic approach to MPA site selection, and toward an effective network of sites. For this purpose it is best to use the term "marine protected areas", as used in the New Zealand Biodiversity Strategy. This includes marine reserves, but more means of protection as well.

Today we will be dealing with the inshore marine areas – offshore areas will be dealt with separately. There are parallels with the system of classification being developed by the Ministry for the Environment for the whole EEZ.

Why are we working towards a system of MPA's? The NZ Biodiversity Strategy suggests, as Government policy, that we should have a system of representative habitats and ecosystems in MPA's by the year 2020. This network needs some totally "no-take" marine reserves to ensure the system can be ecologically functional.

So far we have 4.8% of our territorial seas protected in marine reserves. Most of this by far is contained in the very large Kermadec Islands marine reserve. The target (NZBS 2002) is for 10% of the territorial sea to be in MPA's by 2010. From some sectors there is pressure for 20% as marine reserves (eg. Forest and Bird). International scientific opinion suggests 20% of each habitat needs "no-take" status.

To achieve a successful network requires a systematic approach. The "ad hoc" approach used so far cannot be sustained. The fishing industry has already indicated they will not accept it. We must not lose the possibility of important areas being protected in the future because of a poor network design.

Clearly iwi want a greater say in MPA's. Also local communities want greater participation in the selection process. Both DOC and non-DOC parties can propose marine reserves. Local communities don't often have good information on which to base proposals.

A systematic approach to site selection could work by a combination of technical information, community and iwi opinions. This would ensure sites are ecologically meaningful, acceptable to iwi, and are highly acceptable to the local communities.

Kathy relayed her experience with the Hahei marine reserve proposal and social impact research at the reserve by Cocklin, Craw & McAuley (1998) & Wolfenden, Cram & Kirkwood (1994). There would have been much better acceptance of the proposal if the community had been involved earlier.

There are three stages in the process:

1 Assembling the relevant information
2 Presenting technical advice and making broad recommendations
3 Site selection

1 Information gathering.

Efforts are made to gather existing published or unpublished relevant information. In the interim we are focussing on the nearshore areas, but will extend further offshore at a later stage. There is a need to start planning even if the information is currently inadequate.

GIS should be used as an information platform. It is a good system and it is advancing technically all the time. DOC should coordinate the collation of information and conversion to the GIS system. DOC should also take responsibility for consistency of the information. There needs to be a sharing of information between groups and agencies.

2 Technical advice.

DOC will facilitate technical experts groups in the conservancies to ensure that a range of expertise (both local, regional & national) can be utilised. These groups recommend broad areas for inclusion in a representative network of marine reserves.

This technical experts group for Northland is a pilot for application in other areas. NIWA Wellington has suggested there should be a National group as well as the regional groups to help avoid missing important offshore sites. This could be useful to review the recommendations of the local groups.

A system of no-take marine reserves should make up a core network of marine protected areas. Other marine protected areas, not necessarily no-take, should be additional to the core network of no-take marine reserves.

Design principles for the network of no-take marine reserves include:

- All habitats are represented
- Special (unique) sites are included
- Represented habitat sites are replicated
- Reserves are geographically dispersed across biogeographic regions
- The network should be self-sustaining (with individual reserves ecologically viable)
- The precautionary principle should apply where there is little knowledge available
- No-take marine reserves are permanent

Ancillary marine protected areas could include rahui, mataitai, taiapure etc. and include site-specific areas managed to sustainably use resources.

The "experts" group will provide recommendations but these will not be site-specific. The group is to use the design principles to define large areas which would meet the requirements. This is not a political process, but is technical and objective. (Therefore stakeholders would only be represented on the experts group where they are able to make technical contributions)

Criteria for recommending broad areas:

- Diversity
- Representative
- Special/distinctive/unique
- Modification/intactness
- Connectivity
- Threat/risk

The criteria are minimised to avoid too many complications. We need to know how to use these criteria.

- Diversity: This refers to the richness of variety of species, communities etc. Cannot be used alone.
- Representative: The area must be representative of specific habitats within the bioregion or specifically within the local ecological unit.
- Special/unique: The area is the only one of its kind. By definition this cannot be replicated.
- Modification: Attention is given to the degree of modification to the area. This includes its ecological viability, and its potential for restoration.
- Connectivity: Interactions in the network. Eg. on the Great Barrier Reef the "blue highway" is a term used to recognise the importance of connectedness to a range of species, such as the life history of the Red Emperor fish which uses a range of habitats from the inshore through to the outer reef at different stages in its life cycle. (New Zealand examples might include migration paths for yellow-eye mullet, packhorse crayfish, or hapuku.)
- Threat/risk: eg. fishing, sedimentation

3 Community involvement.

DOC will bring together the community groups. How this is done will vary with the Conservancy. DOC needs to plan this - who? where? and timing?
Community groups will be supplied with technical information where possible in GIS format, as well as the recommendations from the Technical ('experts") group.

The community groups will need to establish rules for their decision-making. This is necessary to ensure that agreements are reached between the members who will likely have different backgrounds and agendas. A good example is Guardians of Fiordland group which has worked very well. The group includes scientists, iwi, commercial fishermen, tour operators etc. Another good example was the group set up at the Galapagos Islands. The group got agreement amongst its members at each step in the process before moving on to another step.

Criteria for selection of possible sites.

- Economic interests, including commercial fishing
- Customary and cultural
- Social, eg. proximity of a school
- Scientific interests
- Pragmatic considerations, eg. ability for enforcement
- Threats/risks
- Design principles, eg. contribution to replication etc.

Each community group should have a technical expert on it to ensure areas suggested fit various criteria, eg. large enough to be ecologically viable.

Kathy discussed some of the information available, ie. the Stage 1 information gathering process. This is dynamic in that additional information is accumulating all the time. It is useful for other coastal management purposes as well. So far on GIS we have bathymetry at 50m through to 500m, a map of biogeographic regions with descriptive background, and a map of coastal units linked to descriptive information. This can be used as a basis for a network design. Also mapped is the location of current marine reserves and proposals.

For Northland there is also mangroves, sand/mud areas, study sites for fish and algae (Brook), and the Mimiwhangata side scan sonar runs and underwater video (ROV) drops, and fish survey sites from Auckland University survey in April 2002.
The maps of biogeographic regions (national) and of coastal units (Northland, Auckland, Waikato) and descriptive text were handed out.

Discussion of **BIOGEOGRAPHIC REGIONS** considered;

Three Kings/North Cape Biogeographic Region. Strong upwellings influence water temperature etc. The biota shows a high degree of endemism, particularly in fish, algae and echinoderms. There is also a strong southern influence in the biota.

Northeastern Biogeographic Region. North Cape to East Cape (but with a large transition zone extending from East Cape southwards.) Strong influence of the subtropical East Auckland Current. Several endemic species.

Central Biogeographic Region. A large area extending from Scott Pt (north Ninety Mile Beach) to a zone of transition north of Fiordland and south of East Cape to what appears to be a distinct boundary in the Canterbury/Otago area. The Golden Bay/Cook Strait area appears to be different at the subregional scale because of the influence of water masses moving through the Strait.

Southern Biogeographic Region. Fiordland, Otago, and Stewart Island. Distinctive southern biota. Fiordland is special within this region.

(Also recognised but not discussed were the Kermadec Islands, Chatham Islands, Snares Islands, and Subantarctic Biogeographic Regions.)

COASTAL UNITS are smaller areas within the biogeographic regions. Each unit has a fairly basic description, considering geography, oceanography and biota. The Coastal Units have been worked out for all of New Zealand but there are some gaps in information.

Example of what is available for Australia's Great Barrier Reef – the Representative Areas Programme uses computer software "marxan" (Marine Reserve Design using Spatially Explicit Annealing) to model physical and biological data, extrapolate and classify diversity. With more detailed data, we could use this as a future model, and basis to assist community groups with site selection.

Currently our approach is to propose large areas based on scientific principles, then get the community groups to decide on specific sites within those larger areas. The Coastal Units are currently the smallest units we can put out to the people, but we need more information on specific areas.

So far there has been a lack of consideration of traditional knowledge. This is where the community groups can add local "non-scientific information".

We need to encourage the community to buy in to the principles for networks of mpa's.

There is a danger of perceiving iwi as "another interest group". They are much more than this and have a special status as a Treaty Partner. If this is not handled sensitively we run the danger of alienating them. Perhaps we should try running a parallel process with iwi, but how do we join the two processes together?

Our job today is partly about getting the process right. Tony Seymour suggested that scientific rationalism is not the only approach for this process.

Four participants outlined their involvement in relevant marine issues:

Russ Babcock from Leigh Marine Laboratory outlined his work on marine reserves. Recovery of predators following protection has flow-on effects on the habitats and communities. He has been involved with surveys inside and outside marine reserves and proposed marine reserves. It can be useful to see how these studies fit into the marine reserve creation process. The challenge is to use this information to educate people to understand more about snapper, crayfish etc.

Martin Cryer from NIWA used a powerpoint presentation to outline NIWA's capabilities in:

1 broad-scale habitat mapping
2 fine-scale habitat mapping
3 taxonomy
4 communities of organisms
5 modelling

1 Broad scale habitat mapping: NIWA uses sidescan sonar and QTC scanning. Examples are Firth of Thames, Hauraki Gulf, Tonga Island, Spirits Bay (1999).
2 Fine-scale habitat sampling. They use vessels such as Tangaroa and Kahuroa, as well as smaller 4 to 8m vessels. They use a wide variety of sampling gear, including sidescan sonar, QTC, corers, grabs, sledges, underwater digital video, and dive teams.
3 Taxonomy. They have expertise in sponges (Michelle Kelly-Shanks), bryozoans (Dennis Gordon), ophiuroids (Don McKnight), octopods (Steve OShea), polychaetes (Geoff Reid). They hold major collections, as well as NZOI archives and data bases.
4 Community composition. NIWA has analytical skills and appropriate software. Cluster analysis, investigation of sites, classification of communities. What are the important environmental drivers of community composition?
5 Modelling of reserve design and utility. NIWA's focus is on international "fisheries" research. There is a need for spatially explicit modelling. Better models need more information on movement, growth, mortality and recruitment. There is a need to understand the dynamics of the populations in relation to fishing.

Mark Morrison from NIWA also gave a powerpoint presentation on the information NIWA is collecting relevant to Northland. He has another (not presented) on mapping. Martin outlined the Harbours project, describing the importance of estuaries to juvenile snapper and trevally. Determining large-scale distribution within estuaries, and what could influence them. They have been carrying out work on lots

of Northland estuaries and harbours. They used beach seines in late summer and at low tide, collecting all species which shelter in the low tidal channels. They also measured physical variables.

At 305 sites through Northland, 94% of the fish caught were less than 100mm long. Recently settled juvenile snapper measured from 16mm, with a peak size of 30mm. They showed up some important areas for juvenile snapper in the estuaries. The juvenile fish are in the estuaries for only a couple of months.

Parore and spotty juveniles are mainly in seagrass areas. Snapper were generally in cleaner parts of the lower estuary, although newly settled snapper were common in subtidal seagrass areas. Other areas with a 3-dimensional component may also be important, such as horse mussel beds, rhodoliths, oyster beds, Gracilaria beds, mangroves, Hormosira etc.

There are important linkages between coastal and estuarine areas.

NIWA are investigating the possible use of otolith microchemistry to fingerprint where the fish came from. If it works we can use this technique to assess the relative contribution from each estuary to the snapper stock. They are trying this on the west coast estuaries first.

NIWA are using QTC scanning for broad scale mapping in the Firth of Thames, with run lines 1.5nm apart. This is to plug in to the Ministry for the Environment/DOC/Mfish study of marine classification. The mapping is being extended to the rest of the Hauraki Gulf.

Tony Seymour from Northland Regional Council outlined the NRC involvement with marine issues. NRC promotes sustainable management under the Resource Management Act, and prepares coastal plans.

NRC has as one of their objectives to establish and support more marine reserves where there are social benefits. They may propose marine reserves as well, and encourage establishment of networks of marine reserves.

NRC already has a GIS data base which apparently matches well with the DOC system. NRC are also setting up a system looking at constraints on aquaculture (as is the ARC), but a lot of the constraints relate to possible marine reserve siting. The GIS data base is also used for education.

NRC has politicians supportive of marine reserves. NRC could act as a forum on marine reserve issues, and could work with DOC on community relations in relation to marine reserves.

The aquaculture issue will go through a a public process by way of a plan change. Areas which are especially valued or are possible marine reserve sites may be

significant restraints on aquaculture siting. This can help to lead to defendable conclusions on locations for marine reserves.

Tony made a comparison with terrestrial situations where developers are required to establish reserves. In the sea this could mean that development of aquaculture also requires mitigation, for example setting up marine reserve areas.

After lunch Kathy handed out information on the network design principles and criteria to assist with creation of marine reserves in the Northland context. This material included a map and descriptions of the Marine Biogeographic Regions for New Zealand, descriptions and maps of the Coastal Units, three pages from Kathy's powerpoint presentation illustrating the 3 stages of implementation.

There followed a discussion on design principles, particularly use of the "precautionary principle", which here is not intended to be in the "legal" context. Maybe this should be replaced with the term "based on best available information". The huge lack of information can be used as a red herring by people opposing marine reserves. [The legal definition of precautionary principle refers to kinds of effects that could occur if an activity was allowed – in NZ this is a narrow definition. Kathy will find and supply a useful definition of the term "precautionary principle". The scientific use of this term differs from its legal use. Note that this principle means different things to different people.]

We are asking the public to "buy into" the list of design principles.

The design principles for a network of marine reserves (as listed on page 4):

- All habitats are represented
- Special (unique) sites are included
- Representative habitat sites are replicated
- Reserves are geographically dispersed across biogeographic regions
- The network should be self-sustaining (with individual reserves ecologically viable
- The precautionary principle should apply where there is little knowledge available
- No-take marine reserves are permanent

Our process for recommending broad areas:

Using the criteria for recommending broad areas (diversity; representative; special/distinctive/unique; modification/intactness; connectivity; threat/risk), we can use the Coastal Units as a guide. These are portions of the coastline that appear to be self-contained in terms of known information. The Coastal Units are different from each other, but the magnitude of the difference will be vary between units. We should probably look at the Coastal Units as a starting point. Perhaps we could think of 3 marine

reserves in each unit, though this should not be a fixed idea. We should cover all habitats within each Coastal Unit. This could perhaps be the basis for a network.

It is difficult to include estuaries in the Coastal Units system as there is much variation within estuaries. Estuaries may need to be considered as a separate category.

The question of scale is important. We should start with the key habitats within each Coastal Unit. We will start with the northern area.

The **Three Kings/North Cape biogeographic region** is relatively small, but consists of Coastal Units 2.01 (Three Kings) and 2.02 (North Cape). **[Please refer to your hand-out notes on the Coastal Unit Descriptions.]**

1 2.01 Three Kings coastal unit.

This area is special and unique. It cannot be replicated as it is one of a kind.
Two options for the area were discussed:

Option 1: The whole area recommended to at least 7 nautical miles offshore and to 200 metres plus depth to include sediments and outlying deep reefs.
Option 2: Extend across to the top of the North Island. This is a high current area with low runoff from land, and includes unusual high carbonate sediment assemblages.
[Note: During this discussion it was suggested that a new Coastal Unit, 2.03, be added between the 3 Kings and North Cape. This could deal with the Option 2 issue - see later discussion].

Recommendation re 2.01:
1. If it has to be split, make sure that it includes entire islands or island groups rather than cutting through habitats partway along an island.
2. The area meets the principle of being special or unique, and should cover as many habitats as possible by covering a broad depth range to 200 metres plus.
3. Must be big enough to protect some mobile pelagic species such as kingfish.
4. Must include all endemic and taxonomically important species.
5. If the whole area can't be protected, the preferred part would be all of the Princes Group.
6. This would be a substantial part of the Biogeographic Region which can't be found elsewhere.

Martin mentioned that there could be some larval retention in the area. A special feature of some high current habitat species eg. some hydroids, is that they drop their larvae within centimetres rather than releasing them to the water where they could drift away.

2 2.02 North Cape coastal unit.

On an old chart there is apparently a rectangle east of North Cape indicating a packhorse crayfish breeding area, in which fishing for packhorse is prohibited.

Four areas were indicated for protection on the map. One at the west, one running north off the centre, one running east off North Cape and into the packhorse breeding area, and one in an area north of North Cape recognised as special for large pink gorgonian corals about 0.7m high as well as new coral species. **[Map to be included]** As initially drawn the western area covered 3700 hectares and the area east of North Cape included 2200 hectares.

Recommendation re 2.02:
1. Minimum replication of 2 coastal areas, each including headlands and beaches and out to 2 nautical miles offshore.
2. They need to be large enough to be ecologically sustainable, at least 5 kilometres of coastline per marine reserve, or minimum of 10% of the Coastal Unit.
3. Need to extend to a minimum of 100 metres depth or 2 nautical miles offshore.
4. Must also include unique and important habitats and associations, eg. the packhorse breeding ground east of North Cape, and the deepwater corals and gorgonians area, including new species) at 50 to 100 metres depth north of North Cape.

[We discussed putting up larger areas around these for the community to select within these larger areas. The problem was that the community may take these as suggested large areas, as happened in 1995 when MAF used this approach, and the community reacted against the large areas apparently suggested. There will, however, be a community plan at the time of release explaining how they should understand the areas suggested on the map. We need to give the public clues as to what is important. It was also discussed to perhaps leave lines off the map and just indicate the principles, i.e. the minimum criteria. We need to give the public sufficient information to make informed choices, however, and maps with some lines are an important part of that information.]

3 2.03 Offshore North Cape/Cape Reinga coastal unit.

This is a special unique area characterised by strong currents and carbonate-rich sediments. Part of the area is already regulated to exclude trawling and dredging. (Martin drew a suggested boundary for the new coastal unit **[Map to be included].**

Recommendation re 2.03:
1. Within this unit we should have an area protected from 2 nautical miles offshore (approximately 40 metres depth) out to 80 metres depth to cover the full depth range.
2. Must include foul ground and soft sediments [See NIWA report ENV 9805].
3. Should include the area already closed to dredging and trawling.
4. Should include taxonomically important species.
5. Objective is to protect the unique benthic assemblages of the area.
6. This should include a substantial part of the Biogeographic Region which is not found elsewhere.

4 Estuaries.

There are many estuaries in Northland. The larger ones are separate Coastal Units, but this does not cover the smaller ones. The model of the Kamo High School application was briefly discussed, in which representative sections of Whangarei Harbour are suggested as marine reserves. Further discussion of estuaries was abandonned through lack of time, but will be continued at the next meeting.

WRAP-UP.

Kathy posed the questions: "Where have we got so far? Have we any major concerns about where this is going? Should we presently keep this confidential?" In asking around the table she got the following responses regarding the process:

Russ Babcock;Happy to go with it so far. Not concerned about confidentiality.

Martin Cryer; This is a good and timely step. We have dealt with so far only one small area. It could be a huge task, drawing in all the infornation, and is not a quick process. Need a level of confidentiality, as some data is confidential to various NIWA clients and some is public arena data. Today is more of a scoping exercise.

Mark Morrison; We should keep the document to broad concepts, not specific lines. Data confidentiality is a problem.

Roger Grace; Expressed frustration at data confidentiality. This will always be a problem.

Tony Seymour; Stages 2 & 3 should be pooled. Northern Regional Council has resources to help. Putting lines on maps is counter-productive at present. We should stick to principles at present. We should strive to get agreement to the principles now. Tony agrees to using the coastal units but nothing smaller. Even the coastal units could be considered to be targetting individuals.

Vince Kerr; At the Three Kings we could start putting down details of ideas, but even in this group lines started becoming a problem.

Tony Seymour; We probably want these criteria to be applied by anyone wanting to propose a marine reserve. Need to involve the community early - thinking of joining stages 2 and 3.

Vince Kerr; We are trying to get advice from external partners. This is not a DOC meeting.

Kathy Walls; The principles are derived from an international group which will be putting together a technical document. New Zealand must follow the

international line and ensure an adequate coverage of no-take marine reserves.

Roger is to write up what we have so far and send out to participants.
Another days work will be planned for continuing the other Biogeographic Regions.
Terry is to send out a map of the coastal units with bathymetry.
Vince has sorted out a date for the next meeting:

FRIDAY 13th SEPTEMBER 2002.
NORTHLAND CONSERVANCY OFFICE,
10:00am to 4:00pm.

Your tardy scribe Roger Grace J

Record of Expert Group Meeting 2

Northland Marine Reserve Network Design Project

Summary of meeting held at Northland Conservancy, 13 September 2002.

Note taker: Roger Grace

Participants:

Kathy Walls, DOC, Northern Regional Office
Vince Kerr, Consultant to DOC, Northland Conservancy
Roger Grace, Consultant to DOC, Northland and Auckland Conservancies
Mark Morrison, NIWA
Martin Cryer, NIWA
Tony Seymour, Northland Regional Council
Russ Babcock, Auckland University, Leigh Marine Laboratory
Jarrod Walker, Auckland University, Leigh Marine Laboratory

Assistance with maps etc:

Terry Conaghan, DOC, Northland Conservancy

Assigned scribe:

Roger Grace ☺

1025 Introduction from Viince Kerr. Stakeholders, community and Department of Conservation all agree this process here is extremely important. They all want a *plan* rather than an *ad hoc* approach. This process has got off to a good start.

The agenda for today's meeting is as follows:

1. Review first meeting report and matters arising.
2. Restatement process we are following i.e. principles and criteria briefly.
3. Check that members are OK with process we used for first set of recommendations we made last meeting relating to Far North coastal units.
4. Continue process systematically through other coastal units, making notes on how the process (principles and criteria) is working. Suggest we tackle West Coast bioregion.
5. Have discussion on information gaps and how to solve this. Focus on Northeast Coast bioregion.
6. Plan next meeting and progressing report.

1 Review of first meeting and matters arising.

Vince discussed briefly the report on the previous meeting and invited comments on the report.

Martin Cryer; Regarding the process on page 10, Martin said that if we lock into 3 marine reserves in each coastal unit we could end up with a hundred marine reserves north of Auckland. The process is not intended that way. The science is not strong for so many reserves. It would be administratively difficult and many marine reserves would be small. There was discussion whether to delete the sentence referring to 3 marine reserves in each coastal unit.

Russ Babcock; It embodies the idea of replication which is important.

Martin Cryer; If we are thinking of replication and sustainability, we need to think of some large marine reserves too, especially for mobile species. Depends if we are considering their use for fisheries management.

Kathy Walls; Not related to fisheries management, rather to management of populations of marine animals.

Martin/Russ; Simpler if we stick to conservation rather than fisheries management.

Martin; There are growing thoughts, however, that marine reserves can help fisheries.

Vince Kerr; Marine reserves and fisheries management will have to come together and support each other. Our ideas will change as we look at marine reserves for outer shelf and offshore areas.

2 Restatement of the process we are following.

MPA network design principles - with core network of no-take areas.
Geographically dispersed across biogeographic regions.

The main focus of our exercise is:

All habitats are represented.
All habitats are replicated.
Special or unique sites are included.
Each is self-sustaining (ie sufficiently large to allow this)
Use best available information (precautiona ry principle)
Each area is permanent (here we assume permanent protection for the core network of totally protected areas)

There was discussion regarding Marine Protected Areas or Marine Reserves. Perhaps we need to change our focus from MR's to MPA's? Kathy explained DOC's role with the

New Zealand Biodiversity Strategy. The politics are difficult. DOC is really going for a network of no-take Marine Reserves. Within DOC about half the people believe DOC should be going for marine reserves, but the other half believes that lesser protection within MPA's is something DOC is behind. We will stick to our group title (that is Marine Reserve Network Design) and any explanation will cover this problem. An ancillary network of MPA's may not be permanent.

3 How we deal with different types of areas, and examples

Special/unique areas.

- These are one of a kind, therefore cannot be replicated
- Describe the features

Example: Three Kings/North Cape Biogeographic Region;

Three Kings Coastal Unit 2.01;

Features:
Locally endemic species
Cool temperate and subtropical species occurrences
Oceanographic - influenced by East Auckland current, West Auckland and Westland currents
Localised upwelling
Possible larval retention

Recommendation; We made 6 recommendations as listed on page 11 of the previous report.

Example: North Cape/Cape Reinga offshore unit 2.03;

Features:
Endemic species
Benthic assemblages not found elsewhere in NZ
Oceanographic - strong currents etc.

Recommendation; 6 recommendations as on page 13 of the previous report.

Representative/Typical areas.

- Minimum replication of at least 2 per habitat type
- Sufficient size to be ecologically sustainable
- Consider - diversity
  - connectivity
  - threat/risk

Example: North Cape coastal unit (Ohau to Scott Point) 2.02;

Minimum number - 2 areas that include headlands and beaches
Size/area - at least 5 km of coastline per site selected
- at least 10% per habitat (Note: the previous concept of "at least 10% per coastal unit" has been changed to "at least 10% per habitat". The reason is that the Coastal Units are to some extent arbitrary, but "habitat" has more ecological sense. There will likely be exceptions and reasons for a higher percentage.)
- Minimum depth 100m (or 2nm offshore if practical - relates to variation of distance offshore to the 100m line.

Discussion:

Vince; We can discuss theory at length, or get into the practical activity and see what theoretical problems arise during the process.
Russ; 10% is a practical target at present. Some people are calling for more eg. 20%. 10% would be difficult to pull back from.
Kathy; 10% came from Bill Ballantine. There is no scientific justification - it just seemed a practical target. Jim Bohnsack seeks 20%, and this is a common call internationally.
Mark; On the west coast there are huge sand areas in relation to small reef areas. Do we want 10% of all sand areas? This may be too much. And in contrast 10% of small reef areas might not be enough.
Tony; How about relating to what people perceive on land? We have about 30% protected on land. Can we use this to help people understand the concept in marine areas? We don't want **science** to drive this.
Kathy; Maybe add note after the 10% statement - "or more depending on the location".
Russ; Precautionary principle and best available information suggests that 10% is a number we do not want to go below, and more would be better.
Kathy; Don't want NZ to seem "whimps" in relation to aims overseas, eg. on Australia's Great Barrier Reef they are aiming for 20%.
Martin; Perhaps we leave the 10% as an assumption or starting point, acknowledging that there will be exceptions.
Mark; In some areas it may be easy to get more than 10% if there is not much human use being made of those areas, eg. seagrass beds or other subsets or habitats.
Martin; MFish has an obligation to protect areas that have special values for fisheries, eg. nursery areas.

4 Continue process through Coastal Units.

The West Coast Bioregion is too big to be of any practical use in this exercise.

4.01 Ninety Mile Beach coastal unit. (Scott Point - Tauroa Pt). (See coloured hand-out)

There is very little information on this area, and no sediment maps. We should only place lines in unique or special areas. The rest should be based on design principles, but with no lines on maps.

Pandora Bank was covered last time in Coastal Unit 2.02.

Mark Morrison has dived at 8m and 18m depths off Ahipara. Lots of extensive reef area to at least 40m depth.

Discussed toheroas. NIWA did survey for MFish in 2000. Most toheroa currently near the north end of 90 mile beach, north of Motopia Island. Juveniles are scattered down 90 mile beach but there is no guarantee that they will result in beds of adults. They often just disappear. Toheroa is an **icon** species. We need to look at toheroa from a conservation point of view. Although there may be Customary fishing issues and vehicle driving issues, these are not our present concern. Maybe we need to consider the current distribution of toheroa as a special/unique area? This area can't be replicated because of the localised occurrence of toheroa, and is locally special. (Note: Areas further south, eg. west of Auckland, have scattered toheroa, but not as frequent as in northern part of 90 mile beach).

Size of area; scale of kilometres as minimum (need to allow for movement of beds). Also includes subtidal molluscs eg. surf clams of open exposed subtidal habitat. We also have the opportunity to include rocky outcops and headlands within this special/unique area. Probably to 2nm offshore (100m is too far out). (Note trawl-free zone out to 1nm offshore).

Discussion re whether 90 mile beach is still a road (probably is). Can be damaging to small toheroa on upper beach. This aspect will have to be taken into account.

Mark indicated that NIWA has done fish surveys (soft sediment areas) all up and down the west coast. NIWA Technical reports 1997 and 2001 - Morrison et. al.

Agar seaweed is collected mostly in the southern part of 90 mile beach.

For representativeness and replication, possibly another marine reserve somewhere down 90 mile beach? This may fall out naturally - may be too close to the northern one to be accepted. Replication of the sandy beach habitat may be covered in Coastal Units 4.02 and 4.03 further south.

North and South Ahipara Banks are unique and special in the West Coast Bioregion and there is little information on them. Andrew Jeffs has investigated mussel spat dynamics. Gathering more information on this area is highly desirable.

Tauroa Point area (South end 90 mile beach). Mark has dived this area and it is very rich. There is a difference between the area north and the area south of Tauroa Point. The

reefs go down to 40 to 50 metres. Probably separated by sediment from North and South Ahipara Banks offshore.

Recommendations re 4.01

1 Special/unique area between Scott Point and north of Motopia Island. Establish marine reserve to 2nm offshore, and include substantial area (several kilometres) of toheroa beach, as well as some rocky outcrops and headlands. Threats to toheroa populations include vehicles on the beach, and will need to be taken into consideration.

2 Special/unique area of offshore west coast reef on the North and South Ahipara Banks. Establish marine reserve somewhere in this area meeting appropriate criteria regarding size etc.

3 Establish a marine reserve on an open stretch of 90 mile beach that fulfils the criteria and principles for representativeness.

4 Establish an area of sheltered west coast reef habitat north of Tauroa Point.

4.02 Tauroa Point to Maunganui Bluff (Hokianga Coast.)

This unit has about 30% rocky shores. Northland Polytech and Vince Kerr did a toheroa survey at Mitimiti. There were lots of toheroa spat but only very small occasional beds of larger toheroa.

It is probably possible to find two areas which each have rocky reef, sandy beach, and harbour mouth habitats. This way we could have two marine reserves instead of about 6 to cover the habitats.

There is some data from Fred Brook on subtidal areas off Kawerua.

Habitat considerations:
- Exposed rocky reef
- Exposed west coast beach
- Harbour entrance

Recommendations re 4.02

1 Attempt to have a minimum of two areas containing beach, rocky reef and harbour entrance habitats.

2 The areas to extend to 2km offshore, or preferably to some ecological or sediment breakpoint in the seabed features.

4.04 Maunganui Bluff to Muriwai Beach.

Information: Ackroyd and Walsh have produced 2 reports to MFish . There is information on a juvenile snapper aggregation area off South Kaipara Head at a depth of 10 to 25 metres. There is considerable historical information on toheroas.

Note trawling bans out to 1nm offshore, and out to 3 nm off harbour entrances.

The Hector's dolphin protection/management zone overlaps with this unit.

Note the threat of vehicle impacts on beach shellfish.

Recommendations re 4.04

1 Establish a minimum of 2 marine reserves on the exposed sandy beaches. Each area should have at least one toheroa bed in it.

2 The reserves should be big enough that there is a 90% chance of having at least one significant toheroa bed included at any time, therefore taking into account possible future movement of beds.

3 Extend to 2nm offshore, or to a significant ecological or sediment breakpoint in the seabed features.

4.03 Hokianga Harbour.

All harbours have a riverine to oceanic gradient. There is a secondary gradient from the harbour arms into the channel.

There is quite a lot of information on the Hokianga Harbour (Vince Kerr and Rob ....). The harbour splits well into 3 zones. There is appalling sedimentation in parts of the upper harbour, but some very good examples of healthy mangroves in the central area. The lower "oceanic" zone has been well-dived by Vince Kerr over the past 15 years. The habitats are very patchy, with some interesting small reef areas rich in sponges and other invertebrates. Rob has made recommendations but these need further work. It may be unrealistic to protect the whole harbour although this might be desirable from an ecological point of view.

Information includes Hamilton NIWA Ecophysical Classification System - Terry Hume.

Any reserves must recognise the ecological integrity of the harbour, and include as many habitats as possible.

Current threats to the harbour include Spartina (present in several areas), and impacts of surrounding land use (siltation).

Recommendations re 4.03

1 Establish 3 marine reserves representing the 3 broad zones of the harbour, that is the lower, middle and upper areas.

2 Include as many habitats as possible in the reserves.

3 Each reserve to be structured as a functional unit, incorporating side arms of the harbour down to the main channel.

4 Total area to be a minimum of 10% of the harbour.

Further discussion.

There was considerable further discussion regarding the Hokianga and other harbours in general.

Tony Seymour; Should we be protecting only the most healthy areas or should we also be protecting some degraded areas ie. with a view to helping restore these areas?

Tony also raised the issue of aquaculture. Aquaculture ventures can only go where the quality of the estuarine system is very high. This could lead to a competition for space between aquaculture and marine reserves.

Kathy referred to the Marine Reserves Act which indicates that to qualify for a marine reserve an area must have the ability to be restored. Also good quality areas are needed to protect biodiversity. There was some discussion over whether marine reserves should be used to put pressure on land use issues.

There was also the question of whether all estuaries should have a marine reserve somewhere in them. Some of the smaller ones might not easily accommodate marine reserves. Consensus seems to be that the Hokianga and Kaipara harbours are large enough to have marine reserves in 3 zones.

There was also discussion as to whether we should recommend 10% protection for within harbours. Russ reminded us that we already have that as a principle.

Tony suggested that perhaps if there is a special feature identified in a small harbour, then we should seek to protect it. Otherwise leave all harbour habitats to protection in the large harbours.

Small harbours on the west coast include Herekino and Whangape. The range of habitats in these harbours is represented across other larger harbours. Any unique habitats or species assemblages should be identified, however, and considered for protection.

(Note: the possibility of a small estuary being protected in its entirety, as a microcosm of a harbour or estuary. This could be good for educational purposes as well as for other

undefined values. This approach might be more appropriate on the east coast where there are many small estuaries.)

Note: The final array of reserves in west coast harbours needs to satisfy the criterion of geographical spread.

In the Kaipara and Hokianga special subtidal areas may be a consideration, eg. green-lipped mussel beds on sandy bottom - vulnerable to dredging. Also in the entrance to the Kaipara there are subtidal tuatua beds.

The East Coast.

We discussed how to approach the east coast.

1 Coastal Unit by Coastal Unit
2 Collection of information
3 Tackle each estuary
4 Treat all estuaries in a broad manner as we did on the west coast. Probably treat little harbours separately from big harbours.

We decided to look at harbours first.

3.02 Parengarenga Harbour.

Main information source is the paper by Bruce Hayward et al. There is also some information associated with sand mining operations in the harbour entrance channel (reports by Roger Grace), and some observations by Lew Ritchie. There are probably also various reports associated with oyster leases in the harbour.

We should treat this as a "big harbour". It has a very small catchment which is virtually undeveloped. There is very little sediment input from land runoff. It is unique as the northernmost estuary in NZ, and has some special features eg. subtropical elements including spotted black grouper. Extensive seagrass beds are also a special feature.

Significant restraints include the sand mining licence near the entrance, and about 20 oyster leases throughout the harbour.

Recommendations re 3.02

1 Establish 3 marine reserves representing the 3 broad zones of the harbour, that is the lower, middle and upper areas.

2 This has a high priority and is unique as the most northern harbour, with a subtropical influence, a small intact catchment (and hence very little sediment input), and extensive seagrass beds.

3 The area is geologically special with silica sands.

3.03 Houhora Harbour.

We should treat this as a "small harbour". It has extensive seagrass beds near the head of the harbour, and has a strong influence from subtropical species.

Recommendations re 3.03

1 Special feature of seagrass beds should be protected.

2 Consider protection of the area with high subtropical influence.

3.04 Rangaunu Harbour.

We should treat this as a "big harbour". Main source of information Ken Grange's study.

Recommendations re 3.04

1 Establish 3 marine reserves representing the 3 main zones of the harbour, that is the lower, middle and upper areas.

2 Identify any special or unique features and endeavour to include these in one of the three protected zones.

Small harbours.

The small harbours of Taipa and Mangonui should be treated as other small harbours.

Recommendation

1 Identify any special features of these harbours and consider for protection.

3.06 Whangaroa Harbour.

Treat as a "small harbour".

Special characteristics include deep subtidal areas, underwater rock walls - some with strong tidal currents, rock formations, scallop habitats, and island in the harbour.

The upper harbour is mostly compromised by oyster farms, although there are extensive mangrove and saltmarsh areas of moderate to high wildlife value.

Recommendation re 3.06

1 Identify any special areas, particularly in the lower harbour, and seek protection.

3.08 Bay of Islands.

This area is unusual because of the large size of the bay, its many islands and wide wave-exposure range, and the 3 "small harbours" within the bay.

Information sources include Fred Brooke's work, and Offshore Islands Research Group paper.

Constraints include the Waikare Inlet being full of oyster leases.

We could treat Kerikeri Inlet, Waikare Inlet, and Te Puna Inlet as "small harbours".

(Note: All small inlets from Taipa, Mangonui, and down to Mangawhai should be treated as "small harbours", but we need to take an inventory of habitats in them and be sure that each is adequately represented in marine reserves. Also need to ensure an adequate geographic spread of representation in these small harbours.)

The middle areas of the Bay of Islands are sheltered, and there is also the outer exposed coasts of the Bay. We should look at the possibility of including shelter, exposure, island and mainland coasts all in one marine reserve. The aim is to protect representative areas of sheltered water, exposed coast, reef and soft-bottom communities, and aim for replication of each habitat in 2 marine reserves. Also aim for an outer boundary at 2 nm offshore.

The Black Rocks area has been noted as an area with high biodiversity values.

Recommendations re 3.08

1 Treat the 3 inlets (Waikare, Te Puna, Kerikeri) as small harbours, identify any special features and consider those for protection.

2 Aim to protect representative areas of sheltered water, exposed coast, rocky reef, and soft-bottom communities, and aim for replication of each habitat in 2 marine reserves.

3 Outer boundary of marine reserve area(s) at 2nm offshore.

4 Identify any special or unique areas and attempt to include these in the above marine reserves, or establish special marine reserves in those areas.

3.11 Whangarei Harbour.

We should treat this as a "big harbour".

Assuming Kamo High School application is successful, we should consider expanding or replicating the area of marine reserve in the lower harbour, towards 10% of harbour habitats in protection.

Recommendation re 3.11

1 Assuming KHS application successful, expand or replicate marine reserve area in lower harbour towards 10% of harbour habitats in protection.

3.01 Ohau Point to Karikari Bay/Cape Karikari (Great Exhibition Bay).

This includes exposed sandy beaches and rocky reefs and headlands.

Recommendations re 3.01

1 Identify any special or unique areas and move toward protection in marine reserves.

2 Establish 2 areas (replicates) of marine reserves that include predominant habitats, ie. exposed sandy beaches and rocky reefs. Areas to extend to 2nm offshore.

3 As an alternative to 2 above, establish one larger marine reserve which protects approximately 10% of the coastal unit and includes as wide a range of habitats as possible.

3.07 Cavalli (Karikari Bay/Cape Karikari to Cape Wiwiki)

Indented coast of exposed rock and cliffs interspersed by small sandy bays. Some offshore reefs and pinnacles.

Recommendations re 3.07

1 Identify any special or unique areas and move toward protection in marine reserves.

2 Establish 2 areas (replicates) of marine reserves that include predominant habitats, ie. exposed rocks and cliffs, and sandy bays. Areas to extend to 2nm offshore.

3 As an alternative to 2 above, establish one larger marine reserve which protects approximately 10% of the coastal unit and includes as wide a range of habitats as possible.

3.09 Bream Head (Cape Brett to Bream Head).

Exposed rocky shores and cliffs with a number of medium to coarse grained sandy beaches, and several minor harbours. Some offshore reefs and pinnacles, and extensive fields of gorgonians on low-relief reefs. Includes Mimiwhangata Marine Park.

Recommendations re 3.09

1 Identify any special or unique areas and move toward protection in marine reserves.

2 Proceed with conversion of Mimiwhangata Marine Park to full marine reserve status.

3 Establish at least one additional marine reserve including predominant habitats ie. exposed rocks and cliffs, and sandy or gravelly bays, to extend to 2nm offshore.

4 Aim for protection package totalling approximately 10% of the coastal unit, including as wide a range of habitats as possible.

Vince and Roger to try to complete the other coastal units in the same style, and to assemble annotated references for each coastal unit.

Roger Grace

Remaining Coastal Units Workshop Meeting

Working Notes Remaining Coastal Units Northland Nearshore Classification System

13 November 2002

Kathy Walls, Vince Kerr & Roger Grace present

3.05 Doubtless Bay

Important features of unit:

- Relatively shallow, exposed bay
- Variety of habitats, geology and exposures.
- Rocky substrates and range of soft sediments
- Exposed S.E & N.W facing rocky shores on open coast situation – the two sides are different due to different exposures
- Whatawhiwhi much less exposed than Berghan Point
- Exposed open beaches
- Small harbour and wetlands
- Isolated rocky outcrops/reefs in bay

Recommendation:

As a minimum:

- S – S.E. facing Whatawhiwhi rocky reef area – at least 1 site
- W – N.W Manganui – Berghan Point coastline rocky reef area at least 1 site
- Representative example of isolated submerged or emergent rocky reefs – preferably replicated, preferably at a range of depths.

Other recommendations:

- An area of mangrove and salt marsh
- An area of open sandy shore including subtidal
- An inshore rocky reef site in Cable Bay – Coopers Beach area

Note: refer to recommendation of North Cape

General Rules:

- 5km coastline
- For representative 10% per habitats in reserve areas
- Network design principles (replication etc) met
- Single large or several small (SLDSS) options identified

- Seaward boundaries to extend to 100mtr depth contour

3.06 Cavalli – Karikari Bay/Cape Karikari to Cape Wikiwiki

Important features:

Islands are an important and distinctive feature of this coastal unit. The Cavalli Islands stand out as special out of this group of islands.

Recommendation:

- Area/s at Cavalli Islands which includes at least: the north facing islets
- Important features to include in reserve areas:
    - offshore pinnacles (eg Taheke ……..)
    - exposed habitats, diverse habitats
    - deepwater assemblies including subtropical fish species, (e.g. splendid perch)
    - steep drop-offs/ spectacular underwater scenery
    - range of sediment dwelling benthic species between islets and main island (note could include Rainbow Warrior)
- At least 2 areas that include: a continuum/sequence island/s, rocky reefs, cliffs, sandy bays. (Refer to general rules)
- At least to 100mtr depth or 2nm from shore.

Priority: Maitai Bay/Cape Kerikeri/Moturoa Islands area

3.10 Poor Knights Islands

Recommendation:

- Extend Boundary to include
    - deeper water and deepwater pinnacles
    - connectivity between islands
    - openwater habitat for pelagic spp (e.g. trevally, kingfish)
    - extended range of deepwater habitats

3.11 Bream Head – Pakiri, including Hen & Chicks and Sail Rock

Important features:

- Gorgonian fields at Coppermine Island and Whatupuke Island at 45mtr depth
- Extensive kelp forests and large boulder rocky reef habitats

Recommendation:

- Area/s at Hen & Chicks Islands which include as a minimum:
    - one whole island

- an area beyond the rocky reef attached to island which includes a suitable area of soft sediment habitat to create a continuum/sequence of shallow – deep habitat (i.e. deeper than 45mtr)
- the reserve should extend out from the island to 2nm

- As a minimum: South facing Bream Head – Harbour entrance – at least x 1 site
- At least 2 areas with an array of beach and rocky intertidal if possible.
- At least 1 estuary (or part of) (i.e. representative of barrier spit type estuaries)

MPA NETWORK DESIGN PRINCIPLES [NO TAKE: CORE NETWORK]

* All habitats are represented

* Special (unique) sites included

* Replicated habitats

* Geographically dispersed across biogeographic regions

* Self sustaining

* Use best available information (precautionary principle)

* Permanent

Implementation of Community Participation Network Design Process

Notes by V. Kerr for the expert group and Northland Conservancy

Explanation: This was a first go at planning for the next stage of the Network desing project. It is obviously preliminaryand timescales suggested need to be put back at least a year, but it is useful as a start point for ideas and discussion. More detailed planning and clarification of the capacity requirements are current underway at Northland Consevancy.

Years 2003-2005 Project Brief Update

The facilitation of an external expert group to advance this marine classification information and Northland marine reserve network design guidelines, (due to complete June 2003), is part of a process of shifting ownership of marine conservation to the wider community. Also a sound technical base must be in place to inform the community participatory process to follow.

Work to carry out the community participatory process will begin in July 2003. It will follow the sequence below:

- Identification of local planning areas
- Identification of stakeholders
- Stakeholder analysis and communication plan formation
- Facilitation of stakeholder group formation
- Information and issues identification phase
- Integration of science guideline with other social, cultural and political constraints
- Development of stakeholder group's design criteria
- Identification of priority areas for marine reserve sites and options
- Formation of proposal group and proposal process begins

This program will be lead by the Conservancy PA team, but will require significant capacity in each Area of the conservancy to support delivery of process and respond to demands for information etc. that will arise at the local level. Supporting this strategy also is the ongoing work in the Conservancy which is building a broad base of understanding of marine conservation issues and the benefits of marine conservation and specifically marine reserves. Our Seaweek programs and the various activities and outputs of the "Experiencing Marine Reserves Program" are examples of this activity.

There will also be considerable ongoing technical inputs required to provide more detailed information and advice to the process - especially when specific sites or site investigations are identified. Once proposals and applications emerge from the process there is again a role for a conservancy technical staff person. It is also likely that the basic information system now being assembled as part of the Conservancy GIS system will

need further work which may be in the form of survey, literature reviews or mapping exercises. Cooperation with other agencies and information sharing will also feature in the development of this project. These requirements are being identified as part of the current expert group process.

Iwi will be requested to guide and fully participate in all aspects of this process.

It is envisioned that a member of the science expert group will be involved and required to clarify the application of the science principles, recommendations and benefits to the stakeholders involved at the local level. The marine scientists will contribute the crucial tools and ecological understanding, but the process will then require leadership from other disciplines, (social and political), to implement the strategy successfully.

The initiation of a community participation process aiming to establish a network of marine reserves does not in any way restrict DOC from supporting other marine protection concepts to achieve conservation gains. A crucial point here is that the science will conclusively show that it is not an either or situation. A no-take network fulfils a different function than all other techniques of management, (i.e. at the systems level as well as specific species and habitat levels). In addition it also supports all other efforts.

Record of Expert Group Meeting 3

Note: Kathy produced a checklist as a tool for recommendation of candidate areas for this meeting this checklist appears in Appendix 2.

Minutes of Editorial Meeting
Technical Report Draft 1 on Network Design of No-take Marine Reserves in Northland
Leigh Marine Reserve
Thursday 24 January 2003-01-25

Meeting opened 10.45

Present: Graeme Morell (Nga Ngaru Trust South Hokianga Takiwa, & Te Kete Mahinga Kai, Ngapuhi Runanga), Vince Kerr, Kathy Walls, Bill Ballantine, Roger Grace, Mark Morrison, Jarod Walker, Martin Criyer, Ann Midson, note taker. Russ Babcock joined 11.25.

Introductions
Programme:
Introductions
Words from Graeme
Discussion of the technical report
Formatting
Finishing the report
Consistency of language and criteria
Specificity relating to sites
Future action

Summary

It was clear that there needed to be an explanatory section at the beginning of the re-draft.
Network design principles need to be explained, along with a description of the assumptions under which the report was formulated.
It needs to clarify that not enough is known about marine environment regeneration to make definitive statements about the optimum size of reserves.
The scientific group and its role need to be identified and described, but not in a way that makes it sound like a bunch of secret squirrels.
There needs to be an explanation of the scientific definition of uniqueness and that unique features identified in the report were just the starting point and that the community would have a lot more to say about this.

The final report needs to be appropriately annotated and referenced with plenty of high-quality maps showing different features and uses of units
If coastal units boundaries can be aligned with traditional tangata whenua boundaries this is an advantage.

Notes of meeting:

Graeme outlined his background and said his task was to find a way for scientists and DoC etc, (people working to preserve marine environments) and Tangata Whenua to work together to make sure that scientific knowledge and traditional Maori knowledge (tikanga) relating to marine environment protection could be combined to ensure success of a network of marine reserves.

General Debate:

1. Martin Criyer voiced philosophical concerns over publication of a Document that stated opinions about marine reserves as if they were fact. He said scientists did not know exactly how big or small reserves should be for optimum preservation, and it was contextual. Sometimes big reserves were thought to be most effective, while at other times small reserves might be considered effective. He expressed concern at matters in the report going out under his name given the arguability of the science
2. Roger Grace (supported by Bill Ballantine) suggested that the best solution might be to have reserves ranging in size. Mark said the work had been completed based upon an agreed set of assumptions. He suggested that these assumptions should be stated at the front of the Document, pointing out that there were still gaps in the scientific knowledge. This was supported by Vince and Kathy.
3. It was agreed that the experts involved should be named, but that the work should not be attributed to any one person.
4. There was discussion as to whose name the report should come out under, either as a report by a group of experts for DoC, or by DoC.
5. Mark suggested that it be a report by Vince and Kathy (DoC) but with experts brought in.
6. Kathy said it should be a report to DoC and that DoC should use it to prepare Documents for wider exposure. The group approved this approach, with DoC taking the role of editing together information from many sources and drawing its own conclusions.
7. Russ said DoC should say (in the Document) who was consulted, but make it very clear that it was a DoC Document.
8. Vince said the DoC has not had a plan for designing or establishing a network of marine reserves or appropriate staffing at this point. He said that the technical report, the result of three year's work was a starting point and the first time such a thing had been attempted in New Zealand.
9. The focus of the campaign would be driven out of work with Tangata Whenua and community groups.

10. There would be much demand for a Document of the PISCO type. Iwi were already starting to work toward resolving marine environment degradation in traditional ways, the Northland Regional Council was working to identify marine areas of special significance.
11. Funding was available for a PISCO type Document to work as a resource for the community.
12. Through their respective positions, Vince and Graeme would work together in planning and initiating the public process.
13. Kathy suggested a fact sheet be produced to raise awareness and get people prepared ahead of schedule for the concept of a marine reserve network
14. Vince said there were marine reserve education programmes in Northland, a how-to kit was being prepared for community groups and there was increasing f community involvement.

Discussion moved to the table on page 4 of the technical report.

1. Kathy designed the table in an effort to provide more consistency of standards being applied to selection of sites for possible marine reserves.
2. Vince said the good thing about the table was that sites suggested by the community could be checked against it.
3. The information was taken from the coastal units already identified by the team in the draft technical report Document
4. Kathy queried how to deal with sites that were considered representative and sites that were considered unique, whether a different table should be drawn up for each category. The decision was made simply to show this differentiation within a single table for each site Kathy wil redraft table to reflect the differences between representative sites and special and unique sites.
5. Kathy asked whether priorities should be given to sites. Russ said prioritisation should be up to the communities involved, and not stated in the table.
6. Russ raised the issue of making special areas contiguous.
7. The group decided to work through two examples of units using the table, Three Kings and Hokianga. (Kathy has my copies of the tables formed through this process.)
8. Hokianga, Whangape and Herekino.
9. The group discussed whether or not Whangape and Herekino should be considered part of a coastal unit or part of the Hokianga Harbour unit as many of the habitats were represented in all three harbours. (check Vince)
10. Graeme stated that from a tikanga point of view, all three harbours related back to the same catchment or maunga o moana, and would therefore be considered part of the same “unit”. He stated that when Iwi looked at these areas they would consider them in their own cultural framework rather than the boundaries drawn up according to scientific criteria. A member of the team stated that further south the units had been identified according to cultural boundaries, then scientifically assessed.

11. Graeme said identifying units by their cultural boundaries would immediate make the process more agreeable, by showing that at the most fundamental level Maori values had been acknowledged.
12. A lot of discussion then ensued (of a technical nature) as to whether or not one of the harbours should be thought of as unique and the others as representative.
13. The group broke for lunch, after which Bill spoke on the issues of representative vs. unique environments and connectivity.
14. He said in any environment there would be elements that would be considered unique and others that were considered representative so taking an either/or approach was not relevant. Better, he said, to look at them as the end points on a continuum and to allocate each unit a point on the continuum and state why.
15. He said in terms of connectivity, all unique elements existed within a representative environment, so it made sense to identify unique features and extend protection around them into the representative area. This would make connectivity automatic.
16. Bill recommended that in 3.08 in the report, it should state "at least" two nautical miles
17. In 3.09, "at least" 10%.
18. Vince and Mark and Russ agreed a "caveat" in the "principles and criteria" part of the Document, to make it clear to the community that the scientific information (including definition of uniqueness) was just a starting point and that what it had included as unique was not exhaustive. Vince said these comments from Bill should be incorporated into the new section in the Document that will outline the principals and assumptions under which the report was created.
19. Vince asked whether the community would be able to challenge the uniqueness as identified in the Document and said community groups might disagree about what was unique. Bill said most reasonable people would understand what was meant, and scientific principles would not prevent community from stating its opinions or challenging scientific opinions.

Editorial style

1. Kathy suggested that for the report format Vince look at the publication standards that Science and Research use to guide technical reports, also Niwa, To get a feel for the technical approach to take.
2. Kathy thought it important to describe the "expert panel" in the new terms of reference/assumptions part of the report.
3. The introduction should include purpose, national relevance, Northland relevance, experts panel etc.
4. Vince wanted to know what people thought about the results part of the Document, layout etc,
5. Russ suggested maps of each unit,
6. Bill wanted annotated references included
7. BALLANYTNE FIELD NOTES A note to remember to consider Bill's extensive field notes when we go back to job of collating biodiversity information for each coastal unit.

8. Discussion about putting things on the internet,

9. problems putting things on DoC's internet, Graeme offered to put material on the Ngapuhi website.
10. General discussion, Bill demonstrating that importance reduces with rarity, even though interest increases.
11. Russ and Bill both drew diagrams to explain how two medium sized reserves could be of higher value in terms of species preservation than one large reserve, and explaining how there were so many variables (including the species being counted) that it was almost impossible to state optimum size of reserve.
12. This information to be included in the "assumptions" part of the report.

Where to from here Tasks

1. Communications strategy: Vince coordinating responsibility, Roger, Kathy, Ann assisting
2. Tables to be completed for all coastal units, Kathy, Vince, Roger
3. GIS mapping – Vince to coordinate with Terry C. Russ noted that these should show different things like where people fish, places special to iwi. Graeme said lots of this information had been collected and could be added to GIS
4. Other information – Ministry of Fisheries, Vince and Kathy to coordinate
5. Time Line – Vince and Kathy
6. Coastal units written information
7. Re-draft technical report, Vince, Kathy, Roger.
8. Deadline for all work to be completed: June.

Summing up

Meeting closed with Vince and Kathy acknowledging the efforts of the group and especially Bill and Graeme for joining the group for this meeting. It was also agreed that as progress was made on the tasks above Vince would circulate work to the group for comment and critical revue. It was also discussed that from now to June we would try to communicate and exchange information work drafts etc. by email, however if the group decides at any point another meeting is called for it would be held.

Appendix 1 Northland Marine Clasification System

A Biogeographical Ecological Classification System for the Near Coastal Environments of Northland

NORTHLAND CONSERVANCY
(version 1/2/00)
Fred Brook
Gerrard Carlin

Northland Conservancy covers the far north of New Zealand including the Three Kings Islands north-west of Cape Reinga, and is bounded in the south by a line from the base of Mangawhai Spit on the east coast through to the Kaipara Harbour on the west coast. Northland is an elongate, north-west-tending land mass less than 100 km at its widest point. It is bounded to the east by the Pacific Ocean and to the west by the Tasman Sea. The coastline is approximately 1700 km, of rugged cliffs, rocky shoreline, sandy beaches and sheltered harbours. There are also many offshore islands and stacks, including three major island groups, the Three Kings, Poor Knights and the Hen and Chicken Islands. Northland contains the country's largest area of relatively unmodified dunelands, some of the largest areas of mudflats, and the largest areas of mangrove forest. Northland lies within three biogeographic regions; the Three Kings/North Cape region (characterised by localised upwelling and influenced by the Tasman Current), the North-eastern region (influenced by the warm East Auckland Current), and the Central region (influenced by mixed water masses of both subtropical and subantarctic origin).

The east coast of Northland (within the North-eastern Biogeographic Region) is characterised by mangrove-lined harbours and estuaries, rocky headlands and sheltered bays, and numerous off-shore islands and rock stacks. It is more sheltered from the prevailing westerly winds, but is exposed to north-easterly gales and occasional the remnants of tropical cyclones. Many of the off-shore islands and parts of the mainland coast are influenced by the warm subtropical East Auckland Current, derived from the north-western Tasman Sea flow south-eastwards adjacent to the coast. This current brings with it a variety of Indo-Pacific larvae. The mix of these subtropical species that survive along with the many endemic species, make these areas ecologically unique.

The west coast of Northland (within the Central Biogeographic Region) has a relatively smooth outline, with several extensive shallow harbours opening via narrow mouths to the sea. Significant harbours include the Herekino, Whangape, Hokianga and the Kaipara Harbours. The west coast is less sheltered then the east coast and is exposed to the onshore oceanic swells of the Tasman sea, causing a high degree of turbulence, turbidity and sediment movement in the intertidal and shallow shelf habitats. The seafloor along much of the west coast of Northland is gently sloping and sandy, with the 50 m contour being located about 3 - 14 km offshore. Most of the coastal reefs drop off to sand very quickly, but deeper subtidal reefs are widespread between Kawerua and Hokianga

Harbour. Rocky banks extend up to 30 - 45 m depth off from Ahipara, and up to 6 m depth off from Cape Maria van Diemen. The coast is influenced by the West Auckland Current, and is dominated by species with cooler water affinities.

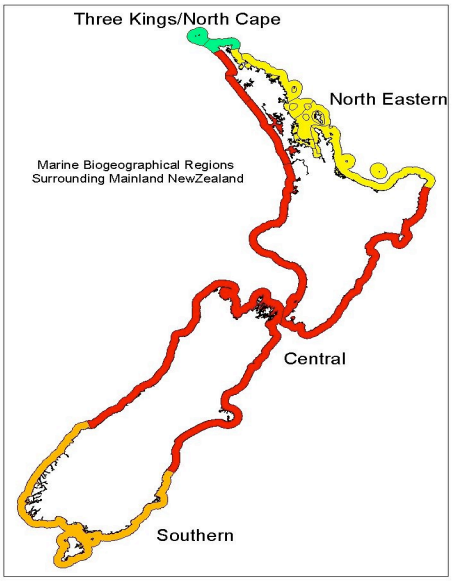


Figure 1 Biogeographic regions of New Zealand

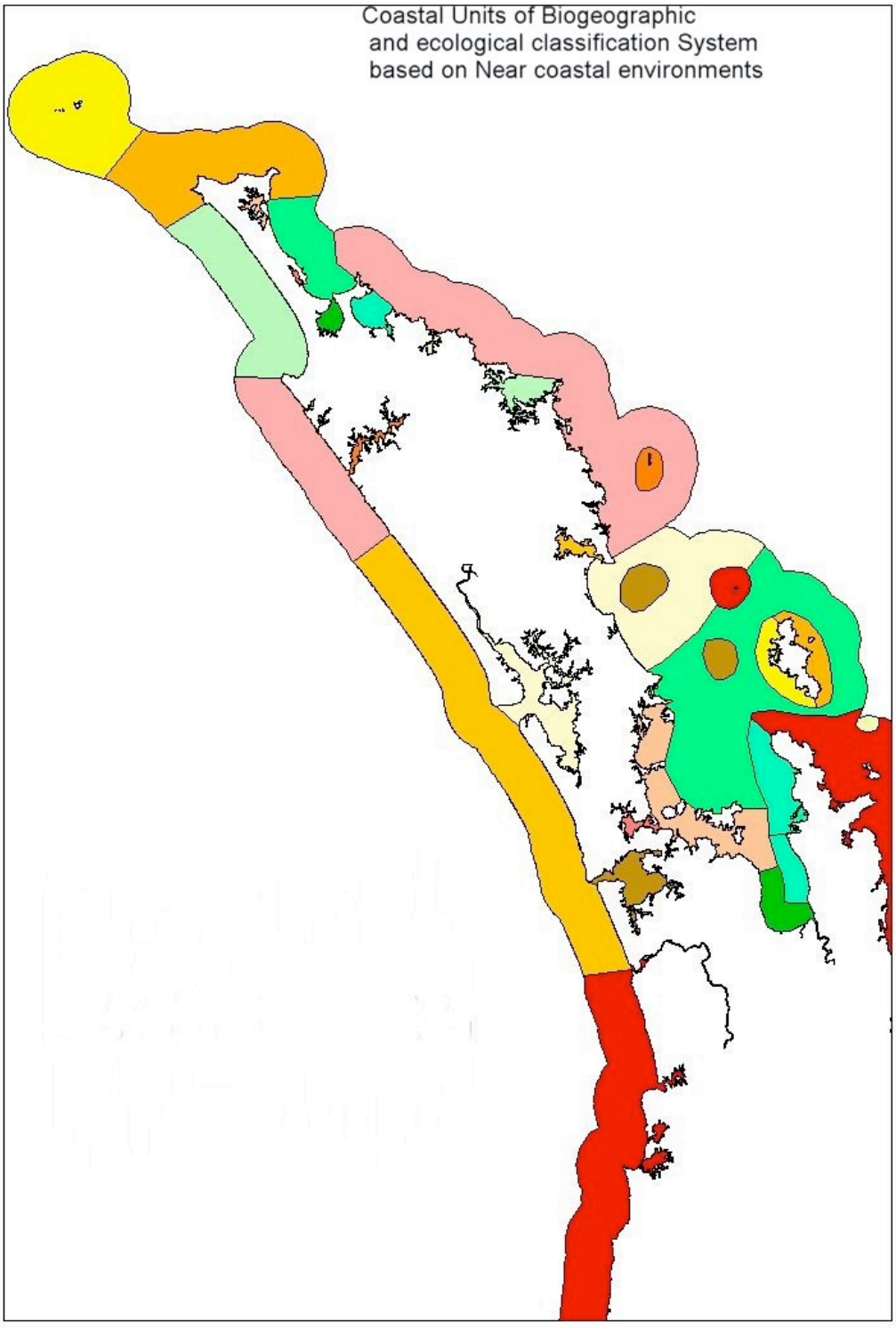


Figure 2 Coastal units of the Northern part of the North Island

Coastal units

Biogeographic Region	Coastal Unit Description	
2.01 Three Kings/North Cape BR.	**Three Kings Islands**	
	Description	The Three Kings island group (within the Three Kings/North Cape region) is 48 km northwest of Cape Reinga and consists of one large island (Great Island), three small islands (North East, South West and West Islands) and a chain of bare or scrub covered rocks (Princes Islands). The island group has a extremely exposed and precipitous coastline of volcanic origin. Steeply sloping reefs drop down to about 25 m or more. The islands have been separated by deep water (300 m deep) from mainland New Zealand since the Pliocene, whereas most of the other North Island islands have been connected to the mainland up until the last glaciation. The offshore areas of this region contains areas of bare rock from volcanic outcrops, shelf terraces and escarpments. To the northwest are areas of coarse biogenic sediments while finer terrigenous sediments are located to the east and south-west.
	Oceanography	The islands have a mild subtropical climate with much mist and fog. They are influenced by the eastward flowing oceanic waters of the East Australian Current plus the unpredictable south and north flows of the West Auckland and Westland Currents respectively. The island group is in an area where localised upwelling of cold water periodically occurs. Strong tidal currents. Sea surface salinity about 35.5‰.
	Biota	The marine biota of the Three Kings area is particularly significant in that it has a high number of occur locally endemic species of algae, corals, molluscs, urchins and fish. There are affiliations with North Cape on mainland New Zealand. This area is also characterised by the presence of some Australian and or south-west Pacific marine species that are not known elsewhere in New Zealand; the absence of a number of species that are generally widespread around the northern coasts; and by the presence of some central-southern species that are not found in northern New Zealand. Unusual features of this region are the abundance of the Cook Strait limpet *Cellana denticulata* and the complete absence of *C. ornata.*

		Notolabrus cinctus, a cool temperate labrid, occurs at the Kings, although it's northern distributional limit is southern North Island. Other notable absences of mollusc species with generally widespread distributions include *Perna canaliculus*, *Xenostrobus pulex*, *Scutus breviculus*, *Trochus viridis*, and *Cookia sulcata*. Also present is the subtropical thaid *Neothais smithii.* There are a number of algal species that are restricted or endemic to the Three Kings, including *Caulerpa longifolia*, *C. sertularioides*, *Porphyra kaspar*, and *Sargassum johnsonii*. Notable absences of algal species that are widespread around northern New Zealand, but are not found at the Three Kings include *Carpophyllum maschalocarpum*, *Lessonia variegata* and *Gigartina alveata*. *Durvillaea antarctica* most northern occurrence is at the Three Kings, where it is plentiful on very exposed rock faces. Offshore communities of *Nemocardium pulchellum - Venericardia purpurata, Scalpomactra scalpellum - Mactra ordinaria* and *Tawera spissa - V purpurata* have been recorded on sediments ranging from gravelly sands to mud. The islands are used as breeding sites by the Australian gannet, and petrel and shearwater species. There is also an over-wintering colony of New Zealand fur seal.
2.02 Three Kings BR NI north coast	**North Cape** Ohao Point to Scott Point.	
	Description	Area between Ohao Point on the east coast and Scott Point on the west coast. It consists of a repeating sequence of rocky headland and sandy beach, with Motuopao Island just offshore from Cape Maria van Diemen. The beaches are often backed by areas of wetland. Most of the headlands are of volcanic origin with steep cliffs and rocky platforms at their bases. Wave exposure changes from high energy on the west coast to lower energy lee on the east coast. Offshore calcareous gravel sands and terrigenous sediments.
	Oceanography	Strong inshore tidal currents move around the top of the

		peninsula, flowing north-east in the ebb tide and south-west in the flood. The oceanic current pattern is dominated by subtropical water of the easterly drifting Tasman Sea. The area is influenced to the west by the warm, saline waters of the Westland Current and to the north and east by the subtropical East Auckland Current. Salinities are over 35.0‰. Temperatures between 15-21^{o}C . Maximum tidal range of 2.1 m.
	Biota	Bull kelp occurs from Cape Maria van Diemen to Spirits Bay. Eastern algal species *Carpophyllum angustifolium* and *C. plumosum* do not extend past North Cape. Water off North Cape is considered a nursery area for the packhorse lobster, with the main fishery for the adults occurring off Cape Reinga. Wetlands backing Spirits Bay and Tom Bowling Bay are important breeding and feeding grounds for birds, including the New Zealand dotterel, banded dotterel, black swan, grey duck, pied shag and spotless crake.
Biogeographic Region	**Coastal Unit Description**	
3.01 North-eastern BR. NI east coast.	Ohao Point to Karikari Bay/Karikari Peninsula.	
	Description	The coastline from Cape Karikari to Ohao Point is predominantly a soft shore (open, white sand beaches backed by extensive dunes and wetlands) broken by a number of minor rocky outcrops and indented by three extensive estuarine systems. This is a low energy shore with prevailing wind from the west. Exposed to storm surges from the east and north. This region is bordered to the south and north by the rocky and precipitous coastlines of Cape Karikari and North Cape respectively. Offshore areas of sands and muddy sands.
	Oceanography	The region is influenced by subtropical water of the East Auckland Current. Maximum tidal range of 2 m.
	Biota	Tuatua and scallops are common bivalves of the shore. Coastal plants include marram grass and pingao. Offshore communities of *Tawera spissa - Venericardia purpurata* and *Nemocardium pulchellum - V purpurata*

		are found on sandy substrates.
3.02 North-eastern BR. NI east coast.	**Parengarenga Harbour**	
	Description	Parengarenga Harbour is formed from a drowned valley system impounded behind a large unique silica sand spit (Kokota Spit). This is the most northerly harbour in mainland New Zealand. It has an area of 6,5000 ha and 90% of it consists of intertidal flats of sand mud, mangrove, seagrass and saltmarsh. The harbour is shallow and has an array of tidal mangrove-lined inlets that radiate inland from the entrance and terminate in numerous swamp-backed channels. The creeks and streams that enter the harbour do not contribute a substantial freshwater flow. Course shell banks and areas of muds offshore from the harbour, with areas of sands and sandy muds on the mid to outer shelf areas.
	Oceanography	Maximum tidal range is about 3 m.
	Biota	Parengarenga Harbour supports a higher fish species diversity than any other of the Far North harbours. Reefs adjacent to the sandy areas support juveniles of subtropical fish species such as spotted black grouper *Epinephelus daemelii*, and mado *Atypichthys latus*. Molluscs found in the harbour include several subtropical species, e.g. *Natica migratoria*, *Bursa bus*, *Conus kermadecensis*, and *Hydatina physis*. Also, the harbour is the only place in New Zealand where the bivalve *Myochama tasmanica* occurs. It also supports endemic subspecies of the gastropods *Maurea punctulata* and *Cominella virgata*. The large extent of intertidal seagrass flats with high infaunal biomass provides important feeding grounds for bird and fish populations. Offshore communities of *Tawera spissa* - *Venericardia purpurata* and *Nemocardium pulchellum* - *V purpurata* are found on sandy substrates. Parengarenga Harbour is of 'outstanding' value as a wildlife habitat especially for migratory wading birds, at times supporting up to 20,000 birds. Rare visitors include the American whimbrel, greenshank, grey-tailed tattler and terek sandpiper.
3.03 North-eastern BR.	**Houhora Harbour**	

NI east coast.		
	Description	Houhora Harbour (1,500 ha) is a shallow harbour, 8.5 km long, with extensive sandy mud flats. A narrow channel over 4 m deep extends about 3 km upstream. Mount Carmel, a 235 m high volcanic outcrop, forms the north head of the entrance. Apart from this, the surrounding land consists of relatively flat dune sand and, on the eastern side, an extensive belt of saltmarsh.
	Oceanography	Maximum tidal range for this area is about 3 m.
	Biota	Intertidal flats molluscs include the mud whelk, *Zeacumantus lutulentus, Z subcarinatus, Zediloma subrostrata* and bivalves *Nucula hartvigiana,* wedge shell and the cockle. Other molluscs found in the harbour include several subtropical species, e.g. *Natica migratoria*, *Bursa bus*, *Conus kermadecensis*, and *Hydatina physis*. Crustaceans are relatively scarce but are represented by the snapping shrimp, mantis shrimp and pill-box crabs. Offshore communities of *Tawera spissa-Venericardia purpurata* and *Nemocardium pulchellum - V purpurata* are found on sandy substrates. Parore, snapper, spotties, john dory, flounder and stingrays frequent the harbour. This area is considered an 'excellent' habitat for wading birds. It lies between Parengarenga and Rangaunu Harbours and forms an important link in a chain of nationally important estuaries. Extensive saltmarshes grade to freshwater swamps and shrublands. Mangroves are most dense in the upper reaches, where trees attain a height of 7 m.
3.04 North-eastern BR. NI east coast.	**Rangaunu Harbour**	
	Description	Rangaunu Harbour is a large circular harbour with a narrow entrance (10,000 ha), of which 53% is exposed as mud, seagrass and mangrove flats at low tide. The mangrove area amounts to 31 km^2, the largest mangrove forest in New Zealand, and as such represents 15% of the New Zealand stock. Inside the harbour, the entrance channel divides into many branches, the main branch being the centrally flowing Awanui Channel originating from the Awanui River. Rangaunu Harbour arose from the formation of the Aupouri and Karikari Peninsulas which joined a number of former islands with the

		mainland. Maximum depth of the harbour channels is about 10 m.
	Oceanography	Tidal flows dominate water movement. Tidal variation is about 3 m. At high tide, a strong temperature and salinity gradient develops near the mouth of the Awanui River. This gradient extends at low tide to the middle of the harbour. In the harbour proper, salinities approach 35.3‰, and 35.7‰ at the entrance.
	Biota	The mangrove community occupies 50% of the intertidal area. The remaining flats support extensive dense meadows of seagrass. Common inhabitants include snapping shrimp, tubeworm, venus shell, cockle, mud crab and mud whelk. Among the mangroves occur pipis, mud snails, barnacles and occasional rock oysters on the pneumatophores of the trees. A characteristic snail of the sandy bottom is *Umbonium zelandicum.* The harbour is an important feeding and nursery ground for a large number of fish species (28 species recorded) including parore, snapper, john dory and flatfish. Molluscs found in the harbour include several subtropical species, e.g. *Natica migratoria*, *Bursa bus*, *Conus kermadecensis*, and *Hydatina physis*. Offshore communities of *Tawera spissa-Venericardia purpurata* and *Nemocardium pulchellum - V purpurata* are found on sandy substrates. The tidal flats attract many thousands of international wading birds. The Rangiputa shellbank supports a breeding colony of red-billed gulls and Caspian terns. White herons frequent the area around the Okatakata Islands. The endangered ferns *Thelypteris confluent* and *Todea lyarbora* are present in the saltmarsh on the eastern slope of the harbour.
3.05 North-eastern BR. NI east coast.	**Doubtless Bay** Knuckle Point/Karikari Peninsula to Berghan Point.	
	Description	Doubtless Bay is a large bay between Berghan Point in the south and Knuckle Point (Karikari Peninsula) in the north. It consists of exposed rock/cliff headlands enclosing medium to coarse grained sandy beaches, broken by occasional rocky outcrops, and a small estuarine harbour in the south-eastern corner (Mangonui Harbour). Mudflats make up 94% of the area of Mangonui Harbour.

	Oceanography	The tidal range is 2.1 m.
	Biota	Mangroves occur in Mangonui Harbour and the Taipa River estuary. Reef heron and white-faced heron are recorded from the former. Tokerau Beach has three swamps along it, one of which contains the rare ferns *Cyclosorus interruptus and Thelypteris confluens.*
3.06 North-eastern BR. NI east coast.	**Whangaroa Harbour**	
	Description	An 8 km long estuarine embayment of 19 km', of which 26% is mudflat. Rocky shoreline occurs in the vicinity of the entrance, however most of the shore consists of mangrove/saltmarsh flats. The outer harbour is 9 m deep at low tide.
	Oceanography	There is a tidal range of 2.0 m.
	Biota	Mangroves occupy an area of over 4 km^2 . Birds present include the New Zealand dotterel, red-billed gull, four species of shag and banded rail. This area is considered of moderate-high value as an estuarine wildlife habitat.
3.07 North-eastern BR. NI east coast.	**Cavalli** Cape Karikari to Cape Wiwiki.	
	Description	Area from Cape Karikari to Cape Wiwiki, including the Moturoa Islands to the northwest of the C. Karikari headland, and the Cavalli group of islands off Matauri Bay. This area consists of an indented coast of exposed rock and cliffs interspersed by small, sandy bays. Offshore areas of sands and muddy sands.
	Oceanography	This coast is exposed to the full fetch of the Pacific although the prevailing wind is offshore. It is influenced by subtropical waters of the East Auckland Current and has a tidal range of 1.7 m.
	Biota	The exposed rocky coastline is dominated by broad zones of barnacles *Chamaesipho brunnea* and *Elminius plicatus* and algae species such as *Porphyra columbina*, *Gelidium pusillum*, *Codium adherens, Xiphophora chondrophylla* var. *minor* and *Carpophyllum angustifolium*. Common mollusc species include *Nerita melanotragus*, *Neothais*

		scalaris and limpets *Cellana ornata*, *C. radians* and *Notoacmea parviconoidea*. A diverse bird fauna is present including the northern blue penguin, grey-faced petrel, fluttering shearwater, northern diving petrel, pied shag and southern black-backed gull. Motukawanui Island in the Cavalli group is an important area for seabirds. Similarly, the Moturoa group of four islands and associated stacks supports a large petrel and shearwater population.
3.08 North-eastern BR. NI east coast.	**Bay of Islands** Cape Wiwiki to Cape Brett.	
	Description	The Bay of Islands is an open embayment of about 1800 km^2 in area, containing several large estuaries and about 200 islands. It is bordered to the north and south by the precipitous headlands of Cape Wiwiki and Cape Brett respectively. The area has a deeply indented coastline of about 400 km length and contains a number of habitat types from estuaries with mangroves and saltmarsh in the upper reaches to steep exposed rocky coasts in the outer bay. Approximately 4% of the total area (8 km^2) is exposed as mudflat at low tide. The bay is up to 65 m deep, but reaches 85 m at the seaward limit. Much of the terrain surrounding outer areas of the bay is steep and gullied while inner areas are more moderately rolling. There are extensive areas of sheltered rock in the mid section of the bay.
	Oceanography	The estuarine areas with tidal waters extend inland as far as Kerikeri and Kawakawa, the main freshwater inflows being the Kerikeri, Waitangi, Kawakawa and Waikare Rivers. Sea surface temperatures of the bay range from 15 to 23^{o}C (ranges of 9 ^{o}C and 6.5 ^{o}C recorded for inner and outer Bay of Islands respectively). Salinities in the main basin and towards the open coast are about 35.5‰, lower in the upper harbours and inlets. Tidal range is 2.0 m.
	Biota	The area is important for the farming of rock oysters and Pacific oysters. The latter species is one example of the many migrant foreign molluscs found in this district (and surrounding areas of Northland in general). The giant heart urchin *Brissus gigas* occurs in deep water. Mangroves are common in the upper reaches of the Bay. Commercial species include crayfish and packhorse lobster, snapper, kahawai and kingfish. Big game fishing

		for marlins, sharks and tuna also occurs. Seabirds such as the southern black-backed gull, grey-faced petrel and white-fronted tern use the area for feeding and breeding. There are a number of brown teal roosting sites.
3.09 North-eastern BR. NI east coast.	**Bream Head** Cape Brett to Bream Head.	
	Description	This area extends from Cape Brett to Bream Head. It contains exposed rock and cliffs interspersed by a number of medium-coarse grained sandy beaches and minor estuarine harbours, notably Whangaruru Harbour and Ngunguru. The coastline is dominated by steep cliffs of high resistance greywacke that are exposed to the full fetch of the Pacific although the prevailing winds are offshore.
	Oceanography	The area is influenced by the subtropical high salinity and temperature East Auckland Current. The maximum tidal range is 2 m. Sea surface salinity about 35.5‰.
	Biota	Common fauna of the sandy beaches include the tuatua and pipi, sandlouse and sandhopper, polychaete worms and swimming crab. The subtidal sand/'gravel habitat is inhabitated by the comb star, morning star shell, basket cockle and dog cockle. Mangroves occur in five localities. The dominant algae of the rocky shore depending on the degree of shore exposure include *Ecklonia radiata, Lessonia variegata and Carpophyllum* sp. Animals include the seacucumber, kina, starfishes *Stegnaster inflatus* and *Astrostole scabra* and the red rock crab. Occurring subtidally are the purple spined urchin *Centrostephanus* and the large sponges *Polymastia granulosa* and *Ancorina alata.* Fish species present include snapper, blue maomao, black angelfish, red moki, demoiselle, labrids, short and longtailed stingrays. Over 50 species have been observed at Mimiwhangata. Investigations at Mimiwhangata Marine Park have highlighted a considerable number of rare species such as the ivory coral *Oculina virgosa,* red-lined bubble shell *Bullina lineata,* an unidentified callianassid shrimp, the spotted black groper, sharp-nosed pufferfish and sabretooth blenny.

		The area also contains a diverse bird fauna including nesting colonies of the fluttering shearwater and northern diving petrel.
3.10 North-eastern BR. NI east coast.	**Poor Knights** Poor Knights, High Peak Rocks and Sugarloaf Rocks.	
	Description	The Poor Knights are a group of two large and several small islands located 24 km off the mainland coast, north-east of Whangarei Heads.
	Oceanography	Influenced by the subtropical East Auckland Current.
	Biota	Poor Knights are bathed by the warm East Auckland Current, and support a number of subtropical fish species found only rarely elsewhere. On the Poor Knights, the gastropod *Novastoa lamellosa* forms a zone in the middle shore, below which are found *Lithothamnion, Xiphophora chondrophylla, Carpophyllum angustifolium and Lessonia variegata.* Although the Poor Knights are only 24 km from the mainland, there are a number of departures from the mainland coastal community patterns. Poor Knights have had a longer isolation from the mainland than most of the North Island islands. Some common species found on the nearby mainland are absent at the Poor Knights. (e.g. - the common acorn barnacle *Chamaesipho columna*, and two mussels *Modiolus neozelanicus* and *Perna canaliculus* are all absent form the Islands).
3.11 North-eastern BR. NI east coast.	**Whangarei Harbour** Whangarei Harbour, entrance between Marsden Point and Bream head.	
	Description	Whangarei Harbour is a long deepwater estuarine embayment (9,800 ha) formed from a flooded river valley, with substantial areas of mudflats and mangroves, (60% is exposed as mudflats and sand/ shell banks at low tide). The area is bounded to the north by the exposed cliffs of Busby Head/Bream Head and to the south by the sandy beach of Marsden Point. There are areas of rocky shore in the outer and middle reaches, extensive sand flats at the entrance, and mangrove/salt marsh beds in the sheltered bays and inner reaches.
	Oceanography	The tidal range of this district is 2.2 m.

	Biota	The inner reaches of this district are dominated by mangroves and their associated biota. The sand/shell flats are populated by cockles and pipis. The sheltered rocky shore is characterised by zones of barnacles *(Chamaesipho columna),* rock oysters, *Pomatoceros* tubeworm*s* and *Corallina/Hormosira.* The sublittoral fringe consists of large brown algae, notably species of *Carpophyllum* and *Cystophora.* The coastal and estuarine areas support a very diverse bird fauna, with at least 83 species being recorded, including common and rare migratory waders. Supports over 10,000 birds.
3.12 North-eastern BR. NI east coast.	**Pakiri** Ocean Beach/Bream Head to Pakiri, including Hen and Chicken Islands, Sail Rock.	
	Description	Pakiri Beach - exposed east-coast open sandy beach about 20 km to Bream tail. Bream tail - Marsden Point - exposed east-coast open sandy beach about 20 km. Pakiri to Marsden Point - long stretches exposed east-coast open beaches composed of fine grain sand, broken by wave cut platforms of Bream Tail and the exposed volcanic rock cliffs of Te Arai Point. There is a small estuarine harbour (Mangawhai) to the south of Bream Tail. Mangawhai Harbour is a small sandspit enclosed mesotidal estuarine lagoon. Off-shore sediments generally sand with calcareous gravel, moving through to muddy sands and calcareous gravel, and muddy sand with depth. Includes the Hen and Chicken Islands.
	Oceanography	Influenced by the subtropical East Auckland Current. Max. tidal Range = 2.2 m near Marsden Point.
	Biota	Crustacea of the sandy beaches include the sea-slater, sandlouse and common sandhopper, isopods of the families Sphaeromidae and Eurydicidae, paddle crab, ghost shrimp and mantis shrimp. The tuatua is the most common bivalve on this and other east coast beaches. Mangawhai Spit is the only regular nesting site for fairy tern in New Zealand. Other shore birds include the Caspian tern, white-fronted tern, banded dotterel, New Zealand dotterel and variable oystercatcher.

		Mangroves occur in two localities - Ruakaka River and Mangawhai Harbour.
Biogeographic Region	**Coastal Unit Description**	
4.01 Central BR. NI west coast.	**Ninety Mile Beach** Ninety Mile Beach/Scott Point to Tauroa Point.	
	Description	Ninety Mile Beach is bordered to the north and south by the rocky promontories of Scott Point and Tauroa Point, respectively. The area forms a long sweeping low profile coastline of firm white sands backed by a belt of shifting dunes up to 150 m high and, in some places, penetrating 10 km inland. The beach is interrupted by two rocky outcrops - The Bluff and Te Arai Rock and the 50 m high, consolidated sand dome of Hukatere Hill, and has one island (Matapia Island). This area is exposed to the west although Tauroa Point affords some shelter to the southernmost beaches in Ahipara Bay.
	Oceanography	The area is influenced predominantly by the Westland Current and the to a lesser extent the ephemeral West Auckland Current. Surface currents are weak and strongly dependant on wind. Inshore surface salinities range from 35.3-35.5‰. Temperatures range from 14-21^{o}C. Maximum tidal range of 3.2 m.
	Biota	Beach supports toheroa and tuatua. Offshore communities of *Nemocardium pulchellum - Venericardia purpurata, Scalpomactra scalpellum - Mactra ordinaria* and *Tawera spissa - V purpurata* have been recorded on sediments ranging from gravelly sands to mud.
4.02 Central BR. NI west coast.	**Hokianga Coast** Tauroa Point/Tauroa Peninsula to Muanganui Bluff.	
	Description	This coastline is characterised by open, exposed sandy beaches interspersed by stretches of rocky platforms, bluffs and outcrops. Two small harbours and the large Hokianga Harbour (treated as a separate unit, see 4.03) break the southward running line of this shore (Herekino - 630 ha and Whangape - 850 ha). Tidal mudflats occupy approximately 50% of each harbour.

		Herekino entrance lies between huge dunes to the north and a prominent spur to the south.. Whangape opens to the sea via a 4 km long, 150 m wide channel bordered by steep hillsides. Two moderately large rivers (Waipoua and the Waimamaku) drain onto the coast.
	Oceanography	The area is influenced by the subtropical north flowing Westland Current and occasionally by the south flowing West Auckland Current. Salinities are between 35.0 and 35.5‰. Sea surface temperatures range between 15-22^{o}C.
	Biota	Toheroa present in low numbers on some of the sandy beaches. Offshore *Scalpomactra scalpellum-Mactra ordinaria* communities have been recorded on sandy substrates. The area is important for birdlife including the New Zealand dotterel, blue penguins, black shags and grey faced petrels. The harbours contain mangrove stands and *Juncus, Leptocarpus and Muehlenbeckia* saltmarsh. Whangape Harbour has some of the tallest mangroves (10 m in height) in New Zealand. The harbours are of considerable wildlife value and are important for birdlife.
4.03 Central BR. NI west coast.	**Hokianga Harbour**	
	Description	The area of the Hokianga Harbour is 11,500 ha, with tidal mudflats occupying approximately 50% of its area. Hokianga Harbour is a drowned river valley and extends well inland.
	Oceanography	The maximum tidal range of the harbour is 3 m.
	Biota	The harbour contains mangrove stands and *Juncus, Leptocarpus and Muehlenbeckia* saltmarsh. Whangape Harbour has some of the tallest mangroves (10 m in height) in New Zealand. The harbours are of considerable wildlife value and are important for birdlife. Hokianga has a small brown teal roost in the Mangamuka arm and high numbers of banded rail and spotless crake.

4.04 Central BR. NI west coast.	**Muriwai** Muanganui Bluff/Aranga Beach to Waikato River Mouth (excluding Muriwae to S. Karekare).	
	Description	This area is characterised by long stretches of exposed sandy beaches, intersected by a section of exposed rocky shore and cliffs (between Muriwai and Karekare), and is interupted by the Kaipara Harbour. The area from Aranga Beach south to Muriwai Beach consists of a uniform stretch of exposed fine grained sandy beaches backed by high foredunes behind which a series of sand waves extend inland. Ironsands occur along much of the coast particularly south of Kaipara Harbour. The Kaipara coast is a high energy shore exposed to the prevailing south-west winds. Rangitira and Muriwai beaches stretch unbroken 48 km down from South Kaipara Head to Otakomiro Point. High energy exposed beach fine black ironsand beaches. Whatipau Beach is the northern exposed tidal delta at the north mouth of Manukau Harbour, forming an extensive area of sand dunes 7 km long and about 1 km wide at the toe of the Waitakere Ranges. South Manukau to Port Waikato is a 20 km stretch of beach composed mostly of ironsands. Off shore sand and iron sand sediments.
	Oceanography	Area is influenced predominantly by subtropical waters of the Westland Current and occasionally by the West Auckland Current. Surface currents are weak and strongly dependant on local winds. Salinities range from 35.0-35.5‰. Temperatures range between 14 and 22^{o}C. Maximum tidal range is 2.9 m.
	Biota	Crustaceans include: seaslater, sandlouse and sandhopper on the upper beach, isopods of families Sphaeromidae and Eurydicidae on the middle beach, and ghost shrimp, paddle crab, mantis shrimp and haustoriid amphipods on the lower beach. Dominant molluscs are tuatua and toheroa. Muriwai Beach contains the only significant population of toheroa in the Auckland Region. Offshore *Scalpomactra scalpellum-Mactra ordinaria* communities have been recorded on sand to mud substrate. Further south off the Waikato coast, *Scalpomactra scalpellum-Mactra ordinaria, Glycymeris*

		laticostata - Venericardia purpurata and Nemocardium pulchellum - V purpurata communities are reported on sandy substrates. Dune vegetation includes silvery sand grass, marram grass, tree lupin, five species of pampas grass *and Muehlenbeckia complexa.* Among the sand dunes, there are areas of swamps and small lakes that support waterfowl and wading birds such as the New Zealand scaup, paradise shell duck, grey duck, pied shag, little shag and little black shag.

Marine Protected Areas

Poor Knights Islands Marine Reserve - established 1981.
Island group located north-east of Whangarei. The waters surrounding the islands are internationally famous for the blend of subtropical and temperate species which can be found there. The reserve has spectacular underwater scenery, such as steep cliffs, caves and archways, and abundant schooling fish.
Area: 1,890 ha. (Statutory Regulation 1981/16).

Mimiwhangata Marine Park – established 1983.
Located north of Whangarei and south of Bay of Islands. Administered by Department of Conservation and Ministry of Fisheries. Area: 2,000 ha.

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Appendix 2 Coastal Unit Checklist

DRAFT
NORTHLAND MARINE RESERVE NETWORK DESIGN PROJECT

Coastal unit checklist standard table

Table descriptor	Instruction	Example
Biogeographic Region	Give the reference number and name of the Biogeographic Region	3. Northeastern Biogeographic Region.
Coastal Unit Number	• Give the reference number and the geographic descriptor • Give the area of the coastal unit in ha	3.07. Karikari Bay/Cape Karikari to Cape Wiwiki (55,192 ha)
Key habitats/natural features	• Give a brief description of the key habitats/features	• Area (i): Indented coastline of exposed rock, cliffs & small sandy bays, offshore reefs & pinnacles, islands of varying size. • Area (ii): Cavalli Islands special feature of the unit. Exposed & diverse habitats, deepwater assemblages, subtropical influence (e.g. fish), spectacular underwater scenery.
Guidelines & checklist for forming recommendations	• Use the design principles for a network that apply (*refer to attached principles) • Identify if habitats/features are representative • Identify if habitats/features are special (unique) • Replicate each habitat at least twice (if representative) • Ecologically self-sustaining – record the elements that apply : 1. Outer boundary 2nm offshore or 100m depth, where possible 2. At least 10% per habitat (may be exceptions for larger areas)	Checklist Y=yes, N=no, O=other; N/A=not applicable: Area (i): • Representative Y • Special (unique) N • Replicated (if representative) O • Ecologically self-sustaining elements number: cont'd 1. Y; 2. Y; 3. O; 4. Y; 5. N Area (ii): • Representative N

	3. Minimum of 5km coastline length, where possible 4. Include sequences of habitat types, where possible 5. Include whole island features, where possible	• Special (unique) Y • Replicated (if representative) N/A • Ecologically self-sustaining elements number: 1. Y; 2. Y?; 3. N; 4. Y; 5. N? (do islets count?)
Recommendation/s	• One or more recommendations may be made per coastal unit • Identify the guidelines that were used to make the recommendation/s	**Rec. 1**: Either minimum of 2 areas that include exposed rock & cliff & sandy bays Or at least 1 area [minimum 10% of unit] with most/all habitats in unit, to 2nm or 100m depth. Priority – Matai Bay/Cape Karikari/Moturoa Is. Area. **Rec. 2**: Area/s at Cavalli Is. that incl. at least the north facing islets.

*** Design principles for a network of no take mpa's (marine reserves):**

- All habitats are represented
- Special (unique) habitats are included
- Habitats are replicated (minimum of two of similar habitat types to enable meaningful comparison. More replicates to safeguard against unexpected failures or collapse of populations).
- Sites are geographically dispersed across each biogeographic region (to provide protection against unexpected failures or collapse of populations in particular locations)
- Sites are ecologically self sustaining

  The site:
  - is of sufficient size to be ecologically functional or contribute to the maintenance of essential ecological processes or life-support systems
  - includes habitat on which species or other systems are dependent
  - preserves genetic diversity

- Network is ecologically self sustaining (sites making up the network are collectively ecological functional. Connectivity of some sites will be crucial to the functioning of the network).
- Precautionary approach is applied (use best available information)
- Sites are permanent (to enable long term changes to be measured and assessed).