COASTAL RESOURCE INVENTORY

FIRST ORDER SURVEY

AUCKLAND CONSERVANCY

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PREFACE

The Coastal Resource Inventory (CRI) programme is an ongoing project of the Department of Conservation. The programme is organized into First, Second and Third Order Surveys which span the coastal zone of New Zealand. The First Order Survey provides the basis for a national overview of coastal conservation values and is derived from information on the physical, biological and human resources of the coastal zone. The Second Order CRI Surveys will provide regional overviews for each of the Departments Conservancies. Third Order Surveys will provide detailed information at a site specific level for a specific purpose.

The coastal zone covered by the Coastal Resource Inventory is an area bounded by the outer limits of the New Zealand Territorial Sea, 12 nautical miles offshore and the landward limit of marine influence. The latter varies from place to place depending on site specific physical, biological and human factors.

The First Order Coastal Resource Inventory presented here covers the coastal zone of one of the thirteen coastal conservancies of the Department. It is based on existing information compiled by conservancy staff from regional and national databases, published and unpublished reports, limited field surveys and personal or anecdotal information from various experts. The information has been compiled according to guidelines and standards set by the Departments' Coastal Resource Inventory Taskforce.

As one might expect, the First Order Survey has revealed a substantial variation in the quality and quantity of information between Conservancies and also between information categories. In general there is more information about the resources and attributes of the landward part of the coastal zone than the seaward part, especially offshore. Conservancies with large metropolitan centres such as Auckland have more information than the remote coastal areas of New Zealand such as the East Coast. This does not mean that the latter areas are lower in coastal conservation values or resources. Rather, it simply reflects the lack of knowledge and possible directions for further work, so that a balanced national overview of coastal conservation values and resources is eventually obtained.

The First Order CRI provides essential information for managers, planners and users of the coastal zone of New Zealand. The national overview provided by the First Order Survey will be updated from time to time by the Department as new information comes to hand.

Bill Mansfield
DIRECTOR GENERAL
DEPARTMENT OF CONSERVATION

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INSTRUCTIONS FOR USE OF THE COASTAL RESOURCE INVENTORY

This folder consists of an introduction, summary, site record forms, and maps. The site record form gives written information on each site and is to be used with corresponding maps for that site.

Read the site record form with its corresponding maps by following these steps:

SITE RECORD FORMS

1. Turn to the site record forms.
2. Find the site number in the top right-hand corner of the page e.g. CRI 01 0001.
   The number 01 represents a conservancy coastline. Refer to map of New Zealand below e.g. 01= Northland Conservancy.
   The number 0001 refers to a particular site e.g. Firth of Thames.
3. Each site record form gives written information on the following:

   natural values, cultural values, historic values } site of conservation value

   existing threats
   human use and modification
   existing protection

4. Letter codes (a,b,c,d,e,f,g) give detail for each part of the information on the site record form. A key is provided on the maps and the codes are listed in the "Methods" section.

MAPS

5. Turn to the map index overleaf.
   The index gives the site number and its corresponding maps.
6. Find the corresponding maps in the second part of the folder.
7. Accompanying the maps are two transparent map overlays:

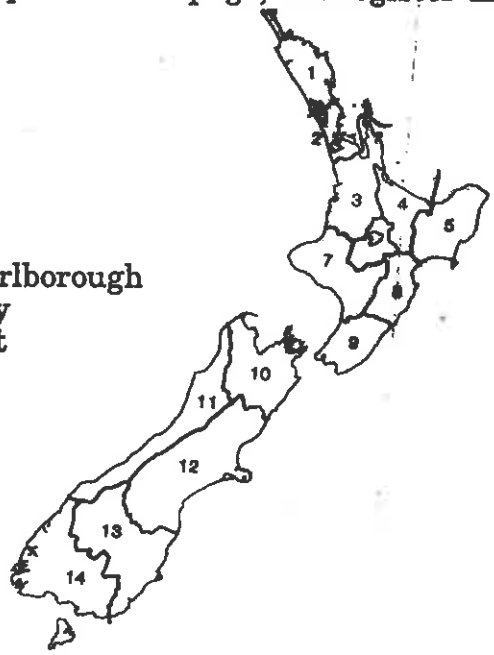
   i) CONSERVATION VALUES overlay
   ii) BASE MAP overlay

8. The BASE MAP and CONSERVATION VALUES overlays are designed to lift out and overlay onto each of the previous pages (i.e. natural, cultural, historic, human modification and use, existing threats, existing protection etc.)
9. To accurately overlay the base map with each page, use register marks which are found on each map.

   i.e. ⊕ overlays on ⊕

DEPARTMENT OF CONSERVATION COASTAL CONSERVANCIES

1. Northland
2. Auckland
3. Waikato
4. Bay of Plenty
5. East Coast
6. Hawkes Bay
7. Wanganui
8. Wellington
9. Nelson/ Marlborough
10. Canterbury
11. West Coast
12. Otago
13. Southland



GLOSSARY

archaeological site	Any place in New Zealand associated with human activity which occurred more than 100 years before that time.
historic place	A place which is associated with the past. This includes archaeological sites, traditional sites, buildings, natural objects and historic areas.
holostratotype	A geological term describing the type section that has become the time definition for a New Zealand stage.
tombolo	A bar connecting an island with the mainland or with another island.
type locality	The place where a geological formation is named, and is typically displayed.
ventifact	Rock cut by wind-blown sand.

BIOLOGICAL TERMS:

endangered	Species in danger of extinction and whose survival is unlikely if the causal factors continue operating. Included are those whose numbers have been reduced to a critical level or whose habitats have been so drastically reduced that they are considered to be in immediate danger of extinction.
threatened/ vulnerable	Species believed to likely to move into the endangered category in the near future if the causal factors continue operating.
regionally threatened	Where species are considered to be threatened regionally.
rare	Species with small world populations that are not at present endangered or vulnerable, but are at risk. These are usually localised within restricted geographic areas or habitats or are thinly scattered over a more extensive range.
indeterminate	This category is used for plants thought to be extinct, endangered, vulnerable or rare, but for which there is insufficient information to allow allocation to a category.

In New Zealand a category additional to those used by IUCN (International Union for the Conservation of Nature and Natural Resources) has been found useful:

local	This category includes plants not under threat but potentially threatened, and hence deserving some level of monitoring and possibly protection. Included are regional endemics, plants of potentially vulnerable habitats, and species occurring as frequent but small populations.

endemic	A species which is confined to New Zealand and is not found elsewhere.
endemic subspecies	A subspecies or geographic race which is confined to New Zealand.
introduced	A species which has been transported to New Zealand, and helped establish by humans.

MAORI	ENGLISH
hāngi	earth oven
hapū	section of large tribe, clan, subtribe
iwi	nation, people; tribe that traces its history back to a common ancestor
kai moana	food from the sea
kāinga	dwelling place, village
kaitiaki	guardian, keeper
Kaumātua	adult, old man or woman
kōhatu/ toka	stone, rock
mātaitai	food resources from the sea
mahinga mātaitai	the areas from which these resources are gathered
mahinga kai	sites for harvesting kai moana according to tribal customary values
mana	authority, control; influence, prestige, power; psychic force
mana whenua	customary authority exercised by a tribe in an identified area
marae	enclosed space in front of a meeting house, courtyard
mauri	life principle which is latent in all things
midden	Māori shell deposits
moana	sea
Moriori	tangata whenua of Rēkohu (Chatham Islands)
pā	fortified place
rāhui	control/ restriction (e.g. fishing control)
rūnanga	assembly/ council
taiāpure	area of coastal water set aside under the Maori Fisheries Act 1989 as a local fishery because of its special significance to an iwi or hapū, either as a source of food or for spiritual or cultural reasons
Tangaroa	god of the sea
Tangata whenua	indigenous people
tapu	sacred, forbidden (tapu consists of different levels of prohibitions)
tauranga waka	original canoe landing site
tupuna/ tipuna	ancestor/ grandparent
urupā	burial place
wāhi tapu	sacred site
waka	canoe; supra-tribal grouping
whānau	family

1.0 INTRODUCTION

1.1 METHODS

The information for the First Order Survey has been collated and mapped in six major categories: natural, historic, cultural, existing threats, human modification and use, and existing protection.

1. Natural Values:

   Information on known areas of physical, biological and ecological value in the coastal zone under the following headings:

   a - High degree of naturalness
   b - Rare/unique species, communities or habitats
   c - Important breeding/feeding/roosting/haulout/nursery areas
   d - Fragile/environmentally sensitive areas
   e - Unique or unusual landforms
   f - Representativeness
   g - Known scientific value
   h - National or international importance
   i - Other

2. Cultural Values:

   Areas of important Maori and non-Maori cultural values in the coastal zone under the following headings:

   a - Traditional values
   b - Aesthetic value
   c - Landscape (seascape) value
   d - Spiritual value
   e - Educational value
   f - Other

3. Historic Values:

   Areas of important historic and archaeological value in the coastal zone under the following headings:

   a - Known historic value
   b - Archaeological value - Maori origin
   c - Archaeological value - Non-Maori origin
   d - Shipwrecks and wreck sites
   e - Known national or international significance
   f - Other

Explanatory Notes

(i) The decision to include the attributes "high degree of naturalness", "representativeness", aesthetic value", "land/seascape value" and "spiritual" value was based on the experience of the data recorder.

The Natural, Cultural and Historic categories of information were combined to form the Conservation Value overlay map, where all features of natural, historic or cultural value were overlaid then amalgamated to form sites of conservation value (Conservation Sites). For each of these sites a brief description was provided on the Site Record Form. The Site Record Form contains details of the conservation values mapped and includes the following three other categories (4-6) that impact on these values:

4. Existing Threats:

Threats may be natural or human induced activities that are or have a history of damage or destruction of the coastal resources. Information on the following was collated and mapped:

a - Erosion, flooding, landslip
b - Siltation
c - Noxious and invasive exotic plants
d - Noxious or farmed animals
e - Water pollution
f - Mining
g - Shore stabilisation works
h - Aquaculture
i - Fishing techniques
j - Spoil and refuse dumping
k - Recreation
l - Coastal subdivision
m - Other

Explanatory Notes

(ii) The inclusion of "recreation", "mining", "aquaculture" and "fishing techniques" in the "Existing Threats" category was only used where these activities threatened conservation values. It is acknowledged that there are many places where these activities do not pose a threat.

5. Human Modification and Use:

Information on the following was collated and mapped:

a - Land development
b - Reclamations and causeways
c - Commercial port areas
d - Small boat harbours and moorings
e - Outfalls, major pipelines and cables
f - Artificial cuts
g - Beach replenishment
h - Shoreland-based recreation
i - Water-based recreation
j - Traditional Maori use
k - Other

6. Existing Protection:

Areas of varying protection status in the coastal zone were mapped, including:

a - National protected areas
b - Regional protected areas
c - Local protected areas
d - Protective zonings
e - Marine parks
f - Private protected areas
g - Voluntary protection of areas
h - Rahui
i - Other

Evaluation Site Importance

Evaluation of site importance was largely species based using the following criteria: The criteria or fauna (Bell, 1986) and flora (Given et al, 1987 and Wilson and Given 1989) are based on the IUCN Red Data list.

1. If a species of plant or animal is listed as endangered and it is an endemic species, then the place(s) where this plant or animal still remain are of INTERNATIONAL importance.

2. If a species of plant is vulnerable or rare, then the site where it naturally occurs is of NATIONAL importance. Similarly if a species of animal is classified as threatened or rare then the site is of NATIONAL importance.

3. For a species of animal that is classified as threatened regionally only, the site has regional importance.

4. Where sufficient information allowed the Ramsar convention was used to determine site importance in Wellington, East Coast and Bay of Plenty. The Ramsar convention states: *"a site is of international importance if 1% of the total population of species or subspecies is found there or if the area supports 1% of breeding pairs".*

5. Other information on site importance from the historic or cultural categories which is documented in the literature was also used.

6. The highest level of importance for any category located within a site is given to the whole site.

Explanatory Notes

(iii) The site importance is not a ranking system for the sites. It merely indicates whether there is a feature present at the site which is of known importance. The Conservation Sites identified in the First Order Survey vary considerable in size and importance.

(iv) Wildlife which have an established international conservation status in New Zealand include the terrestrial mammals, birds, reptiles and amphibians and terrestrial arthropods and molluscs. There is no established status list for fish, marine invertebrates and marine mammals. This means that the assessment of comparative site importance in this survey has an unavoidable bias towards the importance of terrestrial wildlife.

(v) Archaeological site information was presented here without comment on its comparative importance. This was necessary because"

(a) authority to assess archaeological site importance under the Historic Places Act 1980 rests with the New Zealand Historic Places Trust, for the purpose of regulating site damage.

(b) No methodology is recognised for assessing comparative importance in a similar manner applied to the other resources described here.

2.0 AUCKLAND CONSERVANCY CRI- FIRST ORDER SURVEY:

Auckland Conservancy is located in the northern half of the North Island as shown in Figure one.

The Conservancy as shown in Figure two is bounded by the Waikato River and Miranda in the Firth of Thames to the south and a northern boundary that lies at the base of Mangawhai Spit on the east coast and continues across to bisect the Kaipara Harbour through the heads on the west. For the Auckland CRI first order survey, northern conservancy coastal boundaries were extended northwards, to include the whole of the Mangawhai Harbour, spit and highdunes and the entire Kaipara Harbour. The rationale behind this decision focused on the functional relationship these areas have with the Auckland Conservancy, especially with regard to physical coastal processes. Both areas fall within the Northland Conservancy and arrangements were made to prevent duplication of information, for these areas.

The Kermadec Islands group is within the Auckland Conservancy. A base map at a scale of 1:250,000 was not available. Information for the area has been prepared at a scale of 1:1,250,000. The base map is taken from the Navy Hydrographic Chart NZ 22. The different scale is noted on the Kermadecs map.

The coastal zone is broadly defined as the area that extends from the 12 mile territorial limit to inland areas of marine influence. This distance inland varies depending on the information type, for example fauna values were limited to areas where coastal species breed, roost and feed. For historic values the inland limit included sites of historical importance which were influenced by the proximity of the coast or were located nearby.

2.1 Mapping of Information:

Initial consideration of available information for the Conservancy coastal zone necessitated the further division of information being collected in some of the six categories outlined in Section 1.0. Additional overlays were created to handle the wide range of information available. The Natural Values map was divided into:

1.1 Geomorphic Values
1.2 Flora Values
1.3 Fauna Values
1.4 Marine Ecological Values

The Historical Values map was divided into:

3.1 Historical Value
3.2 Archaeological Value
3.3 Archaeological Printout (from NZ Archaeological Association)

Human Modification and Use Map was divided into:

5.1 Land-based Recreation
5.2 Water-based Recreation
5.3 Structures and Fisheries

The division of information within the categories enabled the information to be mapped on separate overlays and thus displayed clearly for ease of use and interpretation.

2.2 Background to Mapping of Values:

Cultural:

Little information has been mapped within the cultural values categories, especially traditional, aesthetic and spiritual. When issues arise or studies are planned in an area then it is important to establish contact with the appropriate people to discuss the spiritual or traditional values of that area. With this in mind, informal contact was made with the various tribes in the Conservancy. Following discussion within the Conservancy office and with members of local Maori tribes it was considered more appropriate that the traditional and spiritual values were not mapped in this first order survey and possibly never. The sensitive nature of the information lends its recording to be carried out and maintained by the kaumatua from each tribe.

Iwi were frequently not prepared to put lines on a map to show tribal boundaries. General opinion was that it was better to show general areas with associated tribes but not boundary lines. Each CRI site sheet includes the name of the tribe associated with the area and the contact person. Contact should be made with them in the first instance if information is required about an area.

Landscape:

Landscape value was assessed by the Conservancy Landscape Architect, John Hawley. The landscape contribution to CRI used the Assessment of the Auckland Region's Landscape prepared by the ARA Planning Department in 1984 (ARA 1984). This study did not, however, cover all the conservancy, notably the northern half of the Kaipara Harbour, Kermadec Islands, Great Barrier and other Hauraki Gulf Islands were not included. The assessment of these areas was drawn from a variety of sources as noted on the site record forms.

The ARA assessment divided the Auckland Region into 633 landscape units comprising areas deemed to have a homogenity of appearance and character. The small units were then grouped to provide representative landscape types. Members of the public were invited to participate in the survey of comparing and rating the 85 landscape types. The results were collated and used to produce the distribution of final values that appear on the landscape quality maps.

The landscape quality was rated from categories 7 to 1.

(7) Outstanding landscape
(6) Highly attractive
(5) Above average
(4) Average
(3) Below average
(2) Unattractive
(1) Very unattractive

For the purpose of the CRI study only landscapes rated 7 to 5 were included. The public survey method to establish landscape quality produced strong preferences for landscapes containing coastlines, large lakes and rivers. The study also indicated biases against landscapes which contain lowland wetlands.

Archaeological:

The archaeological information was prepared by Brenda Sewell, Conservancy Archaeologist. A printout of all archaeological sites in the Conservancy was obtained from Head Office from the New Zealand Archaeological Association (NZAA) register. The register records all the reported archaeological sites in the conservancy, Maps 3.3 show the sites. An assessment of sites with known value has been made by Brenda Sewell based on her personal judgement. Maps 3.2 show sites of known value. The Maori traditional sites are recorded archaeological sites that are considered of traditional value by Brenda. In the preparation of this section Brenda specifically noted that tangata whenua may give an entirely different set of sites based on different values.

Human Modification and Use:

Three of the most common human modifications and uses of coastal areas in the conservancy, namely Harbours Act structures, marine farms and commercial fishing were not included in the human modification and use map categories (a) to (g), therefore these modifications and uses have been labelled:

(k_1) Harbours Act Structures
(k_2) Commercial Fishing Areas and Regulations
(k_3) Marine Farming

Geomorphic, Fauna and Flora:

The geomorphological and fauna information that has been mapped under natural values is limited to that of regional significance and higher. Fauna information was principally taken from the Sites of Special Wildlife Interest (SSWI) database, which for most of the Auckland Conservancy has been updated since 1986. The flora information has the lower limit of ecological district significance (from relevant Protected Natural Area (PNA) surveys). For the first order survey working at a scale of 1:250,000 there was too much information available thus the information portrayed on the maps has already been selectively mapped, and is a summary of existing information.

Marine Ecology:

Information on marine ecology is generally lacking. Information that is available is more difficult to map than land based information as boundaries are difficult to define offshore. Most of the available information is site specific and is focussed on the Marine Reserve at Cape Rodney, portions of the Waitemata Harbour and the nearshore zone of the inner Hauraki gulf. Absent from the information are significance rankings for marine areas. Areas of regional or national significance cannot be readily determined as most of the research carried out has been of a descriptive nature.

2.3 Conservation Overview Sites:

In general the conservation overview sites are large as the categories of information overlapped extensively. In fact almost the entire conservancy coastline is important for its natural, cultural or historic value. In areas where there were few or no natural breaks, decisions have been made to group similar areas together, i.e. the Manukau Harbour is one site. Large sites means the conservation values frequently have to be summarised but at a scale of 1:250,000 this is to be expected.

2.4 Hauraki Gulf - Description of Conservation Values:

When the coast was divided into sites of conservation value it was intended that marine as well as shore-based sites would be written up. The level and type of information available for marine areas was, however, found to be different to that of land sites. The Hauraki Gulf is a very important body of water in the Conservancy for a variety of conservation values. For this reason it was decided to include a brief description of its conservation values because much of the information for this area was not easily mapped.

The Hauraki Gulf is unique among New Zealand's coastal areas. It is associated with the country's most populous region and is situated in an area that has a pleasant warm climate. This has led to it becoming the focus of intensive recreational use, which in turn has led to conflict over the natural resources. At times the conservation values of the area are threatened by factors associated with the sheer population pressure of the area, for examples marinas and intensive coastal subdivision.

Geomorphically the Hauraki Gulf is a large embayment protected to the south west and east and, with the exception of the Barrier Islands, is open to the north and north east.

The natural values of the Gulf are centred on the many estuaries, peninsulas, sandy beaches and islands that make up the indented coastline. These values have been outlined in the various site forms. The values associated with the sub-tidal area are described in this report rather than being mapped. Specific sites have been well researched and described, most notably around the marine reserve at Leigh where the University of Auckland has its research laboratory. Portions of the nearshore and inner gulf including the Waitemata harbour have been the focus of research because of development and the desire for modification. Little information exists to describe the general marine ecology of the Hauraki Gulf but some specific studies have revealed its importance as a breeding, nursery and feeding ground for species such as snapper (*Chrysophrys auratus*) and scallops (*Pecten novaezelandiae*).

Very little information is available which describes the species, communities, habitats and natural process of the Hauraki Gulf let alone studies which make comparisons or assessments of areas.

A simple listing of facts about the Hauraki Gulf, in terms of its physical size and composition fails to convey its importance to Auckland and New Zealand. It is important to note the interaction other sites described in this report have with the Hauraki Gulf. For example, the bird species associated with the internationally recognised wetlands of the Firth of Thames are dependent on the health and vitality of the Gulf waters, as are the oyster (*Crassostrea gigas*) spat catching areas of the Mahurangi Harbour. The seabirds of Rangitoto and Little Barrier Islands feed on schools of small fish as do the whales and dolphins which frequent the Gulf waters.

Some data is available which shows the contribution of the Gulf to Auckland and the nation's recreation and conservation. Boat ownership, recreational fishing and outdoor recreation are important indicators of how significant the coast is to the Auckland Region.

Boat ownership is one indicator of the level of use of the Gulf. In 1970 the number of boats in Auckland was estimated to be 35,000 (ARA 1970). In 1983 this estimate had grown to 60,000 (ARA 1983). By 1990 the number of boats in Auckland could be as high as 80,000, assuming a static growth rate. In addition the number of moorings rose from 2340 in 1970 to 10,800 in 1990, an increase of 360% in 20 years. (These figures are derived from a number of sources held at the Auckland office).

The Ministry of Agriculture and Fisheries (MAF) Recreational Fishing Survey in 1987 found 20% of all reported fishing activity nationally, excluding whitebaiting took place in the Hauraki Gulf (MAF 1987.)

The Auckland Region Council has a network of regional parks which provide opportunities for outdoor recreation. A 1988 visitor survey of these parks showed that 3.6 million visits were made to regional parks over the 1987 calendar year, compared with approximately 2.7 million visitors to the national park system over the same time period. (ARA 1988c).

3.0 CONSERVANCY CONSERVATION VALUES SUMMARY:

Summary statements are provided on the character of the Conservancy coast, for more detailed information site sheets should be consulted.

3.1 Justification for Conservation Value Overlay:

CRI first order survey is based entirely on existing information, collated from several large regional and national databases, published and unpublished reports and also personal information from various experts. The first order survey was given a very tight deadline for completion, so in the Auckland Conservancy no field checks were undertaken. Considerable recent information was already available for most coastal areas which, rather than requiring additional checks, needed summarising for the first order survey. It was considered appropriate that specific areas or issues requiring investigation and research would be targeted in the second order survey.

An extensive source of reference material is available for the Conservancy. The Auckland Regional Council has assembled a large database of information pertaining to the coastal zone, this has been used in conjunction with the SSWI database, Rodney, Waitakere and Hunua PNA information, the Geopreservation database, the Coastal Wetlands Inventory of Auckland and the Wetlands of Ecological and Representative Importance (WERI) database.

Most of the Auckland Conservancy coastline, excluding the Gulf islands and Great Barrier have been subject to a landscape assessment and rated in terms of landscape value and sensitivity. The Conservancy coverage of cultural information is far more limited with little information available on traditional and spiritual values.

The Historic Places Trust and New Zealand Archaeological Association register is available for much of the coast. Large areas of the coast have not been formally surveyed for archaeological sites. No indication of significance or relative value could be given for many areas where archaeological sites are found as the register records location and type of site only.

Shipwrecks around New Zealand have been reasonably well documented through a variety of sources.

Information on existing threats have been collated for most of the coastal zone through field staff, and various personal communications. Human modification and use is very intensive in some portions of the conservancy and information is available on much of the coast. The major areas of existing threats, and human modification and use are noted. Most of the conservancy has a history of ongoing active destruction of the natural (and in places historic) value. In particular a large portion of the east coast has been subdivided. Most of the rest of the coastal zone in the conservancy is backed by pastoral farming.

The major sites of existing protection have been noted around the conservancy coast. Most of the areas already protected are within the categories of nationally and regionally protected areas, protective zoning and marine parks. Most locally protected areas have not been included as the scale of the base maps did not allow accurate portrayal of small areas.

3.2 Conservation Value Summary:

Natural values

The Auckland Conservancy is characterised by urban and rural development. Previous surveys such as those identifyed in the SSWI and the PNA programme note that good representative examples of natural features are now only site specific and dwindling. The publication of "The natural environment of the Auckland Region, a bibliography and inventory" (ARA 1983) by the Auckland Regional Authority was the first major step in the bringing together and assessment of knowledge about the natural environment of the Auckland Region.

Auckland is also characterised by harbours and large estuarine systems. These range in size from the Kaipara (94700 ha) and Manukau Harbours (42000 ha) to the Mahurangi (1120 ha) and Whangateau (640 ha), and in their ecological integrity from the relatively natural state of the lower Firth of Thames (Miranda) to the polluted reaches of the Manukau Harbour and Tamaki River.

Geomorphically the west coast beaches contrast with the protected expanses of the harbours and Gulf. The offshore islands of the Hauraki Gulf provide another set of contrasts, from the unique ecology and geology of Rangitoto, to the human-modified Motukorea (Browns) Island and the far flung isolation of the Mokohinau Islands and beyond to the Kermadecs.

The deposition and erosion of beaches and coasts have given the area its large west coast harbours, behind huge prograded spits. The character of the inner Hauraki Gulf is one of sand and mudstone cliffs and eroded shore platforms. The association of cheniers and gravel ridges at Kaiaua-Miranda are internationally unique. The Mangawhai high dunes and the Whatipu Coast provide good regional examples of sediment movement and deposition.

Of all the marine environments, harbours and estuaries are the most sensitive of marine systems and also the most productive (Knox 1980). With Northland and Waikato we share the kaitiaki of the mangrove (*Avicennia marina* var. *resinifera*) wetland system for the rest of New Zealand.

It is significant to note that the majority of the Auckland Conservancy is made up by twelve ecological districts. To date three of these districts, Rodney, Waitakere and Hunua have been subject to protected natural area survey. These surveys have provided much valuable information in the natural values section.

Cultural values

The people of Auckland, regardless of ethnic background, have cultural affinities with the coast and marine areas. In particular, the tangata whenua have traditional and spiritual ties with the coast and marine areas which continue to be important elements of their lifestyle, not always recognised or appreciated by others.

All parts of the region were occupied and known by generations of maori, extending back perhaps a thousand years. The cultural relationship to the coast was central to their well being and authority. In places, like the Manukau Harbour the degregation and destruction of that relationship has been documented and a focus of public attention. In other areas the relationship has never been fully articulated.

As government agencies incorporate a greater appreciation of the culture of the tangata whenua, and greater sensitivity is shown to the coast, some of these significant areas will be able to have their stories told.

Landscape and aesthetic values are inextricably linked. Much of the coastline of the Auckland area is noted to be of above average, high or outstanding landscape value and, many of the same places are also of high aesthetic value. The distinctive landscapes of the west coast beaches and dunes, the large estuarine harbours, the cliffs and beaches of urban Auckland, the dotted mosaic of the islands in the Hauraki Gulf and the cliffs of Little Barrier Island, Great Barrier Island and the other offshore islands, all add to the landscape splendor and character of the Conservancy. The one thing virtually all the areas of Auckland have in common is a landscape which includes sea or coast.

A distinctive part of this maritime character is the opportunities available for people to both experience the coast and learn from it. Almost every school has a local beach where rocky shore or beach process studies are carried out. There are also several educational facilities around the coast that are used extensively by primary, secondary and tertiary students.

Of special note are the Leigh Marine Laboratory - a world class facility, location and study area; the Motutapu Outdoor Education Camp which builds confidence and awareness in children of all ages, Marine Education Resource Centre at Long Bay, and the facilities of the Miranda Naturalist Trust, where wading birds, marine ecology and the geomorphology of cheniers are all interpreted and accessible.

Historical values

The history of Auckland dates back to about 80 millions years ago, with good fossil and geological evidence present even today. More recently Maori and European occupation has increased the historical significance of the coastal environment. Hauraki means winds from the north, and many canoes came with the winds. The Tainui canoe traversed the Tamaki portage after a voyage from the Coromandel and further afield, to eventually reach

Kawhia. The Waitemata Harbour, surrounded by volcanic cones and full of natural resources must have been a valuable prize, for the tangata whenua changed often over the period up until the early 1800s. Archaeological sites are scattered widely across the Auckland region - more often than not associated with the coast and its abundant resources. The inner Gulf islands show intensive use associated with high populations.

The first pakeha to gaze upon the Hauraki Gulf was Cook in 1769. Timber and flax (*Phormium tenax*) became the next reasons to visit Auckland, with kauri (*Agathis australis*) a much sought after timber. Whalers and sealers soon followed, starting a European tradition of extensive modification and use of coastal resources.

From 1840 and the signing of the Treaty of Waitangi with local Maori at Karaka Bay, Mangere and the Waikato Heads, Auckland became more developed and urbanised. Industrial history is associated with mining, timber production, defence and commerce. Three notable exceptions have been the purchase in 1894 by the Crown of Hauturu (Little Barrier Island) for wildlife protection purposes, the establishment of the Auckland Regional Park system with the passing of the Centennial Memorial Park Act in 1941 and the Hauraki Gulf Maritime Park system in 1967. These have safeguarded some of Auckland's finest coasts and protected both the environment and the right of public access to enjoy the legacy.

Threats

Many of the threats facing the Auckland coast and marine environment arises from human use and interference in the ecological systems. Urbanisation, population increases and lack of understanding of natural systems account for many problems.

Fragile ecosystems such as the extensive dunelands to the north of Muriwai are easily destabilised by human activity such as off-road vehicles, causing blowouts. The same vehicles disrupt the nesting activity of thousands of birds at Papakanui Spit, with drivers frequently ignorant of the degree of damage caused to the birds or the duneland system.

One of the major threats to the coastal zone at present is pollution by plastics, and while it is especially prevalent on Hauraki Gulf beaches and islands, plastics have also been found along large sections of even the most isolated areas on the west coast. A marine debris network, including an adopt-a-beach project has been set up and is being run as a joint venture by Department of Conservation, Royal Forest and Bird Protection Society, Greenpeace, World Society for the Protection of Animals, Society for the Prevention of Cruelty to Animals (SPCA) and the Yachting Federation.

Natural biological values of the coastline are also being threatened through the adverse effects of introduced mammalian predators, such as rats (*Rattus* spp.), mustelids and wild cats (*Felis catus*), which destroy coastal species of birds, lizards and invertebrates. Introduced browsing animals such as possums (*Trichosursus vulpecula*), goats (*Capra hircus*), wallabies (*Petrogale penicillata* and *Macropus* spp.) and rabbits (*Oryctolagus cuniculus*) are also threatening many coastal plant communities. Of major concern in the Auckland Conservancy is the destruction of pohutukawa (*Metrosideros excelsa*) trees in many coastal areas and especially on Rangitoto, Motutapu and Kawau Islands. Removal of this dominant canopy species will have serious implications not only for coastal plant and animal communities but also the natural stability of areas where it occurs with weak and unstable subsoils.

Invasive weeds, especially introduced grasses such as spartina (*Spartina alterniflora*), pampus (*Cortaderia* spp.) and kikuyu (*Pennisetum clandestinum*), represent serious threats to localised areas of coastline by smoothering the natural communities. Of considerable concern is *Spartina* grass which was deliberately planted by a small number of coastal landowners to reclaim intertidal areas. It has since spread to cover increasing areas of the Manukau, Kaipara and Whangateau Harbours.

The mild subtropical climate in Auckland allows these introduced pests and weeds to be active for longer periods, have increased growth and breeding success rates, and thus maximise the adverse effects on their environment.

Human Modification and Use:

With very few exceptions, the Auckland coast is both modified and used. The vast majority of catchments are developed or altered. Beach houses, boatramps, marinas, pipelines, telephone cables, campgrounds, jetties, mooring areas and boats contribute to the often intensive modification of the coastal zone. Figures available estimate that there are well over 3000 structures on the Auckland coastline with approximately 1100 in the Waitemata Harbour; and at least another 300 in the Manukau Harbour. Two major ports are also located here, one in the Waitemata Harbour the other in the Manukau. Being a narrow isthmus with a high population there is considerable dependence on coastal resources for recreation. Although of greater intensity during the summer season, much of the coastline is visited all year round.

As the population increases the urban development reaches coastal areas which were once secluded places for a few holiday homes and beaches. Areas such as the south-eastern and north-western coast of the Manukau Harbour, Muriwai, Orewa-Whangaparaoa area, Waiheke Island, Beachlands and Maraetai are all undergoing rapid residential development. In turn those seeking quiet holiday homes are moving to beaches in the Warkworth area, Great Barrier Island and further afield.

Existing protection

The Hauraki Gulf Maritime Park with its large number of island reserves, and the extensive Auckland Regional Park system encompass significant portions of both coasts and the islands of the Gulf. The islands of Little Barrier, Great Barrier, Mokohinau, Goat and Tiritiri Matangi play an important role in providing protected habitats for many species of plants and animals. The endangered kakapo (*Strigops habrophilus*) survives on Little Barrier Island, far from its last home range in Fiordland and Stewart Island. Rangitoto Island is protected for its geomorphic and botanical significance.

The islands of Motuihe, Motutapu, Browns Island, Kawau and Great Barrier serve to preserve recreational opportunities, as well as landscape, historical and cultural values.

The Regional Park system serves a similar purpose. It protects the environment and contributes to the natural character and recreational life of the region. Some 11,000 ha of land is under Regional Park protection throughout the Conservancy.

There are also many small land-based scenic, scientific, historic and other reserves variously administered by central, regional and local government. Conservation covenants are not common but the concept is gradually becoming more accepted.

The area that has least protection is the marine environment. Within the region there are only three areas where marine life is protected. The Cape Rodney to Okakari Point Marine Reserve, where all marine life is protected, is still the prototype for New Zealand. The Tawharanui Marine Park, administered by the Auckland Regional Council is equally protected. The third site is the Tauhoa Scientific Reserve in the Kaipara Harbour, established specifically to protect mangroves. Other protection of the marine environment is included in fisheries management provisions. Far more protection of the marine environment is needed, particularly in association with existing land protection, to ensure integration of land and water protection.

Conservation overview

The sites of significant conservation value reflect the bias of information available for natural values. A lot less information is readily available for historic or cultural values. This is partly due to the fact that while systems have been developed to analyse, rank and ascribe significance to many geomorphological, floral and faunal types of information, no such system is available for Maori cultural or historic information. Therefore a particular site may be noted for its cultural and historic value but its significance is very difficult to ascertain.

3.3 Areas of Outstanding Conservation Value:

Within this conservancy the entire coastal zone comprising approximately 2877 km of coastline (at 1:250000 scale) is considered to be of great importance for the wide range of values that comprise it. No portion of the coast is without value. Some areas within the coastal zone have already been identified as being of national or international significance. Listed below are sites of conservation value that are of outstanding note. 28 sites within the Auckland Conservancy are of National or International Significance. A further five are of Regional Significance. The terms "endangered" (e), "threatened" (t) and "rare" (r) refer to the conservation status of wildlife according to the International Union for the Conservation of Nature (IUCN) as set out in Bell (1986).

(1) Waikato River Heads - CRI 02 0001: (International) (13.1 km)

The fernleaf, squid shells, belemnites, and ancient bivalve fossils found in the Jursasic mudstone at Port Waikato are of international significance (source: Geopreservation database). The area is also nationally significant due to the presence of breeding bird species - NZ dotterel (*Charadrius obscurus*) (t), variable oystercatcher (*Haematopus unicolor*) (r), spotless crake (*Porzana tabuensis plumbea*), and banded rail (*Rallus philippensis assimilis*) (t) (SSWI).

(2) Waikato River (lower reaches) - CRI 02 0002: (National) (53.6 km)

As a fundamental component of one of the few river deltas in the North Island, the Waikato River delta islands are of major geomorphic significance (ARA 1988b). Large areas of the river contain a considerable number of bird species, in particular waterfowl, (Australasian bittern (*Botaurus stellaris poiciloptilus*) (t), caspian tern (*Hydroprogne caspia*) (t) and North Island fernbird (*Bowdleria punctata vealeae*) (t). These birds breed, feed and roost in the area (SSWI). The combination of these natural resources and the presence of New Zealand's largest eel population indicates that the site is of national significance.

(3) Awhitu Peninsula - CRI 02 0003: (Regional) (36.5 km)

The peninsula has been identified as being regionally significant for its dramatic landscape of coastal cliffs (ARA 1984). Within the peninsula are dotted habitats containing pingao (*Desmoschoenus spiralis*) (r) and *Leptinella* (nationally uncommon) (Wilson and Given 1989), plus Australasian bittern (t), New Zealand dabchick (*Podiceps rufopectus*) (t) and North Island fernbird (t) are found at Lake Pokorua.

(4) Manukau Harbour - CRI 02 0004: (International) (356.5 km)

The harbour has been identified as a natural area of international significance (IUCN 1981). It is a roosting and feeding site of international importance. Many of the birds using this habitat have a high conservation status, including many "threatened" species (wrybill (*Anarhynchus frontalis*) (t), caspian tern, NZ dotterel (*Charadrius obscurus*) (t) and banded dotterel (*C. bicinctus bicinctus*) (t). Rare international waders, up to 50,000 birds in summer and 25,000 in winter, many of them international migratory waders, roost and feed in the area. Within the broader site the Wiri lava cave has national significance as the only Auckland example of such a cave embodying volcanic features in their most perfect form (source: Geopreservation database). The Crater Hill archaeological site contains the most intact archaeological landscape on a volcanic tuff ring in Auckland. (Sullivan 1975, B Sewell pers.comm 1990).

(5) Whatipu Dune Field - CRI 02 0005: (National) (10.9 km)

Whatipu is an association of wetlands, supporting large healthy populations of sand-binding grass and herb fields, soaks and ephemeral lakes/ponds, extensive mobile prograding dunes, coastal cliffs and caves of national importance. The dunefield is the best example of rapid recent sand aggradation in New Zealand and is a nationally significant geopreservation site. It also has breeding, roosting and feeding sites for "threatened" bird species including NZ dotterel, banded dotterel, Australasian bittern, North Island fernbirds and caspian tern (SSWI).

(6) Cowan Point - Te Waha Point - CRI 02 0006: (Regional) (5.9 km)

Within this stretch of coast are three sites of regional significance for their geomorphology - Lion Rock at Piha, the sea caves, arches and blowholes of South Piha, being the best northern examples of these features, and the vertical 100 m chimney sea cave at Mercer Bay, (Geopreservation Database). The marine environment is also significant, being the transition zone from colder to warmer seas, and this is reflected transition zone from colder to warmer seas, and this is reflected in the regionally unique mix of species present. (Irving, P. pers. comm. 1990).

(7) Te Waha Point-Otakamiro Point - CRI 02 0007: (National) (17.6 km)

Andesitic pillow lava has been deposited under water to form a heap of cylindical bodies. The examples at Maori Bay are the best in New Zealand and among the best in the world, they are therefore nationally significant (source: Geopreservation database; Auckland Regional Council 1990b). Also within the site, Lake Kawaupaka is one of the few dune lakes on the west coast of New Zealand which is still completely surrounded by intact native vegetation, a complex association of many uncommon species (Auckland Regional Council, 1990b, D Slaven pers.comm 1990).

(8) Muriwai/Rangitira Coast - CRI 02 0008: (National) (41.2 km)

The dune lakes and associated swamps in this site are variously and individually, rated moderate to high according to SSWI wildlife value, however, as a group they rank as nationally significant (C Green pers. comm. 1990). Among the bird species present on the lakes are NZ dabchick, caspian tern and Australasian bittern, all "threatened" species. The lakes are also nationally significant as a recreational coarse fishery.

(9) Kaipara Harbour Mouth : CRI 02 0009: (National) (37.6 km)

The site represents a major roosting and breeding area for wading birds and waterfowl in New Zealand, and is a habitat for high numbers of "threatened" and "endangered" species. Caspian tern (t), white-fronted tern (*Sterna striata*) and large numbers of arctic migrants nest on the Papakanui Spit. There can be up to 10,000 wading birds at this roost site at any one time, with high numbers of NZ dotterel (t), wrybill (t) variable oystercatcher (*Haematopus unicolor*) (r),, South Island pied oystercatcher (*H. ostralegus finschi*), turnstone (*Arenaria interpres interpres*), fairy tern (*Sterna nereis*) (e) and red-necked stint (*Calidris ruficollis*) (r) present. "Threatened" wetland birds use the Waionui Inlet (Australasian bittern, North Island fernbird). North Head contains a large number of dune lakes, classified as first order by NWASCO (1986), which are excellent habitats for waterfowl, secretive swamp species and lake shag species (SSWI). Also of national significance within this site is the historic Poutu lighthouse (New Zealand Historic Places Trust).

(10) Kaipara Harbour - CRI 02 0010: (International) (806.4 km)

This site is of international significance for its wildlife values, particularly wading bird species (IUCN 1981). Many "threatened" and "endangered" species as mentioned in the previous site CRI 02 009 are present and use the harbour for roosting, feeding and breeding. The site rates as nationally significant for marine ecological values including its role in the life cycle of many fish species such as snapper, mullet, sole (*Peltorhamphus novaezeelandiae*), kahawai (*Arripis trutta*), trevally (*Caranx georgianus*), gurnard (*Chelidonichthys kumu*), skates, rays and sharks. The harbour is a spawning ground and juvenile habitat for these species. It also plays a major role in spat collection for pacific oyster (*Crassostrea gigas*) aquaculture. The historic values within this site are also of national significance. Particular buildings of national significance are Minnesdale House and Chapel at Wharehine, Gittos House at Rangiora, Gittos mission station site at Gittos Point, Kakarea Church at Kakarea and Wrights pottery site at Paparoa (New Zealand Historic Places Trust).

(11) Mokohinau Islands - CRI 02 0011: (National) (24.0 km)

The Mokohinau Islands are characterised by nationally significant fauna. They contain an endangered stag beetle (*Dorcus ithaginus*), several species of petrel, "rare" North Island saddleback (*Philesturnus carunculatus rufusater*), terns and gannets, an unusual species of skink of uncertain identity (possibly a new species), and rare intertidal chiton and subtropical fish species (Creese and Ballantine 1978). A wide range of subtidal marine habitats, renowned for their diversity, are contained in a small area (op. cit).

(12) Mangawhai Harbour - CRI 02 0012: (National) (31.3 km)

The site contains breeding populations of nationally significant "endangered" fairy tern, "threatened" NZ dotterel, banded dotterel, caspian tern and "rare" variable oystercatcher bird species (SSWI). Also of national significance is the Mangawhai transverse dunefield, a regionally rare high dynamic sand dune with very high geomorphic values (Auckland Regional Council 1990a). The historic Double Cottage and Mangawhai Hotel of national significance are also within this site (New Zealand Historic Places Trust).

(13) Lake Tomarata (Pakiri Beach Unit) - CRI 02 0013: (National) (21.0 km)

Lake Tomarata is a dune lake with nationally significant "threatened" Australasian bittern and "regionally threatened" North Island fernbird species present (SSWI). It has high wildlife values, and is a representative lake and wetland complex (ARA 1989).

(14) Little Barrier Island - CRI 02 0014: (International) (23.5 km)

Due to the presence of several "endangered" bird species which breed and nest in the coastal zone and the undisturbed nature of the vegetation, the site is of international significance. North Island kokako (*Callaeas cinerea wilsoni*) (e), North island brown kiwi (*Apteryx australis mantelli*) (t), North Island saddleback (r), North Island kaka (*Nestor meridionalis septentrionalis*) (t), long-tailed cuckoo (*Eudynamus taitensis*) (r), North Island robin (*Petroica macrocephala longipes*) (t), whitehead (*Mohoua albicilla*), pied tit (*Petroica macrocephala toitoi*), stitch bird (*Notiomystis cincta*) (r), black petrel (*Procellaria parkinsoni*) (t), cooks petrel (*Pterodroma cookii cookii*) (c), pied shag (*Phalacrocorax varius varius*) and half the world population of kakapo breed in this site (SSWI). Little Barrier contains the only remaining sizeable unmodified stands of kauri (*Agathis australis*) hard beech (*Nothofagus truncata*) in the northern region, and contains over 400 kinds of native flowering plants and 90 species of fern (Hamilton 1961). The coastline also has outstanding landscape of national significance and very high aesthetic value (J Hawley pers.comm 1990).

(15) Leigh (Cape Rodney) - CRI 02 0015: (National) (16.7 km)

The Cape Rodney to Okakari Point Marine Reserve, is the focus of intensive scientific investigation. Much of the marine ecological information produced on the local coastline, Mangawhai Heads to Takatu and out to the Mokohinau, Hen and Chicken and Little Barrier Islands is of national, if not, international significance (Ballantine pers. comm. 1990.). Of particular importance are maps of the subtidal habitats and features of the marine reserve.

(16) Omaha Bay-Whangateau Harbour - CRI 02 0016: (Regional) (26.5 km)

A number of rare (r) and threatened (t) wading bird species use the harbour, mudflats and sandspit for feeding and nesting; (NZ dotterel (t), variable oystercatcher (r), caspian tern (t), eastern curlew (*Numenius madagascariensis*) (r), and asiatic whimbrel (*N. phaeopus variegatus*) (r)) (Bell 1986). The harbour is also the one of only two natural sites of *Pomaderris hamiltonii* (vulnerable) (Given 1981) in New Zealand. The site is of scientific interest for the association of holocene and integlacial marine deposits (Reid 1978) and a known habitat of the NZ lancet (*Amphioxus* sp.) a primitive "relic" animal (Irving pers. comm. 1990).

(17) Tawharanui Peninsula - CRI 02 0017: (National) (178.5 km)

This area contains a nationally significant marine environment, with a high degree of naturalness (Irving pers. comm. 1990). A resident population of the mado (*Atypichthys latus*) fish is present (Grace, R.V. pers. comm. 1990). Rocky and sand, sub and intertidal habitats representative of north eastern New Zealand are included in the site. The Marine Park on the northern side of the Peninsula is of national significance as one of only two marine areas in New Zealand totally protected against all forms of exploitation.

(18) Kawau Island - CRI 02 0018: (National) (102.2 km)

Kawau Island is characterised by nationally significant historic sites including a coppermine, the pumphouse ruins, the smelting house ruins which is the earliest industrial building in New Zealand still standing, and Mansion House which was associated with Governor Grey (New Zealand Historic Places Trust).

(19) Mahurangi - CRI 02 0019: (National) (126.8 km)

Mahurangi Harbour is of national significance for its oyster spat collection (ARA 1988a). The site also contains nationally significant historic sites, the Wilson Cement works ruin at Warkworth and Scotts Hotel at Scotts Landing, Mahurangi Harbour (New Zealand Historic Places Trust).

(20) Weiti Spit (Whangaparaoa Peninsula Unit) - CRI 02 0020: (International) (59.2 km)

The Weiti River Spits are of international geomorphic significance as a site of major importance to New Zealand and to the South Pacific region as a whole for the study of paleo sea levels. Radio-carbon dating of the spit deposits has been used to construct a sea level curve for New Zealand spanning the last 10,000 years (Auckland Regional Council 1990a).

(21) Tiritiri Matangi Island - CRI 02 0021: (National) (6.9 km)

Tiritiri contains a historic site of national significance, its lighthouse and associated buildings (New Zealand Historic Places Trust).

(22) North Head and Fort Cautley (Long Bay to North Head Unit) - CRI 02 0022: (National) (22.8 km)

The fortification of North Head Historic Reserve and Fort Cautley are historical sites of national significance (New Zealand Historic Places Trust).

(23) Motutapu Island - CRI 02 0023: (National) (39.9 km)

On Motutapu Island are preserved fossil human footprints and dog paw prints in Rangitoto Ash, these are unique in New Zealand and have national significance (source: Geopreservation database).

(24) Rangitoto Island - CRI 02 0024: (International) (24.3 km)

Rangitoto Island is of international geomorphic significance as a volcanic landform. Each stage from the initial colonisation of raw basalt and scoria to the formation of scrub and immature forest can be seen (ARA 1988a). Of national significance are Rangitoto's three lava caves near the summit of the island. These are significant as examples of lava caves freely accessibly to the public (source: Geopreservation database). The island also has outstanding landscape and aesthetic value (J Hawley pers.comm 1990).

(25) Waitemata Harbour - CRI 02 0025: (National) (245.9 km)

This site has many values that are of national significance. The Orakei Greensand is of national scientific importance (Geopreservation database). It is the location of samples collected by Hochstetter and is the type locality of several mollusca and foraminifera described by Karrer in 1864 (Hornibrook 1971). The Kaiwanake Point landslide is also of national significance (Geopreservation database), it is one of the few places where pumice silts exist at sea level. The harbour is nationally important due to its level of use by bird species for breeding, feeding and roosting including many "threatened" species such as the banded rail, NZ dotterel and wrybill. Pollen and Traherne Islands are the most important of the high tide roost sites in the harbour and they also have a high diversity of plant and animal species including several very rare insect species (SSWI).

(26) Waiheke Island - CRI 02 0026: (National) (162.7 km)

The presence of regionally depleted and rare plant species as well as "threatened", and "regionally threatened" bird species highlight Waiheke Island as a nationally significant area (Fitzgibbon and Slaven 1988). Rare plant species include Pingao and the king fern (*Marattra salicina*) (Given, 1981). Bird species include NZ dotterel (t), wrybill (t), variable (r) and South Island pied oystercatcher, banded dotterel (t), Australasian bittern (t), caspian tern (t) and reef heron (*Egreta sacra sacra*) (t). Of particular significance as a wader habitat is Te Matuku Bay, in which NZ dotterel nest on a shell spit (SSWI).

(27) Cockle Bay - CRI 02 0027: (Regional) (29.6 km)

Turanga Creek is of regional significance for the quality and extent of the local flora, (D Slavin pers. comm. 1990) and for the moderate to high numbers of wading birds, including threatened and rare species (C Green pers. comm. 1990).

(28) Wairoa River & Estuary - CRI 02 0028: (National) (39.0 km)

The combination of a good habitat for wader species and the presence of many threatened bird species such as NZ dotterel, banded rail and North Island fernbird breeding in the area make this system of national significance. (SSWI).

(29) Kawakawa Bay to Wharekawa - CRI 02 0029: (Regional) (29.6 km)

The main archaeological sites give this a regional significance (Donovan, L 1975 and 1976), while the geomorphic, marine and flora sites have significance within the ecological district (ARC 1989).

(30) Kaiaua/Miranda - CRI 02 0030: (International) (14.0 km)

Geomorphologically this site is recognised as being internationally significant for the Whakatiwai gravel ridges, the chenier plain and current cheniers on the coastal foreshore at Miranda. In association they are internationally unique (ARA 1987a, ARA 1987b). The area is also internationally significant for the fauna present. The entire site has extensive roosting, and feeding areas for many "threatened" and "endangered" species including the white heron (*Egreta alba modesta*) (e), Australasian bittern (t), caspian tern (t), NZ dotterel (t), reef heron (t), banded rail (t) and banded dotterel (t). At least 56 different species of coastal birds are known for this site (SSWI). The area was recently made a Wetland of International Importance under the Ramsar convention due to its high value for wading bird species.

(31) Kaitoke Swamp, Medlands Beach & Mitchener Road Creek (Great Barrier Island (South)) - CRI 02 0031: (International) (75.2 km)

These habitats have international importance due to the presence of a variety of "endangered", "threatened" and "rare" bird species, which breed, feed and roost in the area. Each of the habitats have large populations of the "endangered" brown teal (*Anas aucklandia chlorotis*), and populations of banded rail (t), spotless crake, Australasian bittern (t) and North Island fernbird (t). Brown teal nest in surrounding shrubland and feed on pasture and beach front (SSWI).

(32) Great Barrier Island (North) - CRI 02 0032: (International) (128.5 km)

Great Barrier Island (north), like Great Barrier Island (south), is internationally significant due to the presence of roosting, nesting and feeding areas for brown teal. Brown teal occur at Port Fitzroy, Mabeys Stream, Whangapoua Estuary, Awana (possibly the best feeding habitat), and at Harataonga Stream. Whangapoua Harbour and associated spit is also nationally significant due to its relatively unmodified state and range of habitats including estuarine, sands, spit, soft and hard shores (SSWI). Great Barrier also has significant landscape value, and is generally considered to be a microcosm of northern New Zealand in terms of its landscape (J Hawley pers.comm 1990), flora (D Slavin pers. comm. 1990) and marine habitats (P Irving pers. comm. 1990).

(33) Kermadec Islands - CRI 02 0033: (International)

Geomorphically this is a site of international significance because of the active volcanoes that constitute part of the island group. It is of international significance due to its global location and thus its place in the marine biogeographic sequence between temperate and tropical climates and for its botanical endemism (Francis 1985). The archaeological site of Low Flat in Denham Bay and the Terraces that have early east Polynesian artefacts are also considered to be of international significance. (New Zealand Archaeological Assocation).

Table 1 below summarises the information presented above in terms of the length of coastline and number of sites recognised as being of international, national and regional importance.

Table 1

Site significance	No. of sites	approx length	% of coast
International	10	1570.7 km	55%
National	18	1178.6 km	40%
Regional	5	128.1 km	5%
	33	2877.4 km	100%

3.4 Quality of Information

It is important to note that for virtually all sites there existed both reference material and a variety of experts prepared to share their knowledge. The extent of the information did vary between the various values (natural, cultural, historic) and the human use, modification and threats information; some sites had information for all categories, some for only one or two.

There are no areas for which information was totally lacking. Indeed, the problem faced in many instances was not which information to include but which to leave out, so as not to completely swamp the inventory. In this respect, the Auckland Conservancy was fortunate for the amount and quality of information available.

4.0 NEW ZEALAND COASTAL POLICY ISSUES:

Within the conservancy, discussion has focused on general guiding principles for New Zealand Coastal Policy as well as specific issues. It is considered that those involved with CRI should interact closely with people writing the New Zealand Coastal Policy. The draft guiding principles which the conservancy considers most important are:

Public Ownership and Access:

The maintenance of the public ownership of the coastal zoning including foreshore, seabed and estuarine waters is fundamental to the perception and values which the public place on that resource.

New Zealand has enjoyed a tradition of free public access along the coastline and over coastal waters. The continuation of this tradition (right of access) is seen as fundamental to future coastal management in New Zealand. While in some areas access along the coastline is restricted by natural features and conditions, access should only be intentionally restricted in the interests of public safety or where unrestricted access threatens important conservation values.

The sole right of use of that area by way of lease or licence must be considered a privilege, and can only be considered if the benefits of that proposal to New Zealand are greater than the benefits derived from maintenance of that area in public ownership.

Natural Character:

The natural, physical and cultural features of the coastal environment form the basis of the values which New Zealand society places on that resource. It is therefore essential that these values and hence the character of the coastal environment is maintained so as not to limit the values/options of future generations.

Integration of Coastal Land and Waters Planning:

In many areas activities on land can potentially have a substantial impact on the coastal marine environment. Some users of coastal waters in turn may have an impact on people's use and enjoyment of coastal land. The physical processes operating in coastal waters may also limit the way in which coastal land may be used. For these reasons integration of land use planning and coastal management is essential. District Schemes and regional and coastal plans should be written to facilitate this integration. New Zealand Coastal Policy is an important mechanism for achieving this integration also. Regional policy statements and regional plans will also play an important role.

Sustainability:

Management of the coast must recognise the importance of:

(i) maintaining the healthy functioning of coastal ecosystems and their intrinsic values.

(ii) maintaining the ability of the coastal environment to meet the needs of future generations.

Sustainable (Conservation) Management:

The New Zealand coast and coastal waters must be managed such that the natural character of that area is maintained. This does not preclude use of an area so long as that use is sustainable and that it does not degrade the natural character of the coastal environment. The Resource Management Bill is specific to include historic and cultural values of the coast and it is expected that the New Zealand Coastal Policy will take account of these values.

Tangata Whenua:

The values placed on the coast by the tangata whenua must be recognised and taken account of.

The coastal environment has special cultural and spiritual significance for the tangata whenua. The regional coastal plans must take into special account the requirement for protection of those sites of special significance to the tangata whenua, including waahi tapu, tauranga waka, mahinga maataitai, and taonga raranga.

More specific issues that the New Zealand Coastal Policy should address include:

Private Structures:

The proliferation of private structures, e.g. jetties. Many of the coastal areas around Auckland are already crowded with privately owned structures licensed under the Harbours Act. A policy discouraging this privatisation of the foreshore and seabed is required.

Illegal Structures:

There are several hundred structures, especially in the Waitemata, Manukau and Kaipara Harbours that have never been licensed under the Harbours Act. A policy on the most appropriate course of action is required.

Sand Extraction:

Criteria and EIA requirements need to be developed in policy so the appropriateness of sand extraction in the coastal zone as opposed to land based sources can be assessed.

The need for research on physical coastal processes and thus sustainability of extraction operations also has to be addressed in policy.

Conflict Between Uses:

In certain areas, especially over the summer months conflicts arise between recreational use and the conservation values of an area. The conflict is mainly caused by population pressure and a lack of integrated management of land and water areas. A policy is required on how best to resolve the issue.

Protection of Marine Areas:

The protection of marine areas must be carefully assessed. Education of the public about the significance of the marine and coastal environments must also be considered. The role of marine reserves or marine protected areas must be addressed in policy.

Private Land Ownership:

At various places throughout the Conservancy surveyed private property titles extend down to high water mark or even mean low water mark. This contrasts to most titles that only extend to mean high water ordinary spring tide. Policy needs to consider the best way to manage the portion of intertidal land that is not under Crown ownership. With the possibility of sea level rise this problem could become more widespread.

Protection of Mangroves:

Auckland has many areas of good quality mangroves. Mangrove estuarine systems are one of the most ecologically productive of all natural systems. Mangroves traditionally have a history of abuse, frequently being sites of refuse disposal or reclamations. Policy is needed to ensure protection of these areas from continued abuse and disturbance.

Water Quality:

Some marine portions of the conservancy experience high water pollution from industrial and agricultural sources. Policy on maintenance of high water quality standards are required.

Marinas:

The Auckland Conservancy already has several large marinas, mostly centred around the metropolitan area. Policy on the justification and demand for more marina berths is required along with environmental standards so the effects of such complexes can be monitored and mitigated.

Plastic Pollution:

The entire conservancy coastal zone is under threat from plastic debris. Policy is required on the disposal of waste, particularly plastics and on recyclable and bio-degradable products. Commitment must be given that New Zealand will be part of any international effort on the reduction of plastic production for packaging etc.

Tourism:

This activity is likely to be one of the largest money earners for the Auckland area in the future. In order to protect the coastal and marine environment, which attracts so many of the visitors to the region, a holistic approach to management of resources is essential. Policy must recognise that all parts of coastal management must be integrated to maintain the high values of much of the coast.

Quality Information:

After regional coastal plans have been written, regional councils will have the primary role of coastal management. Policy should stipulate that standard information systems should be set up to enable the collection of comparable information on coastal resources throughout New Zealand. Such information will allow better management of the coastal zone.

5.0 CRI SECOND ORDER SURVEY

Throughout the collation of information for this exercise the Auckland Regional Council has provided us with valuable resources and discussion. Towards the end of the exercise a meeting was held with staff involved in regional and maritime planning and the Harbours section of the Regional Council to discuss priorities for the next stage of CRI. The following list of general items were discussed. A further definition of many of the items will be required before the second order survey can begin, however the list will provide direction.

1. Update the conservancy database which has been set up at a scale of 1:25,000. A lot of information has been amassed over a very short space of time for the first order survey. It was not necessary to use all of the information for the first cut so it is imperative that all information be recorded on a database at a scale more appropriate for day-to-day conservancy management.

2. There are several types of information, from existing sources that need to be gathered as a priority. They include information relating to Section 58 strips, esplanade reserves, paper roads on the coast plus areas of the foreshore and seabed in private ownership. These information needs have already been identified within the conservancy.

3. Within the national context an appropriate database for storage of CRI information must also be developed and established as soon as possible.

4. Priority areas of second order survey are as yet undetermined but will be a combination of areas where relatively little information is available, e.g. Kaipara Harbour, and areas subject to development pressure. Development pressure is frequently intense in Auckland. It is hoped that by targetting areas likely to be subject to development pressure proactive conservation measures can be introduced.

5. Offshore marine areas - further assessment of existing literature, needs to be carried out. The potential amount of information able to be collected on marine areas is very extensive, it may be more appropriate to focus attention on information collection in association with MPA investigations.

6. Information that will help specific coastal policies will need to be collected. It is likely that when the transitional policies are released they will help identify information needs e.g. the sand and shingle extraction policy may identify that more physical process information is required to fully assess applications to remove material.

7. Recreational study: there is an urgent need for an update of the outdoor recreation studies carried out in 1970, particularly related to use of the Auckland coastline and marine areas. Recreational activities both land and sea-based are important to the character of Auckland and contribute significantly to both the cultural and economic wellbeing of the region.

8. Maori liaison and contacts need to be consolidated. Participation by the tangata whenua in the coastal management and conservation process needs to be encouraged and facilitated.

9. Databases: computing compatibility between DOC and regional councils should be assessed.

The general aim for second order information collection is that research done by DOC and regional councils in particular will compliment each other. In Auckland there is an understanding between these bodies that coastal management will be a co-operative venture and so duplication of information is of benefit to neither party. Other organisations such as MAF and DSIR need to be encouraged to participate in CRI so that information can be shared between all agencies associated with coastal research and management.

Further communication between this Conservancy and the Auckland Regional Council will enable clarification of which topics are the most important and which each organisation will carry out. It is anticipated that CRI will become an integrated component of coastal zone management for both organisations.

6.0 CONCLUSIONS:

The primary mission for CRI was to provide information for the maintenance, enhancement and restoration of the natural character and qualities of coasts and their sensitive use. The completion of the first order CRI has been the first step in meeting that goal. The specific tasks that were established at the beginning of the exercise of being able to identify coasts with various conservation values, uses, threats and protection has also been accomplished to the level of detail possible working at a scale of 1:250,000. The main aim of the exercise now is to facilitate the use of this information by the people developing New Zealand Coastal Policy, by regional councils preparing regional coastal plans, by local councils and by conservancy staff. If this is done effectively good coastal policy will be written to guide future coastal management in New Zealand. Regional councils will also be able to prepare and put into operation coastal plans that are sensitive to the many natural, cultural and historic values of the coastal zone.

The first order CRI survey will be of use to a wide variety of organisations but it must be remembered that it is only the first step in a co-operative, co-ordinated approach to coastal management. It is imperative that further research is begun quickly in the coastal marine zone and stage two of CRI, the second order survey, is implemented as soon as possible.

Felicity Fahy
Paul Irving
Sian John
AUCKLAND CONSERVANCY

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Site Record Forms

Site Name/s: Waikato River Heads	Site No: CRI 020 001
Recorders Name: Felicity Fahy	Conservancy: Auckland
Map/Grid Ref: R13 26630 64225	Date: 12.03.90

Brief Description of Site:

The Waikato Heads form the mouth of this the largest river in the North Island. The Heads area is continually changing, at present a large flat sandspit extends about 3 km northwards from the South Head, Port Waikato area. At times an island is formed in the mouth. The northern bank of the river, planted in exotic *Pinus radiata*, is steadily being eroded away causing continual loss of Waiuku State forest land.

The vegetated margins of this area are made up of sedges, rushes with pingao (*Desmoschoenus spiralis*), *Spinifex hirsutus* and marram grass (*Ammophila arenaria*) binding the sand areas with lupins (*Lupinus arboreus*) on drier areas.

There is also a small area (1 ha) of a fairly mature wetland system. Raupo (*Typha orientalis*) is dominant with some cabbage trees (*Cordyline australis*) and flax (*Phormium tenax*) also present. The raupo grades into sedges with a rush border.

The area is used by many forms of land and water-based recreation. One such form of this recreation, trail bike and dune buggy riding, is causing substantial damage to the dunefields and threatening wildlife habitats. The aea is otherwise sparsely populated.

Conservation Values: Natural: b,c,e,g,h Cultural: a Historic: b,c,d

Comment:

Natural: The oldest rocks at Port Waikato are Jurassic mudstone. This series of mudstone beds contain numerous fossil sites. Near the beach the rocks have notable fern leaf traces - fossils of international interest; there are also the cigar-shaped fossil squid shells, belemnites and ancient bivalves including the shells of a giant mussel *Inoccramus* (source 1).

The sandy areas of this site are breeding grounds for the NZ dotterel (*Charadrius obscurus*) & variable oystercatcher (*Haematopus unicolor*). Banded rail (*Rallus philippensis assimilis*) feed and roost on the mangrove (*Avecinnia marina* var. *resinifera*) and rush-reedland areas on the river banks just up from the mount. The spotless crake (*Porzana tabuensis plumbea*) has also been reported in the river mouth area. The former three species of birds are "threatened" species (source 2). Twenty-two bird species in total have been recorded. Many species of coastal wading birds utilise the intertidal feeding grounds and at least three shag species use the river waters as an important feeding ground. There is also a moderate size colony (66) of white-fronted terns (*Sterna striata*) that nest on the sand dunes.

Historic: There are six recorded shipwrecks within this site, that were all stranded and wrecked on the river mouth bars and spit within the period 1832-1883 (source 7). This area has a wide range of archaeological sites including Pa, undefended settlements, individual middens, burials, stone structures, an early mission station and 1860 land war sites. This assemblege represents Maori occupation although it probably was not dense in the prehistoric or historic period. The sand dunes at the northern mouth of the river were used as burial grounds and are of great importance to Ngati Te Ata. There is also a Mission station on the southern bank of the river. (Sources 3-6).

Cultural: The burial grounds noted above are of traditional value (B Sewell pers. comm. (1990)).

Site Importance: International National Regional Local Unknown

Comment:

The fossils found in the Jurassic mudstone are of international interest (source 1). The site is of national significance for the many threatened species present, especially as several breed at the site (source 2). The Waikato river and mouth is the primary physical feature of the area and is regionally important (source 8).

Existing Threats: c,f,k

Type & Comment:

This area is affected by seed stock from the adjacent forest and is prone to the establishment of lupins, marram, pines and pampas (*Cortaderia* spp).

The mining of ironsand on the northern side of the mouth has a high visual impact on the flat valley floor, and it may also be damaging archaeological sites in its vicinity.

The area is used for many different forms of recreation. Dune buggies and motorbikes are frequently ridden in the area, this has caused damage to the habitat and destroyed bird nests.

Human Modification and Human Use: h,i

The site is used for several different types of shore based recreation including walking, orienteering, horseriding, picnicking and fishing. As previously mentioned it is also used for off-road riding of motorbikes and dune buggies. People also go boating, swimming and whitebaiting around this area. There is only one jetty, located on the southern side of the mouth.

Existing Protection: a

Type & Comment:

There is no general protection of the heads, however, the coastal strip around the northern mouth area of the river is DOC estate.

Availability of Information:

Natural	1 2 3
Cultural	1 2 3
Historic	1 2 3
Threats	1 2 3
Human Mod. & Use	1 2 3

1. Well documented
2. Limited information (general)
3. Little information (if any)

Comment:

Generally limited cultural information but well documented landscape assessment. Historic - within surveyed areas site knowledge very good, outside surveys knowledge minimal.

Sources of Information:

Natural	1 2 3 4 5 6 7	1. Derived info. from existing literature & databases
Cultural	1 2 3 4 5 6 7	2. Derived info as above & field check
Historic	1 2 3 4 5 6 7	3. Derived from existing maps & aerial photographs
Threats	1 2 3 4 5 6 7	4. Recent DOC survey including sampling & analysis
Human Mod. & Use	1 2 3 4 5 6 7	5. Recent DOC survey excluding sampling & analysis
		6. Experience
		7. Expert opinion

Comment:

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Recorded on Existing Databases:

1. WERI - No
2. SSWI
3. PNA - No
4. Geopreservation - No
5. HPT County Inventories - No
6. Other - ARA (1984). An assessment of Auckland Region's Landscape. ARA, Regional Planning Department.
7. None

Comment: Waikato river mouth gr. R13 26620 64230 SSWI ranked: High.
Raupo swamp gr. R13 26626 64218 SSWI ranked: Moderate
SSWI sites surveyed in 1982.

Other Considerations:

The mouth of the Waikato River forms part of the boundary between the Ngati Te Ata tribe to the north and Ngati Tipa tribe to the south. The contact people for these tribes are Alec Kaihau, Waiuku, and Carmen Kirkwood, Huakina Development Trust respectively.

At Port Waikato approximately 50 Maori chiefs signed the english version of the Treaty of Waitangi in 1840.

Accompanying Maps and Photographs:

Site Name/s: Waikato River (lower reaches)	Site No: CRI 020 002
Recorders Name: Sian John	Conservancy: Auckland
Map/Grid Ref: R13 26690 64300	Date: 12.03.90

Brief Description of Site:

The Waikato River from Mercer downstream to Port Waikato is generally a broad and gently meandering waterbody characterised by elongated low-lying deltaic islands in its lower reaches, and bounded by a defined river valley surrounded by hills further inland. The river is made up of sandbars, islets, broad braids and channels, with the last 5km typically being deeper than the rest of the river channel, and confined between the stablished sand dunes of Port Waikato. Generally, areas of flat land under pasture and exotic willows (*Salix* spp.), alder (*Alnus incana*), and silver poplar (*Populus alba*) remnants alternate with steeper hills and gullies under regenerating native kahikatea (*Podocarpus dacrydioids*), pukatea (*Laurelia novae-zelandiae*), puriri (*Vitex lucens*), and cabbage tree (*Cordyline australis*). The river delta islands reflect the dynamic processes and hydrological characteristics of the river and are vegetated by significant stands of kahikatea. The vicinity of the delta islands is also characterised by large areas of wetland. Thus while the drier areas have a subcanopy and shrub tiers of native shrub species, the wetter areas have a coverage of raupo (*Typha orientalis*), rush and sedges, with large banks of waterweed in places.

The area has a "largely agricultural setting" with only a few isolated incidences of development, with the bulk of the landscape being in pasture. The remaining undeveloped vegetation stands of the site have also been much modified by the introduction of exotics. The landscape of the river valley is substantially altered for commercial production (including farming, power stations, mining operations, etc.).

Recreational use of the site is not high, with the exception of traditional fishing.

Conservation Values: Natural: b,c,e Cultural: c Historic: b,c

Comment:

Natural: The elongated low-lying islands of the river delta were formed as the sediment-carrying capacity of the Waikato River diminished. They represented an important component of one of the few river deltas in the North Island (source 1).

The most important fauna species present include Australasian bittern (*Botaurus stellaris poiciloptilus*) and Caspian tern (*Hydroprogne caspia*), both are "threatened" species (source 2). Bittern breed in the thick raupo and *Scirpus* swamp, and Caspian terns feed and roost on the river. Thirty-one species have been recorded as inhabiting the river and its associated swamp and shore vegetation, including a very high number of waterfowl. N.I. fernbird (*Bowdleria punctata vealeae*) have also been noted in the more thickly vegetated margins.

A few of the deltaic islands are characterised by kahikatea, totara (*Podocarpus totara*) forest cover, and have significance as the only forested islands in the Waikato.

The marine environment is locally important as the channel to the sea for the whitebait (*Galaxias* spp.) of most of the Waikato Valley, and as New Zealand's largest eel (*Anguilla* spp.) fishery, providing up to 25-30% of the National catch. (Source 4)

Cultural: The site contains stretches of highly attractive landscape, with above average landscape scores of 5 and 6 in a range from 1 to 7 (source 5).

Historic: The site contains Maori archaeological stone structures on the northern banks of the river south east of Tuakau, and the Alexandra Redoubt (see Map 3.6, Historic Value Map 3.2, sites 51 & 52), both of which are of regional significance and indicate the presence of Maori occupation in this area (source 3). More generally the range of occupation sites include pa, undefended settlements, middens, burial sites, and sites of the 1860 land war. Maori occupation was not dense, however, in either the prehistoric and historic periods (NZAA Site Surveys).

Site Importance: International **National** Regional Local Unknown

Comment:

As a fundamental component of one of the few river deltas in the North Island, the Waikato River delta islands are of major geomorphic significance (source 1). Large areas of the river contain a considerable number of birds, in particular waterfowl and several "threatened" species in good numbers (source 2). The combination of these natural resources and the presence of New Zealand's largest eel fishery (source 4) determines that the site is of national significance.

Existing Threats: a,c,d,e,f,j,m

Type & Comment:

Sand extraction and quarrying has a high visual impact on the flat valley floor.

The area contains invasive exotic plants (e.g. pampas (*Cortaderia* spp.)).

Runoff from developed land in the catchment is affecting the water quality of the site, as is the discharge of treated effluent from the Tuakau oxidation ponds.

Cattle often graze down to the waters edge, destroying the river-shoreline habitat.

A water purification plant poses a threat to the Tuakau stone structures due to its proximity.

The area floods seasonally, with flooding becoming more pronounced in the last 30 years due to increased clearance of the catchment.

The discharge of heated water, from the Huntly Power Station, into the river adds to production and eutrophication. Water withdrawal from the river also occurs (NZ Steel, Waiuku) and adds to the disruption of the natural system.

Human Modification and Human Use: a,h,i,j

The vegetation of the area is highly modified, introduced crack willow (*Salix fragilis*) and gray alder dominate large stretches of the river bank and adjacent wetlands. Much of the surrounding land area has been developed into farmland, and has therefore undergone modification by stock and farm practices.

Several mining installations have a high visual impact on the landscape.

Some land-based recreation occurs in association with the wetlands, for example, bird watching. Water-based recreation includes whitebaiting and fishing (up to 1000 whitebaiters use the river in a season).

Traditional Maori uses include whitebaiting, grey mullet (*Mugil cephalus*), and eel fishing.

Existing Protection:

Type & Comment:

This site has no protection.

Availability of Information:

Natural	1 2 3
Cultural	1 2 3
Historic	1 2 3
Threats	1 2 3
Human Mod. & Use	1 2 3

1. Well documented
2. Limited information (general)
3. Little information (if any)

Comment: In the cultural sections, while the information base is very general in most cases, landscape value is well documented.

Sources of Information:

Natural	1 2 3 4 5 6 7
Cultural	1 2 3 4 5 6 7
Historic	1 2 3 4 5 6 7
Threats	1 2 3 4 5 6 7
Human Mod. & Use	1 2 3 4 5 6 7

1. Derived info. from existing literature & databases
2. Derived info as above & field check
3. Derived from existing maps & aerial photographs
4. Recent DOC survey including sampling & analysis
5. Recent DOC survey excluding sampling & analysis
6. Experience
7. Expert opinion

Comment:

Sources:

1. ARC unpublished document - "Landforms" (M. Hilton).
2. Bell, B.D. (1986). The Conservation Status of NZ Wildlife. Wildlife Service Occasional Publication No. 12.
3. Lawlor, I.T. (1988). Preliminary Archaeological Survey of proposed schemes. ARA future Bulk Water Supply Study Phase 4. Background Report No. 55.
4. MAFFish (1989). Effects of commercial fishing on the fisheries of the Manukau Harbour and Lower Waikato River. MAFFish North Auckland March 1989.
5. ARA (1984) An assessment of Auckland Region's Landscape. ARA Regional Planning Department.

Recorded on Existing Databases:

1. WERI - No
2. SSWI
3. PNA - No
4. Geopreservation - No
5. HPT County Inventories - No
6. Other - (a) ARA (1984) An assessment of Auckland Region's Landscape.. ARA Regional Planning Department.
7. None (b) NZAA Site Surveys.

Comment: SSWI Survey 1982, Ranked: High.

Other Considerations:

The regional importance of the river delta islands should be recognised, and research on the physical characteristics of the area encouraged to identify its precise ecological value (M. Hilton, ARC).

This site falls into the tribal boundaries of the Ngati Te Ata, Ngati Tipa, and Ngati Tamaoho. The
contact people for these tribes are: Alec Kaihau, Waiuku; Carmen Kirkwood, Huakina Development Trust; and Barney Kirkwood, Huakina respectively.

Accompanying Maps and Photographs:

Site Name/s: Awhitu Peninsula	Site No: CRI 020 003
Recorders Name: Sian John	Conservancy: Auckland
Map/Grid Ref: R12 26542 64410	Date: 13.03.90

Brief Description of Site:

The Awhitu Peninsula represents a stretch of straight unbroken sandy shoreline 20 kms long backed by steep marine cliffs, cut from consolidated (kaihu) sediments, 50 to 100 metres high. In the north the terrain is deeply dissected and elevations reach 200-300 metres, while both elevation and the degree of dissection decreases to the south. The coastline is indented only by gullies or "gaps" caused by spring-head sapping in unconsolidated sediments. The soft-coast is characterised by two dune groups, with the more recent belt overlying the older dunes on the cliff tops (source 6).

Pingao (*Desmoschoenus spiralis*) is scattered throughout the site, with the coastal cliffs containing good and extensive flax (*Phormium tenax*) communities. The site also contains an important area for New Zealand's wildlife, Lake Pokorua, within which a number of threatened species feed and breed.

The site remains essentially unmodified although farming is the predominant landuse type landward of the site. Recreational use is popular but normally light. The major threats to the area stem from adjacent landuse practices.

Conservation Values: Natural: b,c,e Cultural: c Historic: b,d

Comment:

Natural: The cliffs and adjoining gullies and coastline are predominent West Coast landforms of high scenic and geological value (source 4). They record a period of rapid erosion of the landmass at the climax of the last major marine transgression. In the north the coast comprises cliffs 50 to 100 metres high in largely unconsolidated sediments. In its middle portion the peninsula is characterised by an incipient and discontinuous foredune banked up against the cliffs, which decreases in height towards the south. In the south a continuous series of Holocene dune ridges, widening southwards, dominate the landscape. Overall the site has shown significant post-glacial growth to become a relatively permanent and important feature of the Auckland landscape (source 5).

Excellent flax fields are scattered along the beach hillslopes, and pingao (a "rare" species) is present on the beach sediments. Kariotahi Beach has the only Auckland record of a species of *Leptinella* which is nationally uncommon (source 1).

Lake Pokorua, a large lake wetland system (75% open water, 15% raupo (*Typha orientalis*), and 10% reeds and rushes), is characterised by the "threatened" species Australasian bittern (*Botaurus stellaris poiciloptilus*) and NZ dabchick (*Podiceps rufopectus*) and is an excellent N.I. fernbird (*Bowdleria punctata vealeae*) (regionally "threatened") habitat (source 2). These bird species feed, breed and roost at this site. The lake area is also characterised by a good variety of waterfowl, including NZ shoveler (*Anas rhynchotis variegata*), NZ scaup (*Aythya novaeseelandiae*), paradise shelduck (*Tadorna variegata*), and black swan (*Cygnus atratus*), and several shag species (black (*Phalacrocorax carbo novaehollandiae*) and little shag (*P. melanoleucos brevirostris*)). Some coastal species, White-fronted terns (*Sterna striata*) and black backed gulls (*Larus bulleri*), also use the lake.

Cultural: The site has an above average landscape quality score of 5 on a scale of 7-1 (source 9), due to the expanse of ocean, boiling surf, black sand, cliffs, wind, light and wilderness qualities of the area.

Historic: The area was traditionally exploited by the Maori people for its coastal resources, while living sites were typically further inland. At the northern extent of the site/peninsula burial areas are apparent (sources 3 and 7).

Six ships were wrecked along the peninsula between 1865 and 1981. (Source 8)

Site Importance: International National Regional Local Unknown

Comment:

The coastal cliffs of Awhitu are an important component of Auckland's regional landscape (source 4), while the site contains "threatened" faunal species (SSWI) (and a good variety of other bird species), and "rare" flora species (source 1). The site also represents a regionally significant landscape site (source 9).

Existing Threats: a,c,d,m

Type & Comment:

Stock graze (pastures) right down to the border of Lake Pokorua, and some runoff occurs from the pasture catchment. Stock also grazes the coastal strip of the peninsula.

The area has a high sensitivity rating (7) due to its natural character, highly visable cliff-face, small scale native vegetation cover and erodable soils.

An annual cycle of deposition and erosion occurs along the cliffed shoreline, threatening farmland.

The southern portion of the peninsula is affected by seed stocks from the adjacent forest, and therefore, is prone to the establishment of lupin (*Lupinus* spp.), marram grass (*Ammophila areneris*) and pine (*Pinus* spp.) seedlings.

Proposed alternatives to the Auckland Sewage Disposal Options include piping sewage through Cochran's and/or Hamilton's gap.

Human Modification and Human Use: h,i,k

Walking is a popular recreational use of the whole peninsula, while at its southern end surfing, swimming and some motor cycle riding occurs. At Kariotahi a surf club has been established.

The peninsula coastline remains essentially unmodified.

Existing Protection: a

Type & Comment:

Most of this site has no protection, however, it does contain four sand dune or cliff pieces of DOC estate (in total covering an area of 97.1 hectares) due to the presence of burial grounds (source 3). Lake Pokorua Conservation Area is 1.5 ha around the lake.

Availability of Information:

Natural	1 **2** 3	**1. Well documented**
Cultural	1 **2** 3	**2. Limited information (general)**
Historic	**1** 2 3	**3. Little information (if any)**
Threats	1 **2** 3	
Human Mod. & Use	1 **2** 3	

Comment:

Fauna and geomorphic information is reasonably good in the 'natural' category, but flora information is poor. In the 'cultural' category while landscape information is good little other information is available.

Sources of Information:

Natural	**1** 2 3 4 5 **6** 7	**1. Derived info. from existing literature & databases**
Cultural	**1** 2 **3** 4 5 6 7	**2. Derived info as above & field check**
Historic	**1** 2 3 4 5 **6** 7	**3. Derived from existing maps & aerial photographs**
Threats	**1** 2 3 4 5 6 **7**	**4. Recent DOC survey including sampling & analysis**
Human Mod. & Use	**1** 2 3 4 5 6 7	**5. Recent DOC survey excluding sampling & analysis**
		6. Experience
		7. Expert opinion

Comment:

Sources:
1. Wilson, C.M. and D.R. Given (1989). Threatened Plants of NZ. DSIR Publishing, Wellington.
2. Bell, B.D. (1986). The Conservation Status of NZ Wildlife. NZ Wildlife Service, Occasional Publication No. 12.
3. Hayward, B.W. and J.T. Diamond (1984). Prehistoric Archaeological Sites of the Waitakere Ranges and West Auckland, NZ, ARA.
4. ARC unpublished report "Landforms" (M. Hilton)
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7. Goodwin, J.W. (1984). Modification and utilisation of landscape : A study of Human Activity in the Awhitu Peninsula. Unpublished Research Essay. Department of Anthropology, University of Auckland.
8. Ingram, C.W.N. (1984). NZ Shipwrecks 1795-1982, AH and A Reed Ltd.
9. ARA (1984) An Assessment of Auckland Region's Landscape, ARA Regional Planning Department.

Recorded on Existing Databases:

1. **WERI** - No
2. **SSWI**
3. **PNA** - No
4. **Geopreservation** - No
5. **HPT County Inventories** - No
6. **Other** - (a) ARA (1984) An Assessment of Auckland Region's Landscape, ARA Regional Planning Department.
7. **None** (b) NZAA Site Records.
   (c) Shipwrecks database - held in Auckland CRI.

Comment: SSWI Survey 1982, Rank: Moderate-High.

Other Considerations:

This site falls into the tribal boundaries of the Ngati Te Ata. The contact person for this tribe is Alec Kaihau, Waiuku.

A potential threat to the area is the possible discharge of sewage through Cochram's Gap or Hamilton's Gap according to the proposed Auckland sewage outfall scheme.

Accompanying Maps and Photographs:

Site Name/s: Manukau Harbour	Site No: CRI 020 004
Recorders Name: Sian John	Conservancy: Auckland
Map/Grid Ref: R12 26660 64600	Date: 13.03.90

Brief Description of Site:

The Manukau is a large sheltered harbour (covering approximately 420 square kilometres) with an extensive tidal range and substantial intertidal mudflats (70-80% sand flats, shellfish beds, silts and and muds, and 20% mangroves (*Avecinnia marina* var. *resinifera*) and salt marshes) (source 2). It is a major area of open space with an extensive shoreline backed by landscapes that are generally rural or predominantly natural in character (cliffs and bush clad hills), but also includes areas of urban development. Mangroves and salt marshes dominate the upper reaches of the harbour. This habitat provides for a variety of ecological systems, from maritime saltmarshes to deepwater channels. The siting of major industries and waste disposal systems have, however, degraded the harbour to a condition well below optimal. Human use and modification of this site is high.

Conservation Values: **Natural:** b,c,e,f,g,h **Cultural:** c **Historic:** b,c

Comment:

Natural: There are five sites of geomorphic importance on the NE coastline of the harbour: the Ihumatao fossil forest (approx. 30000 yrs old) (source 1), Pukaki lagoon (a circular explosion crater with a tuff ring breached on the seaward side by a narrow channel), Puketutu Island (a volcanic island surrounded by a small lava field), Mangere lagoon (a sea-invaded "maar"), and the nationally significant Wiri lava cave (the only Auckland example embodying volcanic features in their most perfect form). There are also two sites of significance near the northern harbour mouth: the Te Komoki ex-foliation dome and the Paratutae wave-cut notch.

The extensive area of intertidal mudflats exposed during low tide act as a massive, rich, invertebrate food source for up to 50 000 wading birds during summer and up to 25 000 during winter. Most of the summer waders are migrant species from the arctic. The harbour is a single integrated habitat for wildlife, within which birds travel widely, which includes six very important roosts: Ambury Park Roost, Puhinui Roost, Karaka Roost (the most important roost), Seagrove Roost, Waipipi Roost, and Pollok Spit Roost. Many of the birds feeding and roosting in this habitat have a high conservation status, including many "threatened" species: Wrybill (*Anarhynchus frontalis*), Caspian terns (*Hydroprogne caspia*), NZ dotterel (*Charadrius obscurus*), and banded dotterel (*C. bicinctus bicinctus*) (source 10). Unusual and rare international waders also roost in the Manukau, for example, Sharp tailed sandpiper (*Calidrus acuminata*), Curlew sandpiper (*C. ferruginea*), Red-necked stint (*C. ruficollis*), Siberian tattler (*Tringa brevipes*), and Far eastern curlew (*Numenius madaqascariensis*). Other species which inhabit the Manukau in high numbers include Eastern bar-tailed godwit (*Limosa lapponica baueri*), Lesser knots (*Calidrus canutus canutus*), South Island pied oystercaters (*Haematopus ostralegus finschi*), and Pied stilts (*Himatopus himantopus leucocephalus*), with Red-billed gulls (*Larus novaehollandiae scopulinus*), Southern black-backed gulls (*L. dominicanus*), Turnstone (*Arenaria interpres interpres*), N.I. fernbird (*Bowdleria punctata vealeae*) ("regionally threatened") and Golden plover (*Pluvialis fulva*) also present. The east and south of the Manukau harbour has important salt marsh zones and mangrove communities, including large beds of *Zostera* (feeding areas for fish and birds) and *Gracilaria prolifate* (which performs a valuable function in nutrient stripping and trapping fine particles). The Pahurehure Inlet is the most important area in

the Manukau in terms of healthy mangroves and saltmarsh species, including *Cotula* and *Triglochin leptocarpus*. The northern shoreline also represents an important floral site in the Manukau, due to its native coastal forest species. Wattle Bay Forest is the most natural piece of pohutukawa forest in Auckland. Big Muddy Creek contains the best kauri (*Agathus australis*)-kanuka (*Kunzea ericoides*), kanuka, pohutukawa (*Metrosideros excelsa*), and puriri (*Vitex lucens*) forest on sheltered coast dissected hill country. Kaitarakihi Bay is characterised by the best manuka (*Leptospermum scoparium*) scrub on sheltered coast dissected hill country and contains the "rare" *Prosophyllum pumilium* (source 11). North Manukau Head contains the best examples of kauri, kauri-kanuka, kanuka, manuka, mamangi (*Coprosma arborea*), puriri composite, kowhai (*Sophora* spp)-kanuka scrub, and pohutukawa forest on exposed harbour coastline. Nahana Point has the best pohutukawa forest on an exposed harbour entrance in the district. The marine habitat in the Manukau is significant due to its capacity to contribute to fisheries (nursery and breeding areas). Extensive scientific investigation and monitoring has been undertaken in the area concerning marine biology, water quality and fisheries.

Cultural: Large sections of the coastline are rated as having above average landscape quality, while the Huia/Laingholm coastline is rated as very attractive (as a consequence of its coastal, native vegetation) (source 13).

Historic: The southern portion of the mouth of the Manukau is characterised by the only midden sites of Archaic age on the Auckland mainland. The northern mouth includes the Te Komoki Pa and the Karangahape Pa (1840). Intensive Maori settlement focussed on the volcanic soils of the NE shoreline. This area contains five sites of Maori archaeological significance including: Ambury Park and Puketutu island Pa, living sites, gardens, and burial areas; Ihumatao Mission Station and 19th century village; Pukaki Creek Pa and 19th century and earlier villages; Crater Hill living terraces, pits and burial caves; and Puhinui Creek Pa, living sites and gardens. All of these areas have associated burial sites (sources 3-9). Other features of historic note are early logging sites along the northern shoreline/Waitakere coast. (Source 5)

Site Importance: **International** **National** **Regional** **Local** **Unknown**

Comment:

The harbour has been identified by the International Union for the Conservation of Nature as a natural area of international significance (source 12). It is a roosting and feeding site of international importance and contains original terrestrial vegetation in good order (SSWI). The Wiri Lava Cave has national significance as a geomorphic feature (source 1), and the Crater Hill archaeological site contains the most intact archaeological landscape on a volcanic tuff ring in the Auckland area (source 5).

Existing Threats: b,c,d,e,g,j,l

Type & Comment:

Siltation due to stormwater run-off is a large threat to the Manukau; in particular in the northern, southern (Pahurehure) and Waiku catchments. *Spartina* spp. has been planted and has fragmented in several areas of the harbour including; Karaka, Clarks Creek, Pahurehure Inlet, Whangapouri Creek, Blackbridge Creek, the Manukau Inlet, Waiuku, and Waipipi. Pampas grass (*Cortaderia* spp. is also present in some areas. Along the southern shoreline cattle can graze down to the water's edge. Water pollution is a substantial threat in the Manukau with pollutants coming from the airport and farm run-off, discharge of domestic and industrial wastes, sewage pumping station overflows and from the sewerage treatment area. The Manukau Harbour has some of the most polluted

pieces of coastal water in New Zealand. Various examples of poor structures/reclamations are apparent along the shoreline from Mangere Inlet to Waiuku. Some harbour margins have been used as private dumping grounds, in particular upper inlets. Refuse tipping has also occurred at Pikes Point and and Waikuwhai Bay, which subsequently poses the threat of leachates. Subdivision is a potential threat to the bird roost sites at Karaka and Seagrove.

The Manukau Harbour is probably the most "threatened" harbour/estuarine environment in the Auckland Conservancy.

Human Modification and Human Use: a,b,c,d,e,h,i,k1(structures),k2(fisheries)

The northern and eastern shorelines have been developed for urban and industrial use, including the Airport, while the southern and western shorelines are developed for rural use. Major reclamations have occurred in association with the Auckland Airport, the sewerage treatment plant, and the Mangere inlet. Other smaller reclamations are also scattered throughout the harbour. Mooring areas are scattered around the shoreline, in particular along the northern shoreline and in Waiuku Creek and Pahurehure Inlet. Mangere inlet is the site of a major commercial port, and the harbour as a whole contains significant shipping channels.

The harbour also contains a considerable number of stormwater outfalls, pipelines and cables. A large number of private jetties, boat ramps, boat houses and wharves are also located around the harbour shoreline, and bring the total number of structures (including reclamations and cables) in the harbour to at least 330. Shore-based recreation in the Manukau includes walking, water skiing, swimming, camping and horse-riding. The site also includes three Auckland Regional Council Parks - Cornwallis, Ambury, and Awhitu. Water-based recreation is important in the Manukau, and includes fishing (line fishing and flounder-fishin and shellfish gathering. The Manukau harbour has considerable recreational value as well as being a focus for commercial fishing, primarily rig (*Mustelus lenticulatus*), mullet (*Mugil cephalus*), snapper (*Chrysophrys auratus*) and flat fish.

The Manukau Harbour is an extensively modified area.

Existing Protection: a,b,d

Type & Comment:

The site includes three regiongal parks administered by the Auckland Regional Council, Ambury, Awhitu, and Cornwallis. A large number of local purpose reserves also scatter the shoreline, but are unmappable at this scale.

DOC estate land is found in six <u>small</u> locations around the harbour: Waiau Pa Historic Reserve (0.5 ha); Weymouth Conservation Area (0.4 ha); Mangere Bridge; Mangere Conservation Area (0.07 ha); Otahuhu-Favona Road Conservation Area (0.2 ha); and Titirangi.

The harbour itself has been extensively divided into Conservation and Habitat Protection zones by the Manukau Harbour Maritime Planning Authority. The Maritime Scheme however, is still in a proposed form as of 1990. The harbour also contains a no anchorage and fishing zone in the vicinity of the airport. The entire Manukau Harbour is a restricted commercial fishing area with trawling, danish seining and drag netting prohibited.

Availability of Information:		1. Well documented
Natural	1 2 3	2. Limited information (general)
Cultural	1 2 3	3. Little information (if any)
Historic	1 2 3	
Threats	1 2 3	
Human Mod. & Use	1 2 3	

Comment:

A vast body of information exists concerning the Manukau Harbour.

Sources of Information:		1. Derived info. from existing literature & databases
Natural	1 2 3 4 5 6 7	2. Derived info as above & field check
Cultural	1 2 3 4 5 6 7	3. Derived from existing maps & aerial photographs
Historic	1 2 3 4 5 6 7	4. Recent DOC survey including sampling & analysis
Threats	1 2 3 4 5 6 7	5. Recent DOC survey excluding sampling & analysis
Human Mod. & Use	1 2 3 4 5 6 7	6. Experience
		7. Expert opinion

Comment:

Sources:
1. ARA (1988). Auckland Regional Planning Scheme. ARA.
2. Manukau Harbour Maritime Planning Authority (1989). Proposed Manukau Harbour Maritime Planning Scheme. Auckland Harbour Board.
3. Cramond, B., Bulmer, S. and Lilbbern, K. (1982). Archaeological Survey of the Wiri Oil Terminal Site (N42/1224). NZHPT Auckland 1982/6.
4. Foster, R. and Johns, D (1983). Archaeological Survey, Pukaki Creek, Stage 3. NZHPT Auckland 1983/10, 1983/13.
5. Hayward, B.W. and Diamond, J.T. (1978). Historic Archaeological sites of the Waitakere Waitakere Ranges, West Auckland, NZ ARA.
6. Hayward, B.W. and Diamond, J.T. (1978). Prehistoric Archaeological Sites of the Waitakere Ranges and West Auckland, NZ. ARA.
7. Sullivan, A. (1973). Site Survey of lower Pukaki Creek, Department of Anthropology, University of Auckland, Working paper in Archaeology No. 27.
8. Sullivan, A. (1975). Checklist of Archaeological Sites and Crater Hill, Papatoetoe. Department of Anthropology, University of Auckland, Working paper in Archaeology No. 37.
9. Rickard, S., Bulmer, S. and Veart, D. (1983). A review of Archaeological Stone Structures of South Auckland. NZHPT Auckland 1983/4.
10. Bell, B.D. (1986). The Conservation Status of New Zealand Wildlife. NZ Wildlife Service, Occasional Publication No. 12.
11. Given, D.R. (1981). Rare and Endangered Plants of New Zealand. A.H. and A.W. Reed Ltd.
12. International Union for the Conservation of Nature and Natural Resources (1981). Resolutions of the 15th session of the General Assembly of I.U.C.N., Christchurch, New Zealand, 11-23 October 1981. I.U.C.N. 1196, Gland, Switzerland. 12p.
13. ARA (1984) An assessment of Auckland Region's Landscape. ARA, Regional Planning Department.

Recorded on Existing Databases:

1. **WERI**
2. **SSWI**
3. **PNA** - Waitakere (1989)
4. **Geopreservation** - No
5. **HPT County Inventories** - No
6. **Other** - (a) ARA (1984) An assessment of Auckland Region's Landscape. ARA, Regional Planning Department.
7. **None** (b) NZAA Site Records.

Comment: SSWI Survey 1982 - ranked: Outstanding.

Other Considerations:

This site falls into the tribal boundaries of the Kawerau, Waiohua, Ngai Tai, Ngai Paoa, Te Akitai, Ngati Te Ata. The contact people for these tribes are: Mariato Eve, Mangere; Joseph Wilson, Ihumatao; Ngatai Tribal Committee; Ngati Paoa Development Trust; Joseph Wilson, Ihumatao; and Alec Kaihau, Waiuku respectively.

The level of water pollution in the Manukau Harbour and its importance as an international wildlife site and a regionally significant vegetation site are diametrically opposed.

Accompanying Maps and Photographs:

Site Name/s: Whatipu Dune Field	Site No: CRI 020 005
Recorders Name: Sian John	Conservancy: Auckland
Map/Grid Ref: Q11 26430 64620	Date: 05.03.90

Brief Description of Site:

Whatipu Beach is the northern exposed portion of a tidal delta at the mouth of Manukau Harbour, forming an extensive area of sand dunes 6 km long and over 1 km wide at the toe of the Waitakere Ranges (source 2). The dunes support a large and healthy population of sand-binding grass and herb fields, and are characterised by a number of permanent and temporary dune lakes. The sand country is of low relief, with the exception of mobile dunes which reach up to approximately 20 m in height. This contrasts sharply to the high, dramatic relief of the adjacent bush covered Waitakere Ranges, characterised by coastal cliffs over 200 m high. Whatipu is noted for its rapid progradation of sand, and wet unstable sand plains (flooding in the winter) which provide a habitat for various botanical and wildlife species. It is also recognised for its historical features and structures dating from late 19th century logging.

The land area adjacent to the site is covered by native bush, and is part of the ARC administered Centennial Memorial Park. With no land development in the area, the site maintains a high level of naturalness, with its biggest use being recreation. Recreational levels are not high, but the undisturbed and fragile nature of the habitat (in particular the salt herb fields and pingao (*Desmoschoenus spiralis*) associations) means that any form of recreational pressure poses a threat to the habitat.

Conservation Values: **Natural:** a,b,c,d,e,f,g,hCultural: a,c **Historic:** a,b,d

Comment:

Natural: The dunes support large areas of salt herb fields, which contain a variety of dominants and associations including the best examples of coastal herb fields (dominated by *Triglochin striata, Myriophyllum votchii, Carex pumila, Lilaeopsis novae zealandiae, Libosella lineata* and by various combinations of these species and monocultures), pingao sandfields, spinifex (*Spinifex hirsutus*) sandfields and pingao-spinifex sandfields, in the ecological district. These assemblages are reasonably fragile systems. The pingao sandfields are one of the more extensive in Auckland, and these are classified as rare (source 5). Of particular significance are the sandflats around the Pararaha River, which support an extensive population of the sand herb *Eleocharis neozelandica*, an "endangered" species (source 1). In contrast the coastal cliff-face vegetation is dominated by pohutukawa (*Metrosideros excelsa*) with tawapou (*Planchonella nova-zelandica*), puriri (*Vitex lucens*) and other coastal broadleaf species. The cliffs contain numerous individuals of the kowhai (*Sophora microphylla* var. *fuluida*) endemic to the Waitakere ecological district, and a few populations of the fern *Asplenium terrestre* subsp. *maritimum*, *Celmisia major* var. *major*, and *Myosotis petiolata* var. *ponsa*. In conjunction with the dune vegetation, the flora in this area has a high degree of naturalness and is outstanding (D Slaven pers. comm. 1990).

The site is characterised by a high diversity of coastal bird species (39). Important coastal waders include breeding NZ dotterel (*Charadrius obscurus*), banded dotterel (*C. bicinctus bicinctus*), and variable oystercatchers (*Haematopus unicolor*). Caspian tern (*Hydroprogne caspia*) also feed and roost in the dune area. Swamp birds found feeding and roosting seasonally throughout the wetter areas include Australasian bittern (*Botaurus stellaris poiciloptilus*), N.I. fernbird (*Bowdleria punctata vealeae*) and pukeko (*Porphyrio*

porphyrio melanotus). Ohaka Head Lake and Pararaha in particular contain good numbers of Australasian bittern ("threatened"), N.I. fernbird ("regionally threatened"), black shag (*Phalacrocorax carbo novaehollandiae*), little shag (*P. melanoleucos brevirostris*), pukeko, spotless crake (*Porzana tabuensis plumbea*), and caspian tern ("threatened") (source 6).

The Whatipu sandflat dunefield is a huge area of sandflats and low dunes of national significance deposited between 1900 and 1930. It is an unconsolidated mobile sand area of dense black sand with a history of rapid progradation and recession (ARA 1988). At present it is the best example of rapid recent sand aggradation in NZ, extending 1.5 to 2km from the foot of the Waitakere Ranges. This trend has been extensively studied (Williams 1977). A second important geopreservation site in this area are the Whatipu Caves, at the back of the Whatipu sandflat. They are a group of 4 to 5 sea caves, some short and narrow, and others large (including one that had a wooden dance floor inside it in the timber mill days of the 1870s), eroded by the sea along joints and old volcanic necks and pipes in the Waitakere Group volcanic breccias (Miocene rocks). These caves are now abandoned due to the aggradation of the coastline.

Cultural: The area has significant traditional value due to the use of many of the caves and shelters as Maori burial grounds. Whatipu has an above average landscape quality rating (rated according to the ARA Landscape Assessment), as the most southerly of the popular west coast beaches readily accessible from Auckland (source 3).

Historic: Approximately 35 Maori occupation sites have been identified including a number of middens, rock shelters, undefended living sites and burial caves. Of particular significance is the Pararaha Point Pa site. With the exception of this pa, settlement appears to have been centred on pa or ridges further inland than the coastal strip (source 4). The area also has European historical significance centred on the Whatipu wharf, the end point of the steam trains carrying logs from Karekare. Eleven ships were wrecked in the vicinity of the Manukau bar and heads between 1848 and 1968 (source 9), including the HMS Orpheus, the most disasterous wreck in New Zealand's maritime history in terms of the life lost - 189 men died.

Site Importance: International **National** Regional Local Unknown

Comment:

The association of wetlands, soaks and ephemeral lakes/ponds, extensive mobile dunes, and coastal cliffs and caves form an important assemblage (sources 2, 6, 8, 10). The area represents the best example of pingao-spinifex sand fields and coastal herb fields in the district, and the sand flat dune fields is a nationally significant geopreservation site (source 8). Regionally this was also an important area historically for its logging industry.

Existing Threats: c,k

Type & Comment:

The major threat to the area (due to its high sensitivity) is to the dune complex and its vegetation, due to illegal recreational use by four-wheel drives and motor bikes which is not compatable with preservation of the system. Another threat is the modification of the vegetation complex in the central and southern regions near the terrestrial cliffs by weeds (e.g. Pampas (*Cortaderia selloana*)). It is also apparent that sand progradation may bury coastal middens.

Human Modification and Human Use: a,h

Up to five years ago cattle (*Bos taurus*) grazed the area, this use however, has since ceased.

Shore-based recreation is generally popular, in particular: surfcasting, swimming and surfing, walking, and trail bike riding. The area is boardered by shoreline and cliff line walks, and incorporates an ARC campground including a fishing lodge and car park at its southern end.

This site remains essentially unmodified and thereby could retain a high level of naturalness, once itinerant and illegal vehicle use ceases.

Existing Protection: i

Type & Comment:

The area is a recognised geopreservation site due to the dune complex and cliff caves, and is administered by the Auckland Regional Council Parks Division, however, it is not a protected site. The remote wilderness character of this area is, officially, protected by ARA policy of foot access only to the area (ARA 1988), but compromised by illegal vehicle use.

Availability of Information:

Natural	1 2 3
Cultural	1 2 3
Historic	1 2 3
Threats	1 2 3
Human Mod. & Use	1 2 3

1. Well documented
2. Limited information (general)
3. Little information (if any)

Comment:

While landscape information is good, for other categories of the cultural value, available information is poor.

Sources of Information:

Natural	1 2 3 4 5 6 7
Cultural	1 2 3 4 5 6 7
Historic	1 2 3 4 5 6 7
Threats	1 2 3 4 5 6 7
Human Mod. & Use	1 2 3 4 5 6 7

1. Derived info. from existing literature & databases
2. Derived info as above & field check
3. Derived from existing maps & aerial photographs
4. Recent DOC survey including sampling & analysis
5. Recent DOC survey excluding sampling & analysis
6. Experience
7. Expert opinion

Comment:

Sources:
1. Esler, A.E (1974). Vegetation of the sand country bordering the Waitakere Ranges, e.g. Auckland: The Southern Beaches. Proc. NZ Ecol. Soc. 21:72-77.
2. Ballance, P.F. and Williams. P.W. (1982). The geomorphology of Auckland and Northland. In: Landforms of NZ, Soons & Selby (Eds):127-146.
3. ARA (1984) An Assessment of Auckland Regions Landscape. ARA, Regional Planning Office.
4. Hayward, B.W. and Diamond, J.T. (1978). Historic archaeological sites of the Waitakere Ranges, West Auckland. ARA.

5. Given, D.R. (1981). Rare and endangered plants of NZ. A.H. & A.W. Reed Ltd.
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8. Slaven, D. (1990). Environmental Consultant, Auckland.
9. Ingram, C.W.N. (1984). New Zealand Shipwrecks 1795-1982. AH & A Reed Ltd.
10. ARA 1988. Auckland Regional Planning Scheme. Auckland Regional Authority.

Recorded on Existing Databases:

1. WERI - No
2. SSWI
3. PNA - Waitakere (1989)
4. Geopreservation - Caves and landforms
5. HPT County Inventories
6. Other-(a) ARA (1984). An Assessment of Auckland Region's Landscape. ARA, Regional Planning Department.
7. None (b) NZAA Site Records.

Comment: SSWI rating is high (re-surveyed January 1989).

Other Considerations:

The Whatipu dune field is backed by the ARC Centennial Memorial Park. However, the rapidly aggrading sand flats have never been surveyed and so have no legal ownership. ARC is administering the area until its legal status has been resolved. At present DOC, ARC, tangata whenua and community interest groups are seeking to resolve the issue of ownership. Once this is resolved it is expected that legal protective status will be placed over the area to ensure the proper management of this significant area.

This site falls into the tribal boundaries of the Kawerua. The contact person for this tribe is Hariata Ewe, Auckland.

Accompanying Maps and Photographs:

Site Name/s: Cowan Point - Te Waha Point (Karekare - Piha)	Site No: CRI 020 006
Recorders Name: Felicity Fahy	Conservancy: Auckland
Map/Grid Ref: Q11 26405 64705	Date: 14.03.90

Brief Description of Site:

This stretch of coast comprises several expanses of rocky coastline, with sandy beaches formed in between the headlands. Piha and Karekare are the most notable of the sandy beaches in this site. High rocky sandcliffs make access to much of the coast difficult, the cliffs are backed by sloping hillcountry covered in teatree scrub and flaxland. The cliffs drop steeply into high energy west coast waters. The tops of the cliffs are exposed to high winds which stunts vegetation growth. Much of the original vegetation along this stretch of coastline was destroyed long ago as a result of extensive fires. There are remnants of coastal forest but much of the coastline is regenerating kanuaka (*Kunzea ericoides*) and manuka (*Leptospermum scoparium*) scrub and forest. A large number of species endemic to the Waitakere coastline are present.

This stretch of coastline is extensively used for land-based recreation, in particular swimming and surfing, and subsequently its development (where it is developed at the back of sandy beaches) is focused on bach accommodation, however, a permanent alternative lifestyle community is established here.

Conservation Values: **Natural:** b,c,d,e,f,g **Cultural:** c,e **Historic:** b,c,d

Comment:

Natural: There are three sites of particular geomorphic significance within this area. Lion Rock, a large rocky stack made of Andesitic breccia and lava with a lion shaped profile, is a very distinctive feature on Piha beach. At the southern end of Piha beach are several sea caves. They are the best examples of contemporary sea arches and blowholes on the west coast of Northland and Auckland. There are also two tunnels cut through the breccia. Two kilometres north of Karekare Beach, at Mercer Bay is a good example of a sea cave that has eroded vertically to form a 100 m high chimney (Geopreservation database). There are several places along this coast where little blue penguins (*Eudyptula minor iredalei*) come ashore to nest. Grey-faced petrels (*Pterodroma macroptera gouldi*) are are also known to nest in predator free areas along the cliffs. (Waitakere PNA).

The exposed rocky coast has several flora assembleges of regional importance. All of the rocky coast has been designated a recommended area for protection in the Waitakere PNA report. The site contains the two best cliff-face herbfields in the ecological district, notable for there representative vegetation and coastal fern *Asplenium northlandicum*. The best coastal manuka - flax (*Phormium tenax*) scrub and best kanuka scrub in the ecological district is also found here. The stretch of coast between Karekare and Piha has three areas designated as priority vegetation sites designated in the PNA survey. The area is notable for large numbers of a kowhai (*Sophora microphylla* var. *fluvida*) endemic to the Waitakere's. Nun rock to the south of Piha has one of the best coastal shrublands in the district. At Karekare there is an excellent example of a coastal pohutukawa (*Metrosideros excelsa*) forest with a good sized population of tawapou (*Planchonella novo-zelandica*), a species relatively depleted on mainland NZ.

The marine environment of this site is also significant, as the only location of the marine intertidal species *Durvillea antarctica* kelp, the green mussel *Perna canaliculus*, and the *Stichaster* starfish in the Auckland region. These species are typically southern cold water species, and their location at this site recognises the transitional nature of Auckland's west coast between the subtropical marine envionment of Northland and the colder southern marine regions. Due to the nature of this transition zone and the marine habitats reliance on it, the system is fragile, for if one of the two components were to dominate for a period for example, the whole nature of the marine component of this site would change. This coastline has been subject to a number of studies of mussel/starfish interactions (relating to the concept of keystone species). (Irving, pers. comm. 1990.)

Cultural: All the coast of this site is rated highly attractive - 6, on a scale of 1-7 from the ARA landscape database. It is a very valuable landscape resource comprised of open space, clean air and water (source 5). It is frequently used as a place of retreat and spiritual renewal for Aucklanders. The site is also of educational significance, and is used frequently on secondary school field trips.

Historic: This area has a range of recorded archaeological sites including pa, undefended sites, midden, rock shelters and burials. Sites of non-Maori origin associated with logging are also present, they include tramlines, boilers, engines and bridges. The archaeological sites are fairly evenly distributed with some clustering evident around stream mouths. A number of the rock shelters in the area were used as burial caves by the Kawerau tribe. A survey done in 1978 (source 1 & 2) indicates that the Pa at Lion Rock and at Pararaha Point, as well as the rock shelters at Karekare that were occupied by Kawerau in 1826, are coastal sites of importance.

There is one known shipwreck site and associated graves in this area. (Source 4.)

Site Importance: International National Regional Local Unknown

Comment:

Of regional significance are the geomorphic sites (Geopreservation database), the vegetation of the rocky coast (Waitakere PNA), and the transition zone between the subtropical marine and the colder southern marine environment offshore (Irving, P. pers. comm. 1990). The area is also locally important as a breeding area for little blue penguins. (Waitakere PNA)

Existing Threats: e,k,l,m

Type & Comment:

From a landscape perspective inappropriately sited coastal subdivision, on sand dunes and at a high elevation overlooking the coast is a threat. This unit has a high sensitivity rating (ARA study) on account of its natural character with steep coastal cliffs and native vegetation cover. Excessive recreational shellfish gathering, is also a threat. Proposed alternatives to the Auckland Sewage Disposal Options include piping sewage through karekare and/or Piha.

Human Modification and Human Use: a,h,i,k(structures)

Human modification is limited to specific areas of settlement. The site has only one structure (bridge) built over an area with tidal influences. The coastal area behind Piha has been developed with a camp ground, baches and surf club buildings. The sandy beaches within this site are used extensively for for surfing, swimming, picnicking, walking. The accessable rocky outcrops are used for fishing. Piha and Karekare are also the location of Regional Parks which have facilities for picnicking, barbecues, family walks, and backpack camping. Some offshore recreation also occurs, primarily fishing and diving if coastal and harbour bar conditions permit.

Existing Protection: b

Type & Comment:

The Auckland Regional Council has two regional parks within this site, based at Piha and Karekare.

Availability of Information:

Natural	1 2 3
Cultural	1 2 3
Historic	1 2 3
Threats	1 2 3
Human Mod. & Use	1 2 3

1. Well documented
2. Limited information (general)
3. Little information (if any)

Comment:

The marine biological component of natural values has little available information, whereas information on geomorphic, fauna and flora values is well documented.

The cultural information available is general in nature but the landscape component has well documented information

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Sources of Information:

Natural	1 2 3 4 5 6 7
Cultural	1 2 3 4 5 6 7
Historic	1 2 3 4 5 6 7
Threats	1 2 3 4 5 6 7
Human Mod. & Use	1 2 3 4 5 6 7

1. Derived info. from existing literature & databases
2. Derived info as above & field check
3. Derived from existing maps & aerial photographs
4. Recent DOC survey including sampling & analysis
5. Recent DOC survey excluding sampling & analysis
6. Experience
7. Expert opinion

Comment:

1. Hayward, B.W. and J.T. Diamond (1978). Prehistoric Archaeological Sites of Waitakere Ranges and West Auckland NZ. ARA pp 122.
2. Hayward, B.W. and J.T. Diamond (1978). Historic Archaeological Sites of the Waitakere Ranges, West Auckland NZ. ARA pp 73.
3. Irving, P. Department of Conservation, Auckland.
4. Ingram CNW (1984). New Zealand Shipwrecks 1795-1982. AH & A Reed Ltd.
5. ARA (1984) An assessment of Auckland Regions Landscape. ARA Regional Planning Department.

Recorded on Existing Databases: **Comment:**

1. WERI
2. SSWI
3. PNA - Waitakere PNA 1989
4. Geopreservation
5. HPT County Inventories - No
6. Other - (a) ARA (1984) An assessment of Auckland Regions Landscape. ARA Regional Planning Department.
   - (b) NZAA Site Records.
7. None

Other Considerations:

This site falls within the tribal boundaries of the Kawerau. The contact person for this tribe is Hariata Ewe, Auckland.

Accompanying Maps and Photographs:

Site Name/s: Te Waha Point - Otakamiro Point (Whites Beach - Maori Bay)	**Site No:** CRI 020 007
Recorders Name: Felicity Fahy	**Conservancy:** Auckland
Map/Grid Ref: Q11 26380 64795	**Date:** 14.03.90

Brief Description of Site:

This site is comprised of exposed, rugged west coast headlands and sandy beaches, as well as offshore stacks and small islands. Steep sandcliffs make access to the rocky portion of the coast difficult. The cliffs drop steeply into high energy west coast waters. The cliffs are backed by sloping hillcountry covered in tea tree scrub and flaxlands. As with site 006 a lot of the original vegetation along this stretch of coast was destroyed as a result of extensive fires. Anawhata and Te Henga (Bethells) are the largest sandy beaches that have formed between the headlands in this site. This site provides a break both geomorphically and botanically to the pleistocene beach systems of South Kaipara and Awhitu. A large number of species endemic to the Waitakere coastline are present as well as several "at risk" and uncommon botanical species. The Te Henga dune lakes is an area of exceptional significance on most ecological parameters. The rocky bluffs, headlands and islands, particularly the association of Erangi Point, Ihumoana Island and Kauwhahaia Island stand out from a botanical view point. This very high quality of the geomorphic, floral and faunal complexes make this site a popular recreational area for walking, swimming, fishing and surfing. Overuse poses a threat to this area as it has a high sensitivity to disruption and a low site recoverability, as does pollution from rural runoff.

Conservation Values: **Natural:** a,b,c,e,f,g,h **Cultural:** c **Historic:** b

Comment:

Natural: The volcanic origin of the geology of this coast gives rise to several sites of geomorphic significance. Two of the best localities in New Zealand for pillow lava are within this CRI site. The andesitic pillow lava has been deposited under water to form a heap of cylindrical bodies. The examples at Maori Bay are the best in NZ, among the best in the world, and therefore are of national significance (Source: Geopreservation; source 1). In the cliffs at the southern end of Maori Bay there is a site of significance that contains rarely found early Miocene deepwater microfauna, bathyal molluscan fauna and a conglomerate bed with redeposited shallow water reef corals (geopreservation). Powell Bay to the south also has pillow lavas present. In the Te Henga (Bethalls) beach area there are three dune-dammed swamps. The lower end of the Waitakere valley was damned by Holocene sand dunes. It is the largest remaining swamp in the Auckland area. Inland from Te Henga two lakes, Lake Waimanu and Lake Kawaupaka have been formed by the damming of their valleys by active sand dunes. Both are well defined as they have been little modified by by human activity (source: geopreservation). This area has been surveyed as part of the Waitakere Ecological District PNA survey. There are 10 priority vegetation sites that all fall within larger recommended areas for protection (RAP sites). Within this area there is one of the best "seacliff" vegetation types, flaxfield on cliffs and manuka (*Leptospermum scoparium*) scrub sites on coastal hillslopes in the ecological district. The Waitakere endemic Kowhai *Sophora microphylla* var. *fuluida* is also present. Within this site there is the best kanuka (*Kunzea ericoides*) scrub on consolidated sands, best pohutukawa (*Metrosideros excelsa*)-puriri (*Vitex lucens*), kanuka forest on dissected hillcountry, one of the best raupo (*Typha orientalis*) wetlands, and cabbage tree (*Cordyline australis*) forests in the ecological district. Lake Kawaupoka is one of the very few dune lakes on the west coast

of NZ which is still completely surrounded by intact native vegetation. There is a complex association with many uncommon species including *Loistreopsis velutiua, Microlaena polynoda, Echinopogon ovatus, Asplenium hookerianum,* and *Myosotis petiolata* var. *spausa*. Ihumoana Island has the best houpara (*Pseudopanex lessonii*) forest in the ecological district. Erangi Pt has one of the best pohutukawa forests in the district. Kauwahaia Island has the best island karo (*Pittosporum crassifolium*) forest in the district. Raetahinga Pt has the best manuka-flax (*Phormium tenax*) scrubland in the district. These four sites form the basis of a coastal RAP site from the Waitakere PNA survey, that stretches from the mouth of the Te Henga River to Raetahinga Pt. The Muriwai cliffs within this site have the best *Coprosma macrocarpa* shrubland in the district. It is also within a larger PNA RAP site. There is a small stand of old, very large pohutukawa forest in the Muriwai Reserve, such a stand is rare on the Auckland coast given the long history of exploitation of the species for boat building. There are many rare or unique species, including the threatened species Australasian bittern (*Botaurus stellaris poiciloptilus*) and N.I. fernbird (*Bowdleria punctata vealeae*) and the spotless crake (*Porzana tabuensis plumbea*) at Lake Wainamu. Ihumoana Is, which is connected to Te Henga beach at low tide, maintains an established colony of grey faced petrel (*Pterodroma macroptera gouldi*). The cliffs at Erangi Point are used extensively as a breeding and roosting area for spotted shag (*Strictocarbo punctatus punctatus*), an endemic species with restricted distribution on the west coast of Northland and Auckland of National significance (SSWI data). Kauwahaia Island has a high degree of naturalness as the steep cliffs make access difficult. It is a breeding area for grey faced petrel, sooty shearwater (*Puffinus griseus*) and diving petrel (*Pelecanoides urinatrix urinatrix*) colonies and is also of national significance (SSWI). Te Henga swamp is the largest freshwater swamp in the Auckland Ecological Region. A large number of scientific studies have been carried out on the swamp. The area has a good diversity of swamp birds including "threatened" Australasian bittern and "regionally threatened" N.I. fernbird, spotless and marsh crake (*Porzana pussilla affinis*) and banded rail (*Rallus philippensis assimilis*), all threatened species (source 6). The swamp also attracts a large number of waterfowl. There are four areas within this site where Australian gannets (*Sula bassana serrator*) breed. Gannet numbers have been increasingly steadily over the last few years, their breeding areas have extended from Oaia Island onto the mainland since 1982. It is important as one of the few mainland nesting areas for Australian gannet in NZ. Oaia Island is the only true offshore island on the west coast between Sugarload off Taranaki and the Three Kings. It is regionally unique for its role as a seasonal colony for fur seals (*Arctocephalus forsteri*), it forms an important feeding and haulout area for them. Malcolm Francis (pers. comm. 1989) believes the island to have a high degree of naturalness. His observations indicate that it is representative of a high energy west coast rock shore and subtidal zone.

Cultural: This coastal area is rated highly attractive, 6, on a scale of 1-7 in the ARA Landscape Assessment Study. It is a very valuable landscape resource. The rugged coastline and sandy bays provide areas of open space, clean air and water in close proximity to Auckland (source 5).

Historical: The area has a wide range of recorded archaeological sites including pa, undefended sites, midden, rock shelters and burials. Many of the Maori sites are pre-European but there was considerable Maori occupation in undefended settlements in the last century, especially at Te Henga. The sites are fairly well distributed with some clustering around stream mouths. Of special note is a pa on Kauwahaia Island that is still in a relatively intact state. Survey of large areas of the Waitakere ranges has been undertaken by Hayward and Diamond (source 2 & 3). A survey by Visser (source 4) has also been carried out at Takapu Refuge, Muriwai.

Site Importance: International **National** Regional Local Unknown

Comment:

The Pillow lavas at Maori Bay are extremely well formed and include a high number of very large individual pillows. They are of national significance (source 1). There are many botanical sites of regional and ecological district significance. The association of vegetation around Lake Kawaupaka is of regional signficance, and may be of national significance (pers. comm. Dave Slaven 1990).

Existing Threats: c,d,e,k

Type & Comment:

This coast has a high sensitivity rating of 7 on account of its natural character, steep coastal cliffs, native forest and low site recoverability (source 5). Inappropriately sited coastal subdivision could pose problems. Stock is able to graze down to the shore of Lake Wainomu. Rats (*Rattus* sp.) are a threat to wildlife on the islands in this site, especially those linked to the mainland at low tide. Recreation in the form of walkers, picnickers, day trippers tend to trample the often fragile vegetation. In Te Henga swamp part of the waterway is being clogged with willow (*Salix* spp). Water pollution is a problem in the swamp, due to runoff from pig (*Sus scrofa*) and chicken (*Gallus gallus*) farms in the catchment. Threat to the gannet colonies is mainly from the sheer number of people that visit the area. Some vandalism to the colony area and surrounding habitat takes place.

Human Modification and Human Use: a,h,i,k(structures)

Human modification and use is mainly limited to specific areas of settlement, e.g. Muriwai (which is characterised by an intensively used boat ramp. Pasture backs the cliff edge in the north of the site and recreation, e.g. swimming, surfing, walking, fishing. The land adjoining the southern side of Te Henga has been developed into and subdivided into lifestyle blocks. These blocks are often grassed down to the swamp margin. Seasonal duck shooting is carried out at Te Henga swamp, provided ducks are hunted in the legal manner it does not pose a threat. Some offshore fishing and diving occurs as conditions allow, especially associated with Oaia Island.

Existing Protection: b,c,f

Type & Comment:

Part of this site to the north falls within Muriwai Regional Park, the southern portion of the site falls within Auckland Centennial Park, both parks are administered by the Auckland Region Council. The land surrounding Te Henga swamp is partly owned by the Acclimatisation Society, another portion is owned by Royal Forest and Bird Protection Society (Matuku Reserve) the remainder is in private ownership. The area surrounding Lake Wainamu is owned mostly by Waitakere City Council and is a reserve.

Availability of Information:

Natural	1 2 3
Cultural	1 2 3
Historic	1 2 3
Threats	1 2 3
Human Mod. & Use	1 2 3

1. Well documented
2. Limited information (general)
3. Little information (if any)

Comment:

The Marine ecological component of the natural values has little available information. There is generally little cultural information available but the landscape component has been well documented.

Sources of Information:

Natural	1	2	3	**4**	**5**	6	7
Cultural	1	2	**3**	4	5	6	7
Historic	1	2	3	4	5	6	7
Threats	1	2	3	4	5	**6**	**7**
Human Mod. & Use	1	2	3	4	5	**6**	7

1. **Derived info. from existing literature & databases**
2. **Derived info as above & field check**
3. **Derived from existing maps & aerial photographs**
4. **Recent DOC survey including sampling & analysis**
5. **Recent DOC survey excluding sampling & analysis**
6. **Experience**
7. **Expert opinion**

Comment:

1. ARA (1988). Auckland Regional Planning Scheme. ARA July.
2. Hayward, B.W. & J.T. Diamond (1978). Prehistoric Archaeological sites of Waitakere Ranges and West Auckland NZ. ARA pp122.
3. Hayward, B.W. & J.T. Diamond (1978). Historic Archaeological sites of the Waitakere Ranges and West Auckland. ARA pp73.
4. Visser, E. (1978). Archaeological Assessment of the Takapu Refuge, Muriwai. Unpublished Report pp19, NZHPT Auckland
5. ARA (1984). An Assessment of Auckland Region's Landscape. ARA Regional Planning Department.
6. Bell, B.D. (1986). The Conservation Status of New Zealand Wildlife. NZ Wildlife Service, Occasional Publication No. 12.
7. Francis, M. (1989). Ministry of Agriculture and Fisheries, Fisheries Scientist Wellington, currently based at Leigh Marine Laboratory.
8. Slaven, D. Environmental Consultant, Auckland.
9. Irving, P. Department of Conservation, Auckland.

Recorded on Existing Databases:

1. **WERI** - No
2. **SSWI**
3. **PNA** - Waitakere (1989)
4. **Geopreservation**
5. **HPT County Inventories** - No
6. **Other** - (a) ARC Ornothological Society, NZ
   (b) NZAA Site Record.
7. **None**

Comment: OSNZ maintain database of numbers of gannets from year to year. Monitoring of petrel species and numbers has recently been instigated. SSWI ranked: Lake Wainamu - moderate-high, surveyed 1981, resurveyed 1989; Ihumoana Island - moderate-high, surveyed 1981, resurveyed 1989; Erangi Point - high, surveyed 1981, resurveyed 1989. Geopreservation - recorded several pillow lava sites, 2 dune dammed lakes and a fossil molluscan and coral conglomerate.

Other Considerations:

This site falls within the Kawerau tribal area, the contact person for this tribe is Hariata Ewe.

The marine area between Muriwai and Oaia Island has been identified by the Auckland Regional Council, Parks Department as warranting conservation protection (Irving, P. 1990 pers. comm.).

Accompanying Maps and Photographs:

Site Name/s: Muriwai/Rangitira Coast	Site No: CRI 020 008
Recorders Name: Paul Irving	Conservancy: Auckland
Map/Grid Ref: Q10 26297 65000	Date: 13.03.90

Brief Description of Site:

Muriwai and Rangitira beaches, extend unbroken 48 kilometres from the rock outcrop of Otakomiro Point to the South Kaipara Head. This is a high energy West Coast beach formed on the seaward edge of the South Kaipara peninsula, and backed by extensive holocene dunes of two to five thousand years of age. The overall trend is towards accretion of material on the beach and peninsula, but annual erosion and deposition also occurs. The dunes grade into vegetation, beginning with marram (*Ammophila areneria*) and pingao (*Desmoschoenus spiralis*), on the dunes themselves, with a belt of mixed exotic/native shrublands fronting the pine forest (*Pinus* spp.) of woodhill State Forest. Within the dunes is series of forty-plus dune lakes characterised by both rare and native and more common exotic wildfowl and marsh/lake species, plus native and coarse fish species. Much of the land surrounding the lakes is in pasture, with some native bush edging the lakes. The lakes rate as Sites of Special Wildlife Interest (SSWI). The beach, dunes and lakes are heavily used for recreation, with more than 600,000 visitor days expected per year. The southern end of the beach is dominated by the Muriwai Regional Park (ARC) complex, which provides vehicle access to the beach, and is a recognised road.

Conservation Values: **Natural:** a,b,c,e,f,g,i, **Cultural:** c,e. **Historic:** d.

Comment:

Natural: The site extends from the low tide mark inland across the beach to the dunes and dune lakes. the whole of the dune formation incorporated within this zone has recognised geomorphic significance (ARA 1988). The South Kaipara dune barrier is a complex, sedimentary structure composed of plio-quarternary sediments. Unconsolidated sediments, predominantly sands, lie unconformably over, and to the west of, consolidated plio-pleistocene deposits. The form of the sediment body is primarily a response to the varying rates of marine and colian deposition during a period of extreme sea level fluctuation (Hilton 1982). That is, the general theme of deposition, initiated against the rock mass of the Waitakere volcanics was intermittently interrupted by periods of relatively high sea level, eroding surfaces to a modern elevation of 168 metres. The holocene dunes of the barrier, with only an incipient soil cover, extend 3.5 km inland, and dune belts five to one represent five stages of progradation during periods of sea level regression (Schofield 1975). The South Kaipara peninsula is also characterised by uplifted marine terraces (a geopreservation site) of regional significance. Their significance lies in the fact that they are preserved uplifted pleistocene marine terraces, with six terrace levels in total at c. 8, 20, 40, 70, 110 and 170 metres above sea level. Their uplift level is 0.3 millimetres per year. The beaches are the site within the Auckland region which support significant toheroa (*Paphies ventricosa*) populations and, as such, have been the subject of years of investigation by fisheries scientists studying the general biology/population dynamics of toheroa (Hore A pers. comm. 1990). The dunes contain two species of rare plants. Pingao (rare) is found sporadically along the coastline, although marram has also been planted to stabilise the sand. The second, *Pseudopanax ferox* (locally rare), occurs in the belt of native vegetation between the dunes and the pines of Woodhill Forest. This vegetation is considered representative of dune systems (Slaven D pers. comm. 1990). The dune lakes are of three geomorphic types (ephereal inter-dune hollows), barrier lakes where dunes block valleys, e.g. Lake Otatoa, and hollows between succesive dunes, e.g. Lake Kereta). The dune lakes and associated swamps are variously, individually, rated

between 'moderate' to 'high' as SSWI sites, but should as a group be ranked as nationally significant (C Green pers. comm. 1990). At least one species of plant, *Hydrocotyle otatoa*, is endemic to Lake Otatoa (D Slaven pers. comm. 1990). The dune lakes vary from Okiritoto Swamp (10% water, 'most high' SSWI, 1981), with 20 bird species recorded, to Lake Otatoa 95% of 100 hectares open water. Among the bird species present on some or all of the lakes are NZ dabchicks (*Podiceps rufopectus*), caspian tern (*Hydroprogne caspia*) and Australasian bittern (*Botaurus stellaris poiciloptilus*); all threatened species (source 6). The lakes are also seasonal feeding, breeding and roosting areas for other native and introduced water-fowl as a consequence of the range and variety of habitats available.

Lake Otatoa is the only known significant location of koura (*Paranephrops planifrons*) (native freshwater crayfish) in the Auckland region, and it now contains the dwarf native Inanga (*Galaxias gracilis*) (introduced). (A Moore, pers. comm. 1990)

Historic: The beach between Muriwai and the South Kaipara Heads has been the site of eight shipwrecks (source 11), with one being refloated and salvaged. A total of eleven deaths occurred in two such incidents. Bodies of the 'Orpheus' wreck were washed up and buried in the dunes at Okiritoto Stream [1863] (source 1).

Cultural: This landscape, of a straight 40 kilometre long beach and dune system, backed by the Woodhill Forest pine plantation, rates as above average according to the ARA landscape study (source 2). The scene is both awesome and monotonous. The beach and dunes are used by geomorphology students from Auckland University for the study of coastal processes, due to its proximity to Auckland. It now has a well documented erosion history. (Source 1)

Site Importance: International **National** Regional Local Unknown

Comment:

Overall the site has national significance as a unit for faunal and floral values, particularly those associated with the dune lakes (Green; Slaven pers. comm. 1990)(SSWI). It has a nationally significant recreational coarse fishery in the dune lakes (A Moore pers. comm. 1990), and a regionally significant geomorphic landscape, and cultural, educational and recreational values.

Existing Threats: Type and Comment: a, c, d, e, i, k, l, m

a) Muriwai Beach is subject to both erosion and deposition in short term cycles. Shore stabilisation works were destroyed during a series of storms in the late 1970s. (Sources 4, 5)

c) Invasion into the dune vegetation by marram grass, deliberately planted for sand-dune stabilisation, and into the native vegetation landward of the dunes by pines and lupin (*Lupinus arboreus*).

d)
- Coarse (non-native and species for fishing purposes) fish liberated into dune lakes.
- Grazing of stock to the margins of lakes and swamps.
- Close proximity of marron (*Cherax tenuimanus*) (freshwater crayfish [Australian]) to only significant koura population in Auckland region (Lake Otatoa).

e) Pasture run-off into lakes; nutrients causing eutrophication.

i) Toheroa beds previously subject to over-use. Beds normally have a two to five million polulation. In 1976 the population was 2.5 million, and the season was opened for nine days - 1.5 million were taken. The beds have been closed since.

k) Use of the beach as a road is causal factor in toheroa population decline. Off-road vehicles amongst the sand dunes are causing erosion by destroying vegetation. Camping and fires at Muriwai in the dunes, and shooting on the lakes is also a problem.
l) Muriwai golf course - grassed areas of dunes - is subject to major sand movement.
m) Lakes drying up due to a lowering watertable, e.g. Lake Kereta dropped four to five metres; that is, 50% in the last 20 years.

Human Modification and Human Use: a,e,h,j,k(road),k2(fishing)

a) Land development includes golf course and regional park facilities at Murawai, within the fore and rear dune complex, and Woodhill Forest plantation of pines to:
i) stabilise holocene dunes, and
ii) for production.
a) Pasture and farming surround the dune lakes and, apparently, as a consequence, the water table is being lowered - direct extraction for irrigation, or pine/grassland transpiration.
e) Old Commonwealth telecommunications cable comes ashore at Okiritoto Stream mouth.
h) Muriwai Regional Park provides main point of access to the beach, which is also a public road. The beach is of significant value as a recreational resource, primarily sunbathing 21%, walks 17%, swimming 17%, fishing 6% and surfing 6%, are the major activities of 561,000 visitor days in 1987, with 10,000 people per day in peak times. The dune lakes are regionally significant coarse fisheries, with Lake Kereta noted as a nationally significant coarse fishery (A Moore, pers. comm. 1990).
h) Driving on the beach, kite fishing, shellfish, location of major surfcasting fishing contests, surfing, duck shooting, orienteering and hang-gliding, are other popular land based recreational uses.
j) Pingao harvesting and shellfishing (toheroa/tuatua (*Paphies subtriangulata*)) are traditional Maori uses of the area.
k) Major road, access to South Kaipara Heads.
k2) Commercial pair trawling for snapper (*Chrysophrys auratus*) occurs just off the beach, but a one mile trawl/danish seine restriction prohibits this close to the beach.

Existing Protection: Type and Comment: a,b,d

a) DOC owns some lakes - Lake Otatoa (205 ha) - and parts of others - Lake Kereta.
b) Muriwai Regional Park for the first eight kilometres of beach, but not the beach itself.
c) - Closed toheroa area.
- One nautical mile trawl/Danish seine line off beach.
- Lakes listed in regional scheme as 'Regional Significance - Protected'.

Availability of Information:

Natural	1 **2** **3**
Cultural	**1** **2** 3
Historic	1 2 **3**
Threats	1 **2** 3
Human Mod. & Use	1 **2** 3

1. **Well documented**
2. **Limited information (general)**
3. **Little information (if any)**

Comment:

Sources of Information:		1. Derived info. from existing literature & databases
Natural	1 2 3 4 5 6 7	2. Derived info as above & field check
Cultural	1 2 3 4 5 6 7	3. Derived from existing maps & aerial photographs
Historic	1 2 3 4 5 6 7	4. Recent DOC survey including sampling & analysis
Threats	1 2 3 4 5 6 7	5. Recent DOC survey excluding sampling & analysis
Human Mod. & Use	1 2 3 4 5 6 7	6. Experience
		7. Expert opinion

Comment:

Reference list:

1. Auckland Regional Authority, Regional Parks Department (1989). Muriwai Regional Park Draft Management Plan, ARC, Auckland.
2. ARA (1984). An Assessment of Auckland Region's Landscape. ARA, Regional Planning Dept.
3. ARA (1988). Auckland Regional Planning Scheme. ARA.
4. Hilton, M.J. (1982). Post-glacial coastal deposition: South Kaipara Peninsula. MA thesis, Geography, Auckland.
5. Schofield, J.C. (1975). Sea level fluctuations cause periodic, post-glacial progradation, South Kaipara Barrier, NI, NZ. NZ Journal of Geology and Geophysics. 18: 295-316.
6. Bell, B.D. (1986). The Conservation Status of New Zealand Wildlife. NZ Wildlife Service, Occasional Publication No. 12.
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8. Slaven, D. (1990). Ecologicial Consultant, Auckland.
9. Green, C. (1990). Department of Conservation, Auckland.
10. Moore, A. (1990). Department of Conservation, Auckland.
11. Ingram, C.W.N. (1984). NZ Shipwrecks of NZ 1795-1982. AH & AW Reed Ltd.

Recorded on Existing Databases:

1. WERI
2. SSWI
3. PNA
4. Geopreservation
5. HPT County Inventories
6. Other: ARA Landscape Assessment.
7. None

Comment: WERI and SSWI information primary source of data for lakes. Also MAF Rivers and Lakes of Importance to Fisheries data base.

SSWI: Lake Otatoa, site 17/70 M/H
Lake Kuwakatai, site 17/69
Lake Kereta, 18/69 H.
Lake Karaka (south) 1A 18/68 P.
Lake Karaka (south) A02 18/68 P.
Otakanini Topu South Lake 18/68 H.
Lake Okaihau, 19/66 M/H
Okiritoto Swamp. 19/66 M/H.

Other Considerations:

This area is of national significance for some rare bird species, and efforts should be made to permanently protect all the dune lakes. Vehicular access to the beach needs to be reviewed, in light of damage to dunes and toheroa beds. Virtually no information is known about the adjacent West Coast marine environment and, given the focus for recreation is coastal/sea orientated, attention should be given to this. Muriwai, including the cliffs to the south, Oaia Island offshore, and part of the beach, has been identified as a future marine reserve, based on use, representativeness, sensitivity, and rare speces, e.g. gannets (*Sula bassana serrator*), seals (*Arctocephalus forstori*), needs for feeding, etc. The tangata whenua are Te Taou of Ngati Whatua, with Marina Fletcher as the contact person.

Accompanying Maps and Photographs:

Site Name/s: Kaipara Harbour Mouth	Site No: CRI 020 009
Recorders Name: Sian John	Conservancy: Auckland
Map/Grid Ref: Q09 26160 65320	Date: 15.03.90

Brief Description of Site:

The Kaipara Harbour mouth is approximately 8kms across between Pouto Settlement and South Head. In combination with the terrestrial complexes at north and south head it forms a diverse and significant area for wildlife (in particular bird species) and botanical ecotones. Geomorphically the area is extremely active, with substantial sand progradation occurring on the seaward edge of the heads, while erosion rates increase as you move further into the harbour. The heads themselves are characterised by extensive areas of sand flats, dunes, impounded wetlands, and dune lakes. A series of lakes have formed on north head, either as basins in consolidated pleistocene dunes or between consolidated dunes and encroaching dunes from the west.

The more elevated land of the site is covered by exotic forest, while on lower ground farmland gradually gives way to shifting sand and native vegetation. These adjacent landuses tend to threaten the valuable wildlife habitats of the area, as does recreational use by campers and 4-wheel drive enthusiasts.

Conservation Values: **Natural:** a,b,c,f,g,h,i **Cultural:** c **Historic:** a,b,d

Comment:

Natural: The Kaipara Harbour mouth is an outstanding area for flora with unequalled natural ecotone sequences of sandfield vegetation, freshwater swamps, saline wetlands, coastal scrub, and coastal forest. On its south head the Waionui wetlands form an extensive area of sand dunes, soaks and wetlands which are regionally rare, and contain "vulnerable" species (*Cyclosorus interruptus* (source 7), *Mazus pumilio* (source 10)) and good sequences of a diversity of ecotones (Slaven, pers. comm. 1990). In conjunction with the wetlands the Waionui inlet, with extensive mudflats and mangroves (*Avicennia marina* var. *resinifera*), contains good ecotone sequences. The north head contains a wetland area of a similar caliber, but remains unresearched. North head is also characterised by two unmodified native forest remnants growing amidst mobile dunes, which is very unusal. The species present include manuka (*Leptospermum scoparium*), kanuka (*Kunzea ericoides*), kohekohe (*Dysoxylum spectabile*), karaka (*Corynocarpus laevigatus*), cabbage tree (*Cordyline australis*), taraire (*Beilschmiedia tarairi*), rewarewa (*Knightia excelsa*), and totara (*Podacarpus totara*). The dune lakes on north head contain noteworthy aquatic vegetation, including the "endangered" species *Hydatella inconspicua* (source 4), and have good ecotone sequences.

The Papakanui Spit is the principle nesting area for the caspian tern (*Hydroprogne caspia*) ("threatened") and white fronted tern (*Sterna striata*) on the Kaipara, and large numbers of arctic migrant birds use the spit as a roost site, including the bar-tailed godwit (*Limosa lapponica baueri*) and lesser knot (*Calidris canutus canutus*). There can be up to 10000 wading birds at this roost site at any one time, with high numbers of NZ dotterel (*Charadrius obscurus*), variable oystercatcher (*Haematopus unicolor*) and wrybill (*Anarhynchus frontalis*) (three "threatened" species), as well as South Island pied oystercatcher (*Haematopus ostralegus finschi*), turnstone (*Arenaria interpres interpres*), fairy tern (*Sterna nereis*) ("endangered") and red-necked stint (*Calidris ruficollis*) ("rare arctic") (source 8). The adjacent Waionui inlet is an important feeding site for the large numbers of wading birds previously noted, and wetland birds use the margins of the

habitat, including bittern (*Botaurus stellaris poiciloptilus*) ("threatened"), fernbird (*Bowdleria punctata vealeae*) (regionally "threatened"), and crake species (*Porzana* spp.) (source 8). These wetland bird species are also present at the Lagoon Road Pond, as well as pukeko (*Porphyrio porphyrio melanotus*), little shag (*Phalacrocorax melanoleucos brevirostris*), capsian tern, and breeding black swan (*Cygnus atratus*), mallard (*Anas platyrhynchos platyrhynchos*), and grey duck (*A. superciliosa superciliosa*). The pond is a good quality habitat for "threatened" species. On the Kaipara north head bluffs there is a grey petrel colony (*Procellaria cinerea*) with a large number of burrows (estimated to be approx. 70 in 1980). North head also contains a large number of dune lakes, which are excellent habitats for waterfowl, secretive swamp species and lake shag species. NZ scaup (*Aytha novaeseelandiae*), shoveler duck (*Anas clypeata*), black swan, grey duck and grey (*A. gibberifrons gracilis*) and brown teal (*A. aucklandica chlorotis*) ("endangered" species) breed in the lakes, and they are an important moulting site for the paradise shelduck (*Tadorna variegata*). Other birds which inhabit the site include bittern and fernbird ("threatened"), spotless crake (*Porzana tabuensis plumbea*), pukeko, banded rail (*Rallus philippensis assimilis*) ("threatened"), little shag, little black shag (*Phalacrocorax sulcirostris*), pied shag (*P. varius varius*), NZ dotterel (*Charadrius obscurus*), banded dotterel (*C. bicinctus bicinctus*), terns, and the NZ dabchick (*Podiceps rufopectus*) ("threatened"). 56 different bird species have been recorded in the northern head lake area (Green, pers. comm. 1990). The north head dune lakes contain populations of the endangered dwarf inanga (*Galaxias gracilis*).

Cultural: The heads have an above average landscape quality value, due to their natural qualities. (Source 9)

Historic: North head is characterised by two pa sites, middens and one probable agricultural site, however, the most important archaeological site in this area is the Pukekura historic area, a burial ground (source 2 and 5). Adjacent to this site is a feature of known historic value, the Poutu lighthouse. South head is almost exclusively characterised by middens (source 6). 28 ships were wrecked in the harbour mouth and/or on the heads between 1840 and 1974. (Ingram, 1984)

Site Importance: International National Regional Local Unknown

Comment:

The site represents a major roost and breeding area for wading birds and waterfowl in New Zealand, and is a habitat for high numbers of "threatened" and "endangered" species (source 8, SSWI). The wetlands in the area are regionally "rare", and the botany is generally characterised by good sequences of a diversity of ecotones (Slaven, pers. comm. 1990). A number of the dune lakes in the site have been classified as first order lakes by NWASCO (1986) (source 3).

Existing Threats: c,d,k,m

Type & Comment:

Wild cats, cattle (grazing down to the water's edge), possums (*Trichosurus vulpecula*) and visitors dogs (*Canis familiaris*) have all been identified as damaging the wildlife habitat and directly threatening petrels and their burrows. Pines (*Pinus* spp.) planted in the vicinity of dune lakes may eventually reduce the water level of the lakes. Seed stocks from the pine plantations along the southern peninsula enhance the likelihood of the establishement of lupins (*Lupinus arboreus*), marram (*Ammophila areneria*) and pines. Recreational threats include 4-wheel drive and motor bike enthusiasts driving in the dunes, and campers using the area, affecting habitats and birds. The area adjacent to the Waionui inlet and Papakanui spit is used by the Airforce as a bombing practice range. (Ritchie, pers. comm. 1990)

Human Modification and Human Use: a,h,i,k1 (structures),k2 (fisheries)

Catchment modification has occurred around the dune lake complexes, including pastoral development, exotic forestry, and some water extraction for local users. The Poutu offshore sand extraction operation north west of Pouto, is licensed by the Department of Conservation to take 60 000 m^3 per year. Fishermen fish off the beach at the base of the north head bluffs, 4-wheel drive vehicles and campers use the area (with a camp site at Poutu), and birdwatching is a popular pastime. Some boat fishing occurs, it is however, dependent on the harbour bar conditions. On the whole, human modification in the area is limited. The Kaipara Heads is a popular commercial net fishery when conditions are suitable for small boats. Larger vessels (trawlers and danish seine boats) are prohibited from working within one mile of the beach and heads.

Existing Protection: a,d

Type & Comment:

The north head dune lakes are part of a wildlife refuge (rural A classification) which covers much of the site in question (including the Pouto peninsula lakes and Papakanui spit).

Most of the south and north head sand bodies (including the Papakanui Conservation Area (1113.5 ha) and the Kaipara Head bluffs) and the dune areas surrounding the northeast dunelakes and the northwestern shoreline is DOC estate. This area is as a whole is extensively protected. Commercial fishing restrictions apply to the Kaipara Harbour mouth.

Availability of Information:

Natural	1 2 3
Cultural	1 2 3
Historic	1 2 3
Threats	1 2 3
Human Mod. & Use	1 2 3

1. **Well documented**
2. **Limited information (general)**
3. **Little information (if any)**

Comment:
Bird counts and breeding success is monitored by the OSNZ, the area is also regularly visited by DOC staff.

Sources of Information:

Natural	1 2 3 4 5 6 7
Cultural	1 2 3 4 5 6 7
Historic	1 2 3 4 5 6 7
Threats	1 2 3 4 5 6 7
Human Mod. & Use	1 2 3 4 5 6 7

1. **Derived info. from existing literature & databases**
2. **Derived info as above & field check**
3. **Derived from existing maps & aerial photographs**
4. **Recent DOC survey including sampling & analysis**
5. **Recent DOC survey excluding sampling & analysis**
6. **Experience**
7. **Expert opinion**

Comment:

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2. Coster, J. (1980). Pouto State Forest, Archaeological Site Survey (1978-80). NZ Forest Service.
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11. Given, D.R., W.R. Sykes, P.A. Williams & C.H. Wilson. Threatened local plants of NZ: A revised checklist. Botany Division Report. DSIR, Christchurch.
12. Slaven, D. (1990). Ecological Consultant, Auckland.
13. Green, C. (1990). Department of Conservation, Auckland.
14. Ritchie, J. (1990). Department of Conservation, Auckland.

Recorded on Existing Databases:

1. **WERI**
2. **SSWI**
3. **PNA** - No
4. **Geopreservation** - No
5. **HPT County Inventories**
6. **Other** - (a) ARA (1984) An Assessment of Auckland Region's Landscape. ARA, Regional Planning Board, (b) NZAA Site Records, (c) MAFFish database.
7. None

Comment:

SSWI Survey 1977, resurveyed 1986.
Waionui Inlet, Lake Rototuna, and Lagoon Road Pond ranked high. Papakanui Spit, Poutu SE and SW dune lakes and Kaipara head bluffs ranked outstanding.

Other Considerations:

This site falls approximately within the tribal boundaries of Te Taou of Ngati Whatua. The contact person for these tribes is Marina Fletcher, Waimauku. Waionui Inlet needs to be added the Papakanui Conservation Area to include the full range of habitats present.

Accompanying Maps and Photographs:

Site Name/s: Kaipara Harbour	Site No: CRI 020 010
Recorders Name: Paul Irving	Conservancy: Auckland
Map/Grid Ref: P08, Q08, Q09, Q10, Q09 26300 65300	Date: 19.03.90

Brief Description of Site:

New Zealand's, and possibly the world's largest enclosed harbour and protected estuarine area. Total area 94,700 ha, with 800 km of coastline, and 40,000 ha of mud and sandflats, with 12,500 ha covered by mangroves (*Avicenna marina* var. *resinifera*). It is a mosaic of estuarine habitats, mangroves, saltmarsh, saltmeadow and maritime rushes. High quality habitat for wading birds and marine species. Relatively modified by reclamation and catchment modification, but extensive size means large remnant areas still exist in a more or less natural state. Presently less utilised and modified than the Manukau, but with the potential for significant change due to external influences from Auckland's urban sprawl and population. There is a low population associated with the harbour, centred primarily on Helensville and Dargaville at the southern and northern ends, otherwise small scattered rural communities.

Conservation Values: **Natural:** a,b,c,e,f,g,h,i **Cultural:** c **Historic:** a,b,c,d,e

Comment:

Natural: (a) Despite some modification the sheer size and extent of the Kaipara Harbour has resulted in some areas still being described as having a high degree of naturalness. It is characterised by large numbers of areas commonly frequented by rare and common wading bird species, a wide variety of estuarine habitats, and good successional sequences from tidal channels to near shore mangrove, saltmarsh, saltmeadow, maritime rushes with freshwater habitats and full forest habitats (most notably the Tuahoa Scientific Reserve for mangroves and estuarine systems, and the Hoteo River and Mt Auckland Forest (Atuanui Conservation Area)). Numerous other sites are also significant, particularly mangrove areas where fairly large remnants exist with associated maritime wetlands to landward, for example Tapora, Arapaoa River, and South East Kaipara and Kaukapakapa areas. Puketohuha has mature coastal forest remnants.

(b) Within the Kaipara there are a number of sites where rare or endangered species are known, or have been sighted. The entire Kaipara is a migratory bird habitat of international significance, and so rare international species, such as the bar-tailed godwit (*Limosa lapponica baueri*), lesser knot (*Calidris canutus canutus*) and turnstone (*Arenaria interpres interpres*) are frequently noted, as are threatened or endangered native species, such as N.I. fernbird (*Bowdleria punctata vealeae*), crake (*Porzana* spp.), Australasian bittern (*Botaurus stellaris poiciloptus*), banded rail (*Rallus philippensis assimilis*), grey-faced petrels (*Pterodroma macroptera gouldi*), banded dotterel (*Charadrius bicinctus bicinctus*), NZ dotterel (*C. obsurus*) and wrybill (*Anarhynchus frontalis*). Botanically, there are a number of different habitats, within which rare or unusual species are found. The Kaukapakapa forest contains the rare *Prasophyllum pumilium*. Barrs Road Forest is an example of lowland kahikatea (*Podocarpus dacrydioids*) forest uncommon in the Auckland region, and Mt Auckland forest contains *Marattia salicina*, and *Bulbophyllum tuberculatum*, both rare. Moturemu Island has the endangered *Clinathus puniceus* (Kaka beak) once thought extinct in Auckland (Given et al 1987). The Hoteo River, a significant freshwater input into the Harbour, arises from a deep gorge and flows directly into the harbour with a minimal estuarine zone. Such a habitat is rare in Auckland generally, and especially for the Kaipara where broad estuarine flats are the norm.

(c) The entire harbour is recognised for its habitat for feeding, roosting, breeding of many native and international wader species. 42 coastal species are known, with upto 45-50,000 birds not uncommon. The international species are bar-tailed godwit (12000), lesser knots (17000), and the migratory national species are, wrybill (100), South Island pied oystercatcher (*Haematopus ostralegus finschi*) (12000) pied stilt (*H. haematopus leucocephalus*) (2000) and banded dotterel (420) and use the harbour for feeding during the summer before returning to the northern hemisphere or South Island respectively to breed. Significant local populations of black swan (*Cygnus atratus*) (3000), bittern, spotless crake (*Porzana tabuensis plumbea*), pukeko (*Porphyrio porphyrio melanotus*), grey duck (*Anas superciliosa superciliosa*) and grey-faced petrels breed in the area (SSWI). The marine and estuarine areas are noted for the breeding of important fish species, snapper (*Chrysophrys auratus*), mullet, sole (*Peltorhamphus novaezeelandiae*), kahawai (*Arripis trutta*), trevally (*Caranx georgianus*), gurnard (*Chelidonichthys kumu*), yellow-eyed mullet (*Aldrichetta forsteri*) and skates, rays and sharks. These and other species spend at least one part of their lifecycle in the Kaipara Harbour. Cockles (*Chione stutchburyi*), pipis (*Paphies australis*), scallops (*Pecten novaezelandiae*) and oysters (*Crassastrea gigas*) also are present in large numbers. Being the largest such harbour on the west coast, and containing significant large areas of suitable juvenile habitat, and breeding grounds, plus having less problems with water quality than the Manukau, the Kaipara Harbour is the singlemost significant wetland for west coast fisheries. (Irving, pers. comm. 1990)

(e) Unusual landforms within the Kaipara, or associated with it are the Hoteo River Gorge, a deeply incised meandering gorge of 30 km length which continues below the tidal influence of the Kaipara (Rodney PNA). The Miocene Coral and Mollusc fossils of Jordans Road quarry (Geopreservation) and the Parakai geothermal field, the largest and hottest in the Auckland region with flows of 220 m^3 per hour at 60°C.

(f) Many of the SSWIs, fauna, flora and marine sites within the Kaipara are noted as being representative of their respective habitats and communities. Of particular significance are the following areas: Those mangrove sites still remaining since 1976 survey by Chapman (40 sites), Arapaoa River, Te Ngaio Pt and Barrs Road Forest for successional habitats, estuarine to terrestrial; East Kaipara, Tauhoa River and South East Kaipara for mangrove and saltmarsh habitats, Kaukapakapa forest and Pukekohuhu for terrestrial coastal forests and Hoteo River/Atuanui for successional sequences from estuarine to freshwater terrestrial habitats.

(g) Tuahoa Scientific Reserve is of known scientific significance for Mangroves, 301 ha in 75% mangroves, specifically. Longterm interest of the harbour over years has resulted in large number of papers, surveys and reports. A bibliography is held on file in the Auckland office.

(h) The Kaipara is recognised in its entirety as a site of international significance for its bird species and habitats. It is of national significance as the site of spat collection for pacific oyster aquaculture, and for its contribution as the spawning grounds and juvenile habitats for important west coast commercial fisheries - given Manukau Harbour's degraded state - high habitat value as an SSWI.

Historic: (a) and (c) Within the Kaipara Harbour, associated (principally) with the Northern Kaipara are 16 buildings of known historic value with Historic Places Act classifications either determined (A-D) or pending (P). Within the Arapaoa River, at Paparoa are the historical archaeological sites of Wrights pottery site and the Redfern Brickworks, plus Cliff House (C classified) and the National Bank with a classification pending. At nearby Matakohe is Smiths Mill site, also an historical archaeological site. At Whakapirau, is the C classified St Albans Church building, with the former hotel at Pahi pending classification. Opposite Karahanui is the former limeworks,

another archaeological site. Within the Otamatea is the Karakeo Church building (C) and Gittos Home (C). At Bately is Masefield House (pending) and the former fish cannery and flourmill sites - both archaeological sites. Up the Oruawaro River is the Gittos Point Mission Station archaeological site, and Minnesdale House (D) and Chapel (P) at Wharehine. Six sites rate national significance.

(b) Many pa, undefended settlements and individual middens representing intensive occupation of such a large shallow protected harbour full of natural resources, ranging from food to transport routes. The location of clusters of sites is more an artefact of areas of intensive survey, than real. The expectation is that settlement would have been dense all around the harbour and associated rivers, dunes and dune lakes. A report of archaic artefacts on South Kaipara Head suggest early prehistoric occupation (B Sewell, pers comm. 1990). Good or adequate surveys are recorded for much of the harbour and surrounds, but areas not surveyed include the Kaukapakapa to Wharehine Coast, and the North Kaipara Inlet, Ruawai to Bately (B Sewell pers comm. 1990).

(d) The kaipara Harbour has 10 known shipwreck sites, dating from 1874 to 1978 (Ingram 1984).

(e) As noted in (a) above, six sites of historic value are of national significance. These are - Wrights pottery site, Paparoa; Gittos House, Rangiora; Karakea Church,;Gittos Point Mission site: and the Minniesdale House and Chapel, Wharehine (D Reynolds pers comm. 1990).

Cultural: (c) The landscape quality ratings for the Kaipara coastaline vary from 6-3 on the scale of 1-7, with 5 (above average) and 6 (high). It is not consistently high enough to rate more than local significance overall. The mouth and southern bank of the Oruawharo River to Port Albert rate high (6). Short stretches of the western shore, south of South Head, Shelley Beach, Kakanui Point, Mataia, Karaka Point and Orongo Point rate 5 (above average). (ARA 1984)

Site Importance: International **National** **Regional** **Local** **Unknown**

Comment:

International significance for the wildlife values - particularly wading bird species (IUCN 1981). For fisheries (Irving, pers. comm 1990), and historic values it rates of national significance (D Reynolds pers comm. 1990). Botanically it rates of regional significance (D Slaven pers comm. 1990).

Existing Threats: a,b,c,d,e,f,g,h,j,k,m

Type & Comment:

(a) Erosion - the harbour is characterised by high medium and low energy erosion and deposition areas. The above average landscape areas of South Kaipara Head to Shelley Beach characterised by progressive erosion of soft sediments (Brockbank 1983).

(a) Flooding - significant high tide roosts - lowlying reclamations at Oyster point and Jordons are threatened by postulated sea level rise. These areas already subject to low energy erosion/deposition events.

(b) Siltation from farmland development and reclamations noted in some catchments, plus fears for future felling of pine forests associated with catchment heads.

(c) Spartina - well established in various areas, notably associated with reclamations and farmland - probably resulting from deliberate plantings. "Jordans", Oyster Point, Hoteo River margins and Shelley Beach. *Pinus pinaster* and *Pinus radiata* plus "mile-a-minute" plant (*Dipogon lignosus*) is a local problem on Moturemu Island. Self sown pines a problem in other bush and forest areas, due to close proximity of large plantations.

(d) Pasture and grazing encroaching on many mangrove and estuarine areas around the entire margin relates to private ownership of these, plus lack of adequate fencing to keep stock out. Also poor attitude of local farmers to protection of foreshore. Rats are present on Moturemu Island and are predating on seedlings etc.

(e) Water pollution, due to direct discharge of treated sewage from some settlements, especially Helensville, dairy farming and dairy factories, especially Kaipara River and Maungataroto. Otherwise little known about water quality (see other consideration).

(f) Sand mining occurs on the harbour margins at "Jordans" and Oyster Point. These may affect roosting areas in the future.

(g) Extensive reclamations all around harbour, some hundreds of hectares in extent. Some are legal, but most illegal, often associated with private title. These provide roosts for birds, but remove estuarine wetlands, used for food, and nursery areas for marine resources.

(h) Aquaculture, both oyster and mussel (*Perna canaliculus*) farmed within the harbour. The practice has changed for oyster since the advent of pacific oysters. These are now found extensively throughout they harbour, occasionally being so dense on mudflats as to preclude recreational use, i.e. swimming. Grey mullet (*Mugil cephalus*) farming established at 2 locations. This uses foreshore impoundments to rear fish in. Has led to illegal reclamation and stopbanking. Marron (*Cherax tenuimanus*) farm now abandoned but still possible in the future.

(j) Litter associated with road cuttings becoming a problem in some areas, particularly plastics. No major landfills currently used, but dumps associated with private land still visible, plus unknown effects of previous tipping at Helensville.

(k) Recreation is extensive across entire harbour. Specific problems associated with offroad vehicles on mudflats and in mangroves, and shooting of ducks, plus wildlife (inadvertantly?).

(m) Private ownership of seabed. Many landowners have surveyed title below MHWM. Indiscriminant dumping and reclamation etc results.

Human Modification and Human Use: a,b,h,i,k1(structures),k2(fisheries),k3(aquaculture)

(a) Virtually the entire catchment is modified and in pasture forestry or rural/small urban development.

(b) The body of the Kaipara has been subject to significant reclamations over the past 80 years. Much of the margin is in private title and reclamation is commonplace, but often illegal.

(h) Recreation primarily associated with the water areas, but wildlife watching, occurs at most locations around the harbour where land access available. Camping occurs at limited locations.

(i) Water based recreation - primarily fishing and boating associated with fishing. Occurs all over harbour, but mainly associated with boat ramp access, e.g. Helensville and Shelly Beach.

(j) Maori oyster reserves within the harbour.

(k1) 239 structures known for the Kaipara - many illegal - particularly reclamations.

(k2) Significant commercial fishery - limited to the harbour by the entrance bar. Major species; grey mullet, flounder (*Rhombosolea* spp.), school shark (*Galeorhinus australis*) and rig (*Mustelus lenticulatus*). 100 boats - most less that 5 m long taking 615 tonnes in 1989. Dredge mussels and cockles also fished commercially.

(k3) Approximately 45 oyster leases, 2 grey mullet farms.

Existing Protection: a,d
Type & Comment:

(a) Tauhoa Scientific Reserve for Mangroves (301 ha)
(a) Mt Auckland Conservation Area (611 ha)
(a) Sand Island (Tapora) Wildlife Management Area (63 ha)
(a) Mohuremu Island (5 ha)
(a) Kaukapakapa Estuary Scientific Reserve (209 ha)
(a) Okahukura Conservation Area (536 ha)
(a) Tauhoa River Conservation Area (251 ha)
(a) Waioneke Conservation Area (91 ha)

(d) Exclusion of trawling, danish seine fishing, dragnetting within the harbour. Restrictions on set net size and mesh.
(d) Maori Oyster Reserve in some arms of Kaipara.

Plus numerous other scenic and other reserves within the catchment and foreshore area.

Availability of Information:

Natural	1 2 3
Cultural	1 2 3
Historic	1 2 3
Threats	1 2 3
Human Mod. & Use	1 2 3

1. **Well documented**
2. **Limited information (general)**
3. **Little information (if any)**

Comment:

Natural - well documented for flora and fauna values. Marine ecology less so, but primarily related to estuaries in general. Geomorphic values documented by site specific work, or University thesis.

Cultural - well documented, in landscape but little info on spiritual values. Needs further work. Historic - well documented for archaeology - except those areas not yet surveyed. Historic sites noted. Shipwrecks noted but not shown on maps.

Sources of Information:

Natural	1 2 3 4 5 6 7
Cultural	1 2 3 4 5 6 7
Historic	1 2 3 4 5 6 7
Threats	1 2 3 4 5 6 7
Human Mod. & Use	1 2 3 4 5 6 7

1. **Derived info. from existing literature & databases**
2. **Derived info as above & field check**
3. **Derived from existing maps & aerial photographs**
4. **Recent DOC survey including sampling & analysis**
5. **Recent DOC survey excluding sampling & analysis**
6. **Experience**
7. **Expert opinion**

Comment:

The information available on the Kaipara, ranges from good SSWI information to recent site surveys not yet written up for the botanical. Geomorphic information primarily expert opinion.

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Reynolds, D. (1990). Historic Places Trust, Auckland.
Slaven, D. (1990). Environmental Consultant, Auckland.
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Recorded on Existing Databases:

1. **WERI**
2. **SSWI**
3. **PNA**
4. **Geopreservation**
5. **HPT County Inventories**
6. **Other** - MAF Fisheries. DOC Coastal Wetland Inventory (Auckland)
   - Department of Conservation, Inventory of mainland estate, Auckland Conservancy
7. **None**

Comment: SSWI database - mostly resurveyed in the last 5-6 years.

Other Considerations:

- Water quality survey - the state of water quality needs to be addressed and investigated as this will have major impact on natural values.
- Private land ownership below MHWM needs to be investigated and clearly mapped.

Forestry in the headwaters and catchment is quite extensive and poses a potential threat to the entire harbour if not managed well.

The tangata whenua are Ngati Whatua with Marina Fletcher (Waimauku) as the contact.

Accompanying Maps and Photographs:

Site Name/s: Mokohinau Islands	**Site No:** CRI 020 011
Recorders Name: Felicity Fahy	**Conservancy:** Auckland
Map/Grid Ref: S07 (NZMS 260 map unavailable)	**Date:** 19.03.90

Brief Description of Site:

The Mokohinau Island group is composed of two major islands, Burgess and Fanal, 12 associated stacks and 16 rocks. The islands are small enough to be perceived in their entirity and close enough to be considered a group. Fanal Island is the largest in the group with cliff faces up to 150m high rising from the sea. The group is situated northwest of Great Barrier Island, they are the most remote of the outer Hauraki Gulf Islands. The Islands are small and rugged with coastal cliffs which make access difficult. The vegetation has been modified by fire, especially on Burgess Island, much of which has been converted to pasture. The vegetation on the islands is dominated by coastal species such as pohutukawa (*Metrosideros excelsa*), *Pseudoparex lessoni, Coprosma* species and toitoi (*Cortaderia toetoe*). Many of the species are low growing due to the exposed nature of this site. The area has been used for many years as a place for mutton birding, especially by people living on Great Barrier Island. This use is recorded in a number of archaeological sites. Burgess Island is a lighthouse station and the other islands are wildlife sanctuaries, therefore, a permit from DOC is needed to land. As the islands are protected, the major threat to the natural habitat of the islands comes from fishing practices which strip the marine resources of the area.

Conservation Values: **Natural:** a,b,c,d,f,g **Cultural:** a,c,e **Historic:** b,d

Comment:

Natural: The Mokohinau Islands were active rhyolite volcanoes that are known to have erupted periodically for about 2 million years. The islands are noted for their good quality coastal forest and the following species *Hebe "Mokohinau"* which is endemic, *Lepidium oleraccum* which is vulnerable, *Rosippa gigantica* which is rare (D Slaven pers. comm. 1990). It is also noted for the presence of *Botrychium australe* and a large leafed form of *solanum aviculare* var. *latifolium*.

Land fauna is sparce on the Mokohinau group, with the main wildlife being eight lizard species. There is also an endangered stag beatle (*Dorcus ithaginus*) found only on one stack. Several species of petrel rest on the islands. The NI saddleback (*Philesturnus carunculatus rufusater*), a rare species, was released onto Fanal Island but it is unknown if it has survived. Terns and gannets nest on the Cathedral rocks and use the surrounding marine area for feeding. There are species of "Mokohinau" skink (*Cyclodina* sp.) of uncertain identity, they may be a new species, if so they would be rare and with a distribution restricted just to this group of islands.

The coastal waters are renowned for their diversity and intensity of marine life. The waters contain marine fauna not found on mainland coasts or on islands closer to the mainland, e.g. Intertidal chiton, the rare species *Chiton aorangii* and subtropical fish species that are similar to those in the Poor Knights Islands (source 1). There is a very wide range of subtidal marine habitats contained in a small area. The marine ecology of this area has been studied over many years, several MSc thesis have been written on various marine species and subtidal survey maps have been drawn for the islands at a scale of 1:120,000. (Ballantine pers. comm. 1990)

Cultural: On the ridge above the western landing on Fanal Island there is said to be a tapu area of unknown origin (pers. comms. Brenda Sewell 1990). From a landscape perspective the entire coastline is considered to have a high landscape value. The lighthouse on Burgess Island highlights the remoteness of the island group. The Mokohinau group is very important for educational purposes also. Since 1978 the University of Auckland Leigh marine Laboratory has been undertaking inter and subtidal (to 30m) surveys of the area. Some of this information is published (source 1).

Historic: Fanal Island has a range of archaeological sites including 6 terrace sites, 1 cooking area, an obsidian flaking floor, several middens and mutton birding sites. These represent short term and seasonal occupation. Historically Maori people from Great Barrier Island went to Fanal Island on annual mutton-birding expeditions and probably all sites relate to these expeditions (B Sewell pers. comms. 1990) There is a cluster of sites above the eastern landing on Fanal Island, two of which contain a large amount of obsidian which is located at the furtherest known point from the obsidian source. There is one significant site of archaeological value on the northern side of Fanal Island. It is an obsidian flaking floor and contains the obsidian outcrop known as Mataa (pers. comms. B Sewell 1990). Two archaeological surveys have been undertaken on Fanal Island (source 2&3), both were of excellent quality (pers. comm. B Sewell 1990). The more northern island group of Burgess, Hokoromea and Atihau also has a range of archaeological sites including 2 obsidian flake sites, a pa, an undefended site and middens. These sites represent a short term or seasonal occupation by a small group of people. One survey of the area was carried out in 1986 (source 4). One ship was wrecked in 1975 on the islands. (Ingram 1984)

Site Importance: International **National** Regional Local Unknown

Comment:

On the basis of fauna present the Island group is of national importance (pers. comm. C Green 1990). Flora and landscape values indicate that the site is of regional significance (pers. comm. D Slaven, J Hawley 1990 respectively).

Existing Threats: i

Type & Comment:

The main conservation values that may be threatened are associated with the marine ecology. Fishing techniques including recreational gill netting, commercial fishing and paua gathering may all be having a negative impact on the islands fishery resources.

Human Modification and Human Use: a,i,j

The Mokohinaus are used for recreational scuba diving and there are a small number of anchorages available on Burgess Island that are used by fishing and diving boats.

Maori people from Great Barrier Island apply to hunt mutton birds (*Puffinus griseus*) each year and are permitted to do so.

Burgess Island has been extensively cleared and converted to pasture, a lighthouse station is also located there.

Existing Protection: a

Type & Comment:

The Mokohinau group are part of the Hauraki Gulf Maritime Park (108- ha), (with the exception of Burgess Island) and are a Class B nature reserve, which means the islands have restricted access, usually only scientific groups are allowed access (source 5).

Availability of Information:

Natural	1 2 3
Cultural	1 2 3
Historic	1 2 3
Threats	1 2 3
Human Mod. & Use	1 2 3

1. Well documented
2. Limited information (general)
3. Little information (if any)

Comment:

Sources of Information:

Natural	1 2 3 4 5 6 7
Cultural	1 2 3 4 5 6 7
Historic	1 2 3 4 5 6 7
Threats	1 2 3 4 5 6 7
Human Mod. & Use	1 2 3 4 5 6 7

1. Derived info. from existing literature & databases
2. Derived info as above & field check
3. Derived from existing maps & aerial photographs
4. Recent DOC survey including sampling & analysis
5. Recent DOC survey excluding sampling & analysis
6. Experience
7. Expert opinion

Comment:

1. Creese, R. & W. Ballintine (1978). Joint RMZAF & Leigh Marine Laboratory inter & subtidal (to 30m) study. The Mokohinau Is : A marine survey, Leigh Lab. Bulletin No. 21.
2. Spring-Rice, W. (1980). Fanal Island (Motukino) archaeological survey and historical account. Tane 26:99-105.
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5. Hauraki Gulf Maritime Park Board(1982). Hauraki Gulf Maritime Park Management Plan, September NZ Department of Lands and Survey.
6. Sewell, B. (1990). Department of Conservation, Auckland.
7. Ballantine, W. (1990). University of Auckland.
8. Ingram, C.W.N. (1984). Shipwrecks of NZ 1795-1982. AW & AH Reed Ltd.

Recorded on Existing Databases:

1. WERI
2. SSWI
3. PNA
4. Geopreservation
5. HPT County Inventories
6. Other - Information held by Leigh Laboratory - marine habitat maps, etc.
7. None

Comment:
The Mokohinau Islands are not included in the SSWI database, if they were their ranking would probably be high (pers. comm. C. Green 1990). Coastal conservation values were not found in any existing database but various reports have been written that describe aspects of the island group.

Other Considerations:

This site falls within the tribal boundaries of the Ngati Wai. The contact person for this tribe is Laly Haddon, Wellsford. Future protection of the marine environment is considered to be important, although at present isolation plays a part in its management.

Accompanying Maps and Photographs:

Site Name/s: Mangawhai Harbour	**Site No:** CRI 020 012
Recorders Name: Sian John	**Conservancy:** Auckland
Map/Grid Ref: R08 26545 65640	**Date:** 20.03.90

Brief Description of Site:

The Mangawhai Harbour site is a complex amalgam of an estuary, a large sandspit/sand island, tidal sandflats, and unlimited areas of saltmarsh which grade into shrubland. It is a small, sandspit enclosed, mesotidal estuarine lagoon. During July 1978 the sandspit was breached at its lowest and narrowest point, 1500m south of the original inlet, forming a second inlet which rapidly developed to dominate the harbour hydraulics. (McCabe 1985). The high dune complex dominates the site and is a very important wildlife habitat.

The margins of the inner harbour are largely cleared and are characterised by urban development and roading. The site is an important recreational area, which subsequently poses a threat to the wildlife habitat.

Conservation Values: **Natural:** a,b,c,e,f,h,i **Cultural:** c **Historic:** a,b

Comment:

Natural: Sail Rock, a small offshore island with excellent coastal forest, contains a number of notable species, including *Casmichaelia williamsii* ("vulnerable"), *Pratia physaloides* ("vulnerable"), and *Streblus banksii* (source 3). The harbour itself is characterised by sandspit vegetation, reedland, shrubland, mangroves (*Avecennia marina* var. *resinifera*) and saltmarsh/saltmeadow, with one of the best mangrove forests on saline wetland in the district, and one of the three best *Leptocarpus similis* sedgelands. The northern end of the Pakiri Beach Spinifex (*Spinifex hirsutus*)-pingao (*Desmoschoenus spiralis*) dune/sand field complex is also included in this site, and represents the best such coastal association in the district (source 1).

The Mangawhai Estuary and Spit is an excellent area for wading birds, spotless crake (*Porzana tabuensis plumbea*), N.I. fernbird (*Bowdleria punctata vealeae*), and banded rail (*Rallus philippensis assimilis*). The sandspit is the only regular nesting area for fairy tern (*Sterna hereis*) in NZ, and a major nesting area for caspian tern (*Hydroproque caspia*), white-fronted tern (*Sterna striata*), NZ dotterel (*Charadrius obscurus*), variable oystercatcher (*Haematopus unicolor*), banded dotterel (*Charadrius bicinctus bicinctus*) and pipit (*Anthus novaeseelandiae*). More than 27 bird species have been recorded on the sandspit. (SSWI)

The Mangawhai dunefield is an excellent example of a transverse dune. At 2km long, 750m wide and 42m high it is formed of unconsolidated aeolian sands of marine origin. This high dynamic sand dune is a regionally rare landform with very high geomorphic values (source 1).

Cultural: The landscape quality of the area is rated highly attractive according to the ARA landscape assessment (source 5).

Historic: Historic sites of significance occur at the back of the harbour, and include the Double Cottage and Mangawhai Hotel. Mangawhai Pa and midden sites indicate scattered Maori occupation of the area.

Site Importance: International **National** Regional Local Unknown

Comment:

The site contains breeding populations of "endangered" (fairy tern), "threatened" (NZ dotterel, banded dotterel, caspian tern) and "rare" (variable oystercatcher) bird species (source 4). The Mangawhai transverse dune field is unique in the district and of national significance (PNA - Rodney).

Existing Threats: c,k

Type & Comment:

Marram grass (*Ammophila arenaria*) has been planted on the spit, and is causing problems because Pingao does not compete well with this species and it reduces the value of the habitat for bird nesting.

Peak recreational time coincides with the nesting period of important birds, and as a consequence many nests and chicks are lost.

Human Modification and Human Use: a,d,h,i,k1 (structures),k2 (fisheries)

The open coastal strip is generally unmodified, in the harbour itself, however, limited shore stabilisation has occurred in conjunction with the development of moorings and slipways.

Recreation is a popular use of the area, with the harbour containing three camp sites. Swimming, boating, fishing and walking are popular past-times.

Commercial fishing occurs in and around the harbour, primarily for snapper and net caught species. The harbour and coast are protected from trawling and seining from October to April each year.

Existing Protection: a

Type & Comment:

The sandspit is a Government Purpose (Wildlife Management) Reserve and a Wildlife Refuge, representing part of the DOC estate (Mangawhai Conservation Area).

Some limited fisheries protection is in place, restricting trawling, pair trawling and seining, as part of greater Hauraki Gulf restrictions.

Availability of Information:

Natural	1 2 3
Cultural	1 2 3
Historic	1 2 3
Threats	1 2 3
Human Mod. & Use	1 2 3

1. Well documented
2. Limited information (general)
3. Little information (if any)

Comment:

Water pollution from the increasing population at Mangawhai poses a potential threat.

Sources of Information:		1. Derived info. from existing literature & databases
Natural	1 2 3 4 5 6 7	2. Derived info as above & field check
Cultural	1 2 3 4 5 6 7	3. Derived from existing maps & aerial photographs
Historic	1 2 3 4 5 6 7	4. Recent DOC survey including sampling & analysis
Threats	1 2 3 4 5 6 7	5. Recent DOC survey excluding sampling & analysis
Human Mod. & Use	1 2 3 4 5 6 7	6. Experience
		7. Expert opinion

Comment:

Sources:
1. Rodney PNA; revised report (1983-1984).
2. McCabe, P. (1985). Mangawhai Harbour and the development of its dual inlet system. MSc Thesis, Earth Sciences, Waikato.
3. Given, D.R. (1981). Rare and endangered plants of New Zealand. A.H. & A.W. Reed.
4. Bell, B.D. (1986). The conservation status of New Zealand wildlife. NZ Wildlife Service, Occasional Publication No. 12.
5. ARA (1984) An assessment of Auckland Region's Landscape. ARA, Regional Planning Office.

Recorded on Existing Databases:
1. WERI
2. SSWI
3. PNA
4. Geopreservation
5. HPT County Inventories
6. Other - (a) ARA (1984) An assessment of Auckland Region's Landscape. ARA, Regional Planning Office. - (b) NZAA site survey. - (c) Coastal Wetland Inventory - Auckland held by DOC, Auckland.
7. None

Comment:
Surveyed 1979, resurveyed 1986; ranked - high.

Other Considerations:

This site falls within the tribal boundaries of the Kawerau. The contact person for this tribe is Hariata Ewe, Auckland.

Accompanying Maps and Photographs:

Site Name/s: Pakiri Beach	Site No: CRI 020 013
Recorders Name: Paul Irving	Conservancy: Auckland
Map/Grid Ref: R08 26500 65550	Date: 16.03.90

Brief Description of Site:

Pakiri Beach, Te Arai Point, Tomerata dune lakes, Pakiri rivermouth. A long sweep of East Coast open sand beach, which extends from the mouth of the Mangawhai Harbour to Okakari Point at the southern end of Pakiri Beach (approximately 20 km). The volcanic rock outcrop of Te Arai Point is the only major break. The beach is backed by extensive dunes and dune lakes. The area is the only exposed East Coast beach free of housing and, as such, has wild and scenic qualities. The wetlands associated with Tomarata, Spectacle and Slipper Lakes are rated as Sites of Special Wildlife Interest (SSWI), as is the Pakiri rivermouth. The major human use of the site is for passive recreation. Agricultural runoff does pose some threat to the dune lakes, as a source of entrophication.

Conservation Values: **Natural:** a,b,c,e,f,g. **Cultural:** c,e **Historic:** b,d.

Comment:

Natural: A variety of landforms make up the site:

a) The Pakiri rivermouth is noted as being in a relatively natural state, with a good sequence of flora from sand-dune through to salt-marsh to salt-meadow. Pakiri Beach is also rated as having a high degree of naturalness (D Slaven pers. comm. 1990).
b) Rare species of water-fowl are associated within the dune lakes. Bittern are noted from the lakes and Pakiri Stream. Banded rail (*Rallus philippensis assimilis*) and N.I. fernbird (*Bowdleria punctata vealeae*) also are reported from the Pakiri Stream, plus NZ dotterel (*Charadrius obscurus*) (threatened), caspian tern (*Hydroprogne caspia*) (threatened) and variable oystercatcher (*Haematopus unicolor*) (rare). Pingao (*Demoschoenus spirilis*) is present on Pakiri Beach (rare species: Given et al 1987) and, in a roadside scrub on Pacific road, *Pomaderis phyliciflia* var. *polifolia* occurs (vulnerable: Given 1981).
c) Each of the lakes and the river estuary is a breeding area for Australasian bittern (*Botaurus stellaris poiciloptitus*) and N.I. fernbird. Pakiri Beach and dunes is a breeding area for NZ dotterel, caspian tern, plus shags and other water-fowl feed on the lakes and estuary.
e) Pakiri Beach and its extensive dune complex is the only exposed East Coast beach still in a relatively natural state (Auckland Regional Planning Scheme).
f) Pakiri rivermouth is recognised as being representative of East Coast sand-dune estuarine systems (regional significance). Within the Rodney Ecological District the Rahuikiri Road No. 2 site is recognised as the best pohutukawa (*Metrosideros excelsa*) forest on stabilised sand; and the Rahuikiri Road No. 1 site is recognised for puriri (*Vitex lucens*), manuka (*Leptospermum scoparium*), taraire (*Beilschmiedia tarairi*) and mosaic forest. Lake Tomarata is recognised as a representative lake and wetland complex.
g) Both the Pakiri Beach and Te Arai Point are recognised for scientific investigations of marine processes. Te Arai Point is part of a series of sites being investigated for urchin (*Evichinus chloriticus*)/kelp (*Ecklonia radiata*) inter-actions. Pakiri Beach has been the site of investigation of sand transport and environmental investigation of soft bottom communities. Both are associated with Leigh Marine Laboratory, 6 km SE.

Cultural

c) Pakiri Beach is rated as highly attractive, with a wild and scenic character, lowered only slightly by the intrusion of Te Arai Point (above average) and its associated quarry. (ARA 1984)
e) Pakiri Beach is of significance to the University of Auckland in its teaching of both coastal processes and open soft coast marine communities. This arises as much from the close proximity to the Leigh Laboratory, as the natural values of the areas.

Historic

b) There are no known historic sites within the site. Archaeological sites are known from surveys of Pakiri Beach and the Poutawa Stream to Te Arai Point area. Pa and middens are identified representing an emphasis on coastal occupation and resource use. The population appears to have been somewhat spread out (Newman [1975], Pearce [1975]).
d) Between Mangawhai Harbour and Pakiri Beach five shipwrecks are known to have occurred between 1861-1960. (Ingram 1984)

Site Importance: International **National** Regional Local Unknown

Comment:

Overall the site is of regional significance, but Lake Tomarata is of national significance for its wildlife values and rare species, i.e. Australasian bittern and N.I. fernbird (Ref. SSWI survey card 21/73, Lake Tomarata and Swamp [Green pers. comm. 1990]).

Existing Threats: Type and Comment: c, d, f, g, i, m.

c) Marram grass (*Ammophila arenaria*) planted on the dunes; pingao does not compete well with marram.
d) Stock grazing around the wetlands and other areas of vegetation not protected, i.e. on private land.
f) Sand mining off Pakiri Beach - may affect the beach and the ecological monitoring of marine environments. Te Arai Point quarry removing rock for road metal.
i) Bottom trawling may affect scallop (*Pecten novaezelandiae*) and other beds offshore; also disturbing ecological monitoring programme.
g) Southern side of Te Arai Point has shore stabilisation works, causing local erosion.
m) Drainage of the Tomarata Swamp area.

Human Modification and Human Use: h, i, k1, (structures) k2 (fisheries).

h) Beach used for a number of recreational activities - swimming, surfing, fishing, etc. as are the lakes. Picnic areas are located adjacent to the lakes and beach. High recreational use believed to be affecting seasonal success of NZ dotterel nesting and breeding. Duck shooting around the lakes.
i) Run-off from surrounding pasture appears to be causing lake eutrophication.
k1) A single boat ramp in Lake Tomarata.
k2) Trawling and Danish seining occurs off Pakiri beach at certain times of the year.

Existing Protection:

Type & Comment:

The Rodney District Scheme zoned the site as a Rural Conservation 1 Zone in its proposed second review.

The site also contains DOC estate land, including the Te Arai Point Conservation Area (1.2 ha), and the Pakiri Scenic Reserve (87 ha).

Availability of Information:

Natural	1 2 3
Cultural	1 2 3
Historic	1 2 3
Threats	1 2 3
Human Mod. & Use	1 2 3

1. Well documented
2. Limited information (general)
3. Little information (if any)

Comment:

With the various categories the availability alters.

Natural: Fauna 2, marine 3, botanical 1, geomorphic 1.
Cultural: Landscape 2, educational values 3.
Historic: Archaeological 2 - good where known, but more survey needed to complete area.

Sources of Information:

Natural	1 2 3 4 5 6 7
Cultural	1 2 3 4 5 6 7
Historic	1 2 3 4 5 6 7
Threats	1 2 3 4 5 6 7
Human Mod. & Use	1 2 3 4 5 6 7

1. Derived info. from existing literature & databases
2. Derived info as above & field check
3. Derived from existing maps & aerial photographs
4. Recent DOC survey including sampling & analysis
5. Recent DOC survey excluding sampling & analysis
6. Experience
7. Expert opinion

Comment:

Much of this information comes from existing data bases, PNA, WERI, SSWI, landscape assessment, archaeology surveys, etc.

ARA Regional Planning Dept 1984. An Assessment of Auckland Region's Landscape. ARA.
Newman M (1975). Site Recordings on the Leigh-Pakiri Coast, North Auckland. NZHPT, 13pp.
Pearce, P. (1975). Site Recordings in the Te Arai Point to Poutawa Stream Sand Dunes, North Auckland. NZHPT, 16pp.
Bell, B.D. (1986). The Conservation Status of NZ Wildlife. Wildlife Service Occasional Publication No. 12.
Given, D.R. (1981). Rare and Endangered Plants of NZ. A H & A W Reed Ltd.
Auckland Regional Authority (1988). Regional Planning Scheme. ARA.
Given, D.R., W.R. Sykes, P.A. Williams and C. Wilson (1987). Threatened and local plants of NZ. A revised checklist. DSIR, Christchurch, mimeograph.
Ingram, C.W.N. (1984). New Zealand Shipwrecks 1795-1982. A H & A W Reed Ltd.
Slaven, D. (1990). Ecological Consultant, Auckland
Green, C. (1990). Department of Conservation, Auckland.

Recorded on Existing Databases:

1. **WERI**
2. **SSWI**
3. **PNA** Rodney District 1984.
4. **Geopreservation**
5. **HPT County Inventories**
6. **Other** ARA Landscape Assessment Study
7. **None**

Comment: Five SSWI's:
Little Shag Lakes, 21/74, Res. 1985, Mod.
Slipper Lake, 21/74, Res. 1985, Mod-High.
Spectacle Lake, 21/74, Res. 1985, Mod-High.
Tomarata Lake, 21/73, Res. 1985, High.
Pakiri River estuary, 22/73, Res. 1985, 1984. Mod-High.

Other Considerations:

Tangata whenua is Ngati wai. Contact person is Laly Haddon, Pakiri Beach.

Recreational shooting appears to affect NZ dotterel nesting success.

Lake Tomarata appears to be eutrophying due to local agricultural runoff.

Accompanying Maps and Photographs:

Site Name/s: Little Barrier Island | Site No: CRI 020 014

Recorders Name: Sian John | Conservancy: Auckland

Map/Grid Ref: NZMS 259 27990 65540 | Date: 20.03.90

Brief Description of Site:

Little Barrier Island is roughly circular in outline, being 7 km from north to south and nearly 7 km from east to west. The island is a dissected andesitic volcanic cone of mid-Pleistocene age. Marine erosion has marred the simple symmetry of the island by removing all planezes from the eastern side and has produced high cliffs around its whole perimeter. These cliffs are fringed by an almost continuous boulder beach, except where rocky headlands jut into the sea. The ruggedness of the coastline makes access difficult. The island is covered by forest, including coastal pohutukawa (*Metrosideros excelsa*) forest, which typically grades from kanuka (*Kunzea ericoides*) to mixed kauri (*Agathis australis*)-hardbeech (*Nothofagus truncatus*) and broadleaf associations. The island is a very important wildlife habitat, in the main due to its status as a nature reserve. This status restricts access to the island without a permit and therefore human use and modification is limited, Maori historical occupation is apparent however.

The island has been a nature reserve of some sort since 1894, when purchased from the Maori owners by the Crown, for that specific purpose.

Conservation Values: **Natural:** a,b,c,e,f,g,h **Cultural:** b,c
Historic: b,d

Comment:

Natural: Little Barrier Island is characterised by two sites of coastal geomorphic significance (source 1). Hingaia (pohutukawa flat) is an extensive rock fall in the NE of the island from cliffs that rise 1400ft above sea level. The volume of the fall is approximately 25 000 000 cu.yd., with a weight of approximately 50 000 000 tonnes. The sea has cliffed the debris to a height of nearly 50ft. Te Titoki Point (on the southwest coast) on the other hand was formed by the convergence of two boulder banks, whose height increases from approxiamtely 10ft where they join the normal boulder beach beneath the cliffs to approximately 35ft at the point. Behind the banks is a triangular area of 66 acres, which forms the only area of flat land on the island.

The wildlife of the coastal zone includes a rich variety of forest bird species and several endangered species (source 5), including half the known world population of kakapo (*Strigops habroptilus*). Kokako (*Callaeas cinerea wilsoni*), brown kiwi (*Apteryx australis mantelli*), saddleback, (*Philesturnus carunculatus rufusater*) kaka (*Nestor meridionalis septentrionalis*), long-tailed cuckoo (*Eudynamys taitensis*), NI robin (*Petroica macrocephala longipes*), whitehead (*Mohoua albicilla*), pied tit (*Petroica macrocephala toitoi*), and stitch bird (*Notiomystis cincta*) all breed in this area. Nesting seabirds include black petrel (*Procellaria parkinsoni*) and cooks petrel (*Pterodroma cookii cookii*), and a large pied shag (*Phalacrocorax varius varius*) colony near Te Tikoki Point.

Little Barrier Island contains the only remaining sizeable unmodified stands of kauri-hardbeech in the northern region. It is also the only example of miro (*Podocarpus ferrugineus*)-halls totara (*Podocarpus hallii*) over towai

The marine environment surrounding Little Barrier Island has known scientific value (Irving pers. comm. 1990), this assessment is based on the scientific record of work done. In general, however, our knowledge of this particular site is slight.

Cultural: The entire coastline of Little Barrier Island is considered to have outstanding landscape quality and aesthetic value, much of the forest has never been modified. (Hawley pers. comm. 1990.)

Historic: The Tawiki was wrecked on the shoreline of the Island in 1887 (Hamilton 1961). Little Barrier Island was historically characterised by at least seasonal archaeological Maori settlements, and today contains the remnants of pa, undefended settlements, and stone structures and gardens close to the Te Titoki Point boulder flat (sources 2, 3, 4). Stone walls and structures possibly associated with gardens on the boulder flats represent an area of known significance. Several burials are recorded as having occurred on the island, but location is unknown.

Site Importance: International National Regional Local Unknown

Comment:

Due to the presence of several endemic endangered bird species which breed and nest in the area (particularly kakapo) (source 5) and the undisturbed nature of the vegetation, the site is of international significance. It also has regionally significant geomorphic and archaeological sites, and regionally important aesthetic value.

Existing Threats: d,k(structures)

Type & Comment:

Kiore (*Ratus exulans*) are present on the island and eat the seed stock.

Illegal landing on the island is a threat, which poses a particular threat in terms of camp fires.

Human Modification and Human Use: i,k

Human modification and use is prohibited on the island. The only area of land development is focused around the rangers residence at Te Titoki Point, where landing structures are also present.

The island was partially logged late last century on its lower slopes (Hamilton 1961).

The marine environment surrounding the island is a focus for fishing and diving.

Existing Protection: a

Type & Comment:

Little Barrier Island is a nature reserve of international significance, and part of the DOC estate.

Availability of Information:		1. Well documented
Natural	1 2 3	2. Limited information (general)
Cultural	1 2 3	3. Little information (if any)
Historic	1 2 3	
Threats	1 2 3	
Human Mod. & Use	1 2 3	

Comment:

There is a substantial file and inventory on this island in the Department of Conservation office in Auckland, particularly related to the vegetation, history and fauna, established since the islands acquisition in 1894.

Sources of Information:		1. Derived info. from existing literature & databases
Natural	1 2 3 4 5 6 7	2. Derived info as above & field check
Cultural	1 2 3 4 5 6 7	3. Derived from existing maps & aerial photographs
Historic	1 2 3 4 5 6 7	4. Recent DOC survey including sampling & analysis
Threats	1 2 3 4 5 6 7	5. Recent DOC survey excluding sampling & analysis
Human Mod. & Use	1 2 3 4 5 6 7	6. Experience
		7. Expert opinion

Comment:

Sources:
1. Hamilton, W.M. (1961). Little Barrier Island (Hauturu)(2nd Ed). NZ Department of Scientific and Industrial Research, Bulletin 137. Govt. Printer, Wellington.
2. Bartlett, J. (1980). Little Barrier Island - Hauturu, archaeological site survey 1980. NZHPT, Auckland 1980/4.
3. Hayward, B.W. (1982). Prehistoric archaeological sites on Little Barrier Island, NZ. Tane 28:67-78.
4. Hurley, C & Swadling, P.C. (1969). Preliminary field survey of Little Barrier. NZAA Newsletter 12(4):204-217.
5. Bell, B.D. (1986). The Conservation Status of NZ Wildlife. NZ Wildlife Service, Occasional Publication No. 12.
6. Irving, P. Department of Conservation, Auckland.
7. Hawley, J. Landscape Architect, Department of Conservation, Auckland.
8. Slaven, D. Ecological Consultant, Auckland.
9. Ministry of Agriculture and Fisheries, (1985). Auckland Region Marine Reserves Plan, a discussion paper. Ministry of Agriculture and Fisheries, Auckland, mimeograph.

Recorded on Existing Databases:

1. WERI
2. SSWI
3. PNA
4. Geopreservation
5. HPT County Inventories
6. Other - NZAA Site Survey.
7. None

Comment:

Not recorded on an SSWI, but would fall into the outstanding category (C Green, DOC, Auckland, pers. comm.).

Other Considerations:

This site falls into the tribal boundaries of the Ngati Wai. The contact person for this tribe is Laly Haddon, Pakiri.

The coast of Little Barrier Island has been identified as the site of a possible future marine reserve, (MAF 1985). Both for their own value, and for their value as part of the unbroken sequence from sea to mountain top are these marine areas of value.

Fire is a threat, due to the steep and heavily wooded nature of the island.

Poaching of endangered species could become a major threat, especially of kakapo and other bird species.

Accompanying Maps and Photographs:

Site Name/s: Cape Rodney	Site No: CRI 020 015
Recorders Name: Paul Irving	Conservancy: Auckland
Map/Grid Ref: R09 26742 65455	Date: 20.03.90

Brief Description of Site:

Extends from the southern end of Pakiri Beach to Goat Island, then to Cape Rodney, as part of the exposed rocky coastline of the outer Hauraki Gulf. From Cape Rodney to Ti Point the coastline is more sheltered facing south-east into the Hauraki Gulf. The small harbour of Omaha Cove and the indentation of Mathesons Bay provide for an even more sheltered environment. The northern coast from Okakari Point to Cape Rodney is totally protected by a marine reserve, and the location for the Leigh Marine Laboratory. The southern coast from Cape Rodney to Ti Point is characterised by the more modified landscape of Leigh township, harbour, and rural development of the coastline. Land use is primarily sheep and beef pasture.

Conservation Values: **Natural:** a,b,c,d,e,f,g,h. **Cultural:** c, e. **Historic:** b,d.

Comment:

Natural:

a) As far as can be determined for any stretch of coastline and adjacent waters, the marine ecology of the marine reserve is as natural as can be expected. It is used as a yardstick for sites and species nationwide, yet is still recognised as constantly changing, based on ongoing research (Ballantine pers. comm. 1990).

b) Three species of plant are known from this area to be vulnerable species. These are *Pomadernis hamiltonii*, known only from the Leigh/Omaha/Sandspit area and Kawau, and *Calystegia marginata*, reported from Ti Point (Slaven 1990). Omaha Cove is the known southern limit of *Chianachloa bromivides*, and its only location in Auckland (A E Wright pers. comm. 1990).

c) Due to the intense study of marine life within and adjacent to the marine reserve, many localised sites important to marine species have been identified for this coast. It should be noted that this is not to say the coast is special in this respect, merely well investigated (Irving, pers. comm. 1990).

d) The species and habitats within the marine reserve are now classed as sensitive to change, primarily for the importance for scientific research of controlling or eliminating such change. As the only place in the marine environment where changes could have a significant chance of not being human induced, then any change becomes significant.

e) Goat Island and adjacent coastline is listed as a significant landform by the Rodney Ecological District PNA Survey, for its coastal character of greywacke outcrops, and the comparison of the northern highly exposed coast with the sheltered areas adjacent to Cape Rodney and Ti Point. Also of note are unusual chaliciform coral fossils found at Mathesons Bay. These are noted in the Geopresentation Data Base as being of regional scientific significance, but vulnerable to human induced damage, and worthy of permanent protection.

f) Within the Rodney Ecological District the cliffs of Ti Point are noted as being the best examples of pohutukawa forest sites on coastal cliffs and headlands. The marine and intertidal rocky coast habitats identified and described within the marine reserve have served to define representative habitats. These areas are the habitat equivalent of holotype specimens for species.

g) The site is of significant scientific and educational value. A bibliography of publications is available from Leigh Marine Laboratory or DOC, Auckland, on request.
h) Of national significance due to the role of the area in contributing to marine science, and of international significance for the exercise of mapping the subtidal habitats and features of the marine reserve. Almost a world first (Mimiwhangata provided the prototype). The laboratory and reserve is a focus for international study (Ballantine, Creese pers. comm. 1990).

Cultural:

c) Between Pakiri and Goat Island the landscape is rated above average (5) for the rolling hills backing steep cliffs and rocky shores. Native vegetation remnants and pohutukawa dot the cliffs. Goat Island provides the focus of the area, with its distinctive shape and forest character, adding interest to the distant character of the sea views, the Whangarei heads, the Mokohinaus and other offshore islands. (ARA 1984)
e) This coastline has educational value, focused principally on the marine reserve and the access points of Leigh Harbour, Mathesons Bay, and Ti Point. Large numbers of educational groups, ranging from primary to tertiary, dive schools to scientific conferences, use the area. References include the interpretive pamphlets produced by the marine laboratory, Morton and Chapman (1969), Gordon and Ballantine (1976).

Historic:

b) The area has been surveyed (Newman 1975), with three pa and two settlements noted. Middens are associated with both types of sites. It is suggested that this represents a low utilisation of the area, due to its rugged nature, high cliffs, lack of access to coastal resources, as well as a lack of suitable agricultural soils. Leigh Cove and Mathesons Bay are recommended for further detailed survey.
d) The coast has four shipwrecks dating from 1867 to 1967. (Ingram 1984)

Site Importance: International **National** Regional Local Unknown

Comment:

The location of the Cape Rodney to Okakari Point Marine Reserve, and the Leigh Marine Laboratory on the northern side of the Cape means the entire area is the focus for scientific investigation, now covering many disciplines, using Leigh Marine Laboratory as a base for investigation and education. Much of the information produced at Leigh Marine Laboratory, on the local coastline, Mangawhai Heads to Takatu and out to the Mokohinau, Hen and Chicken, and Little Barrier Islands, is of international significance and has been compared favourably with institutions such as Woods Hole Oceanographic Institute, the world's largest (Ballantine pers. comm. 1990).

Existing Threats: Type and Comment: a, d, e, f, i, k, l

a) Erosion of the exposed Waitemata series sediments on the northern shore of the marine reserve to the detriment of the highly visible cliff face with sparse remnant vegetation cover.
d) Northern coast: Stock on beach of marine reserve - possums (*Trichosurus vulpecula*) browsing on pohutukawas (*Metrosideros excelsa*).
e) Run-off from local agriculture; of particular significance is the Whakatawhenua Stream running into Goat Island Bay. This carries sewage and agricultural run-off from the small catchment directly into the marine reserve at its most visible and heavily used location.

f) Sand mining at Pakiri, locally considered to be a potential cause of changes in the sediment regime within the marine reserve. Seventy thousand cubic metres per annum is being removed; and sediments within the marine reserve are believed to have been lowered by one to two centimetres since recording began in 1986. (Ballantine pers. comm. 1990).
i) Fishing within the reserve (poaching).
k) Recreation over-use within the marine reserve 1983 to 1984: Figures now estimated to be approximately 75,000 visitor days per annum (Irving pers. comm. 1990).
l) Coastal subdivision: Both adjacent to the marine reserve, changing the landscape value by placing highly visible structures on a rural landscape, and around Leigh Harbour and adjacent coasts, Mathesons Bay.

Human Modification and Human Use: a, d, h, i, k2 (fishing)

a) Virtually the entire Cape Rodney peninsula is modified to a rural landscape.
d) Small boat harbour in Omaha Cove (Leigh Harbour), with moorings (<100), minor commercial wharf - principally servicing the fishing industry, and a boat ramp for recreational use.
h) Shore based recreation for both the marine reserve area and the rest of the coast ranges from swimming to picnics to walking (note the Leigh Walkway from Goat Island Bay to Cape Rodney), plus fishing outside the reserve.
i) Water based recreaion - focused on the marine reserve for diving, photography, fishing outside, and Leigh wharf/boat ramp as an access point to other local areas, i.e. Little Barrier, and Mathesons Bay for boating and water skiing.
k2) Commercial fishing is focussed around the perimeter of the reserve.

Existing Protection:

Type and Comment:

a) Cape Rodney to Okakari Point Marine Reserve (518 ha) and associated land reserves.
a) University Reserve, associated with the Leigh Marine Laboratory.

Availability of Information:

Natural	1 2 3
Cultural	1 2 3
Historic	1 2 3
Threats	1 2 3
Human Mod. & Use	1 2 3

1. Well documented
2. Limited information (general)
3. Little information (if any)

Comment:

Sources of Information:

Natural	1 2 3 4 5 6 7
Cultural	1 2 3 4 5 6 7
Historic	1 2 3 4 5 6 7
Threats	1 2 3 4 5 6 7
Human Mod. & Use	1 2 3 4 5 6 7

1. Derived info. from existing literature & databases
2. Derived info as above & field check
3. Derived from existing maps & aerial photographs
4. Recent DOC survey including sampling & analysis
5. Recent DOC survey excluding sampling & analysis
6. Experience
7. Expert opinion

Comment:

Information about the area has been generated primarily by research and study derived from the Leigh Marine Laboratory. This now serves as a base for most research disciplines in the general area. Natural values are well described for marine sciences but less well so for botanical and fauna. The cultural aspects are described only for landscape, derived from the ARA landscape assessment study 1984. Threats and human use of the area is documented and arises from more obscure sources. Major references are:

Newman, M. (1975). Site recordings on the Leigh-Pakiri coast, North Auckland. NZHPT publication 13pp.

ARA Regional Planning Department (1984). An Assessment of Auckland Regions' Landscape. ARA.

Morton, J.E. and V.J. Chapman (1968). Rocky Shore Ecology of the Leigh Area - North Auckland. University of Auckland, 44pp.

Gordon, D.P. and W.J. Ballantine (1976). Cape Rodney to Okakiri Point Marine Reserve. Review of Knowledge. ARA Regional Planning Dept (1988). Auckland Regional Scheme. ARA.

Given, D.R. (1981). Rare and Endangered Plants of NZ. A H & A Reed Ltd.

Rodney PNA (1983) - draft final edition.

Morton, J.E. and M.C. Miller (1968). The New Zealand Seashore. Collins.

Wright, A.E. Botanist, Auckland Institute and Museum.

Ingram, C.W.N. (1984). Shipwrecks of NZ 1795-1982. AW & AH Reed Ltd.

Ballantine & Creese, Marine Laboratory, Leigh.

Irving, P. Department of Conservation, Auckland.

Recorded on Existing Databases:	Comment:
1. WERI	
2. SSWI	
3. PNA	Rodney PNA (1983) - as yet unpublished.
4. Geopreservation	Fossils
5. HPT County Inventories	
6. Other	Auckland University Bio Sciences Review, August 1988.
7. None	Available on request from DOC, Auckland. 100pp, plus references.

Other Considerations:

Whilst the boundaries of the marine reserve fall into this site, the significance of the work done by the Leigh Marine Laboratory extends far beyond. Broadly speaking, from Mangawhai to the Mokohinau Islands, to Great Barrier Island to south of Kawau. These are sites of significance for investigation, using the Leigh Marine Laboratory and the reserve as experimental components. Consideration needs to be given to protecting a much wider area from certain major types of disturbance in order to continue research.

Accompanying Maps and Photographs:

Site Name/s: Omaha Bay - Whangateau Harbour	Site No: CRI 020 016
Recorders Name: Sian John	**Conservancy:** Auckland
Map/Grid Ref: R09 26400 65690	**Date:** 20.03.90

Brief Description of Site:

The coastal landscape boundaries of this site lie between Ti Point and Te Kie Point, the site includes Whangateau Harbour, and Mangatawhiri Barrier-Spit (Omaha). The harbour is characterised by extensive areas of mangroves (*Avicennia marina* var. *resinifera*) and saltmarsh, has good intact ecotone sequences, a 98% water exchange with each tidal cycle, and extensive sand-shell mudflats. The boundary of the harbour is partly continuous with kahikatea (*Podocarpus dacrydioids*) forest at the base of the spit, and farmland over much of the catchment. The barrier spit on the other hand is composed of unconsolidated Holocene coastal sediments deposited on either side of an initial barrier ridge, the landform records the episodic depositional history of the area. The present phase is characterised by erosion along the ocean beach, accentuated by residential development involving a lowering of the foredune topography. This is a substantial threat to the developed foreshore and backshore environment. The site represents a much developed and much used coastline, with coastal subdivision and population growth putting pressure on the resource as well as extensive recreational use. Poor coastal management has marred the value of this site.

Conservation Values: **Natural:** a,b,c,e,f,g **Cultural:** c **Historic:** b,d

Comment:

Natural: Banded rail (*Rallus philippensis assimilis*) (threatened) (t) are present in the mangrove areas of Whangateau Harbour, while important coastal wading birds present include breeding populations of NZ dotterel (*Charadrius obscurus*) (t) and variable oystercatchers (*Haematopus unicolor*) (rare) (r) which nest at the end of Omaha Spit. Reef heron (*Egretta sacra sacra*) (t) and caspian tern (*Hydroprogne caspia*) (t) also feed in the harbour, as do a number of rarely seen international migratory birds including marsh sandpiper (*Tringa stagnatilis*), far-eastern curlew (*Numenius madagascariensis*) (r) and asiatic whimbrel (*Numenius phaeopus variegatus*) (r) (source 5). The harbour provides large areas of rich intertidal feeding grounds for a variety of coastal birds. The kahikatea swamp forest on Omaha Spit provides a second habitat in this site, and is an important food source for NZ pigeons (*Hemiphaga novaeseelandiae novaeseelandiae*) and possibly terns. The harbour itself contains extensive areas of dense mangrove on saline wetlands, and good areas of *Leptocarpus* sedgeland/rushland, with a unique transition in the southern arm from kahikatea forest to saline wetlands (*Leptocarpus similis*-manuka (*Leptospermum scoparium*) scrub-kahikatea). Omaha Spit contains the best coast manuka forest and kahikatea swamp forest on stabilised sands in the region, forming an uninterrupted ecotone sequence with a high degree of naturalness (D Slaven, pers. comm.). Inland and adjacent to the harbour *Pomaderris hamiltonii* ("vulnerable") is established, occurring only here and at one other locality in NZ (source 4). Manuka forest on the Omaha Flats represents the best example of such forest on podzolised sand in the district (source 1).

The Mangatawhiri Spit, Whangateau Estuary, and Whangateau Flats form a unique association of Holocene and last-interglacial marine deposits, incorporating stabilised sand, podzolised sand and saline wetland. The Mangatawhiri Sandspit is a holocene barrier comprised of linear beach (podzolised) and dune ridges, that is, a coastal depositional landform. The Whangateau Flats on the other hand are comprised of "humate" material (the flats may have been a former barrier-spit). This represents the most southerly known occurrance of humate. The site also has an important scientific value, as it records coastal history during the late Quarternary. (Source 1)

The marine environment is representative of the NE coast enclosed harbour, protected shore system, and is a known habitat of *Amphioxus* NZ lancet (P Irving, pers. comm. 1990).

Cultural: The mouth of the Whangateau Harbour is rated as having an outstanding landscape quality (7, on a scale of 1-7), due to the juxtaposition of Te Point, Omaha Spit, and an area of enclosed water with coastal forest cover. The spit itself is also rated highly attractive (6). (Source 7)

Historic: Maori occupation in this area was clustered around the sheltered shoreline and reliant on seafoods. The area is characterised by 4 pa sites, open settlements and middens, with sites clustered on the northern shores of the entrance, and around the westerly channel. The Mary Thomson and the Phoenix sank in 1874 and 1879 respectively in the vicinity of the mouth of Omaha Spit. (Ingram 1984)

Site Importance: International National **Regional** Local Unknown

Comment:

As a breeding area for several threatened and rare species (source 5) and a large rich feeding ground for a number of species, the site is regionally significant. The site is also one of two general localities of *Pomaderris hamiltonii* in NZ, and contains *Amphioxus* NZ lancet.

Existing Threats: b,c,d,e,k,l,m

Type & Comment:

Coastal subdivision has occurred on the Omaha Spit very close to the shoreline, and with it bulldozing of the foredune, the result has been extensive erosion which continues today. The harbour contains large areas of spartina grass, which poses a considerable threat to the intertidal area by raising ground levels by silt build up. Siltation has been, and is, a consequence of coastal subdivision and land development of the rural catchment (in particular Omaha and Point Wells) in excess of natural rates. Water pollution is occurring as a consequence of sewage runoff, in particular from septic tanks and a treatment area. A road causeway built across the southern arm of the harbour impedes the tidal flow and thereby has altered the natural ecological processes. The site is placed under very high recreational pressure from boating and fishing. Cattle and occasionally other stock are able to get onto the harbour and feed off the mangrove/saltmarsh communities.

Human Modification and Human Use: a,b,d,g,h,i,k1 (Structures),k3 (aquaculture)

Land development (subdivision) has occurred right to the margins of the water edge and swamp forest, and several causeways and roads cross the harbour and run through the forest.

Recreational use of the area is heavy, with the harbour containing moorings and two anchorage sites, and the land site containing a golf course. Fishing at the harbour mouth is very popular, as is swimming, boating and net fishing. A marine oyster farm has subsequently been established.

Substantial beach replenishment has occurred on the Omaha Spit, and groynes have been built at the base of the spit in an attempt to stabilise, and enhance progradation of, the sand. Further structures are located within the harbour, and are associated with recreational use (boat ramps, slipways etc) and shore stabilisation. The inner harbour is also characterised by a number of reclamations.

Existing Protection: c,d

Type & Comment:

A nature conservation zone has been established on the Omaha Spit south west foreshore; and the northern portion of the harbour catchment is a Coastal Landscape Protection Zone. The Omaha Forest is privately owned, but is in the process of becoming a local purpose reserve vested with the Rodney District Council, zoned Rural Conservation One. A beach protection plan has been implemented in an attempt to stabilise the eroding ocean beach.

Availability of Information:

Natural	1 2 3
Cultural	1 2 3
Historic	1 2 3
Threats	1 2 3
Human Mod. & Use	1 2 3

1. Well documented
2. Limited information (general)
3. Little information (if any)

Comment:

Sources of Information:

Natural	1 2 3 4 5 6 7
Cultural	1 2 3 4 5 6 7
Historic	1 2 3 4 5 6 7
Threats	1 2 3 4 5 6 7
Human Mod. & Use	1 2 3 4 5 6 7

1. Derived info. from existing literature & databases
2. Derived info as above & field check
3. Derived from existing maps & aerial photographs
4. Recent DOC survey including sampling & analysis
5. Recent DOC survey excluding sampling & analysis
6. Experience
7. Expert opinion

Comment:

Sources:

1. Rodney PNA - Final Edition; Draft (1983-1984).
2. Reid, J.F. (1978). Mangatawhiri Barrier Spit : Geomorphology and surficial sediments. MA Thesis (Geography), University of Auckland.
3. ARA (1988). Auckland Regional Planning Scheme. ARA.
4. Given, D.R. (1981). Rare and Endangered Plants of New Zealand. A.H. & A.W. Reed.
5. Bell, B.D. (1986). The Conservation Status of New Zealand. NZ Wildlife Service, Occasional Publication No. 12.
6. Irving, P. (1990). Department of Conservation, Auckland
7. ARA (1984). An assessment of Auckland Region's Landscape. ARA, Regional Planning Department.
8. Ingram, C.W.N. (1984). Shipwrecks of NZ 1795-1982. A H & A W Reed Ltd.

Recorded on Existing Databases:
1. WERI
2. SSWI
3. PNA - Rodney (1983-1984)
4. Geopreservation
5. HPT County Inventories
6. Other - (a) ARA (1984) An assessment of Auckland Region's Landscape. ARA, Regional Planning Department. (b) NZAA Site Surveys, (c) AKU Herbarium Sheets.
7. None

Comment:
Surveyed 1977, resurveyed 1985; ranked moderate-high.

Other Considerations

This site falls into the tribal boundaries of the Kawerau. The contact person for this tribe is Hariata Ewe, Mangere.

Accompanying Maps and Photographs:

Site Name/s: Tawharanui Peninsula	Site No: CRI 020 017
Recorders Name: Felicity Fahy	Conservancy: Auckland
Map/Grid Ref: R09 26720 65350	Date: 20.03.90

Brief Description of Site:

This peninsula forms a prominent projection of hilly land between Omaha Bay to the north and Kawau Bay and Island to the south. The isthmus is formed by a narrow band of flat to undulating land that lies between the upper limits of the estuaries of the Omaha River and the Matakana River. From Te Kie Point the coastline on the northern side of the peninsula is rocky through to Pukenihinihi Point, from here a series of sandy beaches extends for 3km. A rocky headland protrudes at the extreme eastern end of the peninsula. On the southern side of the peninsula the coastline is characterised by a succession of small bays, that have developed inbetween rocky headlands.

The landscape is rural in character with rolling hills in pasture and bush remnants in the gullies. Along the coast there is a pattern of coastal forest which gives homogeneity to the landscape. Much of this site is included in ARC Tawharanui Regional Park. Offshore from the northern side of the peninsula is a marine park administered by ARC.

The area has a range of archaeological sites present including small pa, undefended settlements, garden sites and a lot of middens.

Intensive recreational fishing, including poaching within the marine park is a threat to the target species in the area.

Conservation Values: **Natural:** a,b,e,f,g,h **Cultural:** c,e **Historic:** b

Comment:

Natural: This peninsula has been identified as a priority landform site and is also included in a large Recommended Area for Protection (RAP) from the Rodney PNA survey (source 1). It is the best example of a peninsula representative of the relatively sheltered eastern coastline of the inner Hauraki Gulf. This peninsula illustrates the characteristic Rodney arrangement of a peninsula joined to the mainland by holocene marine sands, a pattern of landform development which is repeated south of Cape Rodney and gives the district its own distinctive character. The site still retains extensive areas of forest that have conservation value also. The pohutukawa (*Metrosideros excelsa*) forest at Karamuroa is one of the best pohutukawa forest on coastal cliffs in the district, Rodney PNA (source 1) declares it a priority vegetation site, it is within a large RAP site. Tawharanui forest has been identified by the PNA survey as having a kauri (*Agathis australis*) forest "core", the best in the district, with the best taraire (*Beilschmiedia tarairi*) forest in the district also, both areas are priority vegetation sites, the site has a SSWI rating of moderate-high habitat value. The manuka (*Leptospermum scoparium*) forest at the tip of the peninsula has been identified from Rodney PNA as being the best on a peninsula in the district. The forest has a pohutukawa fringe along the coastal edge. The cliffed portion on the southern side of the peninsula has some of the best pohutukawa forest on cliffs in the district, it also has been identified as a priority vegetation site and is within a RAP (source 1).

This site has significant marine ecological value. The marine area of the northern side of the island has a high degree of naturalness as it has been protected under marine parks status for the last 8 years. Comparative studies with Cape Rodney-Okakari Point marine reserve indicte that they are very similar in terms of habitat quality and species present. (P Irving pers. comm. 1990). This peninsula is one of only two places in the Hauraki Gulf to have a resident mado (*Atypichthys latus*) population. A resident population is rare. The area is representative of north eastern NZ rocky and sandy sub and intertidal habitats, and as a result of its protection the marine ecology is no longer significantly modified by human intervention (P Irving pers. comm. 1990). Monitoring of the area has been undertaken annually for the period 1977-1982, as well as 1989 (source 2). The area is of national significance as it is one of only two marine areas in NZ that are totally protected against all forms of human modification and interference. It forms a "standard" for rocky shore surveys carried out by W Ballintine (pers. comm. 1990).

Cultural: All of this coast is rated as (6) highly attractive landscape (ARA landscape assessment database). The peninsula, especially the marine park area, is used extensively by students from Leigh Marine Laboratory. It is also used by school parties due to its proximity to the highly populated Auckland area.

Historic: This area has been fairly well surveyed for archaeological sites (source 3). A range of sites are present including small pa, undefended settlements, garden sites and a number of middens. Emphasis for settlement has been focused on the coast. The widely spaced pa could have been the focus of seasonal settlement based on marine resources. No sites of special significance are noted (B Sewell pers. comm. 1990).

Site Importance: International **National** Regional Local Unknown

Comment:

The site is of national significance, being only one of two totally protected marine reserves in New Zealand and on the basis of marine ecological values (P Irving pers. comms. 1990). From a landscape perspective the area has regional significance (ARA database). The flora described is of significance within the Rodney Ecological District (source 1).

Existing Threats: l,k

Type & Comment:

Coastal settlement is part of the rich character of this coast, until recently coastal subdivision was not. Insensitive development is a major threat to the landscape quality of the coast.

Intensive recreational fishing, especially scallop (*Pecten novaezelandiae*) diving and kina (*Evechinus chloroticus*) gathering is a threat on the southern side of the peninsula. Fishing (poaching) within the marine park also occurs periodically. This is a threat to the target species within the area.

Human Modification and Human Use: a,d,h,i,k1(structures),k2 (fisheries)

Most of the peninsula has been cleared of native vegetation and is now farmed.

The area is used extensively for shore and water based recreation including camping, walking, picnicking, swimming, surfing, diving, fishing and boating. One anchorage for boats is available on the southern side of the peninsula. There are four structures present in the area below mean high water mark, they are concentrated at the eastern tip of the peninsula.

Commercial fishing is practiced intensively throughout the Hauraki Gulf. The type of fishing done in each area is determined by the complex restrictions on vessel size and the methods allowed, which become more restrictive as you move south into the inner gulf.

Existing Protection: b,e

Type & Comment:

The area from Karamuroa Point to Christian Bay is Tawharanui Regional Park administered by ARC. An area extending 800m offshore along 3.1km of the northern shore of the regional park is a marine park set up under the Fisheries Act 1983 and the Harbours Act 1950, and is also administered by ARC.

See also k2 above, as fisheries protection occurs throughout the Hauraki Gulf, but exists primarily to manage use, not for protection per se.

Availability of Information:	
Natural	1 2 3
Cultural	1 2 3
Historic	1 2 3
Threats	1 2 3
Human Mod. & Use	1 2 3

1. Well documented
2. Limited information (general)
3. Little information (if any)

Comment:

Sources of Information:	
Natural	1 2 3 4 5 6 7
Cultural	1 2 3 4 5 6 7
Historic	1 2 3 4 5 6 7
Threats	1 2 3 4 5 6 7
Human Mod. & Use	1 2 3 4 5 6 7

1. Derived info. from existing literature & databases
2. Derived info as above & field check
3. Derived from existing maps & aerial photographs
4. Recent DOC survey including sampling & analysis
5. Recent DOC survey excluding sampling & analysis
6. Experience
7. Expert opinion

Comment:

Sources:
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2. Grace, R. Tawharanui Marine Monitoring Programme. Surveys over the period 1977-1989. ARA Parks Department (unpublished).
3. Newman, M. (1975). Site recordings on the Leigh-Pakiri Coast, North Auckland. NZHPT.
4. Spring-Rice, W. (1981). Archaeological Sites in Wenderholm Regional Park, ARA.
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6. Sewell, B. Archaeologist, Department of Conservation, Auckland.
7. Ballantine, W. University of Auckland.

Recent DOC Survey (4) is PNA work done in association with the ARC.

Recorded on Existing Databases: **Comment:**

1. **WERI**
2. **SSWI**
3. **PNA**
4. **Geopreservation**
5. **HPT County Inventories**
6. **Other** - ARA, Regional Planning Department (1984). An Assessment of Auckland Region's Landscape, ARA.
7. **None** - Marine monitoring by R Grace for ARC.

Other Considerations:

This site falls within the tribal boundaries of the Ngati Wai. Laly Haddon, Wellsford is the contact person for the tribe.

Accompanying Maps and Photographs:

Site Name/s: Kawau to Whangaparaoa; marine	Site No: CRI 020 018
Recorders Name: Sian John	Conservancy: Auckland
Map/Grid Ref: R09 26710 65200	Date: 20.03.90

Brief Description of Site:

The area between Tawharanui Peninsula and Whangaparaoa Peninsula is essentially a marine unit which incorporates the islands of Kawau, Challenger, Beehive, Mayne, Motuketekete, Moturekareka, Motuora, and Te Haupa. Kawau is the largest of this northern island group in the Hauraki Gulf. It is characterised by an exposed eastern coast lined with steep high cliffs and rocky foreshores, and in contrast a more gentle sheltered western shoreline with tidal inlets and sandy beaches, interspersed by tree clad promotories. Kawau has been considerably changed, however, by the introduction of exotic flora and fauna. Motuketekete, Moturekareka and Motutara are similarly characterised by a steep, rocky eastern shore and a sheltered sandy bay or bays on their west coast. Kawau Island is the focus of the site in terms of recreational use, due to its abundance of good anchorage sites and the historic attraction of Mansion House Bay. Recreational use does pose a significant threat to this site, however, due to the pressure of overuse and subsequent pollution. Such pollution is exacerbated by land based discharges of waste and runoff. The marine portion of this site is particularly significant due to its role as a snapper (*Chrysophrys auratus*) nursery, which could be threatened by continued overuse.

Conservation Values: **Natural:** a,c,e,f,g,i **Cultural:** c **Historic:** a,b,c,d,e

Comment:

Natural: Within this site there are three areas of geomorphic significance: Motuketekete Island reef corals (preserved in growth position); Beehive Island stack (a small "top hat" island); and the Kawau Island mining pit slag heap (1870s) (source: Geopreservation). In terms of flora, Challenger Island has district significance, due to its good coastal forest comprised of houpara (*Pseudopanax lessonii*) - *Hymenanthera novae-zelandiae* - wharangi (*Melicope ternata*) - karo (*Pittosporum crassifolium*) - and tawapou (*Planchonella novo-zelandica*). The presence of *Linum monogynum* and *Asplenium haurakiense* adds to the value of this island. (An example of what Kawau Island was like.) The marine environment in the vicinity of Motuora and Te Haupa Islands is recognised as having a high degree of naturalness (Sources 3, 4 and 5). The broader marine area included in this site is significant as a very important snapper nursery ground, with a high level of snapper abundance and a good species distribution. The islands in this site and the marine environment is representative of the outer gulf and its islands, with typical intertidal rock platforms. The marine environment and subtidal rocky areas surrounding Kawau is used for comparative marine ecological studies by researchers from the Leigh Marine Laboratory. (Irving, pers. comm. 1990)

Historic: Numerous pa sites are located on the sheltered western side of Kawau Island, possibly indicating that the island could have been of strategic and polictical importance. Three occupation sites are also present on Motuora Island, including a pa (possibly a refuge for fishing parties) (sources 1 & 2). Sites of non-Maori archaeological significance on Kawau Island include the coppermines, engine house and miners village, and the Smelting house (the earliest industrial building in NZ still standing). The Coppermine Pumphouse ruins and the Smelting House ruins are also sites of known historic value and of national significance, as is Mansion House in Mansion House Bay. From Tawharanui Peninsula to North Head, Mahurangi Harbour, including Kawau and associated Islands, 14 ships were wrecked between 1851 and 1982. (Ingram 1984)

Cultural: That portion of Kawau Island which is part of the Hauraki Gulf Maritime Park has good landscape values due to the association of historic features related to Grey in the 1840s-1850s, that is, vegetation, tree specimens, buildings, structures, and copper mining. Elsewhere on the island coastal pohutukawa (*Metrosideros excelsa*) have a high visual value. Motuora Island is located in a part of the Hauraki Gulf recognised for its high quality landscape, and is zoned for coastal landscape protection by Rodney District Council. Unfortunately natural values have been largely eliminated from the island and the farmland has a poor visual quality. (Hawley, J. pers. comm. 1990)

Site Importance: International National Regional Local Unknown

Comment:

The three geopreservation sites in this area have regional significance, as does the marine environment in terms of its snapper habitat and research potential, and the landscape. The area, however, also contains historic sites of national significance due to the presence of the Kawau Island Coppermine, Smelting House and Mansion House.

Existing Threats: d,e,i,k,l

Type & Comment:

Intertidal and subtidal portions of this site are subject to overfishing.

Introduced animals and bad management practices pose a threat to the natural habitat of the offshore islands in this site. Water pollution is a problem in this area due to specific and non-point discharges associated with human urban and rural landuse practices, in particular in the Hibiscus Coast area, and at Martins Bay where sewage is discharged directly into the sea (ARA 1989). An enormous amount of pressure is placed on the water-based resource in this area, in particular the southern portion, by recreational users, depleting marine resources and enhancing water pollution (plastic debris is a substantial problem). The bed of popular anchorages, for example, are known to be carpeted with inorganic refuse, and their discharge of sewage and other organic wastes often pollutes confined coastal waters (ARA 1976). Insensitive development is a major threat to the landscape quality of the Kawau Island coast.

Human Modification and Human Use: a,d,h,i,k2 (fisheries),k3 (marine farming)

The landscape and natural vegetation of the islands has been modified over many years by pastoral farming. Kawau Island has a long history of copper ore mining, farming, and fishing. Approximately 170 structures, including slipways, boat houses, wharves, and jetties line the shores of the islands in this site, and moorings and anchorage sites are present on the eastern side of Kawau, Motuketekete, Moturekareka, and Motutara Islands (including a major wharf and supply base on Kawau). The marine area between Kawau and the mainland is intensively used by recreational boating, while the rest of the site is used heavily. Wind-surfing is similarly a heavy user of the area, in particular the southern portion. Land based recreation is also popular in this site. Walking, camping, and sightseeing are popular activities on Kawau (with a ferry service operating between Kawau and the mainland), and fishing and diving are popular at flat rock, Motuketekete, Motutara, Motuora, and Te Haupa Islands.

Due to the high levels of snapper abundance and other fish species, commercial fishing occurs in this area. The site is also characterised by an Oyster Lease in Bon Accord Harbour, Kawau Island and six designated sites for mussel farms about Te Henga Island.

Motutora Island contains a DOC camp ground.

Existing Protection: a,d

Type & Comment:

176 hectares of Kawau Island (around Mansion House Bay) and all of Motuora island, Beehive Island, Motutara Island, and Te Haupa Island are part of the Hauraki Gulf Maritime Park (DOC estate). Kawau Island contains scenic, recreational, and historic reserves. Beehive, Motutara and Te Haupa Islands are scenic reserves, and Motuora and Motutara Islands are recreational reserves. The marine environment of this site is closed to trawling and Danish Seining.

Availability of Information:		1. Well documented
Natural	1 2 3	2. Limited information (general)
Cultural	1 2 3	3. Little information (if any)
Historic	1 2 3	
Threats	1 2 3	
Human Mod. & Use	1 2 3	

Comment:

Sources of Information:		1. Derived info. from existing literature & databases
Natural	1 2 3 4 5 6 7	2. Derived info as above & field check
Cultural	1 2 3 4 5 6 7	3. Derived from existing maps & aerial photographs
Historic	1 2 3 4 5 6 7	4. Recent DOC survey including sampling & analysis
Threats	1 2 3 4 5 6 7	5. Recent DOC survey excluding sampling & analysis
Human Mod. & Use	1 2 3 4 5 6 7	6. Experience
		7. Expert opinion

Comment:

Sources:

1. Bates, J. (1979), Kawau Island Archaeological Survey. NZHPT, Auckland 1980/2.
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9. Irving, P. (1990). Department of Conservation, Auckland.
10. Ingram, C.W.N. (1984). NZ Shipwrecks 1795-1982. A H & A W Reed Ltd.

Recorded on Existing Databases:
1. WERI
2. SSWI
3. PNA - Rodney (1983-1984)
4. Geopreservation - Fossil and landform
5. HPT County Inventories
6. Other - NZAA Site Survey
7. None

Comment:
Rodney PNA as yet unpublished.

Other Considerations:

Considerable potential exists for enhancing the natural and visual qualities of Motuora Island.

This site falls within the tribal boundaries of the Ngati Wai. The contact person for this tribe is Laly Haddon, Wellsford.

The area between the Mahurangi Harbour and Te Haupa and Motuora islands is considered to be a possible area for future marine protection.

Accompanying Maps and Photographs:

Site Name/s: Mahurangi	**Site No:** CRI 020 019
Recorders Name: Paul Irving	**Conservancy:** Auckland
Map/Grid Ref: R09 25640 65270	**Date:** 21.03.90

Brief Description of Site: This site incorporates the East Coast estuaries and harbours of Matakana, the Mahurangi, Puhoi and Waiwera, and associated areas. The northern Mahurangi peninsula is also included. Much of the land is farmed and in pasture for sheep and cattle. Settlements are few but coastal subdivision is characterised by Waiwera (poor planning), Warkworth (urban sprawl in microcosm), Snells (coastal subdivision, highly visible and intrusive).

Much of area is in scenic reserve or regional park. The Mahurangi peninsula, between Snells Beach and the Mahurangi harbour contains contrasting coastal features of exposed rocky headlands and sheltered inter-tidal mudflats.

Conservation Values: **Natural:** b,c,d,e,f,g,h,i **Cultural:** c,e **Historic:** a,b,d,e

Comment:

Natural

b) Within the Mahurangi Harbour, Puhoi and Waiwera estuaries and Strakas dam (SSWI sites), species such as Australasian bittern (*Botaurus stellaris poiciloptilus*) (threatened), NZ dabchick (*Podiceps rufopectus*) (threatened), banded rail (*Rallus philippensis assimilis*) (threatened), caspian tern (*Hydroprogne caspia*) (threatened) variable oystercatcher (*Haematopus unicolor*) (rare), plus fernbird (*Bowdleria punctata vealeae*) (regionally threatened), have been recorded (Bell 1986). At McElroys Reserve on the south-eastern side of the Mahurangi Harbour two species of plant, *Grammitis rawlingsii* (rare - Slaven, pers. comm. 1990), and hard beech *Nothofagus truncata*, a species 'scarce' (Slaven pers. comm. 1990) north of Auckland are present.

c) The harbour and estuaries are noted for their habitat as breeding sites for banded rail in the shrubland backing the mangroves (*Avicennia resinifera*). Bittern also breed and feed in these harbours. Mahurangi Harbour is of national significance for the collection of Pacific oyster spat (*Crassostrea gigas*). Despite extensive modification of the catchments these harbours are still considered natural and contain large populations of estuarine species. Note also that 45% of Mahurangi Harbour is still in mangrove.

d) Due to the sensitivity of oyster spat to water quality, Mahurangi is considered a site of extreme sensitivity - MAF. It is also considered to be representative of east coast drowned river valley estuarine systems, thus changes to the estuarine ecosystem would be undesirable - Rodney PNA.

e) Mahurangi peninsula is noted in the Rodney PNA as a landform site of significance. It describes the area as long narrow estuaries and steep sided peninsulars characteristic of ria (drowned) coastline. This is considered representative of the pattern of inter-fingered headlands and bays in estuaries, a distinctive feature of the east coast of the Rodney Ecological District. Puhoi Estuary is noted as the best example of an estuary/headland/barrier association of landforms, that are an essential feature of the ecological district, and are of particular geomorphic value.

f) In the Rodney PNA a number of sites around the area were identified as being representative of particular vegetation communities. Matakana headland - best coastal puriri (*Vitex lucens*) forest on a headland. Mahurangi river forest - best coastal totara (*Podocarpus totara*) forest on hills. Parry Kauri Park - best coastal kauri (*Agathis australis*) forest on hills. Mahurangi harbour - best mangrove forest on saline wetland, also largest site, and Dyers Creek in particular, contains a representative ecotone from tidal estuarine wetlands through sedgeland and mangrove to coastal and lowland forest (pohutukawa (*Metrosideros excelsa*) to kauri/podocarp). Te Kapa River forest - best coastal kanuka (*Kunzea ericoides*) forest on headlands. Mullet Point - best coastal mosaic forest on cliffs. McIlroys Reserve - best coastal mosaic forest on headlands. Mahurangi Heads - best coastal pohutukawa forest on headlands. Wenderholm Reserve Forest - best coastal taraire (*Beilschmiedia tarairi*) forest on cliffs and on headlands. The Puhoi estuary is described as the best example of an estuary/headland/barrier association which characterises the Rodney district, plus it contains representative areas of mangrove *Juncus* and *Leptocarpus*. It also contains an ecotone sequence of saline wetlands grading into freshwater wetlands (Slaven pers. comm. 1990).

g) The scientific value of the Mahurangi Harbour is attested to by the bibliography of scientific research conducted here, ranging from studies related to oyster cultivation to investigations of species or processes. Bibliography available from DOC, Auckland.

h) Of the specific areas under consideration within this site, the Mahurangi Harbour is ranked of national significance for oyster spat collection and cultivation of oysters (ARA Regional Planning Scheme and bibliography).

Cultural

c) The coast between Matakana and the Mahurangi Harbour is generally rated as highly attractive (6/7) on a scale of 1 to 7, with the Matakana River rated at 7 (outstanding landscape), as is the Mahurangi. It is notable that Mahurangi Harbour (with the exception of some upper estuarine areas rated at 5 [above average]), is rated at 7 and, as such, is the largest area of rating 7 landscape (and one of the very few contained landscapes rated 7) in the Auckland region. Wenderholm, Puhoi and Waiwera were rated at 5 (above average), but it is noted that with the long indented coastline, land and water are interlocked in a visually attractive manner.

e) The location of the Mahurangi Regional Park complex, and Wenderholm Regional Park in this area, has led to their increasing use for the teaching of intertidal ecology. The reserves and coastal areas of Wenderholm Regional Park in particular are interpreted in a series of guides. The salt-marsh/salt-meadow areas of Puhoi River adjacent to the regional park are widely used for school trips to study its biological community. This particular area features in the secondary school biological sciences curriculum.

Historic

a) Within this site are eight sites of historic significance, all being buildings classified by the Historic Places Act 1980. At Puhoi are the Puhoi Hotel and Stables (C), Church of St Peter & Paul (B) and the Puhoi Library (P, Pending). At Matakana there are the Sandstone Setts (stepping stones) (D) in the river. At Wenderholm Regional Park is the building of the same name, 'Wenderholm' - (C). At Warkworth is the Wilson Cement Works ruins (B) and Manager's House (D). The ruins are noted as being nationally significant. Also nationally significant is the former Scotts Hotel at Scotts landing, Mahurangi Harbour.

b) Within this site are a range of pa, undefended settlements, and middens. All of these sites are closely related to the coast, a clustering which may relate to the survey locations, but also points to use of the coast, particularly associated with river mouths and estuaries.

The fortified pa of the Mahurangi Harbour entrance suggests defence of the resources of the harbour from the sea but not the land. Soils were and are generally poor for agriculture, so settlement reflects a great dependence on marine resources. Little is known outside the survey areas , but it is noted that as you go progressively southward there is less point in doing survey, due to the modified urban sprawl areas also associated with the coast. (Sewell, B. pers. comm. 1990)

d) Coastal shipwrecks are noted for site CRI 020 018. None are recorded for the estuaries or Mahurangi Harbour.

Site Importance: International **National** Regional Local Unknown

Comment:

For most values the site is of regional significance, due to the representative values it embodies, and for the complex of regional parks within it. The Mahurangi is of national significance for its oyster spat collection, being the only harbour to allow such collecting consistently. National historic values are also noted at Warkworth and Scotts Landing, but overall good regional significance in most instances.

Existing Threats: Type and Comment: b, c, d, e, h, j, k, l.

b) Siltation identified in the Mahurangi Harbour is associated with both human use, and natural processes, adding to the total sediment levels within the harbour, changing oyster farm culture over the past ten years.

c) Spartina (*Spartina alterniflora*) is established in the Puhoi estuary and in Mahurangi Harbour at Dawsons Creek, the Pukapuka Inlet and Te Kapa River.

d) Most estuarine areas are grazed to some extent, especially Waiwera inlet and Matakana River.

e) Water pollution has been a problem in Mahurangi but is slowly being phased out by sewage reticulation and treatment. Milking shed discharges still occur, resulting in non-point pollution. Discharge of sewage into Martins Bay outside Mahurangi Harbour occurs. Waiwera has oxidation ponds and an associated discharge. Some pollution is suspected to be from stormwater from the township and tourist complex. Puhoi is also subject to a lowering water quality from agricultural run-off, but the extent is unknown. Matakana waters are affected by township waste and abattoir discharge (ref. Coastal Wetland Inventory, DOC, Auckland Conservancy).

h) Landscape values of Mahurangi are affected by densities of oyster farms (Hawley pers. comm. 1990).

j) Some refuse dumping in the upper Mahurangi, Puhoi and Waiwera estuaries, normally associated with recreation areas (primarily litter). Dawson Creek, Mahurangi, is a site of refuse tipping amongst mangroves.

k) Recreation is an acceptable use over most areas but is becoming a factor affecting environmental quality around Wenderholm Regional Park. Tuatua (*Paphies subtriangulata*) beds previously notable on Wenderholm beach have disappeared.

l) Coastal subdivision is noted as being detrimental, both to the landscape values and archaeological values of the area. Hawley pers. comm. (1990), notes that coastal settlement is part of the rich character of this coast; coastal subdivision is not. Insensitive development is a major threat to the quality of a coast. Snells Beach is noted particularly, with Warkworth noted for sprawl. Waiwera's waterfront development is often noted as being the pinnacle of insensitive development. All the motel windows face the land and the houses behind, not the sea and beach in front (Morton 1990 pers. comm.).

Human Modification and Human Use: a, b, d, e, h, i, k1 (structures), k3 (marine farming)

a) Much of the immediate catchment is in pasture, in excess of 50% for all catchments - Mahurangi 70% pasture (170 square kilometres, with 75 kilometres of coastline). Settlements occur at Waiwera, Warkworth, Snells Beach, Matakana.
b) State Highway 1 encroaches on the Waiwera, Puhoi estuaries and at Matakana. Reclamations have occurred in Waiwera River for oxidation ponds (highly visible from SH1).
d) Proposed marinas at Sandspit and Goldsworthy Bays. Moorings in Matakana, Waiwera and Puhoi estuaries. Mahurangi Harbour - marinas constructed in old cement works at Wilsons Road, Warkworth. Moorings are located within the harbour also (200 plus).
e) Outfall from 20 sewage treatment into Martins Bay.
h) Virtually the entire coast is important for shore based recreation, with the focus being on the three
& regional parks and the publicly accessible beaches of Snells Beach, Martins Bay, Waiwera. Note -
i) Wenderholm currently (1989 figures) 220,000 visitor days per annum, with peak days of 6,000 plus. The majority of people come to sunbathe, 55%; swim 52%; picnic 42%; walk 29%; with most visitors from the North Shore, 22%; South Auckland 18%; and outside of the Auckland region, 14%. No data exists for other areas.
k)1 Along this coast there are approximately 100 structures, ranging from jetties to marinas.
k)3 Aquaculture - primarily oyster farming in Mahurangi - 45 leases.

Existing Protection: Type and comment: a, b, d.

a) Numerous scenic reserves within the area.
b) Three major regional parks - Wenderholm, Mahurangi East and West.
d) Rodney District Scheme - landscape protection zone over much of the land visible from the Mahurangi Harbour or from sea areas. Snells Beach underlying zoning for proposed regional park. Mahurangi Harbour is zoned for protection - no dredging, reclamation, dumping, etc. without full prior scrutiny by all relevant agencies.

Availability of Information:

Natural	1 2 3
Cultural	1 2 3
Historic	1 2 3
Threats	1 2 3
Human Mod. & Use	1 2 3

1. Well documented
2. Limited information (general)
3. Little information (if any)

Comment:

Information is available for the Mahurangi in particular, but other local areas have been the subject of scrutiny at district and regional planning level site development proposals, etc. - much of it with ARC, Rodney District, DOC, MAF, etc.

Sources of Information:		1. Derived info. from existing literature & databases
Natural	1 2 3 4 5 6 7	2. Derived info as above & field check
Cultural	1 2 3 4 5 6 7	3. Derived from existing maps & aerial photographs
Historic	1 2 3 4 5 6 7	4. Recent DOC survey including sampling & analysis
Threats	1 2 3 4 5 6 7	5. Recent DOC survey excluding sampling & analysis
Human Mod. & Use	1 2 3 4 5 6 7	6. Experience
		7. Expert opinion

Comment:

Bibliography available from DOC, Auckland, if necessary.

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Sewell, B. Archaeologist, Department of Conservation, Auckland.
Hawley, J. Landscape Architect, Department of Conservation, Auckland.
Slaven, D. Environmental Consultant, Auckland.
Morton, J. Prof. emeritus, University of Auckland.

Recorded on Existing Databases:

1. WERI
2. SSWI
3. PNA Rodney District 1984.
4. Geopreservation
5. HPT County Inventories
6. Other - Coastal Wetland Inventory, Auckland - held by DOC, Auckland.
7. None - Mainland DOC Estate - preliminary inventory - held by DOC, Auckland.

Comment: PNA Data Base 1984 and amendments.

SSWI's: Mahurangi Harbour, 22/71, resurveyed 1985, Mod-High.
Puhoi Estuary, 22/69, resurveyed 1985, Mod-High.
Waiwera Estuary, 22/69, resurvey 1985, Mod-High.
Strakas Dam, 22/69, resurveyed 1985, Mod-High.

Other Considerations:

The tangata whenua are Kawerau. The contact person is Hariata Ewe, Mangere. The sea areas immediately offshore from the Mahurangi and Wenderholm Regional Parks, plus the Mahurangi Harbour, Puhoi estuary and the waters around Te Haupa and Motuora Island, have been proposed by the ARA and DOC as a potential marine protected area.

Accompanying Maps and Photographs:

Site Name/s: Whangaparaoa Peninsula	Site No: CRI 020 020
Recorders Name: Felicity Fahy	Conservancy: Auckland
Map/Grid Ref: R10 26660 64060	Date: 21.03.90

Brief Description of Site:

This site comprises Whangaparaoa Peninsula and three estuaries of the Orewa, Weiti and Okura rivers. The peninsula is of moderate relief, it is a well drained elevated headland with conspicuous cliffs and shore platforms of the Waitemata Group rock type. The estuaries are moderate - small in size (<1000 ha). The catchments for all are mostly in pasture with small pockets of shrubland. Orewa and Weiti estuaries are mainly vegetated by mangroves (*Auicennia marina* var. *resinifera*). Three oxidation ponds on the southern margin of the Orewa estuary are also included in the habitat. Okura estuary is more sandy than those to the north, it has very little area in mangroves or saltmarsh. The Weiti River has 6 north trending spits which are shell-sand cheniers overlying fossil estuary shell beds. A seventh sand spit is currently forming. The western portion of the peninsula is heavily subdivided, as is the eastern margins of the Orewa estuary, both these areas are used extensively for many different forms of shore and water based recreation. The Weiti river has scattered settlement around it. A 1000 berth marina is situated in Hobbs Bay, on the southern side of Whangaparaoa Peninsula. The archaeological sites represent almost exclusive coastal settlement. Farmed animals grazing to the waters edge, urban runoff and intensive recreational use are the major threats to the area.

Conservation Values: **Natural:** a,b,c,e,f **Cultural:** c **Historic:** b

Comment:

Natural: This area has been identified as important geomorphically by both the geopreservation inventory and Rodney PNA (source 1). Two Geopreservation sites have been identified, both are shore platforms on the peninsula, one is located at Hobbs Bay, it is an old shore platform that shows examples of bioerosion. The other at Huaroa Point is an extensive intertidal platform cut across dipping Waitemata sandstones and siltstones. The tip of the peninsula, east of Army Bay has been identified by Rodney Ecological District PNA (source 1) as being of geomorphic significance. Radio carbon dating of the spit deposits has been used to construct a sea-level curve for NZ spanning the past 10,000 years. It is a site of major importance to NZ and to the South Pacific region as a whole for the study of paleo sea levels (source 1). The spits are within a PNA Recommended Area for Protection (RAP) site as identified by source (1).

A site has been identified between Matakatia and Hobbs Bay that is the best example of coastal manuka (*Leptospermum scoparium*) on a headland/peninsula in the ecological district (source 1). It is a remnant of a vegetation class once common on peninsulas in the area. A site at the head of the Wade river has been identified also from the Rodney PNA as being the best coastal kanuka forest on cliffs in the district. This area is part of a large recommended area for protection (RAP) (source 1). The forest in this area is made up of karaka (*Corynocarpus laevigatus*), puriri (*Vitex lucens*), pohutukawa (*Metrosideros excelsa*), taraire (*Beilschmiedia tarairi*), kanuka (*Kunzea ericoides*) and kowhai (*Sophora tetraptera*). It has an SSWI rating of potential. The Okura forest borders the northern side of the Okura river, it is a broadleaf coastal forest with a SSWI rating of moderate-high habitat value. Good ecotones and sequences are present from the Okura river inland. The site has one of the two best coastal pohutukawa forests on cliffs in

the district, it also has the best coastal kanuka forest on cliffs and hills in the district (source 1). The Okura estuary has a *Leptocarpus similis* sedgeland community on stabilised sand, the only example in Rodney District. The previous three sites are included in a RAP site that cover both the Okura and Weiti Rivers (source 1).

Within this site the Orewa estuary has a good diversity of coastal wetland species, 23 species are recorded. Banded rail (*Rallus philippensis assimilis*), a threatened species (source 2) are found beneath mangrove areas. Caspian terns (*Hydroprogne caspia*) and NZ dabchick (*Podiceps rufupectus*), both threatened species (source 2) have also been reported. Many duck species included grey (*Anas superciliosa superciliosa*), mallard (*A. platyrhynchos platyrhynchos*), shoveler (*A. clypeata*), scaup (*Aythya novaeseelandiae*) and black swan (*Cygnus atratus*) utilise the estuarine areas and the oxidation ponds. A variety of shag species including pied (*Phalocrocorax varius varius*), little (*P. melanoleucos brevirostris*), black (*P. carbo novaehollandiae*), little black (*P. sulcirostris*) and spotted (*Strictocarbo punctatus punctatus*) all use the area for breeding, feeding, roosting. Spotless crake (*Porzana tabuensis plumbea*) have been recorded in the rush-reedland margin (C Green pers. comm. 1990). The Weiti river estuary has banded rail present also. It also provides feeding grounds for wader species at the mouth and feeding grounds for gulls and shag species. The spits provide good roosting sites for waders, large numbers of South Island pied oystercatchers (*Haematopus ostralegus finischi*) roost there (C Green pers. comm. 1990). The Okura river estuary is home to a good variety of coastal birds, the banded rail is present in small areas of the mangroves. The mouth of the estuary which has a high sand content is used by several hundred wader birds including bar-tailed godwit (*Limosa lapponica baueri*), lesser knot (*Calidrus canutus canutus*) and South Island pied oystercatcher. Several common shag, gull and waterfowl also use the area (C Green pers. comm, 1990).

Cultural: The area to the east of the subdivision on Whangaparaoa peninsula is rated as having above average landscape value. The Okura and Weiti river estuaries are rated as highly attractive landscape (source 10).

Historical: A range of sites including pa, open settlement and midden are present in this area. They represent almost exclusive coastal occupation. The appearance of clusters is more representative of areas of survey than real clusters. The clusters do however suggest that the mouths of the rivers were more important as living sites than the open coast, there was also more intensive occupation of Whangaparaoa than the remainder of the coast. This may have been due to the proximity of fishing grounds but also could relate to the strategic or political location of the peninsula (B Sewell pers. comm. 1990). Four surveys have been done of the area, two on portions of the peninsula and one on the Okura estuary (source 4-6). The significance of the archaeological sites noted is unknown.

Site Importance: **International** **National** **Regional** **Local** **Unknown**

Comment:

The Weiti river spits are of international importance, especially to the south pacific for study of sea level change over the last 10,000 years (source 1). Generally the estuaries in this area are of regional significance for bird habitat in particular. They fit into a chain of estuaries along the east coast (C Green pers. comm. 1990). From landscape values the area is of local significance (J Hawley pers. comm. 1990). The historic/archaeological values are unknown.

Existing Threats: d,e,j,k,l

Type & Comment:

Farmed animals are allowed to graze down to the waters edge of the Orewa estuary destroying wetland plants and habitat for birds. Water quality in the Orewa estuary has been reduced by outfall from the oxidation ponds. In the Weiti estuary the runoff from farmland and stormwater from the timber yard and other industry on the peninsula has lowered water quality. High recreational use of the area is putting pressure in particular on the estuaries, by causing degradation to some of the habitat. Whangaparaoa and Stillwater in particular are under increased pressure from subdivision. There is a proposal for a major regional refuse dump in the catchment of the Okura river, leachates from the dump could pose a serious threat to the estuary if it goes ahead. A large sewage outfall discharges 7000 m^3 of raw sewage each day into the Tiritiri channel.

Human Modification and Human Use: a,b,d,e,h,i,kl (Structures)

The land in this unit has been developed for both residential and rural uses. State Highway 1 crosses the Orewa estuary and has some associated reclamations. There is a 1000 berth marina at Hobbs Bay, on the southern side of the peninsula. There are several areas for boat anchoring and mooring on the southern side of the harbour and in the Weiti river. This site is close to the population centres of Auckland and Orewa, and therefore, the entire site is used extensively for all types of shore and land based recreation including swimming, camping, walking, surfing, diving, fishing, yachting and jet skiing. Recreational pressure is especially high at the sandy bays and mouths of the estuaries. There is a camp ground at the mouth of the Orewa estuary. Whangaparaoa peninsula has an assortment of structures built below high water mark including jetties, boatramps. There are approximately 50 structures within this site.

Existing Protection: a,b

Type & Comment:

The Shakespear Regional park administered by ARC is located at the end of the Whangaparaoa Peninsula.

A number of pieces of DOC estate are also located in this site, including Stanmore Bay Conservation Area, (0.8 hectares) Orewa Conservation and Water Conservation Area (56 hectares), Silverdale Scenic Reserve and Conservation Area (5.5 hectares), and Okura Scenic Reserve and Conservation Area (117 hectares).

Availability of Information:

Natural	**1** 2 3
Cultural	1 **2** 3
Historic	1 **2** 3
Threats	1 **2** 3
Human Mod. & Use	1 **2** 3

1. **Well documented**
2. **Limited information (general)**
3. **Little information (if any)**

Comment:

Sources of Information:							
Natural	1	2	3	4	5	6	7
Cultural	1	2	3	4	5	6	7
Historic	1	2	3	4	5	6	7
Threats	1	2	3	4	5	6	7
Human Mod. & Use	1	2	3	4	5	6	7

1. Derived info. from existing literature & databases
2. Derived info as above & field check
3. Derived from existing maps & aerial photographs
4. Recent DOC survey including sampling & analysis
5. Recent DOC survey excluding sampling & analysis
6. Experience
7. Expert opinion

Comment:

1. Rodney Ecological District. PNA Survey 1983-84. Unpublished revised report.
2. Bell, B.D. (1986). The Conservation Study of NZ Wildlife. NZ Wildlife Service Occasional Publication No. 12.
3. Foster, R. (1984). Archaeological Site Survey of the proposed Gulf Harbour Development. NZHPT 1984/1 pp11.
4. Grace, C.J. and V.A. Rickard (1982). Site Survey of the Weiti Station Silverdale. NZHPT, Auckland 1983/2 pp13.
5. Millynn, G.E. and M. Campbell (1976). Shakespare Regional Park Archaeological Survey. ARA pp12.
6. Robinson, J. (1987). An intensive survey of the proposed Dacre creek residential development. NZHPT, Auckland, 1987/1 pp105.
7. Green, C. Department of Conservation, Auckland.
8. Sewell, B. Department of Conservation, Auckland.
9. Hawley, J. Department of Conservation, Auckland.
10. Auckland Regional Authority, Regional Planning Department (1984). An Assessment of Auckland Region's Landscape - ARA.

Recorded on Existing Databases: Comment:

1. WERI
2. SSWI - Yes
3. PNA - Rodney Ecological District (1983-1984)
4. Geopreservation
5. HPT County Inventories
6. Other - Auckland Regional Authority, Regional Planning Department (1984). An Assessment of Auckland Region's Landscape - ARA.
7. None

Other Considerations:

This area falls within the tribal boundaries of the Ngati Paoa an Kawerau tribes. The contact people for these tribes are Hariata Gordon, Auckland (Ngati Paoa Development Trust) and Hariata Ewe (Kawerau), Auckland.

Accompanying Maps and Photographs:

Site Name/s: Tiritiri Matangi Island	Site No: CRI 020 021
Recorders Name: Sian John	Conservancy: Auckland
Map/Grid Ref: R10 26795 65095	Date: 21.03.90

Brief Description of Site:

Tiritiri Matangi Island lies 4km offshore of the Whangaparaoa Peninsula and is developed as an open sanctuary. The island is being replanted in native trees and the bush allowed to regenerate to provide a home for endangered birds and plant species. Grazing animals were removed from the island in 1972, and the absence of rats (other than kiore (*Rattus exulans*)) and mustelids makes the island of considerable value as a wildlife refuge.

Tiritiri's coast is cliffed with the exception of one sandy beach. It has great potential however for recreation, in particular walking.

Tiritiri Matangi is expected to become a unique experiment in conservation, embodying all that the Hauraki Gulf Maritime Park stands for (Hauraki Gulf Maritime Park Board 1983).

Conservation Values: **Natural:** b,c,e,g **Cultural:** **Historic:** a,b,e

Comment:

Natural: Only patches of coastal forest and scrub remain on the island, the remaining flora is, however, fairly rich in species. A total of 186 species and varieties of native vascular plants have been recorded (Esler 1978). Species of note include *Ranunculus urvilleanus* ("vulnerable") (source 7), *Streblus heterophyllus, Ipomoea polmeta*, and tawapou (*Plauchonella novo-zelandica*). With the removal of grazing animals from the island, the plant succession from pasture is being studied. In limited areas succession has progressed from grassland to manuka (*Leptospermum scoparium*) and kanuka (*Kunzea ericoides*) to mapou (*Myrsine australis*) dominance and further to kohekohe (*Dysoxylum spectabile*) and mahoe (*Melicytus ramiflorus*). Pohutukawa (*Metrosideros excelsa*) are now appearing in former grassland and bracken (*Pteridium aquilinum*) areas. The lack of possums (*Trichosurus vulpecula*) and kikuya grass (*Pennisetum clandestinum*) make the island suitable for research on forest revegetation, and the absence of rats and mustelids make it ideal for the study and introduction of native fauna.

Tiritiri Matangi Island is also characterised by a geopreservation site of regional significance, a shore platform. This platform is a 'high-tidal beach', carved in highly jointed greywacke. The platform morphology is influenced by the major vertical joint planes which control its planar edges, but the horizontal bench is resultant upon water-layer control of subaerial weathering (Healy and Kirk 1982).

A number of native birds nest on the island, including bellbird (*Anthornis melanura melanura*), tui (*Prosthemadera novaeseelandiae novaeseelandiae*), red-crowned parakeet (*Cyanoramphus novaezelandiae novaezelandiae*) (introduced in 1974), grey warbler (*Gerygone igata igata*), spotless crake (*Porzana tabuensis plumbea*), pukeko (*Porphyrio porphyrio melanotus*), saddleback (*Philesturnus carunculatus rufusater*) (introduced in 1985), stitch bird (*Notiomystis cincta*), shining cuckoo (*Chrysococcyx lucidus lucidus*), brown quail (*Synoicus ypsilophorus*), sooty shearwaters (*Puffinus griseus*), Australasian Harrier (*Circus approximans gouldi*), Northern blue penguin (*Eudyptula minor iredalei*), grey-faced petrel (*Pterodroma*

macroptera gouldi), diving petrel (*Pelecanoides urinatrix urinatrix*), and white-fronted tern (*Sterna striata*). Black shag (*Phalacrocorax carbo novaehollandiae*), pied shag (*P. varius varius*), little shag (*P. melanoleucos brevirostris*), reef heron (*Egretta sacra sacra*), caspian tern (*Hydroprogne caspia*), North Island kaka (*Nestor meridionalis septentrionalis*) and pied tit (*Petroica macrocephala toitoi*) visit the island (sources 3 & 5). Tiritiri is the nearest island to Auckland inhabited by the bellbird.

Historic: Tiritiri Matangi Island is characterised by a historic site of national significance, the lighthouse and associated buildings. Unlike the other islands in the inner Hauraki Gulf however, Tiritiri does not have Maori historic occupation sites right around the coast. The sites tend to be located on ridges, and the implication is that occupation of the island was related to fishing parties rather than permanent settlement. This assumption is supported by the fact that horticulture was not an occupation on Tiritiri due to its heavy clay soils (B Sewell pers. comm.). Evidence of Maori occupation is seen, however, in the remains of kumara storage pits, terraces and middens.

Site Importance: International National **Regional** Local Unknown

Comment:

The site is regionally significant due to its role as a regenerating native vegetation site and as a sanctuary for native birds. It also has considerable scientific value, a geopreservation site of regional significance, and a historic site of national significance.

Existing Threats: d,k

Type & Comment:

Boating/use pressure is high between Tiritiri Matangi Island and the mainland, Whangaparaoa Peninsula.

Kiore are present on the island and they eat the seed stock.

Human Modification and Human Use: a,h,i

The original forest cover of the island has been completely modified by farm development.

Tiritiri is a very popular recreational area with a major wharf and anchorage area, and with heavy boating use of the surrounding marine environment. Diving and fishing based from the island is also popular, as is walking.

Existing Protection: a

Type & Comment:

Tiritiri Matangi Island is part of the Hauraki Gulf Maritime Park (DOC estate).

Availability of Information:		1. Well documented
Natural	1 2 3	2. Limited information (general)
Cultural	1 2 3	3. Little information (if any)
Historic	1 2 3	
Threats	1 2 3	
Human Mod. & Use	1 2 3	

Comment:

Sources of Information:		1. Derived info. from existing literature & databases
Natural	1 2 3 4 5 6 7	2. Derived info as above & field check
Cultural	1 2 3 4 5 6 7	3. Derived from existing maps & aerial photographs
Historic	1 2 3 4 5 6 7	4. Recent DOC survey including sampling & analysis
Threats	1 2 3 4 5 6 7	5. Recent DOC survey excluding sampling & analysis
Human Mod. & Use	1 2 3 4 5 6 7	6. Experience
		7. Expert opinion

Comment:

Sources:
1. Esler, A.E. (1978). Botanical features of Tiritiri Island. NZ Journal of Botany 16(2):207-26.
2. Healy, T. and R.M. Kirk (1982). Coasts. In: Landform of NZ, Soons, J.M. and M.J. Selby (eds). Longman Paul, Auckland.
3. ARA (1988). Auckland Regional Planning Scheme. ARA.
4. Sewell, B. (1990). Archaeologist, Department of Conservation, Auckland.
5. Department of Lands and Survey (1982). Tiritiri Matangi Island Working Plan. Hauraki Gulf Maritime Park Board.
6. Hauraki Gulf Maritime Park Board (1983). The story of the Hauraki Gulf Maritime Park. Hauraki Gulf Maritime Park Board.
7. Given, D.R.; W.R. Sykes; P.A. Williams & C.H. Wilson (1987). Threatened and local plans of NZ. Botany Division, DSIR, Christchurch.

Recorded on Existing Databases: **Comment:**

1. WERI - No
2. SSWI - No
3. PNA - No
4. Geopreservation - Landform
5. HPT County Inventories
6. Other - (a) NZAA Site Records
7. None

Other Considerations:

A revegetation programme is currently in operation (initiated in 1984) on the island, which utilises the local seed stock. The intension is to produce a vegetation cover approximately that of the original state. Trees are being planted at a rate of 37 000 per year.

This site falls into the tribal boundaries of the Kawerau. The contact person for this tribe is Hariata Ewe, Mangere.

Accompanying Maps and Photographs:

Site Name/s: Long Bay to North Head	**Site No:** CRI 020 022
Recorders Name: Paul Irving	**Conservancy:** Auckland
Map/Grid Ref: R10, R11; R10 26670 65000	**Date:** 20.03.90

Brief Description of Site:

From Long Bay Regional Park in the north to North Head of the Waitemata, this site traverses the broad intertidal shore platforms and semi-open and protected beaches of Auckland's East Coast Bays. The cliffs and bays are backed by the urban suburbs of Auckland's North Shore, with only the briefest interlude of vegetation and reserve. The geology is layers of Waitemata sand and silt stones (known as 'papa') dating from the shallow seas of the Miocene (25 million years before present). The alternating layers of hard and soft papa rock are very prone to erosion and create the distinctive wave-cut platforms just above low tide level.

The site has a rich historic past and remains a popular living area. Recreational use of this site is very intensive, with water sports and swimming having a high popularity. The major threat to the area, however, comes from general population pressure and use of this intensively developed coastal system.

Conservation Values: **Natural:** b,e,f,g. **Cultural:** c,e. **Historic:** a,b,d,e.

Comment:

Natural

b) The extensive protected beach of Cheltenham is the location of the burrowing acorn worm *Balanoglossus australiensis*, a characteristic species of northern protected beaches (Morton and Miller 1968).

e) The wave-cut platforms, cliffs and beaches are noted by Williams and Cochrane (1979) as being of major geomorphic interest. The Geopreservation Index also notes the Torbay 'stack', a weathered stack of resistant Parnell grit, Waitemata series, which stands isolated above the surrounding intertidal rock platform.

f) Between Long Bay and North Head is a series of shores, well documented in both geomorphic and marine ecological terms, which, while not pristine, are representative of the series of open to protected inner Hauraki Gulf shores (Morton pers. comm. 1988).

g) John Morton, among others, has spent 30 to 40 years documenting the habitats, communities and species of the area, noting changes to environmental quality and erosion processes.

Cultural

c) Long Bay is recognised as being highly attractive, with the urban areas being above average. Once into the East Coast Bays area the coastal strip is narrow; orientation and focus is offshore, east towards the Rangitoto channel and island.

e) Long Bay and parts of the East Coast Bays are recognised for their educational value, notably Long Bay Regional Park, the new Marine Education Resource Centre at Long Bay, and Cheltenham Beach. These are used by school groups and tertiary level students.

Historic

a) Associated with North Head and Devonport are ten sites of historic significance. The fortifications
& of North Head Historic Reserve are an historic archaeological site of national significance.
e) Fort Cautley in Devonport has a 'B' classification, but is noted by Reynolds (pers. comm. 1990) as also being of national significance. Eight other sites within Devonport are classified (C, 6) or Pending (P, 2).
b) Archaeological sites associated with Maori occupation along this coast have, for the most part, been obliterated by urbanisation. The twin volcanoes of North Head and Mount Victoria are known pa sites but are also extensively modified.
d) Between the Mahurangi South Head and Waitemata North Head there were eleven shipwrecks, recorded between 1865 and 1952. Their locations are indeterminate. (Ingram 1984)

Site Importance: International National Regional Local Unknown

Comment:

Regional from a geomorphic perspective and due to its marine ecological significance. Historic and cultural values also reinforce the regional importance of North Head, and its historic values rating nationally significant: 1982 Hauraki Gulf Maritime Park Management Plan.

Existing Threats: Type and comment: a, b, e, g, l.

a) Erosion of the papa rock, which is currently estimated at approximately one metre per fifty years based on observations, threatens not the habitat so much as the expensive real estate above it on the cliffs.
b) Siltation has been a problem in the past, both as a pollutant of the coastal streams and of the inter-tidal and marine areas. The soft siltstone has often been insensitively cleared and eroded inland, to deposit fine smothering silts in biological communities. Auckland Regional Water Board (ARWB) standards for catchment management have reduced this problem.
e) Water pollution: Stormwater outfalls and sewage pumping stations are located in the coastal zone, due to gravity feed reticulation. Discharges of stormwater are a regular occurrence, with sewage infrequently discharged. The sewage outfall for the North Shore draingage area occurs 500 metres off Castor Bay, discharging approximately 20,000 cubic metres of tertiary treated sewage. The beaches of Mairangi Bay and Milford have been known to have high coliform counts (ARWB bathing beach surveys).
g) Shore stabilisation works are prominent the entire length of the coast due to fears of erosion.
l) Coastal (urban) subdivision has encroached directly onto the beach and reduced any natural protective measures. Takapuna Beach, for example, has private ownership of land to mean high water mark.

Human Modification and Human Use: a, b, d, e, h, i, kl (structures)

a) The entire coastline is developed for intensive urban settlement, except Long Bay Regional Park. The catchments also contain commercial areas and light industry.
b) Reclamations are historic attributes of much of this coast, primarily associated with erosion control 1990).
d) Milford Marina, an older style marina with >200 berths.

e) Stormwater outfalls along the entire coast. Sewage overflow outfalls from the North Shore drainage system are located in every stream valley, including a major tertiary sewage outfall at Castor Bay (20,000 cubic metres per day average).

h) Shore based recreation of every conceivable type occurs along the coast. Shellfishing has been reduced in recent years by pollution concerns and dwindling numbers of edible species. Takapuna Beach once had a prolific tuatu (*Paphies subtriangulata*) resource - now completely disappeared. The entire East Coast Bays is subject to intense recreational use and attendant conflicts. Long Bay Regional Park has recently (1987) recorded more than one million visitor days, with peak days of 25,000 plus visits. Of these visitors, over 60% simply come to swim or sunbathe.

i) The entire coastline supports water sports and recreation, ranging from yachting to surf skis to wet-bikes, swimming, fishing, boat racing, etc. This is one of the most intensively used pieces of coast in New Zealand because of its nature and proximity to Auckland.

kl) The shoreline from Long Bay to North Head is scattered with foreshore structures (there are at least 75), which are in the main related to recreational use of the area.

Existing Protection: Type and Comment: a,b

b) Long Bay Regional Park. More people visit this single park than any other in New Zealand (1 million visitor days), with the possible exception of Tongariro National Park.

a) "North Head" as an entity is part of the Hauraki Gulf Maritime Park (DOC estate).

Availability of Information:

Natural	1 2 3
Cultural	1 2 3
Historic	1 2 3
Threats	1 2 3
Human Mod. & Use	1 2 3

1. Well documented
2. Limited information (general)
3. Little information (if any)

Comment:

For those values present, their existence, and the demise of other values, is well documented. Threats and human use are also well documented.

Sources of Information:

Natural	1 2 3 4 5 6 7
Cultural	1 2 3 4 5 6 7
Historic	1 2 3 4 5 6 7
Threats	1 2 3 4 5 6 7
Human Mod. & Use	1 2 3 4 5 6 7

1. Derived info. from existing literature & databases
2. Derived info as above & field check
3. Derived from existing maps & aerial photographs
4. Recent DOC survey including sampling & analysis
5. Recent DOC survey excluding sampling & analysis
6. Experience
7. Expert opinion

Comment:

Morton J and M Miller (1968). The New Zealand Seashore. Collins, Auckland
Ingram C W N (1984). Shipwrecks of NZ 1795-1982. AW & AH Reed Ltd.
Williams P and G R Cochrane (1979). Auckland's Physical Environment. In Auckland and the Central North Island, edited by W Moran and M Taylor. Longman.
Auckland Regional Council (1989). Long Bay Regional Park Management Plan. ARA.

Auckland Regional Authority (1988). Outdoor Recreation in Auckland's Regional Parks - Visitor Survey 1988. ARA.
Auckland Regional Authority (1984). An Assessment of Auckland Region's Landscape. ARA.
Hauraki Gulf Maritime Park Board (1982). HBMP Management Plan.
Morton J. Professor emeritus, University of Auckland.
Reynolds D. Historic Places Trust, Auckland.
Grace R. Marine Biology Consultant, Auckland.

Recorded on Existing Databases: **Comment:**

1. WERI
2. SSWI
3. PNA
4. Geopreservation
5. HPT County Inventories
6. Other — Coastal Wetland Inventory, Auckland Conservancy.
7. None

Other Considerations:

The site falls within the tribal boundaries of Ngati Paoa, Ngati Whatua and Kawerau. All three iwi should be notified and consulted on issues related to this site.
Contacts are: Kawerau - Hariata Ewe, Mangere.
Ngati Whatua - Ani Pihema, Orakei.
Ngati Paoa - Hariata Gordon, Penrose.
Long Bay and the Okura Estuary are sites proposed by ARC and DOC for possible future marine protected areas.

Accompanying Maps and Photographs:

Site Name/s: Motutapu, The Noises & Motuihe Islands	Site No: CRI 020 023
Recorders Name: Sian John	Conservancy: Auckland
Map/Grid Ref: R10 26800 64920	Date: 22.03.90

Brief Description of Site:

This site includes Motutapu, Motuihe and the Noises Islands. Motutapu Island is a combination of sandstone, mudstones, and mixtures of compressed rock and gravel. Its rolling, grass-covered hills and mellow pastoral appearance contrasts sharply with the tumbled confused surface and the thick native vegetation of adjacent Rangitoto. Motutapu has been farmed for approximately a century. Several inlets on the island's eastern shore provide sheltered and popular pleasure boat anchorages. Motutapu supported a large population from very early days of Maori occupation of the region. Motuihe is also a lowlying farmed island, but unlike Motutapu it has patches of both native and exotic trees. Motuihe has several very good sandy beaches, which, with its comparative ease of access from Auckland, makes it the most intensively used island in the region. The rest of the coastline is rocky with prominent cliffs rising boldly at the western end of the island. The Noises (Otata and Motuhoropapa) are small uninhabited islands, with a rugged coastline in an exposed position which discourages visitors and makes the islands comparatively safe nesting and roosting sites for sea birds. The white-faced storm petrel (*Pelagodroma marina maoriana*), grey-faced petrel (*Pterodroma macroptera gouldi*), and spotted shag (*Strictocarbo punctatus punctatus*) breed on the island. This site as a whole is placed under immense boating and recreational pressure.

Conservation Values: Natural: b,c,d,e,g,h,f Cultural: Historic: a,b

Comment:

Natural: Within this area there are four sites of geomorphic significance. A stack shore platform exists north of Gardner's Gap which is a fossil greywacke stack. Adjacent to this stack are fossil giant barnacles (*Bathylasma aucklandica*) (Geopreservation database). This site represents a 'classic type' locality of the barnacle, which sit in the sandstone on which they grew. Diverse barnacle fauna is also apparent in adjacent Parnell Grit beds. This site has a high educational significance for Auckland geology classes (source: geopreservation-fossil). Also on Motutapu are fossil human footprints and dog paw prints preserved in Rangitoto Ash, these are unique in NZ and have national significance. Unfortunately they also have a high vulnerability level. On Motuihe Island, forming a small prominent point, is an area (50 by 30m) of well developed coastal karst in basalt Waitemata Group limestone (Miocene rocks). This is the only limestone karst area in the Auckland Region.

Motuhoropapa Island in the Noises group represents the flora area of significance in this site. The island is characterised by remnant original pockets of forest and scrub. The forests are dominated by pohutukawa (*Metrosideros excelsa*) and lesser amounts of karo (*Pittosporum crassifolium*), koupara (*Pseudopanax lessonii*), mapou (*Myrsine australis*), karamu (*Coprosma lucida*), and tawapou (*Planchonella novo-zelandia*). The island represents one of the few islands in the inner Hauraki Gulf which is still completely covered by indigenous forest and scrub, and its forest remnants are typical of such small islands. Species of note include: *Euphorbia glauca* ("vulnerable"); *Carmichaelia williamsii*; *Linum monogynum*; and *Pterostylis nana* ("rare") (Atkinson 1960).

The marine life around the Noises is plentiful and the rocky marine environment is the focus for the breeding of reef fish. The area is representative of inner Hauraki Gulf subtidal reef systems, and its heavy *Ecklonia* kelp forest is sensitive to water pollution.

Historic: Motutapu Island was densely occupied during all prehistoric periods. 13 pa sites are spaced around the coast along with over 200 other sites representing Maori archaeological occupation. Two archaic midden sites of regional significance indicate occupation prior to the eruption of Rangitoto and suggests a change in economy due to changed vegetation (B Sewell pers. comm.) Settlement was permanent with gardens in volcanic soils being fully utilised. Only two pa sites on the other hand have been recorded on Motuihe, and all other living sites are around the coast. This possibly reflects the fact that only a small population lived on the island, or that it was not permanently occupied. A similar situation is found in the Noises, where clay soils are heavy and possibly unsuitable for gardening (sources 2 & 3). Of historic importance on Motutapu is the Stony Battery and its associated buildings, which were built during World War II.

Site Importance: International National Regional Local Unknown

Comment:

The geopreservation sites on Motutapu and Motuihe Islands are regionally significant, with the fossil footprints having national significance (Geopreservation database). The Noises are regionally important because the vegetation in some locations is close to primitive in condition, and some of the species present are rare/vulnerable (Atkinson 1960). Motutapu also contains archaic midden sites of regional significance.

Existing Threats: d,e,k

Type & Comment:

Cattle (*Bos taurus*) graze down to the shoreline on the northern and eastern coast of Motutapu.

Problems of overcrowding are faced on the most popular beaches of Motuihe Island on sunny days.

The marine environment as a whole in this site faces enormous pressure from boating, and subsequently faces the problem of pollution.

Human Modification and Human Use: a,b,d,h,i,k1(structures),k2(fisheries)

The original forest cover of Motutapu and Motuihe Islands has been completely modified and developed into farmland. There are very few structures on the foreshore of the islands in this site. With the only feature of significance being the causeway between Motutapu and Rangitoto. Land based recreation is very popular on Motutapu and Motuihe, with Motuihe possibly being the most intensively visited island in the Gulf. On both islands walking, swimming, fishing and shellfish gathering are popular, and Motutapu has three camp sites (including a DOC campground). Ferry services run fairly regularly from Auckland central to both islands. This site is very intensively used by recreational boating, with the main boating area of Auckland focused on the area between Motutapu to Rangitoto and Motuihe Island, and the mainland. Motutapu Island has two major wharfs, six anchorage bays and a supply area, while Motuihe Island has 4 anchorage bays. The Noises on the other hand are not a popular anchorage area, yet they are used extensively for diving. The marine environment is also intensively used for commercial fishing, primarily longlining, as trawling and danish seining are prohibited in this part of the Gulf.

The Motutapu Island Outdoor Education Camp caters for approximately 8000 school children each year.

Existing Protection: a,e

Type & Comment:

Both Motutapu and Motuihe Islands in their entirety are part of the Hauraki Gulf Maritime Park (DOC estate). The Noises remain unprotected.

Availability of Information:

Natural	1 2 3
Cultural	1 2 3
Historic	1 2 3
Threats	1 2 3
Human Mod. & Use	1 2 3

1. Well documented
2. Limited information (general)
3. Little information (if any)

Comment:

Sources of Information:

Natural	1 2 3 4 5 6 7
Cultural	1 2 3 4 5 6 7
Historic	1 2 3 4 5 6 7
Threats	1 2 3 4 5 6 7
Human Mod. & Use	1 2 3 4 5 6 7

1. Derived info. from existing literature & databases
2. Derived info as above & field check
3. Derived from existing maps & aerial photographs
4. Recent DOC survey including sampling & analysis
5. Recent DOC survey excluding sampling & analysis
6. Experience
7. Expert opinion

Comment:

Sources:
1. Atkinson, I.A. E. (1960). A preliminary account of the vegetation of Motuhoropapa Island. Tane 8:6-11.
2. Davidson, J. (1970). Survey of archaeological sites on Motutapu Island. Records Auckland Institute and Museum 7:1-12.
3. Law, G. (1987). Site survey method and standards: a check survey of Motutapu Island. NZAA Newsletter 30(1):16-26.
4. ARA (1976). Preliminary Report on the Hauraki Gulf Islands. ARA, Planning Division.
5. ARA (1988). Auckland Regional Planning Scheme. ARA.
6. Sewell, B. Staff Archaeologist, Department of Conservation, Auckland.

Recorded on Existing Databases: **Comment:**

1. WERI - No
2. SSWI - No
3. PNA - No
4. Geopreservation - Fossil; landform
5. HPT County Inventories - No
6. Other - NZAA Site Survey
7. None

Other Considerations:

This site falls into the tribal boundaries of the Ngai Tai. The contact person for this tribe is the Ngai Tai Tribal Committee (Te Warena Taua), Auckland.

The Noises are valuable habitats, and warrant protection from damage or disturbance by human visitors, the best way for this to be achieved appears to be their acquisition by the Department of Conservation and their establishment as wildlife reserves or sanctuaries (ARA 1976; ARA 1988).

Accompanying Maps and Photographs:

Site Name/s: Rangitoto & Motukorea (Browns) Islands **Site No:** CRI 020 024

Recorders Name: Sian John **Conservancy:** Auckland

Map/Grid Ref: R11 26770 64880 **Date:** 21.03.90

Brief Description of Site:

Rangitoto Island is the youngest of the volcanic islands in the region, as its eruption is believed to have only been approximately 600 years ago (R Foster 1990 pers. comm.). Rangitoto is entirely basalt, comprised of a wide lava apron below the remnants of its core, and a conical peak rising to over 250 metres (source 7). The island is roughly circular with a symmetrical profile and a unique rock formation of tumbled scoria. The lava field contains no soil in the usual sense of the word, yet more than 200 species of native ferns and flowering plants grow on the island. Dominant among the trees is pohutukawa (*Metrosideros excelsa*), with kohekohe (*Dysoxylum spectabile*), mangeao (*Litsea calicaris*), puriri (*Vitex lucens*), rewarewa (*Knightia excelsa*), rata (*Metrosideros robusta*), puka (*Griselinia lucida*), five-finger (*Pseudopanax arboreus*) and manuka (*Leptospermum scoparium*) also found. There is also a good and diverse population of native and exotic bird species. The coastal fringe, is the main nesting area of Auckland's large population of black-backed gulls (*Larus bulleri*). Rangitoto provides a reasonably close destination for small pleasure craft from Auckland, and the waters along its coast are popular and productive. Thus the area is a heavily used recreational resource. Rangitoto is a unique and most important component of Auckland's landscape and marine environment (ARA 1976). Motukorea (Browns) Island is a small island of 60 hectares which is an important feature of the harbour views of the eastern suburbs. Motukorea is characterised by grassy flats and hillsides, groves of trees, sheltered beaches, and pohutukawa clad cliffs. It is a valuable recreational amenity for the region due to its proximity to the city, and as such, like Rangitoto, is heavily used.

Conservation Values: **Natural:** a,b,e,f,g,h,i **Cultural:** b,c,e **Historic:** b

Comment:

Natural: Rangitoto Island is of international significance as a volcanic landform because each stage from the initial colonisation of raw basalt and scoria to the formation of scrub to immature forest can be seen (ARA 1988). The greater part of the island is a low dome built up by successions of basaltic lava flows, surmounted by a cluster of scoria mounds and cones, the last built of which has a deep central crater. Of national significance are the Rangitoto lava caves (3) near the summit of the island. These are significant as examples of lava caves freely accessible to the public, and thereby have educational value. Motukorea Island on the other hand is the relic of a much larger structure created when sea levels were low and the harbour dry land. Remnants of a very large tuff cone are preserved in the north eastern ridge and cliffs. The scoria mound is a complex of coalescing cones, while the associated lava field is now beneath the sea. The site is of considerable geological interest. Rangitoto also holds scientific interest as a site of island biogeography in close proximity to a major population centre. It contains the most extensive area of pohutukawa forest remaining in the Auckland region. Notable species include: pohutukawa and northern rata hybird; large leaved pohutukawas; and large leaved puka. Motukorea Island is sparsely vegetated, but remains notable for its record of *Euphorbia glauca* ("vulnerable") (Esler 1980).

Historic: Evidence of archaeological Maori occupation of Rangitoto includes a possible pa site on the summit and three widely separated burial sites. It is likely that the island was used for specialised purposes, but was never a living/occupation site. Davidson (1970) suggests that the island was principally a base for fishing parties. Motukorea on the other hand is virtually one archaeological landscape. It contains an unusual cone rim pa with very squared off terracing, and a number of other pa sites. Stone walls and garden structures point to the practice of horticulture here, and suggest at least a semi-permanent population (sources 4 & 5). The island also contains an archaic midden and possible associated living sites of a high significance. Archaeological non-Maori sites are similarly found on the island from the Campbell family farms.

Cultural: The easily recognisable symmetry of Rangitoto Island has made it a landmark and a symbol of Auckland. Its landscape quality rating is outstanding. As a consequence of these factors Rangitoto also has a high aesthetic value. The education value of Rangitoto is apparent from the statements previously made.

Site Importance: International National Regional Local Unknown

Comment:

Rangitoto Island is a landform of international significance, in terms of its succession from a barren lava/rock land surface to a fully vegetated island. Of national significance are the islands lava caves, while the vegetation and Maori occupation sites are regionally significant. (Source 8)

Existing Threats: d,j,k

Type & Comment:

The offshore environment adjacent to the eastern coast of Motukorea island is officially designated as the foul weather alternative for spoil disposal in Auckland, the site is licensed for 5000m^3 a year.

The marine environment in the vicinity of this site faces enormous pressures from boating, and subsequently faces the problem of pollution.

Possums (*Trichosurus vulpecula*) and wallabies (*Petrogale penicillata*) are a major threat to the vegetation on the islands.

Human Modification and Human Use: a,d,h,i,kl(structures)

Rangitoto Island is essentially unmodified with the exception of the perimeter of the island, along which seaside cottages have been built. The leases for these baches are not being renewed however, and a number of baches have and are being removed. Motukorea Island on the other hand has been substantially modified by the development of pasture.

The marine environment of this site is very intensively used by recreational boating, with the main boating area of Auckland focused on the area between Rangitoto to Motutapu and Motuihe Island, including Motukorea Island, and the mainland. Rangitoto has 2 major wharves, 3 anchorage bays, and one boat supply area, while Motukorea has 2 anchorage bays. Visitors to Rangitoto and Motukorea islands indulge in various recreational activities including swimming, fishing, walking (a track leads to Rangitoto's summit), bird watching and general nature study. Also popular in the vicinity of these islands is rowing and canoeing.

Existing Protection: a,e

Type & Comment:

Both Rangitoto and Motukorea Islands in their entirety are part of the Hauraki Gulf Maritime Park (DOC estate).

Availability of Information:

Natural	1	2	3
Cultural	1	2	3
Historic	1	2	3
Threats	1	2	3
Human Mod. & Use	1	2	3

1. Well documented
2. Limited information (general)
3. Little information (if any)

Comment:

Sources of Information:

Natural	1	2	3	4	5	6	7
Cultural	1	2	3	4	5	6	7
Historic	1	2	3	4	5	6	7
Threats	1	2	3	4	5	6	7
Human Mod. & Use	1	2	3	4	5	6	7

1. Derived info. from existing literature & databases
2. Derived info as above & field check
3. Derived from existing maps & aerial photographs
4. Recent DOC survey including sampling & analysis
5. Recent DOC survey excluding sampling & analysis
6. Experience
7. Expert opinion

Comment:

Sources:

1. ARA (1988). Auckland Regional Planning Scheme. ARA.
2. Esler, A.E.(1980). Botanical Features of Motutapu, Motuihe and Motukorea, Hauraki Gulf, NZ Journal of Botany 18(1):15-36.
3. Davidson, J.(1970). Survey of archaeological sites on Motutapu Island. Records Auckland Institute and Museum 7:1-12.
4. Rickard, V. (1985). Motukorea (Brown's Island). Archaeological Survey. Department of Lands and Survey, Archaeological and Historical Reports No. 11.
5. Smith, I.W.G. (1987). Archaeological Inspection: Motukoera Draft Report for NZHPT Auckland.
6. ARA (1976). Preliminary Report on the Hauraki Gulf Islands. ARA, Planning division.
7. Hauraki Gulf Maritime Park (1983). The story of Hauraki Gulf Maritime Park. Hauraki Gulf Maritime Park Board.
8. Segedin, A. (1985). Rangitoto: Biological assessment and natural history. Department of Lands and Survey (Auckland), Mimeograph.
9. Foster, R. Staff Archaeologist, Department of Conservation, Auckland.

Recorded on Existing Databases:

1. WERI
2. SSWI
3. PNA
4. Geopreservation - Caves and karst
5. HPT County Inventories
6. Other - NZAA Site Surveys
7. None

Comment: A great deal of information on these islands, their flora, fauna, geology, etc is held by the Department of Conservation in Auckland on file, in the library and amongst staff.

Other Considerations:

Fire is a significant potential threat for the vegetation on Rangitoto Island.

This island falls into the tribal boundaries of the Ngai Tai. The contact person for this tribe is the Ngai Tai Tribal Committee (Te Warena Taua), Auckland.

Accompanying Maps and Photographs:

Site Name/s: Waitemata Harbour	**Site No:** CRI 020 025
Recorders Name: Felicity Fahy	**Conservancy:** Auckland
Map/Grid Ref: R11 26610 64840	**Date:** 21.03.90

Brief Description of Site:

This site encompases the Waitemata Harbour and Tamaki River Estuary. The harbour is large with considerable areas of mudflats and sand/shell flats. In places there are considerable areas of mangroves (*Avicennia marina* var. *resinifera*) with associated saltmarsh, especially around the Pollen and Traherne Islands area. The upper estuary is muddy and surrounded by urban development and some agriculture. The boarders of the upper harbour inlets are partly forested by a coastal band of vegetation. Pollen and Traherne Islands have a very large diversity of plant species, it is also home to a number of rare insect species. Towards the entrance to the harbour the coastline alternates between exposed cliffs of the Waitemata formation and pocket beaches. A series of islands form a boundary between the harbour and the Hauraki Gulf. These islands protect the harbour from high seas and swell. The Tamaki Estuary is a large river estuary containing large areas of intertidal mudflats. Most of the catchment and boarder land is residentially or industrially developed. A particular geological feature of the area is the volcanic activity which has occurred periodically throughout Auckland over the last 60,000 years. Recreational use of the area is intensive and ranges from boating of all types, swimming, fishing to walking and picnicking. Parts of harbour are heavily modified by structures and reclamations. The main threats to the area are from the urban community and the demands they put on the harbour.

Conservation Values: **Natural:**a,b,c,e,f,g,h,i **Cultural:** a,c **Historic:** a,b,c,d,e

Comment:

Natural: Waitemata Harbour geology is typical of a drowned river system with its irregular coastline comprised of deep bays and broad sinuous estuaries. This has evolved through a complex history of repeated valley formation and sediment infilling during the past one million years. A particular geological feature of the area is the volcanic activity which has occurred at random locations throughout Auckland over the last 60,000 years. There are several eruption centres in the harbour. Panmure Basin, Orakei Basin and the Northcote Caldera (Tuff Crater) are examples of craters which have been flooded by the sea and filled with soft muddy sediments. In other areas lava flows from land-based eruptions having reached the harbour, the most notable being Meola Reef (source 1). Three geopreservation sites are noted in this site. At Orakei there is an area of greensand that is of known scientific value. Historically it is an important site from which samples were collected by Hochstetter in 1859 (source: Geopreservation). It is a type locality of several mollusca and especially of numerous foraminifera described by Karrer in 1864. The Geopreservation inventory state that it is of national scientific value. At Kaiwanaka Point, Hobsonville there is a complex landslide of national significance (Geopreservation). It is one of the few places where pumice silts exist at sea level. The Auckland Regional Planning Scheme identifies the tank farm on the northern side of the harbour, to be of regional significance. It is a former freshwater crater lake that has been breached by the sea. The area provides sheltered intertidal mangrove and saltmarsh communities which are important as fish and bird habitats. Geopreservation has also identified the shore platform at Musick Point as being of regional significance. The flora of the upper Waitemata harbour is dominated by a high mangrove biomass in the creeks and inlets. There is also a mosaic of saltmeadow and saltmarsh communities. The whole area has high productivity, Lucas Creek is the highest (D Slaven pers. comm. (1990). It provides very good feeding and

nursery for many fish including flounder (*Rhombosolea* spp.), snapper (*Chrysophrys auratus*), yellow-eyed mullet (*Aldrichetta forsteri*) and parore (*Girella tricuspidata*). Paremoremo Creek has the tallest, probably least modified mangrove ecosystem of the upper Waitemata Harbour (D Slaven pers. comm. 1990). Chelsea Bush is important as thelargest remnant of bush left in Auckland City. It is predominantly kanuka (*Kunzea ericoides*)-kauri (*Agathis australis*) with broadleaf species. The lower Waitemata Harbour has extensive areas of mangrove, saltmarsh, saltmeadow and *Zostera*. Pollen Island and Traherne Island are the most important intertidal marsh and shell habitats in the harbour. This area forms a unique association of landforms and vegetation types and has excellent examples of saline ecotone sequences (source 3). The Shoal Bay area also has excellent ecotone sequences including shell banks. It is representative of what the more sheltered shallow areas of the Waitemata would once have been like. The harbour has a very wide diversity of wader bird species. There are very important feeding grounds on intertidal mud and sand flats used by artic migrants such as bar-tailed godwit (*Limosa lapponica baueri*) and many New Zealand species including threatened species (source 2) such as NZ dotterel (*Charadrius obscurus*), banded dotterel (*C. bicinctus bicinctus*), caspian tern (*Hydroprogne caspia*), and the rare variable oystercatcher (*Haematopus unicolor*). Threatened banded rail (*Rallus philippensis assimilis*) are common in the mangrove areas. Pollen and Traherne Islands are the major high-tide wader roost sites for the harbour. The harbour is generally an important breeding and flocking area for NZ dotterel. There is a colony of 30-40 N.I. fernbirds (*Bowdleria punctata vealeae*) in the salt marsh, ribbonwood (*Plagianthus divaricatus*) vegetation on the islands. Pollen Island has a number of rare insect species including one moth species (*Bactra* sp.) found nowhere else. Sandy Point is an important roost site especially for NZ waders. A large number of gulls, terns and shag species also use the spit. In the Tamaki Estuary the mudflats are feeding grounds for a variety of coastal bird species. The Pollen Island area has a high degree of naturalness mainly due to the difficulty of access to the area. (Source 4)

Cultural: The landscape of the upper Waitemata Harbour north of Henderson Creek and isolated stretches such as Kauri Point are rated above average in landscape quality (source 6). The landscape character is generally estuarine. Urban areas were not included in the study so were not ranked. There are four areas of traditional value within this site. The Musick Point Pa has traditional links with the arrival of the first canoes. There are also tapu sites on the banks of the Pakuranga Creek, and a cemetery and burial grounds at Okahu Bay and the pa at Bastion Point are all considered of traditional value (B Sewell pers. comm. 1990).

Historic: Within this site are several clusters of building with known historical significance. At the Chelsea Sugar Refinery, Birkenhead there are four separately classified buildings. At Hobsonville there are various Waitemata pottery sites and there is also a pumphouse at Takapuna. On the Auckland waterfront there are many buildings and structures of historical value including the Birdcage Tavern, Auckland Gas Company, Cargo Shed - Fanshawe Street, Tepid Baths, Western Viaduct Bridge, Auckland Harbour Board Engineers Workshop, Launchmans Building, Eastern and Western Public Shelters, Ferry Building, Queens Wharf Gates, Endean's Buildings, Roberts Seeds Building, former Custom House, former Northern Steamship, former Colonial Sugar Refinery office and former Marine Workshops. Further east along the waterfront is another cluster of sites with historic value, the include Warehouses 10-20, 22-34, 36-42 on Customs Street, the Auckland Railway Station, Bean Rocks Light Tower, Station Hotel, House 66 St George Bay Road, former FTC warehouse and St Stephens Chapel in Parnell which is also of national significance. The Waitemata Harbour and Tamaki Estuary have an abundance of archaeological sites. The distribution of pa indicate the areas closer to the open sea were more strategically important. With the exception of the upper harbour there was a pa on virtually every headland and undefended sites in between. Of particular archaeological significance is the wahi tapu site on the banks of the

Pakuranga Creek, the cemetery and burial grounds at Okahu Bay, Bastion Point Pa and current Ngati Whatua meeting house. There is also a reputed archaic flaking floor at Bucklands Beach, fish traps at Tahuna Torea, and Riverside Pa at Tamaki that is defended by double palisading, which are of archaeological significance (NZAA). There are 89 known shipwrecks within this site dating from 1852 to 1970, most occurred before 1900 (Shipwreck database).

Site Importance: International **National** Regional Local Unknown

Comment:

Orakei Greensand is of national scientific importance (Geopreservation database). The Kaiwanake Point complex landslide is of national significance. The harbour is nationally important due to its level of usage by bird species for breeding, feeding and roosting. Pollen Island is the most important ecological site within the area, it has a huge diversity of plant and animal species for a small site and is of national significance (source 1).

Existing Threats: b,e,j,k,l,m

Type & Comment:

Many values within the harbour are threatened due to the intense urban development surrounding it. Human activities such as road works could pose a threat to the greensand site. The original exposure was destroyed by road making but several poor exposures still remain on the muddy foreshore. The harbour is affected by pollution from the industrial zone, especially Rosebank Peninsula. Residential development down to the water's edge often destroys wildlife habitats. The harbour coastline, especially the mangrove fringes are frequently used as dumping grounds for domestic rubbish. The proposed port facility at Pollen Island is a threat to the whole of the lower harbour, it would involve extensive reclamation and dredging to make a "Port Island". Runoff from the development of new residential areas has caused siltation of the harbour. High recreational boat usage up the Tamaki Estuary causes problems of wave wash eroding the Sandy Point spit.

Human Modification and Human Use: a,b,c,d,e,h,i,k1(structures),k2(fisheries)

This site is surrounded by the most intensive land development and the highest concentration of people in NZ. As a result it has been modified considerably and is used constantly. Rural, residential, and industrial development border the harbour and estuary. There is a large commercial port area which includes reclamations and wharves. There are several mooring areas in the harbour and estuary that cater for up to 4570 boats on swing and pile moorings. There are also 7 marina areas that have a total of 3100 berth and moorings. There are several sewage overflow outfalls that discharge into this site. The harbour and estuary are used very intensively for all imaginable forms of shore and water based recreation, including swimming, walking, picnicking, fishing and diving. Yachting and cruising are especially important, many yacht races are held each year in this area, as are dragon boat trials. There are over 1000 structures below mean high water mark in the harbour which signifies the level of modification the area experiences. Limited commercial fishing occurs within the Waitemata, primarily netting for flounder. Many restrictions apply on commercial trawling, seining and netting.

Existing Protection: a,c,d

Type & Comment:

Conservation and habitat zones are implace under the Waitemata Harbour Maritime Planning Scheme (source 1). Parts of the shoreline are in local purpose reserves administered by the Auckland City Council, and seven DOC estate reserves are located within this site: Tirimoana Road Conservation Area (0.18 ha); Whau River Conservation Area (0.30 ha); Motions Creek Conservation Area (0.52 ha); Purewa Creek Conservation Area (31.5 ha); Bastion Point Conservation Area (0.19 ha); Lucas Creek Scenic Reserve (11 ha); and Brunton Place Conservation Area (0.29 ha) and associated Estdale Road Bush Scenic Reserve.

Availability of Information:

Natural	1 2 3
Cultural	1 2 3
Historic	1 2 3
Threats	1 2 3
Human Mod. & Use	1 2 3

Comment:

1. Well documented
2. Limited information (general)
3. Little information (if any)

Sources of Information:

Natural	1 2 3 4 5 6 7
Cultural	1 2 3 4 5 6 7
Historic	1 2 3 4 5 6 7
Threats	1 2 3 4 5 6 7
Human Mod. & Use	1 2 3 4 5 6 7

1. Derived info. from existing literature & databases
2. Derived info as above & field check
3. Derived from existing maps & aerial photographs
4. Recent DOC survey including sampling & analysis
5. Recent DOC survey excluding sampling & analysis
6. Experience
7. Expert opinion

Comment:

1. Waitemata Harbour Maritime Planning Authority (1987). Waitemata Harbour Maritime Planning Scheme and maps. Auckland Harbour Board.
2. Bell, B.D. (1986). The Conservation Status of New Zealand Wildlife. NZ Wildlife Service Occasional Publication No. 12.
3. Chapman, V.J. and J.W. Ronaldson (1958). The Mangrove and Saltmarsh flats of the Auckland Isthmus. DSIR Bulletin 1:125.
4. Royal Forest and Bird Protection Society of NZ Inc (1989). A Marine reserve proposal for Pollen/Traherne Islands Tidal Zone. mimeograph.
5. Sewell, B. Staff Archaeologist, Department of Conservation Auckland.
6. Auckland Regional Authority, Regional Planning Department (1984). An Assessment of Auckland Region's Landscape, ARA.

Recorded on Existing Databases:

1. NERI
2. SSWI
3. PNA
4. Geopreservation
5. HPT County Inventories
6. Other - (a) NZAA Site Records.
   (b) Auckland Regional Authority, Regional Planning Department (1984). An Assessment of Auckland Region's Landscape, ARA.
   (c) Shipwreck database taken from Ingram, C.W.N. 1984, NZ Shipwrecks 1795-1982 and others - held in DOC, Auckland.
7. None

Comment:

The geopreservation site came from the "Fossil Localities Inventory" and the "Landform Sites Inventory". A large number of historic sites were recorded from the HPT County Inventories. Archaeological sites were identified though the NZ Archaeological Association records.

Other Considerations:

The Treaty of Waitangi was signed in Karaka Bay by 40 Maori chiefs in 1840. From early times, the harbour was used by the Maori people as a means of travel and communication between different parts of the country, as well as for fishing and shellfishing. The harbour is therefore significant to several tribes including the Ngai Tai, contact Nga Tai Tribal Committee (Te Warena Taua); Waiohua, contact Joseph Wilson, Auckland; Ngati Paoa, contact Hariata Gordon, Auckland; and Kawerau, contact Hariata Ewe. The Kaiwanake Point
landslide and Orakei Greensand are both vulnerable to partial destruction or modification by human activity, some form of legal protected is thought necessary. The Musick Point area is under consideration for Reserve Status. Pollen Island and tidal areas are proposed for a marine reserve.

Accompanying Maps and Photographs:

Site Name/s: Waiheke Island	Site No: CRI 020 026
Recorders Name: Sian John	Conservancy: Auckland
Map/Grid Ref: S11 26990 64870	Date: 21.03.90

Brief Description of Site:

This site includes Waiheke, Pakatoa, Rotoroa, and Ponui Islands, of which Waiheke is the dominant feature. Waiheke's coastline is deeply indented and varied, with tidal inlets, sandy bays, steep cliffs and rocky headlands. The greater part of the island is open farmland with some extensive areas of native bush, but its western end has attracted considerable urban development. The character of the island's vegetation is primarily coastal and pohutukawa is very abundant. Of more importance is the presence of less common, regionally depleted, and "rare" species. Waiheke's wildlife habitats are also important and the birdlife includes "threatened", "endangered" and "regionally threatened" species (Te Matuku Bay is of particular significance.) Ponui Island is a combination of extensive pasture, areas of native bush and undeveloped coastline, it is a valuable component of the inner Hauraki Gulf marine recreational area. This site is a very important recreational resource, and as such is heavily used.

Conservation Values: **Natural:** a,b,c,e,f,h **Cultural:** **Historic:** b,c,d

Comment:

Natural: Waiheke Island is characterised by a number of sites of ecological significance. In the vicinity of Onetangi Bay Pingao (*Desmoschoenus spiralis*) ("rare") with Spinifex (*Spinifex hirsutus*)-poroporo (*Solanum aviculare*) is abundant (source 6). Pingao on offshore islands is rare within the Auckland Region. In a band from Onetangi Bay eastwards across the island to Man O' War Bay are a number of terrestrial forest complexes, within which the dominant species are: taraire (*Beilschmiedia tarairi*)-pohutukawa (*Metrosideros excelsa*) forest with puriri (*Vitex lucens*)-rewarewa (*Knightia excelsa*)-kohekohe (*Dysoxylum spectabile*)-matai (*Podocarpus spicatus*)-tawa (*Beilschmiedia tawa*)-kauri (*Agathis australis*)-kanuka (*Kenzea ericoides*)-hybrid (cross between pohutukawa and northern rata)-karaka (*Corynocarpus laevigatus*)-nikau (*Rhopalostylis sapida*)-tawapou (*Planchonella nova-zelandica*)-karo (*Pittosporum crassifolium*)-kowhai (*Saphora tetraptera*)-tanekaha (*Phyllocladus trichomanoides*)-mamangi (*Coprosma arborea*). One such site also contains a king fern (*Marattia salicina*) remnant (rare) (source 6). A further complex at Man-O-War Bay contains: taraire forest with kohekohe; kauri forest with hardbeech-tanekaha; kahikatea (*Podocarpus dacrydioids*)-maire tawake (*Eugenia maire*) forest with puriri-kohekohe-nikau-kanuka; raupo (*Typha orientalis*) with *Scirpus lucustris-Scirpus* spp-*Cyperus astulatus*-kanuka-manuka-*convolvulus*; and associated saltmeadow spp, mangrove (*Avicennia marina* var. *resinifera*) forest and island or spit shrubland vegetation. Beech (*Nothofagus* sp.) is not common in the Auckland region, and is even less common on the islands (Maire tawake is uncommon on Waiheke). Te Matuku Bay and Okahuiti Creek on the southern shoreline are characterised by a very similar association and show excellent ecotone sequences, including gradations between sand/shell spit - saline - saltmarsh - saltmeadow - and various types of terrestrial vegetation. Raupo forest with *Scirpus lacustris* - *Scirpus* spp- *Caperus ustulatus*- kanuka - manuka (*Leptospermum scoparium*) *convolvulus* - *Baumea* spp - *Juncus* spp - *Leptocarpus similis* with associated saltmeadow spp, mangrove forest and island or spit shrubland -tussockland vegetation is present at two locations along the southern shoreline (Waimango Bay and adjacent to Rocky Bay) and adjacent to Woodlands Bay. At Rocky Bay an extensive area of freshwater wetland grades into

saltmarsh and mangroves. Tawaipareira Creek and Putiki Bay contain similar ecosystems but are characterised by the largest concentrations of cabbage tree (*Cordyline australis*) on a Hauraki Gulf island. All of the sites of ecological significance described are the best and representative of their particular vegetation form or ecotone sequence within the islands of the Inner Hauraki Gulf.

Five important sites for fauna have been identified on or surrounding Waiheke Island. Large numbers of a wide variety of coastal birds use the different habitats within Te Matuku Bay (a very important wader habitat), including the NZ dotterel (*Charadrius obscurus*) (threatened), which nests on a shell spit near the estuary mouth. In addition wrybill (*Anarhynchus frontalis*), variable (*Haematopus unicolor*) and South Island pied oystercatcher (*H. ostralegus finschi*), banded dotterel (*Charadrius bicinctus bicinctus*), Australasian bittern (*Botaurus stellaris poiciloptilus*), bar-tailed godwit (*Limosa lapponica baueri*), caspian tern (*Hydroprogne caspia*), white-fronted tern (*Sterna striata*), reef heron (*Egretta sacra sacra*), sandpipers, turnstone (*Arenaria interpres interpres*), and spotless crake (*Porzana tabuensis plumbea*) are present, and bell-birds (*Anthornis melanura melanura*) have recently been released here. Tarahiki Island is a breeding colony for spotted shag (*Strictocarbo punctatus punctatus*) (uncommon in the Auckland region), and the "threatened" reef heron uses the island as a nesting area (source 7). Horuhoru Island is a breeding colony for the Australasian gannet (*Sula bassana serrator*) (one of the largest in NZ). Koi, Cursoe, and Motukaha islands, and Frenchmans Cap are known to support threatened bird species. They are, for example, known irregular nesting areas for the reef heron. Finally, Awaawaroa Bay is the second largest wader habitat on the island after Te Matuku Bay. The area contains relatively large numbers of godwits, South Island pied oystercatchers, mallards (*Anas platyrhynchos platyrhynchos*), grey ducks (*A. superciliosa superciliosa*), little shags (*Phalacrocorax melanolevcos brevirostris*), paradise shelducks (*Iadorna variegata*), pied stilts (*Himantopus himantopus leucocephalus*), pied shags (*Phalacrocorax varius varius*), and NZ dotterel which breed there.

Geomorphic sites of significance include two geopreservation sites: rich shallow water macrofauna in deepening sequence at Double 'U' Bay and Fossil Bay (which also has reef corals in situ); and two sites identified by the Department of Lands and Survey (1978). Te Matuku Bay combines within a defined area a large number of features which make it a significant area not only regionally but also nationally, including an extensive mudflat and an unusual shellbank. The northern coastline in the vicinity of Hakaimango Point is remarkable for the intricately serrated nature of its rocky shoreline and numerous diminutive coves contained within steep cliffs. Hakaimango Point itself is a slender ridge which protrudes northwards out into the sea and falls away into a line of rocky islets.

Historic: This site was characterised by dense Maori occupation covering all prehistoric periods. Sites of Maori archaeological significance on Waiheke Island include a battle site in Putiki Bay; Rangihoua Pa, where Tamehana spoke about the King movement; a Maori cemetery and meeting house at Surfdale; and an archaic midden at Owhiti Bay (source 3). A second archaic midden is found on Ponui Island. Stoney Batter represents a site of non-Maori archaeological significance on Waiheke. On Ponui and Waiheke islands pa are found distributed on the majority of headlands, and undefended sites on beaches and ridges, this suggests permanent and long term settlement with gardens (sources 4 & 5). Settlement on Waiheke was particularly dense in the 19th century, a period during which timber extraction also occurred, with settlement focused on the western end of the island. 12 ships were wrecked between 1860 and 1953 in the Inner Hauraki Gulf about the vicinity of Waiheke Island. (Source 8)

Site Importance: International National Regional Local Unknown

Comment:

This site contains regionally significant flora and fauna species and ecotone sequences which represent the best or only such forms on the islands of the Inner Hauraki Gulf. Te Matuku Bay in particular is a very high value habitat, which contains a number of threatened bird species which breed in the area and valuable geomorphic features, and as an independent unit has national significance. The archaeological features in the site are also of regional significance, as are the geopreservation sites. The presence of regionally depleted and rare plant species and "threatened", "endangered" and "regionally threatened" bird species highlight Waiheke Island as a nationally significant area (Fitzgibbon & Slaven 1988).

Existing Threats: d,h,j

Type & Comment:

Along the northeastern and eastern shorelines cattle graze right down to the water's edge.

Marine debris is a particular problem in this area.

A mussel farm in Man O War Bay has altered the local marine ecology. Mussels (*Perna canaliculus*) are now more prevalent on the coast and sea floor.

Human Modification and Human Use: a,b,d,h,i,k1(structures),k2(fisheries),k3(aquaculture)

The original forest cover of these islands has been substantially modified. The recreational use of this area focuses on boating, with very heavy use of the marine environment. Waiheke Island has 19 anchorage sites, four major wharfs and 6 boat supply areas. Rotoroa Island has two anchorage sites, and Ponui Island has 4 and a major wharf. Popular navigation channels include Tamaki Strait to the south of Waiheke and the channel running between the eastern coastline of Waiheke, and Rotorua and Ponui islands. Popular land based recreation on Waiheke Island includes swimming and walking, with 8 popular swimming beaches on Waiheke (predominantly located on the northern and eastern shorelines). Diving is also a popular past-time off the eastern shorelines of Waiheke, Rotoroa, and Ponui islands, as is shellfish gathering. Approximately 140 structures (jetties, boatramps, boat houses, etc.) are scattered around Waiheke Islands shoreline, with the focus being on the eastern and southern coasts, and 25 are located on Ponui. Major reclamation has been undertaken in Awaawaroa Bay on Waiheke. From a commercial perspective the marine environment of this site is fairly heavily used, with the presence of commercial fishing, two oyster farms in Waiheke's South Eastern harbours and a mussel farm in Man O War Bay. Ponui Island has the only area commercially licensed for the taking of pipis and cockles in the Auckland Conservancy. Off-shore east of Waiheke, towards Coromandel is the MAF Fisheries Trawl Survey area used for research into trawling methods.

Existing Protection: a,f

Type & Comment:

Although Ponui Island is privately owned, it is a valuable component of the inner Hauraki Gulf marine recreational area, and was gazetted as a wildlife refuge in 1964. Onetangi forest (at the back of Onetangi Bay) is a Royal Forest and Bird Protection Society Reserve (a private scenic reserve), as is the Shellbank Wildlife Habitat in Te Matuku Bay. Two pieces of DOC estate land are also apparent in the eastern portions of the island (with one adjacent to Te Matuku Bay and the other opposite Hooks Bay in the NE). Commercial fishing restrictions apply to this area as part of the management of the entire Hauraki Gulf fishery.

Availability of Information:

Natural	1 2 3
Cultural	1 2 3
Historic	1 2 3
Threats	1 2 3
Human Mod. & Use	1 2 3

1. Well documented
2. Limited information (general)
3. Little information (if any)

Comment:

Sources of Information:

Natural	1 2 3 4 5 6 7
Cultural	1 2 3 4 5 6 7
Historic	1 2 3 4 5 6 7
Threats	1 2 3 4 5 6 7
Human Mod. & Use	1 2 3 4 5 6 7

1. Derived info. from existing literature & databases
2. Derived info as above & field check
3. Derived from existing maps & aerial photographs
4. Recent DOC survey including sampling & analysis
5. Recent DOC survey excluding sampling & analysis
6. Experience
7. Expert opinion

Comment:

Sources:

1. Department of Lands and Survey (1978). Coastal Reserves Investigation and Proposal: Report on Waiheke County. Department of Lands and Survey, North Auckland, Land Division.
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3. Atwell, E.G. (1975). Site recording in the eastern half of Waiheke Island. NZHPT.
4. Davidson, J. (1963). Site Survey: Ponui Island. NZAA Newsletter 6:36-44.
5. Matthews, P.J. (1979). Archaeological Site Survey on Ponui Island, Hauraki Gulf, NZ. Tane 25:23-33.
6. Given, D.R. (1981). Rare and Endangered Plants of New Zealand. A.H. & A.W. Reed.
7. Bell, B.D. (1986). The Conservation Status of New Zealand Wildlife. NZ Wildlife Service, Occasional Publication No. 12.
8. Ingram, C.W.N. (1984). New Zealand Shipwrecks 1795-1982. AH & R Reed Ltd.

Recorded on Existing Databases:
1. WERI
2. SSWI
3. PNA
4. Geopreservation - Fossils
5. HPT County Inventories
6. Other - NZAA Site Surveys
7. None

Comment:
Fitzgibbon and Slaven (1988) is the most up to date recording of conservation values.

Other Considerations:

This site falls into the tribal boundaries of the Ngati Paoa (Waiheke, Pakatoa, Rotoroa) and the Ngai Tai (Ponui). The contact people for these tribes are the Ngati Paoa Development Trust (Hariata Gordon), Penrose, and the Nga Tai Tribal Committee (Te Warena Taua), Auckland respectively.

Marine reserve proposals for Te Matuku Bay and Sandy Bay Palm Beach being publicly discussed by local groups.

Accompanying Maps and Photographs:

Site Name/s: Cockle Bay	**Site No:** CRI 020 027
Recorders Name: Felicity Fahy	**Conservancy:** Auckland
Map/Grid Ref: R11 26860 64750	**Date:** 22.03.90

Brief Description of Site:

Three distinct tidal creeks - the Maungamaungaroa, Turanga and Waikopua flow into this one large bay of approximately 1200 ha. The bay has extensive mud, sand and shell flats. The creeks are lined with mangroves (*Avicennia marina* var. *resinifera*) and have areas of saltmarsh in particular at the mouth of the Turanga. There are several islands in the Turanga creek that have a diversity of plant species. There are large shell banks at the mouth of the Turanga and Waikopua creeks. The catchment of all three creeks are in pasture with some shrubland, forest or exotic pine (*Pinus* spp.) plantation adjacent. Residential Howick is now spreading into the Maungamaungaroa catchment, the main threat to the site is continued subdivision and a refuse tip at Whitford. No archaeological surveys have been carried out in this area.

Conservation Values: **Natural:** b,c,f **Cultural:** c **Historic:** b

Comment:

Natural: The Maungamaungaroa estuary has an ecotone sequence of coastal wetlands grading into immediately adjacent coastal taraire (*Beilschmiedia tarairi*) forest. It has the best taraire forest with puriri (*Vitex lucens*) on the coast and the best kowhai (*Sophora tetraptera*) forest on coastal cliffs in the district (source 1). Turanga Creek has extensive mangrove areas. One of the islands in the Bay is of special note. It contains some good quality coastal forest with ngaio (*Myoporum laetum*), pohutukawa (*Metrosideros excelsa*), kowhai and many other broadleaf species. The estuary has the best coastal ribbonwood (*Plagianthus divaricatus*) and coastal shrub daisy (*Olearia solandri*) communities in the district, it also has the best cabbage tree (*Cordyline australis*) - flax (*Phormium tenax*) communities in the district (source 1). The Waikoupua creek has about 20% of the area in mangroves. It has extensive areas of saltmarsh and saltmeadow towards the estuary head, it also has excellent saline community ecotone sequences involving saltmeadow, saltmarsh and mangroves (source 1). The three estuaries are rated as one SSWI of moderate-high. They also fall within a larger Recommended Area for Protection (RAP) site from the Hunua Ecological District PNA survey. Whites Road forest between Maungamaungaroa and Turanga creeks has also been identified in Hunua PNA, as the best example of coastal tawa (*Beilschmiedia tenax*) forest in the district and is part of the above mentioned RAP. Representativeness at all these sites has been indicated by the PNA survey. The site also has many rare bird species present and is an important breeding and feeding ground. There are a good variety of coastal birds present (21 species recorded) including high numbers of the bar-tailed godwit (*Limosa lapponica baveri*) and South Island pied oystercatcher (*Haematopus ostralegus finschi*). The NZ dotterel (*Charadrius obscurus*) attempt to breed on the shellbanks, the banded dotterel (*C. bicinctus bicinctus*), caspian tern (*Hydrprogne caspia*), banded rail (*Rallus philippensis assimilis*) which are all "threatened" species (source 2) breed and live under the mangroves. The variable oystercatcher (*Haematopus unicolor*) and asiatic whimbrel (*Numenius phaeopus variegatus*), both "rare" (source 2) are also present. A variety of more common shags, gulls and ducks feed, breed and roost in the area. The habitat is still of good quality despite modification to the catchment and nearby residential presence (SSWI).

Cultural: A small portion of this coast has been identified as having above average landscape quality (source 8). The coast generally has a pleasant rural quality. A continuity of coastal vegetation reduces the visual impact of urban development.

Historic: No archaeological surveys have been carried out in this area but there is one site of significance. A shell mound exists on Motukaraka Island, which is located at the eastern entrance of the bay. It is an unusual feature, at least in this area as it is the only known example. It could represent a house mound (B Sewell pers. comm. 1990).

Site Importance: International National Regional Local Unknown

Comment:

Turanga Creek vegetation is of regional significance (D Slaven pers. comm. 1990). The area is regionally important for the moderate to high bird numbers including the variety of threatened and rare species. (C Green pers. comm. 1990).

Existing Threats: a,d,e,f,j,l

Type & Comment:

Erosion has occurred on the banks of the Maungamaungaroa with the new subdivision extending Howick. Leachate from the Whitford tip is killing the mangroves in the upper reaches of the Waikopua Creek. This is likely to continue for some time as it is the major refuse tip for the area. There is also the threat of cattle allowed to graze right down to the water's edge of the estuaries. This damages the vegetation and habitats present by trampling or being eaten. There is illegal removal of shellbank material near the mouth of the Waikopua Creek which is destroying roosting areas for birds. Coastal subdivision is probably the biggest threat to the area (source 3). Several large blocks of land close to this site have been subdivided and sold in the past few years.

Human Modification and Human Use: a,d,h,i,kl (Structures)

Most of the surrounding land is developed for agricultural or residential uses. South east Auckland is beginning to surround the estuaries. Several jetties and a wharf have been built at Whitford. Boats are moored in Turanga Creek. Recreation in the area includes many forms of boating, sailing, windsurfing, rowing, canoeing, surfskiing. Swimming is also very popular as is fishing, walking and picnicking.

Existing Protection: a,b

Type & Comment:

DOC owns a small area of land at the head of the Maungamaungaroa Creek, at Clifton Road and along the left bank of the Waikopua Creek. The Manukau City Council has several local purpose reserves on the Howick coastline.

Turanga Creek Conservation Area (4.5 ha) and Beachlands Conservation Are (62.7 ha) are tidal flats and islands respectively within the site.

Availability of Information:		1. Well documented
Natural	1 2 3	2. Limited information (general)
Cultural	1 2 3	3. Little information (if any)
Historic	1 2 3	
Threats	1 2 3	
Human Mod. & Use	1 2 3	

Comment:

There is limited information on the cultural values with the exception of landscape assessment which has been well documented. There is also limited historical information. There has been no archaeological survey done of the area.

Sources of Information:		1. Derived info. from existing literature & databases
Natural	1 2 3 4 5 6 7	2. Derived info as above & field check
Cultural	1 2 3 4 5 6 7	3. Derived from existing maps & aerial photographs
Historic	1 2 3 4 5 6 7	4. Recent DOC survey including sampling & analysis
Threats	1 2 3 4 5 6 7	5. Recent DOC survey excluding sampling & analysis
Human Mod. & Use	1 2 3 4 5 6 7	6. Experience
		7. Expert opinion

Comment:

1. Hunua Ecological District PNA Survey 1989. ARC (unpublished).
2. Bell, B.D. (1986). The Conservation Status of New Zealand Wildlife. NZ Wildlife Service, Occasional Publication No. 12.
3. Maungamaungaroa Estuary Protection Association 1987. Maungamaungaroa Estuary: Proposal for the establishment of a reserve (unpublished report pp32).
4. Sewell, B. Archaeologist, Department of Conservation, Auckland.
5. Green, C. Department of Conservation, Auckland.
6. Slaven, D. Ecological Consultant, Auckland.
7. Manukau City Council (1989). Draft Management Plan, Hauraki Gulf Coastline. Vol. 1. Plan Vol. 2 Maps, Vol. 3 Background Information. MCC.
8. ARA Regional Planning Department (1984). An Assessment of Auckland Region's Landscape, ARA

Recorded on Existing Databases:	Comment:
1. WERI	SSWI site was first surveyed in 1981 and
2. SSWI - Yes	resurveyed in 1988.
3. PNA - Hunua PNA	The area has been ranked as moderate-high.
4. Geopreservation	
5. HPT County Inventories	
6. Other - ARA Regional Planning Department (1984). An Assessment of Auckland Region's Landscape, ARA	
7. None	

Other Considerations:

This area of land falls within the tribal boundaries of Ngai Tai. The contact for this tribe is Ngai Tai Tribal Committee, C/o Te Warena Taua.

This coast has been included in a draft management plan for the Hauraki Coast of Manukau City (1989).

Accompanying Maps and Photographs:

Site Name/s: Wairoa River & Estuary	Site No: CRI 020 028
Recorders Name: Sian John	Conservancy: Auckland
Map/Grid Ref: S11 26970 64720	Date: 21.03.90

Brief Description of Site:

The coastline of this site combines estuarine mudflats, rocky foreshore and sandy/shell beaches with a backdrop of low lying pasture land and rolling rural country. There are patches of regenerating vegetation, but they generally have a high exotic content. Established settlements dominate the shoreline at Beachlands and Maraetai. Wairoa River itself is the largest east coast river in the Auckland Region. 75% of the estuary is mud-sand-shell flats and 10% is mangroves with several areas of high quality saltmarsh, rushes and sedges. This habitat attracts high numbers of wading species which feed and certain species breed in the site. The catchment is predominantly rural, with scattered forest remnants.

Reclamation work has modified the river system and development and human use of the area threatens to damage the habitat, in particular via non-point source pollution.

Conservation Values: **Natural:** b,c,d,e,f **Cultural:** a,c **Historic:** b,d

Comment:

Natural: Three geomorphic areas of significance form this site (Hunua PNA 1989). The Whakakaiwhara Peninsula is the most prominent peninsula along the Hunua coastline, and its associated rocky platforms also have district significance. The peninsula extends 2.5km out to sea and is low lying and undulating. Duders Beach represents an area containing an interesting set of geomorphic features with unspoilt wetlands where fenced. There is a near continuous line of shellbanks along the 1km of beach, and behind the shellbanks is a mudflat with a saltmarsh adjacent to dry land. The mudflat is intertidal and the saltmarsh is inundated by spring tides. The Wairoa Estuary is the largest and most developed estuary in the Hunua ecological district, with interesting geomorphic features. Fed by the Wairoa River there are shellbanks at the mouth of the estuary and an extensive mudflat extending out into the harbour. The estuary is a very rich intertidal feeding ground, with good breeding areas on its shellbanks for NZ dotterel (*Charadrius obscurus*) (probably 3-4 breeding pairs). High numbers of some wading species utilise the habitat including lesser knots (*Calidris canutus canutus*), bar-tailed godwit (*Limosa lapponica baueri*), South Island pied oystercatcher (*Haematopus ostralegus finschi*), pied stilt (*Himantopus himantopus leucocephalus*), and caspian tern (*Hydroprogne caspia*) (for which the Wairoa is a major roosting area - "threatened"). There is also an excellent banded rail (*Rallus philippensis assimilis*) ("threatened") breeding habitat up river, and North Island fernbird (*Bowdleria punctata vealeae*) ("regionally threatened") are found in the wetland area near the river mouth (source 3). Asiatic whimbrel (*Numenius phaeopus variegatus*), variable oystercatcher (*Haematopus unicolor*), and plover (*Pluvialis fulva*) (all "rare") have also been recorded, along with 35 other coastal bird species, in this habitat. North of the estuary are a number of small patches of scattered forest remnants, including tanekaha (*Phyllocladus trichomanoides*) and kauri (*Agathis australis*) (the kauri remnant is an excellent forest stand). Included in these stands are: the best example of kanuka (*Kunzea ericoides*)-tanekaha forest; the best example of kauri forest on hills; the best taraire (*Beilschmiedia tarairi*) forest on headlands; the best pohutukawa (*Metrosideros excelsa*) forest on the headlands; and the best tawa (*Beilschmiedia tawa*)-taraire forest on headlands, in the ecological district. This site is also characterised by extensive areas of mangroves (*Avicennia marina* var. *resinifera*), saltmarsh, and saltmeadow at Duders Beach, Wairoa Estuary and Kauri Bay. The

principle species are *Sarcocornia, Leptocarpus similis, Juncus maritimus, Baumea juncea*, and *Plagianthus divaricatus*. At Duders the saline community ecotone sequences are in excellent condition and contain the best: *Juncus maritimus - Plagianthus* community; *Leptocarpus similis - Juncus maritimus* community; and *Plagiouthus - Juncus - Baumea - Leptocarpus* association, in the district. This is a very valuable, little modified ecosystem (Coastal Wetland Inventory 1989). Wairoa River Estuary has the best: mangrove community; *Leptocarpus - Juncus* community; raupo (*Typha orientalis*) - *Scirpus lacustris* community; and one of the best flax (*Phormium tenax*) communities, in the district. At Kauri Bay an "island" within the mangrove swamp adds an additional component to the ecotone sequences. The bay also contains the best *Baumea - Schoenus* association in the district, and is a very valuable, little modified ecosystem (Coastal Wetland Inventory 1989). Further upstream 3 remnants of kauri ricker are located on alluvial soils (with a drowned kauri remnant also present), along with a totara (*Podocarpus totara*) - mapou (*Myrsine australis*) - kowhai (*Sophora tetraptera*) association, and a kanuka - kowhai association. These are the best examples of such vegetation types on alluvial soils within the district. (Source 2)

Historic: Pa, open settlements and midden sites represent continuous use of the coast and its resources. Of particular significance is: the Umupuia marae, the focus of the Ngai Tai people; the Oue pa, an important 19th century pa, and the adjacent bay (at the mouth of the Wairoa river), within which bodies were wrapped in flax mats and pressed into the mud at low tide for burial; and the "Ring ditch" pa at Omana, which is unusal on the east coast (B Sewell pers. comm. 1990). Two ships have been wrecked on this piece of coastline, the Lucy James in 1900, and the Dauntless in 1928. (Ingram 1984)

Cultural: The coastline has a pleasant rural quality and rates above average as a landscape. Cliff formations and rock strata along parts of the foreshore add visual interest to the scenery. A continuity of coastal vegetation reduces the visual impact of urban development (source 8). This is also an area of high traditional values, with the Umupuia Marae being the focus of the Ngai Tai people, and the coastline adjacent to the Oue Pa being an area which is most tapu due to its historical burials. (Sewell pers. comm. 1990)

Site Importance: International **National** Regional Local Unknown

Comment:

The combination of a habitat for a very good wader species variety and the presence of many threatened species makes the Wairoa Estuary the best such system in the region, and it compares well with systems nationally (Green pers. comm. 1990). Of significance with the ecological district are the vegetation complexes of this site and the geomorphic features present. The archaeological sites are regionally significant.

Existing Threats: a,b,c,d,e,k

Type & Comment:

Flooding of the estuarine environment has increased over the last few years, threatening the wildlife habitat/breeding grounds. The river bed has also been raised due to siltation as a consequence of rural landuse practises, and the presence of silt trapping *Spartina* spp. on river margins. Stock graze to the water's edge in many locations, disturbing the habitat. Water pollution from moored boats, Clevedon township, horticultural and agricultural runoff (for example, cowshed effluent on the western shore near the river mouth) is an existing threat. Current concern relates to septic tank overflow due to population pressures. The western coastline of this unit also faces heavy recreational use pressure.

Human Modification and Human Use: a,b,d,h,i,kl (structures)

The Wairoa Estuary is extensively modified in its downstream portions by stopbanks and drainage channels. A number of foreshore structures are also present in the upstream reaches of the estuary, and in Kauri Bay, while the Maraetai/Omana Beach foreshore is heavily developed (with approximately 30 boating related structures lining the foreshore). The landscape overall has been substantially modified for agricultural use and beach settlement. Along the Maraetai/Omana Beach shoreline recreational uses are also popular. With shore based recreation including camping (an ARC campground is located at Omana Regional Park), horse-riding, walking and swimming. Boating, fishing and windsurfing are popular water based recreations. Omana Regional Park has facilities for picnicking, barbecues, walking, boating, and ball games.

Existing Protection: a,b,d,g

Type & Comment:

The site contains Omana Regional Park, which is administered as a reserve and recreational area by the Auckland Regional Council. A piece of land in the upstream portions of the Wairoa Estuary is administered as DOC estate. The Wairoa Estuary bird habitats are "protected" in a sense in two areas by sympathetic landowners. And the site as a whole has been designated a Habitat Protection Zone by the Manukau City Council.

Availability of Information:

Natural	1 2 3
Cultural	1 2 3
Historic	1 2 3
Threats	1 2 3
Human Mod. & Use	1 2 3

1. Well documented
2. Limited information (general)
3. Little information (if any)

Comment:

Sources of Information:

Natural	1 2 3 4 5 6 7
Cultural	1 2 3 4 5 6 7
Historic	1 2 3 4 5 6 7
Threats	1 2 3 4 5 6 7
Human Mod. & Use	1 2 3 4 5 6 7

1. Derived info. from existing literature & databases
2. Derived info as above & field check
3. Derived from existing maps & aerial photographs
4. Recent DOC survey including sampling & analysis
5. Recent DOC survey excluding sampling & analysis
6. Experience
7. Expert opinion

Comment:

Sources:
1. DOC (1989). Coastal Wetland Inventory, Auckland Region (unpublished).
2. Hunua Ecological District PNA Survey (1989). ARC (unpublished).
3. Bell, B.D. (1986). The Conservation Status of New Zealand's Wildlife. NZ Wildlife Service, Occuaptional Publication No. 12.
4. Ingram, C.W. (1984). NZ Shipwrecks, 1795-1982. A W & A H Reed Ltd.
5. Sewell, B. Archaeologist, Department of Conservation, Auckland.
6 Green, C. Department of Cons rvation, Auckland
7. Irving, P. Department of Conservation, Auckland.
8. ARA (1984). An assessment, Auckland Region's Landscape. ARA, Regional Planning Department.

Recorded on Existing Databases:
1. WERI
2. SSWI
3. PNA - Hunua (1989)
4. Geopreservation
5. HPT County Inventories
6. Other - (a) ARA (1984). An assessment, Auckland Region's Landscape. ARA, Regional Planning Department. (b) NZAA Site Surveys.
7. None

Comment:
SSWI initial survey in 1981, resurveyed in 1988. The site is ranked - high.

Other Considerations:

Potential threats to the site include coastal subdivision along the coastline, and marina development in the Wairoa River. (Irving pers. comm. 1990)

This site falls within the tribal boundaries of the Ngai Tai, the contact person for this tribe is the Nga Tai Tribal Committee (Te Warena Taua), Auckland.

This area falls within the draft Manukau City Coastal Management Plan for the Hauraki Coast. this is both an inventory and set of proposed planning policies. Held on file at DOC, Auckland.

Accompanying Maps and Photographs:

Site Name/s: Kawakawa Bay to Wharekawa	Site No: CRI 020 029
Recorders Name: Sian John	Conservancy: Auckland
Map/Grid Ref: S11 27110 64670	Date: 23.03.90

Brief Description of Site:

Kawakawa Bay can be described as a sequence of broad bays separated by rocky headlands. The topography of this area is gently undulating, generally under pasture with some exotic forestry, and native/exotic mixed shrubland on steeper slopes. Raukina Point to Wharekawa on the other hand is an open stretch of coastline, within which long stretches of coast exhibit a homogeneity of character with a repetition of bays with beaches and rocky promontaries. Pasture again dominates the landscape, although a mixed exotic/native belt of vegetation typifies the coastal edge. South of Matingarahi Point, however, the foothills of the Hunua Ranges have steeper slopes, a higher percentage of vegetation cover and a more consistent occurrence of native forest species, which changes the character of the landscape. The area was a heavily used Maori archaeological site, and remains a popular area for recreational fishing and shellfish gathering today.

Conservation Values: **Natural:** b,c,e,f,g **Cultural:** c **Historic:** b,c

Comment:

Natural: The stretch of coastline in question contains two sites of geomorphic importance (Hunua PNA 1989). The Tapapakanga sea cliffs are significant within the district, stretching along 2km of coastline. They are being heavily eroded at their base, causing mass movement and slumping. The Orere River Valley is 9km long, up to 400m wide, and in its last 2km it has developed an alluvial fan. Terrace remnants are present on the lower valley sides, the significance of which is that the site is used to study sea level oscillations and high depositional periods. (Source 3)

The vegetation of Kawakawa Bay is made up of very small patches of saltmarsh and saltmeadow, however, the cliff-face communities contain the rare shrub *Pomaderris rugosa* (Slaven, pers. comm. 1990). The area also contains the best coastal pohutukawa (*Metrosideros excelsa*) forest on cliffs in the district (PNA). Orere Point forest is predominantly a pohutukawa-coastal broadleaf community and represents the best pohutukawa-puriri (*Vitex lucens*) forest on coastal hills in the district. *Olearia albida* ("local") is also present at this site and is a relatively uncommon species (source 4). This species is also present within the treeland area at Tapapakanga. Waimangu Point is characterised by boulder beaches with scrambling saltmeadow and vinefields which represent the best such communities in the district, that is, the best *Sarcocornia* community and *Calystegia soldonella-Meuhlenbeckia complexa* association. The southern end of this site is characterised by tawa forest which stretches in an intact sequence from the coastline to the highest point in the Hunua Ranges (this unbroken forest block has outstanding habitat value (D Slaven pers. comm. 1990)). This site is also significant for its marine life. It is a feeding and breeding area for flounder (*Rhombosolea* spp.), and the Orere Point to Matingarahi Point coastline is representative of boulder beaches characterised by rock oysters (*Crassostrea glomerata*) and mussels (*Perna canaliculus*). The area has a recorded history of investigation and scientific study, aimed primarily at shore species (P Irving, DOC Auckland, pers. comm.).

Historic: Pa, open settlements and midden sites represent continuous use of the coastline in this area. Local legend has it that there is a large 19th century canoe buried in the mud in Kawakawa Bay, and Taupo Pa on Pawhetau Point was occupied in the 19th century (source 2). Other sites of significance include "Stone heaps" and an unusual pa with a stone wall at Tapapkanga (believed to have been occupied in the 19th century) (source 1). Tapapakanga also has non-Maori archaeological value, as a site of European graves.

Cultural: Kawakawa Bay as a sequence of broad bays separated by rocky headlands has an above average landscape quality, as does most of the coastline from Kawakawa Bay to Wharekawa due to the homogeneity of the sequence of bays with beaches and rocky promontaries, covered by a mixed belt of exotic/native vegetation on the coastal edge (Source 6)

Site Importance: International National Regional Local Unknown

Comment:

The Maori archaeological remains within this site are regionally important, while the geomorphic, marine and flora sites noted have significance within the ecological district.

Existing Threats: a,e,f

Type & Comment:

The coastline of the northern portion of this site is experiencing an erosional phase. Contributing factors are thought to include reduced sediment input to the system and changed sediment characteristics. Rock quarrying is occurring on the coast north west of Kawakawa, and Karamuramu Island is extensively quarried, this represents a visual "blot" in the Bay. Karamuramu has been irreparably changed by quarrying, to the point where all the vegetation has been removed and the various sea birds which roost at the site are under threat. Seepage from septic tanks is also a threat in the less developed areas of the coastline.

Human Modification and Human Use: a,b,d,h,i,k1(structures),k2(fisheries),k3(aquaculture)

The Kawakawa Bay coastline has been heavily modified by agricultural practices and settlement, while the coastal vegetation from Raukura Point to the Waharau Stream has been heavily modified by the introduction of exotics.

Popular recreational uses of this coastline include walking, swimming, fishing, shellfish gathering, and camping (including an ARC camp ground in the Kawakawa Bay area). This site also includes a Regional Park - Tapapakanga, within which activities include picnicking, barbeques, swimming, walking, and fishing. Mainly as a consequence of recreation the shoreline is scattered with foreshore structures (located in most bays). Kawakawa Bay in particular contains a number of structures and also has two major reclamations on its north eastern side.

The coast adjacent to this area has extensive subtidal mussel beds which extend into the Firth. Dredging for mussels has occurred in the past.

Waimangu Point is characterised by an offshore mussel farming area covering 59 hectares.

Existing Protection: b,d

Type & Comment:

The site contains Tapapakanga Regional Park (200 ha), administered by the Auckland Regional Council.

Kawakawa Bay, and a shoreline strip from Raukura Point to Orere Point, have been designated as Habitat Protection Zones by the Manukau City Council.

Availability of Information:		1. Well documented
Natural	1 2 3	2. Limited information (general)
Cultural	1 2 3	3. Little information (if any)
Historic	1 2 3	
Threats	1 2 3	
Human Mod. & Use	1 2 3	

Comment:

Sources of Information:		1. Derived info. from existing literature & databases
Natural	1 2 3 4 5 6 7	2. Derived info as above & field check
Cultural	1 2 3 4 5 6 7	3. Derived from existing maps & aerial photographs
Historic	1 2 3 4 5 6 7	4. Recent DOC survey including sampling & analysis
Threats	1 2 3 4 5 6 7	5. Recent DOC survey excluding sampling & analysis
Human Mod. & Use	1 2 3 4 5 6 7	6. Experience
		7. Expert opinion

Comment:

Sources:

1. Donovan, L.J. (1975). Tapapakanga Reserve - Archaeological Survey. NZHPT.
2. Donovan, L.J. (1976). Orere-Kawakawa Bay Archaeological Survey. NZHPT.
3. Hunua Ecological District PNA Survey (1989). ARC (Unpublished).
4. Given, D.R. (1981). Rare and Endangered Plants of New Zealand. A.H. & A.W. Reed.
5. Given, D.R.; W.R. Sykes; P.A. Williams & C.M. Wilson (1987). Threatened and local plants of NZ: A revised checklist. Botany Division, DSIR mimeograph 17pp.
6. ARA (1984). An Assessment of Auckland Region's Landscape. ARA, Regional Planning Department.
7. Irving, P. Department of Conservation, Auckland.
8. Slaven, D. Environmental Consultant, Auckland.

Recorded on Existing Databases:	Comment:
1. WERI	
2. SSWI	
3. PNA - Hunua (uncomplete) (1989)	
4. Geopreservation	
5. HPT County Inventories	
6. Other - (a) NZAA Site Surveys - (b) ARA (1984). An Assessment of Auckland Region's Landscape. ARA, Regional Planning Department.	
7. None	

Other Considerations:

Restoration of the natural appearance of Karamuramu Island would now be virtually impossible, and cessation of quarrying at this stage would not contribute to nature conservation. As the metal obtained from the island is in demand for road construction and decorative stone work throughout the region, there now seems no good reason why quarrying should not continue as long as economically possible (ARA 1976).

This site falls into the tribal boundaries of the Ngati Paoa. The contact person for this tribe is the Ngati Paoa Development Trust (Hariata Gordon), Penrose.

Accompanying Maps and Photographs:

Site Name/s: Kaiaua/Miranda	Site No: CRI 020 030
Recorders Name: Paul Irving	Conservancy: Auckland
Map/Grid Ref: S12 30165 64450	Date: 22.03.90

Brief Description of Site:

The major values within this site are the Miranda chenier plain, Whakatiwai gravel ridges and the mudflats, bird feeding and roosting sites along the Miranda/Kaiaua coast. All three of these areas are internationally significant. The Whakatiwai gravel ridges are a sequence of stranded fossil beach ridges running parallel to the coast. The ridges are believed to be storm ridges of gravel supplied by local streams and transported by longshore drift. The chenier plain south of Whakatiwai appears to be of similar origin to the gravel ridges. However, in this case the material has been shells and sand, not gravel. Chenier ridges of sand and shell form on the shallow intertidal mudflats, and then migrate landward by wave and wind action, over the embayed tidal flat created behind them. Movement ceases when another chenier forms seaward of an earlier one. The wildlife values of the area are well described and consist of two areas: the first area is the coastline between Kaiaua and Miranda consisting of shellbanks (cheniers), sand and silt deposits, used as high tide roosts, and grass flats and pasture for feeding and roosting. The second area, the foreshore from Whakatiwai to the Waihau River, consists of soft mudflats, flourishing and expanding mangrove (*Avicennia marina* var. *resinifera*) communities (despite being within 100 kilometres of their southern limit), and some intermingling saltmarsh. This is an important feeding ground for both birds (low tide) and marine fishes, such as flounder (*Rhombosolea* spp.) (high tide).

Conservation Values: **Natural:** a,b,c,e,f,g,h. **Cultural:** a, e. **Historic:** b.

Comment:

Natural

a) The shellbanks and mudflats are little modified by human presence, although farming does border the area and some fishing (flounder) does occur.

b) The Kaiaua roadside is one of two regional sites of the nationally vulnerable shrub *Pomaderris hamiltonii* (Given et al 1987). Along the East Coast Road the mistletoe (*Loranthus micranthus*) occurs. It is nationally common but rare in Auckland and under threat in Northland due to possum browsing (Slaven, pers. comm. 1990). As a habitat this entire site, with substantial high tide roosts, shellbanks and grassed areas (70 hectares), mangrove forests, saltmarsh and swamp 730 hectares) and feeding areas - estuarine water and mudflats (7000 hectares), is both regionally and nationally rare. Within it are species which visit to breed or feed, which are rare (r), endangered (e), or threatened (t). Black stilt (*Himantopus novaezealandiae*) (e), white heron (*Egretta alba modesta*) (t), wrybill (*Anarhynchus frontalis*) (t), curlew sandpiper (*Calidris ferruginea*) (r), sharp-tailed sandpiper (*C. acuminata*) (r), golden plover (*Pluvialis fulva*) (r), Asiatic whimbrel (*Numenius phaeopus variegatus*) (r), Australasian bittern (*Botaurus stellaris poiciloptilus*) (t), caspian tern (*Hydroprogne caspia*) (t), variable oystercatcher (*Haematopus unicolor*) (r), NZ dotterel (*Charadrius obscurus*) (t), red-necked stint (*Calidris ruficollis*) (r), grey plover (*Pluvialis squatarola*) (r), American whimbrel (*Numenius phaeopus hudsonicus*)

(r), reef heron (*Egretta sacra sacra*) (t), banded rail (*Rallus philippensis assimilis*) (t), banded dotterel (*Charadrius bicinctus bicinctus*) (t) (Bell, 1986). Vast numbers of marine species such as cockles (*Chione stutchburyi*), flounder (*Rhombosolea* spp.), snapper (*Chrysophyrys auratus*), parore (*Girella tricuspidata*), and yellow-eyed mullet (*Aldrichetta forsteri*) are present. At least 56 coastal bird species are known from this area (Green pers. comm. 1990).

The average number of waders present over the year is around 16,000, while the total may exceed 40,000 migratory birds during the summer (OSNZ bird count data). Bar-tail godwit (7000 plus, approx 8% of New Zealand's overwintering population), lesser knot (*Calidris canutus canutus*) (4000), South Island pied oystercatcher (*Haematopus ostralegus finschi*) (10,000 winter, 2000 summer), pied stilt (*Himantopus himantopus leucocephalus*) (2000), and threatened endemic wrybill (average of 2,900 of the estimated 5000 to 7000 total population overwinter here).

c) The entire site - see description and b) above.

e) The chenier plain and the Whakatiwai gravel ridges, plus the current cheniers on the coastal foreshore are recognised as internationally significant separately and an internationally unique association. (ARA Planning Department 1987)

f) Slaven (pers. comm. 1990) notes three sites of representative flora. These are the Kaiaua Road, with roadside edges and cuttings supporting a range of shrub and scrub species; the Whakatiwai gravel ridges with remnants of raupo (*Typha orientalis*) in boulder beach swales (depressions between ridges), kowhai (*Sophora tetraptera*) in boulder ridges - both best in the Hunua Ecological District; the third area is the south Waihopuhopu Forest with a large, dense stand of ti (cabbage) tree (*Cordyline australis*). Such stands are rare in the Auckland region now, due to the cabbage tree demise of recent years. The shoreline and intertidal areas of Kaiaua, Miranda and south-east to the Waihau River are representative of extensive intertidal mudflats in sheltered waters. The sand gravel and shellbanks, fronted by extensive mudflats and backed by swales and marsh areas are virtually unique in the Auckland region. (Slaven, pers. comm. 1990)

g) Both the geomorphology and wildlife values of the area have been extensively studied. The chenier plain is noted as having particular significance for study of environmental change (sea level rise), because of the close relationship between form, position of the cheniers and the sediment dispersal and dispersal mechanisms.

h) As noted above, both the geomorphic sites of the chenier plain and gravel ridges, and the wading bird habitats of roosting and feeding are of recognised international significance.

Historic

b) Ngati Paoa use the intertidal mudflats and shell areas to bury their dead, and there are a number of burial sites and other waahi tapu along the coast (Sewell pers. comm. 1990).

Cultural

a) Burial and other significant Ngati Paoa sites known from the area, with exact locations withheld.

e) Educational value: The Miranda Naturalist Trust has established a major public viewing and interpretation facility just north of Miranda. This is well used by both the public and organised clubs and school groups (primary to tertiary). Good interpretive material is available on the wildlife, marine life, botany and geomorphology of the area covered by this site.

Site Importance: International National Regional Local Unknown

Comment:

The geomorphology is noted as both internationally significant and unique (Woodroffe et al 1983) and the wildlife also significant internationally (Royal Forest and Bird Protection Society 1989).

Existing Threats: a, c, d, e, f, j, k, m.

Type & Comment:

a) Erosion of the sandbanks is occurring in a small way, reducing high tide roosting areas.
c) *Spartina alterniflora*, an invasive exotic grass that reclaims estuarine areas, is now recorded from the area in small isolated pockets.
d) Fitch farming occurs nearby - accidental escape or release could be disastrous for ground breeding and feeding birds, e.g. NZ dotterel. (C Green, pers. comm. 1990)
e) Some septic tank seepage is known from Whakatiwai. Major concern has been expressed over the possible discharge from mining operations in the Coromandel Ranges on the far side of the Firth of Thames. Cyanide and other toxic chemicals could produce both short and long term affects were they to be released. The area is subject to both prospecting and mining proposals.
f) Gravel extraction occurs at Wharekawa, Parry Bros pit, but this is limited in extent and will only have a small impact overall.
j) Refuse tip south of Kaiaua still in use. Roadside tipping of refuse a problem.
k) Some bird species are no longer as plentiful as they once were, possibly due to the increasing numbers of people holidaying in the area and the number of sightseers visiting the area. Trail-bikes and dune-buggies make rare appearances on the mudflats, but the sensitive nature of bird feeding and breeding means even rare appearances have far reaching effects.
m) Some drainage of coastal swamps, resulting in lowering land and the removal of some sources of food for some bird species.

Human Modification and Human Use: a, b, h, i, j, k1(structures), k2(fisheries)

a) Land around the site, and on top of the chenier plains and gravel ridges has been developed into pasture, but this pasture is also used by estuarine bird species for feeding and roosting.
b) Roads: The East Coast Road runs across and through the chenier plain and gravel ridge (even using a ridge for height and gravel generally for bedding of the road base course).
h) Shore based recreation: Primarily fishing, shellfishing, bird watching, are popular pursuits. Scenic drive also popular.
i) Net fishing for fish (snapper, flounder, yellow-eyed mullet), plus some power boating, but shallow water prevents most of this.
j) Shellfish gathering for the marae at Kaiaua.
k1) Foreshore structures are limited on this stretch of coastline, however, some are present in the vicinity of the Te Puaekaruri Stream Mouth.
k2) Offshore from Kaiaua is a large dredge mussel (*Perna canaliculus*) fishery, and a small area in the middle of the Firth where dredge oysters (*Tiostrea lutaria*) occur.

Existing Protection:

Type & Comment:

a) Conservation estate includes the Taramaire wildlife management reserve at Miranda, covering part of the Chenier Plain roost site (8 ha), and the Miranda Stream Conservation Area (3.5 ha).
b) Whakatiwai Regional Park: Some of the gravel ridges included in this park but only a small amount.
d) The area between the road and the coast, from Kaiaua to Miranda, has been designated by the Auckland Regional Authority as a proposed coastal reserve, but as yet still in private hands.
f) The Miranda Naturalist Trust leases land from a local farmer for its headquarters; and for roosting areas. An area of Queen Elizabeth the Second Natural Trust Land (27.7 ha) has recently been acquired.

Availability of Information:

Natural	1 2 3
Cultural	1 2 3
Historic	1 2 3
Threats	1 2 3
Human Mod. & Use	1 2 3

1. Well documented
2. Limited information (general)
3. Little information (if any)

Comment:

The information on wildlife and geomorphology is readily available but flora and marine ecology is less so, being either old (circa 1975) or associated with PNA studies as yet unpublished. Cultural and historic information is less readily available due to lack of survey/research and reticence of the tangata whenua to divulge information.

Sources of Information:

Natural	1 2 3 4 5 6 7
Cultural	1 2 3 4 5 6 7
Historic	1 2 3 4 5 6 7
Threats	1 2 3 4 5 6 7
Human Mod. & Use	1 2 3 4 5 6 7

1. Derived info. from existing literature & databases
2. Derived info as above & field check
3. Derived from existing maps & aerial photographs
4. Recent DOC survey including sampling & analysis
5. Recent DOC survey excluding sampling & analysis
6. Experience
7. Expert opinion

Comment:

The following is a useful reference list but more on the natural values is available from DOC, Auckland and Waikato:

ARA Planning Department (1987), Landforms of the Firth of Thames, 1, The Chenier Plain at Miranda. Cyclo-styled, 4pp.
ARA Planning Dept (1987), Landforms of the Firth of Thames,2. Gravel Ridges at Whakatiwai. Cyclostyled 4p.
Bacon MR (1972) Coastal Resource Area; Kawakawa Bay to Miranda. Printed and published by ARA.
Bacon MR (1973) Ecology of a Coastal Resource Area: Kawakawa Bay to Miranda. (published by ARA).
Morton J (undated). The shore and saltmarsh plants of Miranda. Miranda Naturalists Trust. Nature Notes No. 2.
Morton J (1983). Invertebrates as a food resource at Miranda Flats. Miranda Naturalists Trust. Nature Notes No. 2.

Schofield JC (1960). Sea level fluctuations during the last 4000 years as recorded by a chenier plain, Firth of Thames. In: New Zealand Journ. of Geol. and Geophys. 3: 467-485.

Woodroffe C D, Curtis R J and McLean R F (1983). Development of a chenier plain, Firth of Thames, New Zealand. In: Marine Geology 53: 1-22.

Royal Forest & Bird Protection Society (1989). Firth of Thames Wetlands of International Importance. Ramsar Nomination. Unpublished report to Convention on Wetlands of International Importance, Especially as Waterfowl Habitat (IUCN).

Bell, B.D. (1986). The Conservation Status of NZ Wildlife, NZ Wildlife Service Occasional Publication No. 12.

Given, D.R.; W.R. Sykes, P.A. Williams and C.H. Wilson (1987). Threatened and local plants of NZ: A revised checklist. Botany Division Report, DSIR, 17pp.

Sewell, B. Archaeologist, Department of Conservation, Auckland.

Green, C. Department of Conservation, Auckland.

Slaven, D. Ecological Consultant, Auckland.

Recorded on Existing Databases:

1. **WERI**
2. **SSWI**
3. **PNA**
4. **Geopreservation**
5. **HPT County Inventories**
6. **Other** OSNZ bird counts.
7. **None**

Comment: PNA Survey 1981 with the Kaiaua area resurveyed 1989. Ornithological Society of New Zealand bird counts annually since 1981 (twice each year)

Other Considerations:

Consideration should be given to this entire site, including the chenier plains, gravel ridges, bird habitats and marine areas gaining permanent protection. A marine reserve proposal for the adjacent areas below MHWM can be expected in 1990/91 time period. The tangata whenua is Ngati Paoa. Contact is Ngati Paoa Development Trust (Hariata Gordon).

Accompanying Maps and Photographs:

Site Name/s: Great Barrier Island (South)	Site No: CRI 020 031
Recorders Name: Felicity Fahy	Conservancy: Auckland
Map/Grid Ref: S09 T09 27340 65430	Date: 24.03.90

Brief Description of Site:

Great Barrier Island forms the eastern flank of the Hauraki Gulf. The eastern side of the site is relatively more exposed than the western and is characterised by a wild and rugged rocky coastline, to which access is difficult; interposed with river estuaries and sandy beaches, which are the focus of recreation. The western side of the site is characterised by an indented coastline, formed by subsidence and subsequent draining of river valleys. Tryphena is the focus of residential development on the island and is the major seafaring point of entry to the island. Several species of rare plants are found on the island. There are also good zonations and representative sequences of vegetation. Several areas within the site provide good habitat for brown teal (*Anas aucklandia chlorotis*) an endemic endangered species (source 2). Over the last ten years the permanent population of the island has expanded rapidly to over 1000 people. The summer influx of tourists is increasing each year. Increasing recreation along the coast is causing the greatest threat to conservation values.

Conservation Values: **Natural:**a,b,c,e,f,g,h,i. **Cultural:** b,c. **Historic:** a,b,c,d

Comment:

Natural There are two sites of particular geomorphic note in the southern portion of Great Barrier - Kaitoke Beach and Windy Hill coast. Kaitoke Beach and much of the flat and hummocky dune country on its landward side represents the largest deposit of sand on the island. The wide expanse of this lengthy, sandy beach ranks it as one of the most outstanding features on the eastern coast of Gt Barrier (Source 1). Windy Hill coast is edged with formations of rocks and interspersed with a number of narrow shingle beaches that are strewn with rock debris. A huge cirque-like feature, is located on the coastal hillside. The coastal cliffs, particularly those east of Windy Hill trig, are spectacular. The western islands, including Mahuhi, Motutaiko and Nelson, have examples of *Nestegis apetala* (coastal maire) which is virtually extinct on mainland NZ (Slaven pers. comm. 1990). *Lepidium oleraceum*, a vulnerable species (source 9), is also present in this group. Kaitoke Creek has a zonation from freshwater swamp, raupo (*Typha orientalis*) and sedges, with manuka (*Leptospermum scoparium*), scattered cabbage trees (*Cordyline australis*), and kahikatea (*Podocarpus dacrydioids*) to saltmarsh and mangroves (*Avicennia marina* var. *resinifera*), indicating a high degree of naturalness. The SSWI rating notes its outstanding habitat value. Much of the 'value' of this area is its large size and the intact, ungrazed nature of the habitat.

There are many wetland orchid species present, including the rare *Spiranthes sinensis*. This is probably the best freshwater wetland in the Auckland region (E Cameron pers. comm. 1990). An area of bush west of Cape Barrier is one of the most intact beach to ridge top forest sequences known, and so is representative of such a sequence (D Slaven pers. comm. 1990). The forest is pohutukawa dominant, with a mixed shrub understorey, including wharangi (*Melicope ternata*), puriri (*Vitex lucens*) and karo (*Pittosporum crassifolium*). There is little stock modification or damage in the area. There are several areas in the southern portion of the island that are important breeding/feeding/roosting areas. Many also contain rare or unique species. Kaitoke Swamp Creek is approximately 300 hectares of freshwater swamp that extends eastwards

from the hot springs to a tidal creek and saltmarshes. The catchment is mostly in forest, so water quality is high. Two roosts of brown teal (50 birds total) inhabit the area. Banded rail (*Rallus philippensis assimilis*) (threatened), spotless crake (*Porzana tabuensis plumbea*), bittern (*Botaurus stellaris poiciloptilus*), fernbird (*Bowdleria punctata vealeae*); all are secretive swamp species, they also feed and breed in the area. At the southern end of Kaitoke Beach a tidal stream and wetland contains approximately 90 brown teal. Medlands Beach wetlands a little further to the south, also has large roosts of brown teal - 80 to 90 birds. Mallard (*Anas platyrhynchos platyrhynchos*), grey duck (*A. superciliosa superciliosa*) and pukeko (*Porphyrio porphyrio melanotus*) also feed and breed in the area. Mitchener Road creek has the largest population of brown teal on the island (230), thus anywhere. Also present are banded rail. The wetland is surrounded by pasture, which provides a feeding ground for the brown teal. They nest in the nearby shrubland areas. Tryphena Stream on the western side of the island is also home to 20 to 30 brown teal. The teal feed on the surrounding pastures, beach front and probably nearby lawns.

The marine ecology of the southern end of Gt Barrier is poorly documented, but widely assumed to be the same as the rest of the Gulf. Four sites have been or are being investigated. The soft bottom benthos has been surveyed around the Broken Islands. Gregory (Source 4) noted benthic forminfera in Whangaparapara Harbour. The fish of Broken Island and Man'O'War passage were investigated by Kingsford and Choat (Source 5). They noted that the species found are representative of such areas. At present, Bowling Alley Bay is one site being investigated for sea urchin (*Evechinus chloroticus*)/kelp interactions as part of a PhD study (University of Auckland).

Cultural

Great Barrier contains a wide range of scenery types in a small area. Maintenance of the landscape quality is essential to the future of the tourism industry. The unmodified nature of much of the coastal scenery is the island's greatest asset. The entire length of this site is considered to have high scenic and aesthetic value (J Hawley pers. comm. (1990).

Historic

There have been 28 shipwrecks along the Gt Barrier coast from 1854 to 1980 (Ingram 1984). The most notable in this site is the 'Wiltshire', wrecked off Windy Hill, north of Rosalie Bay in 1922. Gt Barrier (South) has a range of archaeological sites present, including a pa, undefended settlements, archaic middens. They reflect areas of preferred settlement in the past. There is a cluster of sites at the head of Whangaparapara Harbour surrounding two pa sites. At the head of Whangaparapara Harbour there is also a historic whaling station, timber mill site, and associated lumber camp. There have been three archaeological surveys done in the area (Source 6-8).

Site Importance: International National Regional Local Unknown

Comment:

The flora present is of regional significance (D Slaven pers. comm. 1990). The Kaipara Swamp, Medlands Beach, and Mitchener Road Creek have international importance due to the presence of a variety of endangered, threatened and rare endemic birds (C Green pers. comm. 1990).

Existing Threats: b, d, k, m, l

Type & Comment:

Due to the relatively isolated nature of a large portion of this coast, few threats are posed to the conservation values indicated. However, population numbers have increased dramatically, especially in the southern portion of Gt Barrier where most of the 1000 population live. Goats (*Capra hircus*) and pigs (*Sus scrofa*) are a threat within Gt Barrier Forest. Their grazing and rooting habits lead to destruction of vegetation. This situation is recently considered to be under control. Trail-bike riders over the summer period are threatening the vegetation cover of dunes at Oruawharo Bay. Natural siltation of Whangaparapara Harbour is gradually occurring. Drainage of swamp areas, e.g. at Kaitoke, and possible further subdivision at Tryphena, pose the most threat to the area.

Human Modification and Human Use: a, b, d, h, i, k1 (structures), k2 (fisheries)

The vegetation throughout this site has been heavily modified in places for pasture creation, and logging of native timber. Secondary growth of the forest is apparent, except at the main centres of population - Claris, Tryphena. There are several mooring areas, with boat numbers concentrated in Tryphena Harbour and Whangaparapara Harbour. There is a reclamation at Tryphena Harbour that is used in conjunction with a wooden wharf for major boat and barge access to the island. There is also a reclamation in Whangaparapara Harbour. There is a camp ground at the southern end of Oruawharo Bay that is used intensively over summer. Shore based recreation is mainly concentrated in the sandy bays, and includes swimming, picnicking, walking, fishing. Water based recreation focuses on scuba diving and boating. All forms of recreation are concentrated in the summer months due to the influx of tourists, mainly from Auckland. At Palmers Beach, to the north of Kaitoke, NZ Navy hydrophones extend out through the beach offshore. Twenty railway carriages have recently been placed at the site to prevent fishing boats trawling through the area and disturbing the cables. At Kaitoke Beach and Oruawharo Bay, sand fencing and marram (*Ammophila arenaria*) and pingao (*Desmoschoenus spiralis*) planting has been carried out in an attempt to stabilse the sand. Windblown landward movement of sand from Kaitoke Beach causes problems at Claris Airfield, situated just behind it. Tryphena Harbour is protected from the commercial trawling and scallop (*Pecten novaeseelandiae*) fishing which occurs outside in the Gulf.

Existing Protection: a, c, d, f

Type & Comment:

Sixty per cent of Gt Barrier Island is DOC estate. Most of this land is in the northern portion of the island. There are also five areas that are recreation reserves in this site - an area at Cape Barrier that is a scenic reserve, a wildlife reserve at Oruawharo Bay, and two local body reserves at Tryphena and Oruawharo Bay. A forest sanctuary, under the Conservation Act, covers a stretch of coast on the west between Bowling Alley Bay and Whangaparapara Harbour. Tryphena Point at the entrance to the harbour is protected by the QEII National Trust Act. Tryphena Harbour is protected from commercial trawling and scallop dredging. A second protected marine area is located off the South East Coast adjacent to Claris, where due to the presence of a Naval cable area fishing and anchoring is prohibited.

Availability of Information:

Natural	1 2 3
Cultural	1 2 3
Historic	1 2 3
Threats	1 2 3
Human Mod. & Use	1 2 3

1. Well documented
2. Limited information (general)
3. Little information (if any)

Comment:

Sources of Information:

Natural	1 2 3 4 5 6 7
Cultural	1 2 3 4 5 6 7
Historic	1 2 3 4 5 6 7
Threats	1 2 3 4 5 6 7
Human Mod. & Use	1 2 3 4 5 6 7

1. Derived info. from existing literature & databases
2. Derived info as above & field check
3. Derived from existing maps & aerial photographs
4. Recent DOC survey including sampling & analysis
5. Recent DOC survey excluding sampling & analysis
6. Experience
7. Expert opinion

Comment:

1. Department of Lands & Survey (1983) Coastal Reserves Investigation: Great Barrier Island County. Department of Lands & Survey North Auckland Land District.
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9. Given, D.R.; W.R. Sykes; P.A. Williams and C.H. Wilson (1987). Threatened and local plants of NZ: a revised checklist. Botany Division Report, DSIR, 17pp.
10. Ingram, C.W.N. (1984). Shipwrecks of NZ 1795-1982. AW & AH Reed Ltd.
11. Cameron, E. University of Auckland.
12. Slaven, D. Environmental Consultant, Auckland.
13. Hawley, J. Department of Conservation, Auckland.
14. Green, C. Department of Conservation, Auckland.

Recorded on Existing Databases:

1. WERI
2. SSWI
3. PNA
4. Geopreservation
5. HPT County Inventories
6. Other NZ Archaeological Association records.
7. None

Comment: SSWI sites on Gt Barrier were surveyed in 1980. Three of the sites, at Mitchener Road Creek, Kaitoke Swamp and Medlands Beach, were ranked as 'Outstanding'. Two other sites, at Kaitoke Beach Stream and Tryphena Stream, ranked as 'High'.

Other Considerations:

The tangata whenua are Ngati wai. The local contacts are Whetu McGregor and Don Palmer on Great Barrier. Please also refer to CRI 020 032, Great Barrier Island (North).

Accompanying Maps and Photographs:

Site Name/s: Great Barrier Island (North)	Site No: CRI 020 032
Recorders Name: Paul Irving	Conservancy: Auckland
Map/Grid Ref: NZMS 259 27250 65650	Date: 20.03.90

Brief Description of Site:

The site includes the northern end of Great Barrier Island from Man'O'War Passage on the west coast to Awana Bay on the east coast, via Needles Point. This coast encompasses the west coast sheltered harbour of Port Fitzroy, the wide expanses of Katherine Bay and Port Abercrombie, the rugged bush clad western and eastern sides of the Northern Bush area of Gt Barrier, with the very exposed north-eastern coasts from the Needles to Waikaro Point. South and east of Waikaro Point is the barrier island of Rakitu (Arid Island), giving some shelter to the wide expanse of the Whangapoua Beach and Spit and the rocky coast to Whakatautuna Point. Behind the Spit is Whangapoua Harbour, the most significant estuarine system on the island. South of Whakatautuna Point the coast is again rocky and exposed, with small surf beaches between points. At Awana is a small wetland behind the beach.

Conservation Values: **Natural:**a,b,c,d,e,f,g,h,i **Cultural:** a,b,c,f **Historic:** a,b,c,d.

Comment:

Natural:

a) Around the site a number of areas are notable for retaining a high degree of naturalness in some component of their natural history. With the exception of Port Fitzroy, much of the rest of the coast has a high degree of naturalness in the marine environment; in particular, Whangapoua Harbour, Rakitu and the coastline associated with the Northern Bush. Whangapoua Estuary is also noted for its relatively unmodified faunal complement and vegetation, outside the modified areas under pasture, drained or on the Spit (Irving, pers. comm. 1990). The Northern Bush is noted for its unmodified coastal vegetation, particularly in the small river mouths and coastal cliffs, which goats (*Capra hircus*), now being eradicated, have been unable to adversely affect. Both the northern face of Gt Barrier and Port Fitzroy are considered to be unmodified from a geomorphic point of view. The topography of the northern end is spectacular, with high cliffs and the spectacular Needles (pillars of rock). Port Fitzroy, in contrast, is an almost entirely land locked natural harbour formed of partially drained river valleys.

b) Rare species and communities are found both on the island and in the waters around it. The area is most notable for brown teal (*Anas aucklandica chlorotis*), an endangered endemic, which occur in Port Fitzroy, Mabeys Stream, Whangapoua Harbour, Harataonga Stream, and at Awana; the last being possibly the best feeding habitat for teal. On land the Northern Bush and South Aiguilles Island contain *Fuchsia procumbens* (rare), *Yoania australis* ('local'), *Hebe pubescens* (indeterminate/rare), and the fern *Ophioglossum petiolatum* (vulnerable) (Given, et al 1987). Whangapoua Creek has the wetland orchid *Spiranthes sihensis* (rare); Rakitu has *Rorippa gigantica* (rare) (Slaven pers. comm. 1990). Marine and estuarine habitats are also of note. Whangapoua Harbour is noted, not so much for a single species but for the estuarine community as a whole. As the largest single estuarine wetland on the island it is unique in the Gt Barrier Ecological District. Offshore of Rakitu are found benthic communities which have never previously been recognised in New Zealand, although none of the species are rare (Hayward et al 1982).

c) The most notable sites of breeding for rare species are the brown teal habitats of Port Fitzroy, Whangapoua, Awana, Mabeys Stream, and Harataonga Stream (Bell 1986). Whangapoua is also noted, by virtue of its size and state of habitat, as a breeding area for common marine species which use estuaries - cockles (*Chione stutchburyi*) pipis (*Paphies australis*), snapper (*Chrysophrys auratus*), flounder (*Rhombosolea* spp.) - all of which also feed there and use the harbour as a nursery site. Port Fitzroy is noted as a nursery area and feeding ground for marine fish, due to its protected character and intertidal flats, which have rich benthic communities (food sources).

d) Due to the pristine nature of their marine environments, the coasts of the Northern Bush, Rakitu, and to a lesser extent Whangapoua Harbour, are considered fragile. Here the water is clear, little fishing occurs, and changes as have been documented elsewhere, such as land clearance (sediment) or major fishing practises, would have significant effects on the composition of these communities (Irving, pers. comm. 1990). Whangapoua Harbour appears to have survived the drainage, land clearance and development of parts of its upper catchment, but its resilience to further change must be low. Sand mining outside the Whangapoua Harbour is also noted as a potential threat to the sand system of the estuary and Spit (Fahy, pers. comm. 1990).

e) The Dept of Lands & Survey Coastal Reserves Inventory for Gt Barrier Island notes three areas of significant landforms. These are the northward coast from Miners Head to Needles Point, noted for its spectacular topography of cliffs, rocks and stacks; Port Fitzroy as a drowned river valley system; and Whangapoua Harbour for its spit and estuarine wetland association combined with the surrounding hill country and central basin.

f) Slaven (1990) notes that each of the areas of Rakitu, Whangapoua, the Northern Bush and the South Aiqulles Islands contain representative communities of common coastal species, forest and estuarine communities. Whangapoua Harbour has excellent ecotone sequences of saline vegetation to freshwater swamps, and is noted as one of the best wetland systems in the Auckland region (Wright/Cameron pers. comm. 1990). The coasts of Rakitu, Harataonga, Rangiwhakea Bay, the northern coast and Whangapoua Harbour have been investigated by Hayward et al (1986), Francis and Grace (1986), Roberts et al (1986), Irving pers. comm. (1990) and are considered representative of both hard and soft coastlines and marine benthic communities.

g) All the marine sites of northern Gt Barrier, particularly the east coast, are considered to be of scientific interest, due to the amount of research conducted (see bibliography below); Whangapoua Estuary in particular for botanical, wildlife and marine investigation.

h) Whangapoua Harbour and associated Spit, plus the association of soft shores and hard shores, has been noted by Ballantine (1990) as being of national significance due to its unmodified state and range of habitats. From a wildlife perspective the presence of significant numbers of brown teal rates Whangapoua, Mabeys Stream and Awana as internationally significant, and Port Fitzroy and Harataonga as nationally significant (Green pers. comm. 1990).

i) The Northern Bush has recently been the site of the discovery of a new species of *Apium* (as yet unnamed) and a range extension of *Arthropodium candidum* and *Cotula disica* var. *dioica* (Slaven pers. comm. 1990).

Cultural:

a) The Ngati Wai community is centred on Katherine Bay, with their meeting house, marae and waahi tapu areas in this area. Rakitu is a site traditionally used for gathering obsidian (rock glass).

b) The northern end of Gt Barrier is considered to have high scenic values (Hawley pers. comm. 1990).

c) It is effectively an exposed rocky coast, broken only by the broad embayments of Port Abercrombie and
f) Katherine Bay; the enclosed but nonetheless rugged Port Fitzroy, and the expanse of sand at Whangapoua. The essentially unmodified nature of the landscape is considered important for tourism (Hawley op. cit.).

Historic:

a) There are five known sites of historic importance. These are the gun emplacements on the northern side of Kaikoura Island and Man'O'War Passage, Graves Island in Port Fitzroy (an old cemetery for early European residents), the copper mine remains, shafts and stonework at Miners Head, and the graves of the victims of the sinking of the 'Wairarapa', both in Katherine Bay and at the northern end of Whangapoua Beach.
b) Archaeological sites include the burial sites at Awana Bay, the scattered human remains along the Whangapoua Spit (the result of a battle) and the archaic middens known from Harataonga, Awana and Whangapoua. Rangiwhakaea Bay has been the subject of a detailed survey of sites, with 63 sites known, including a pa in Rangiwhakaea Bay (Eadie and Broome 1983).
c) The only significant non-Maori archaeological site is the Kaiaraara timber milling site in Pt Fitzroy.
d) Great Barrier has been the site of some 28 shipwrecks. The most notable in this site being the Wairarapa which went down at Miners Head in 1894 (Locker, Lampson and Francis 1981). The steamer lost 135 people, the graves of whom are in Katherine Bay and Whangapoua Beach. The wreck still remains in 15 metres of water but is now badly broken up.

Site Importance: International **National** **Regional** **Local** **Unknown**

Comment:

Generally of national significance, as noted by a number of people (Hawley pers. comm. 1990; Ballantine pers. comm. 1990), Gt Barrier is a microcosm of northern New Zealand for landscape, flora and marine habitats. The wildlife values of the island, particularly the endangered endemic brown teal, make it of international significance (Green pers. comm. 1990).

Existing Threats: a, c, d, e, i, k, m.

Type & Comment:

a) Erosion is a slight problem on the Northern Bush coastline, due to goat grazing, but the eradication programme should reduce this.
c) Invasive species such as pines (*Pinus* spp.), lupin (*Lupinus arboreus*) and apple of sodom (*Solanum linnaeaum*) are now present on the Whangapoua Spit (Irving, pers. comm. 1990). Bush and forest areas adjacent to farmland are also subject to adventive invasion by weed species.
d) Goats in the Northern Bush have had an effect, but this is declining. Cattle grazing, plus sheep, have also altered the margins of the wetlands for brown teal, and in Whangapoua Harbour. Possums (*Trichosurus vulpecula*) did not exist on the island but have recently arrived and been caught. Farm dogs and cats pose problems for brown teal. Deer (*Cervus elaphus*), pigs (*Sus scrofa*), sheep (*Ovis aries*) graze Kaikoura Island.

e) Water pollution occurs sporadically - normally associated with settlements such as Port Fitroy, where vehicle repairs have polluted the stream, and sewage septic tank run-off is noticeable. In summer sewage from boats moored in the harbour is also a problem. Whangapoua Harbour is presently receiving run-off from local development blocks; mainly top-dressing and horticultural sprays. Orama has a sewage discharge.

i) Over-fishing of shellfish stocks in Whangapoua estuary is known, principally due to summer campers. Gill-netting of offshore reef fish species is recorded for Rakitu and the West Coast. Trawling is prohibited in the harbour but occurs elsewhere around the coast.

k) Recreation - particularly camping at the new camp grounds of Harataonga and Awana, is known to disturb brown teal. Whangapoua has an 'illegal' camp ground near the airstrip, used during the summer and causing over-use and pollution of the estuary.

m) Drainage of the wetlands associated with Whangapoua has changed this habitat to some degree. Further drainage could cause significant changes. (Reference Department of Conservation staff, Great Barrier Island.)

Human Modification and Human Use: a,b,d,h,i,j,k1(structures),k2(fisheries), k3(marine farming)

a) Land developed in the coastal zone, including housing (Awana), reclamation (Fitzroy), drainage Whangapoua), horticulture (Whangapoua), farmland (Okiwi/Whangapoua/Awana), forestry cutting (Northern Bush), and camp grounds (Awana/Harataonga/Okiwi).

b) Reclamations - Port Fitzroy.

d) Port Fitzroy has a wharf and boat moorings - the major port for the island.

h) Recreation is currently restricted to swimming, walking, camping, surfing, i.e. low impact activities, by relatively small numbers of users.

i) Boating, yachting, diving, fishing all around the site but focused on Port Fitzroy. Game fishing for yellowfin tuna is developing north of the island.

j) Traditional use is made of the marine resources of Katherine Bay and the coast north of it; plus the Whangapoua estuary is a significant site for shellfish gathering. Pingao (*Desmoschoenus spiralis*) occurs on Whangapoua Spit and is used by local Maori. Traditional use was once made of the obsidian found on Rakitu.

k1) Number of coastal structures is unknown but major structures and reclamations are known in Pt Fitzroy.

k2) Port Fitzroy Harbour is protected from commercial trawling, Danish seining and scalloping, as part of the overall fisheries management of the Gulf.

K3) One mussel farm in Port Fitzroy and one in Katherine Bay.

Existing Protection: a, d.

Type & Comment:

a) Much of the coastal area is protected by land administered by DOC under the Reserves Act, the Conservation Act, etc. The most notable being the Northern Bush and the Harataonga Farm Park. Gt Barrier Forest also encompasses most of the western side, outside the Northern Bush. The Wairarapa Graves sites are protected by the Historic Places Act. More than 60% of the land is in DOC hands.

d) The Fisheries Act prohibits commercial trawling and scalloping in Port Fitzroy.

Availability of Information:		1. Well documented
Natural	1 2 3	2. Limited information (general)
Cultural	1 2 3	3. Little information (if any)
Historic	1 2 3	
Threats	1 2 3	
Human Mod. & Use	1 2 3	

Comment:

Natural values - geomorphic (2), flora (1), fauna (1), marine (2).
Cultural - landscape (1), traditional (2).
Historic - archaeology (2) but patchy, historic (2).

Sources of Information:		1. Derived info. from existing literature & databases
Natural	1 2 3 4 5 6 7	2. Derived info as above & field check
Cultural	1 2 3 4 5 6 7	3. Derived from existing maps & aerial photographs
Historic	1 2 3 4 5 6 7	4. Recent DOC survey including sampling & analysis
Threats	1 2 3 4 5 6 7	5. Recent DOC survey excluding sampling & analysis
Human Mod. & Use	1 2 3 4 5 6 7	6. Experience
		7. Expert opinion

Comment:

Eadie F and K G Broome (1983). Ecological Survey of Northern Bush, Great Barrier Island. NZ Forest Service unpublished report.
Lawlor I (1987). Archaeological Survey, Okiwi. Aotea (Great Barrier Island). Department of Conservation, Auckland, pp 13.
Coster J and G (1975). Report on the Kaitoke-Harataonga Archaeological Site Survey. NZHPT. pp14, plus appendices.
Hayward B W, Brook F J, Grace R V and Bull V H (1982). Soft bottom macrofauna and sediments off Rakitu Island, north-east New Zealand. Tane 28: 149-162.
Francis M P and R V Grace (1986). Marine algal survey of northeastern Great Barrier Island, New Zealand. J. Roy. Soc. NZ (16(4)pp, 335-346.
Hayward B W, R V Grace and M P Francis (1986). Sediments and benthos off northeastern Great Barrier Island, New Zealand. J. Roy. Soc. NZ. 16(4)pp, 347-355.
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Wright A E, E K Cameron (1985). Botanical features of northeastern Great Barrier Island, Hauraki Gulf, New Zealand. J. Roy. Soc. NZ. 16(4)pp, 251-278.
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Bell B D (1986). The Conservation of NZ Wildlife. NZ Wildlife Service Occasional Publication No. 12.
Irving P. Department of Conservation, Auckland.
Green C. Department of Conservation, Auckland.
Slaven D. Environmental Consultant, Auckland.
Hawley J. Department of Conservation, Auckland.
Fahy F. Department of Conservation, Auckland.
Ballantine W. Marine Scientist, Leigh Marine Laboratory.
Given D R; W R Sykes; P A Williams and C Wilson (1987). Threatened and local plants of New Zealand: A revised checklist. DSIR, Christchurch, mimeograph.
Locker-Campson S & I Francis (1981). "Eight Minutes Past Midnight - The Wreck of the SS Wairarapa".

Recorded on Existing Databases:

1. WERI
2. SSWI
3. PNA
4. Geopreservation
5. HPT County Inventories
6. Other
7. None

Comment:
Most SSWI's surveyed 1980. Whangapoua and Mabeys Stream resurvey 1990.

Great Barrier Island Landscape Assessment; NZAA records.

Other Considerations:

The tangata whenua is Ngati Wai. Contact person is Whetu McGregor or Don Palmer, Great Barrier Island. The north-east coast, from Whakatautuna Point, north past Rakitu and Whangapoua to the Needles is currently under investigation as a marine protected area. The department should consider Great Barrier Island, given its land holdings and potential marine protected area, as a potential national reserve. Please also refer to site CRI 020 031, Gt Barrier Island (South).

Accompanying Maps and Photographs:

Site Name/s: Kermadec Islands	**Site No:** CRI 020 033
Recorders Name: Paul Irving	**Conservancy:** Auckland
Map/Grid Ref: 29° 16' S 177° 52' W (Raoul Island) Raoul Island 30000 70000	**Date:** 22.03.90

Brief Description of Site:

Lying between 400 and 530 nautical miles north-east of New Zealand, the Kermadec Islands are New Zealand's only truly sub-tropical islands. They represent a chain of recent volcanoes rising from the Kermadec sub-oceanic ridge which lies to the west of the Kermadec Trench (9000 metres deep). There are four main groups of islands - Raoul and Herald Islets (29 km^2), Macauley Island and Hazard Islet (3 km^2), Curtis and Cheeseman Islands (<1 km^2), and L'Esperance Rock. The Kermadecs are rugged and steeply sloping, both above and below sea level. The islands harbour a number of endemic species, both on land and beneath the water. The three southern groups of Macauley, Curtis and L'Esperance are uninhabited, while Raoul Island is currently the site of DOC management associated with a hostel and workshops set up for meteorological observations. The entire site is a nature reserve and landing is restricted.

Conservation Values: **Natural:** a,b,c,d,e,f,g,h. **Cultural:** a,b,c,d. **Historic:** a,b,c,d,e.

Comment:

a) The terrestrial communities of all the islands and islets, except Raoul and Macauley, and the marine environments are considered to be 'natural', as interference by humans has been minimal (Sherley 1986; Francis pers. comm. 1990).

b) The Kermadec Islands, as much as the surveys currently done can determine, have 22 species of endemic plants, with 15 species noted as rare (Given 1981). *Hebe breviracemosa* is known to exist from a single specimen. Three endemic species of fish, plus the only major world population of the spotted black groper (*Epinephelus daemelii*), four endemic species or sub-species of bird, plus numerous other bird species, use the island and associated waters for breeding. An important endemic marine invertebrate is the giant limpet (*Patella kermadecensis*) found sub-tidally. (Ballantine 1990).

c) A number of species of sea bird nest on the Kermadec Islands, including the Kermadec petrel (*Pterodroma neglecta*), the grey ternlet (*Procelsterna cerulea albivitta*), sooty tern (*Sterna fuscata*), masked booby (*Sula dactylatra personata*), red-tailed tropic bird (*Phaethon rubricauda roseotincta*), fairy terns (*Sterna nereis*), and the white-capped noddy (*Anous minutus minutus*). Common land birds include the tui (*Prosthemadera novaeseelandiae novaeseelandiae*), pukeko (*Porphyrio porphyrio melanotus*), yellow hammer (*Emberiza citrinella calignosa*), king-fishers (*Halcyon sancta vagans*), and silver-eyes (*Zosterops lateralis lateralis*). Both the white-capped noddy and white tern (*Gygis alba candida*) are at risk from cat (*Felis catus*) and rat (*Rattus norwegicus*) predation (Bell 1986).

d) Both the islands and the marine environment should be noted as sensitive to change. The marine species include unfished populations of species very valuable to scientific research and the understanding of New Zealand fish population dynamics (Irving pers. comm. 1990). The land environment on Macauley (goats (*Capra hircus*) now removed) and Raoul Islands have been markedly changed by the introduction of feral animals and plants. Other islands, particularly Meyer, are home to burrowing sea birds, and to set foot ashore is to risk damage to their nesting.

e) Raoul Is. is an active volcano (last eruption 1964) with hot springs and a crater lake. Lloyd and Nathan (1981) noted that this volcano forms part of the link with the Taupo volcanic zone. These are the only active volcanoes outside mainland NZ and are of significance for the opportunity they pose for study of volcanoes at lower altitudes.

f) Both the terrestrial flora and fauna, particularly birds, are representative of sub-tropical ecosystems, and the marine ecology most certainly is. The changes wrought by introduced species, on Raoul in particular, and Macauley, mean these areas probably do not qualify as representative, but the other islands do.

g) Scientific investigation in most disciplines has occurred dating back to 1793 when Admiral D'Entrecasteaux discovered Raoul and L'Esperence. Expeditions in 1910 by Oliver made the first systematic taxonomic collections and descriptions. A bibliography of work is available from DOC, Auckland.

h) International significance - "biogeographic considerations of global significance" (Ballantine 1990, in press) in relation to the Kermadec marine environment. The islands are also of international significance for the biogeographical study of botanical endemism, related to time of emergence of the islands from the sea.

Historic

a) Denham Bay and the Terraces contain evidence of European occupation, and burials from 1836 onwards.

& From 1800 to 1850 the island was used sporadically as a base for whaling and from then until 1930.

c) served as an ocean post office for passing ships. (Haigh 1968).

b) On Low Flat on the north-eastern side of Raoul Is. there are sites where early east Polynesian artefacts have been found. Anderson (1980) considers that Raoul is "in all likelihood the Rangitahua Island of orthodox Maori tradition, where the Aotea canoe stopped on its way from the Society Islands to New Zealand". Leach et al (1986) produces evidence and analysis of artefacts of New Zealand origin at Raoul, obsidian, implicating that two way navigation to and from the Kermadecs to New Zealand occurred. Although not classical archaeology, the discovery of species of karaka (*Corynocarpus laevigatus*), ti (*Cordyline terminalis*), candlenut (*Alevrites moluccana*), tubers of taro (*Colocasia esculeuta*) and kumera (*Ipomoea batatas*), plus a range of cultivation weeds, by Sykes (1977), also demonstrates the imprint of humans.

d) Seven shipwrecks occurred in the Kermadecs between 1902 and 1985 (Shipwreck inventory). The most notable (or infamous) being the Columbia River in 1921, the source of the Norway rat (*Rattus norwegicus*), which has played a major role in destroying most of the major sea bird colonies on Raoul Island, and confining certain species to offshore islets. Two wrecks in 1917, the Wairuna and the Winslow, were the result of the depredations of the German commerce raider 'Wolf' which laid up in Denham Bay for two weeks before sinking the vessels and returning to the Pacific war. (Haigh 1968)

e) The archaeological sites of Low Flat, Denham Bay, and the Terraces, are considered to be of international significance (B Sewell pers. comm. 1990).

Cultural

a) See note b) under 'Historical' re landing of Aotea canoe and the significance of Rangitahua (Raoul).

b)& The landscape values of the islands, their rugged precipitous nature in an otherwise flat sea, and the

c) vegetated, natural undeveloped state, are considered to be of high scenic value. Hawley pers. comm. 1990.

d) See note b) under 'Historical', and the descendants of the Aotea canoe, now resident in southern Taranaki and Wangaunui. It appears the island was occupied from approx. 1000 AD to 1450 AD sporadically (Anderson 1978).

Site Importance: International National Regional Local Unknown

Comment:

The Kermadec Islands are of international significance as active volcanoes (Llyod & Nathan 1981), due to their biogeographic considerations in the marine environment (Ballantine 1990) and for the study of botanical endemism, and due to the presence of early east Polynesian artefacts and early European occupation sites (Anderson 1980). The islands also contain a number of significant flora and fauna species.

Existing Threats: Type and Comment: a, c, d, k.

a) Erosion of the low flat area on the northern side of Raoul Island is threatening prehistoric archaeological sites.
c) Invasive plants have left a major legacy on Raoul Is. particularly mysore thorn (*Caesalpinia decapetala*), passionfruit vine (*Passiflora edulis*) and Brazilian buttercup (*Senna septemtrionalis*). Eighteen species are known in total and in some cases, such as mysore thorn, they threaten significant archaeological sites, or are displacing native species, i.e. the arum (*Alocasia macrorrhiza*), which has taken over large areas of forest floor and is preventing regeneration. Buffalo grass (*Stenotaphrum secundatum*) is now also well established on Raoul.
d) Noxious animals, principally goats, now removed from both Macauley and Raoul, cats and Norwegian rats are a threat on Raoul. Goats appear to have been responsible for reducing Macauley's surface to a short tuft. In 1966 three thousand, two hundred goats were killed in an eradication programme.
k) Recreation: Increased use of the waters around Raoul by divers means increased boat traffic and damage to a number of marine species, including the large plate corals (*Turbinaria*), from anchors; and the increased risk of exotic plants (via seed) or animals - rats, mice (*Mus musculus*), cats - being released onto the islands. (Murray pers. comm. 1990)

Human Modification and Human Use: a, h, i.

a) Development on the islands is limited to the meteorological station on Raoul Island.
h) The island faces increased pressure from people wishing to land to 'look around' or meet staff. This in turn places pressure on staff, and on chances for noxious plant or animal invasion.
i) Water based recreation, diving and fishing, is an increasing use of the marine environment surrounding the Kermadecs.

Existing Protection: Type and Comment: a, d.

a) Nature reserve - all islands. Landing by permit only, plus permanent staff presence.
d) Fisheries Act - MAF policy not to exploit within 12 nautical miles. Spotted black groper totally protected. Proposed marine reserve out to 12 nautical miles (Francis 1985).

Availability of Information:

Natural	1 2 3
Cultural	1 2 3
Historic	1 2 3
Threats	1 2 3
Human Mod. & Use	1 2 3

1. Well documented
2. Limited information (general)
3. Little information (if any)

Comment:

Raoul and Kermadec subject to intense study over almost 100 years. Department of Conservation, Auckland, and the Raoul Island Library contain most information.

Sources of Information:								1. Derived info. from existing literature & databases
Natural	1	2	3	4	5	6	7	2. Derived info as above & field check
Cultural	1	2	3	4	5	6	7	3. Derived from existing maps & aerial photographs
Historic	1	2	3	4	5	6	7	4. Recent DOC survey including sampling & analysis
Threats	1	2	3	4	5	6	7	5. Recent DOC survey excluding sampling & analysis
Human Mod. & Use	1	2	3	4	5	6	7	6. Experience
								7. Expert opinion

Comment:

1. Sherley, G.H. (1986), Kermadec Islands Management Plan - Public Draft. Department of Lands & Survey, Wellington.
2. NZ Nature Heritage, The Kermadecs, pages 1641-47.
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5. Lloyd, E.F. and Nathan S (1981). Geology and Tephrochronology of Raoul Island, Kermadec Group, NZ.
6. NZ Geological Survey Bulletin 95.
7. Ballantine W.J. (1990). The significance of island reserves for ecological restoration of marine communites (in press - paper presented at the ecological restoration of offshore islands conference, Auckland 1989).
8. Anderson, A. (1980). The archaeology of Raoul Island (Kermadecs) and its place in the settlement history of Polynesia. Archaeology and Physical Anthropology in Oceania 15: 131-141.
9. Leach F, Anderson A, Sutton D, Bird R, Duerder P and Clayton E (1986). The origin of prehistoric obsidian artefacts from the Chatham and Kermadec Islands. NZ Journal of Archaeology, Vol. 8: 143-170.
10. Francis M P (1985). The Kermadec Islands: A Marine Reserve Proposal. Fisheries Research Division, Ministry of Agriculture & Fisheries. Internal Report No. 29.
11. Francis, M.P. (1990). Fisheries Scientist. Leigh Marine Laboratory. Univesity of Auckland.
12. Sykes W R (1977). Kermadec Islands Flora, an annotated checklist. DSIR Bulletin 219. Government Printer, Wellington.
13. Hawley, J. Landscape Architect, Department of Conservation Auckland.
14. Sewell, B. Archaeologist, Department of Conservation, Auckland.
15. Murray, W. Manager, Department of Conservation, Auckland.
16. Irving, P. Department of Conservation, Auckland.
17. Haigh, J.B. (1968). Raoul (Sunday) Island, Kermadec Group, a brief history, *In* Journal of Whakatane and District Historical Society Inc. pp66-80.
18. Johnston, L. Archaeologist, Department of Conservation, Auckland.

Recorded on Existing Databases: Comment:

1. WERI
2. SSWI
3. PNA
4. Geopreservation
5. HPT County Inventories
6. Other - (a) Shipwreck inventory, DOC, Auckland.
   - (b) Kermadec Island Bibliography, DOC, Auckland.
7. None

Other Considerations:

Protection of the marine environment by establishment of proposed marine reserve (Francis 1985) must go ahead in order to ward off future fishing pressure. The management plan needs to be completed and implemented. There is a need to build an airstrip to facilitate better management. DOC, Auckland, are investigating its feasibility and desirability. Airstrip location would damage significant prehistoric site(s) (Johnson, pers. comm. 1990.

Accompanying Maps and Photographs: