10 The Coastal Resources of Northland

10.1 Introduction to the Coastal Resources of Northland

Northland is renowned for its coastal environment, in particular the extensive number of beaches and the numerous harbours and estuaries along its 1700km length. The coastline varies from rugged cliffs to sandy beaches and sheltered harbours and embayments on its east coast, to large harbours and wide expansive beaches that can stretch for tens of kilometres on its west coast. Together with a warm climate, this sets the Northland coast apart from other areas of New Zealand.

Mahinepua Bay

Northland's east coast is bounded by the Pacific Ocean, and is characterised by enclosed mangrove-lined harbours and estuaries, rocky headlands and sheltered embayments and semi-enclosed sandy beaches interspersed along its length. Many of the harbours along the east coast are highly infilled, having extensive intertidal areas of sand, shell and estuarine muds.

There are also numerous islands along the region's east coast. These offshore islands include major island groups in the Bay of Islands, the Cavalli Islands, Hen and Chicks and the world-renowned Poor Knights Islands. All add to the distinctive feature of Northland's coast. Although the east coast is sheltered from the prevailing westerly winds, it is occasionally lashed by north-easterly gales and the remnants of tropical cyclones.

By contrast, the west coast has a relatively smooth outline, broken only by the mouths of several extensive harbours such as the Kaipara and Hokianga harbours and the occasional headland. The wide expansive beaches along its length are the result of the higher wave energy arriving on this coast from the Tasman Sea. Beach and dunefield habitats are a dominant feature along the expansive west coast beaches.

Parengarenga Harbour - South Head

Coastal dunes are home to several endangered plant species, with beaches important as roosting, nesting and feeding areas for coastal birds such as the threatened New Zealand dotterel, the rare and endemic variable oystercatcher and the endangered fairy tern. The west coast harbours (Kaipara, Hokianga, Herekino and Whangape) and the east coast harbours (Parengarenga,

Rangaunu, Houhora and Whangarei) as well as numerous lakes and swamps are valuable feeding grounds for migratory waders such as plovers, godwits, turnstones and tattlers.

Extensive areas of mangrove forest and salt-marsh are present in harbours on the east and west coasts of Northland. Mangrove habitats in particular are invaluable as a rearing ground for juvenile fish species including many commercially exploited species, and important feeding and roosting areas for birds.

Marine habitats containing locally endemic species and New Zealand endemics that are very rare elsewhere are present in the Cape Reinga area. These areas along with the Moturoa Islands, Cape Karikari, Cavalli Islands, Cape Brett and the Poor Knights Islands are influenced by the East Auckland current. This warm subtropical current brings with it the larvae of Indo-Pacific species including several species of molluscs, echinoids (sea-eggs) and a variety of fish. The larvae mature within the areas washed by the current, and along with many endemics, make these areas ecologically unique.

Coastal lowland broadleaf forest vegetation in Northland has been largely removed or otherwise modified by human influences. Unmodified coastal forest is now very rare, being present on some islands, and at only a few localities on the mainland: Herekino Harbour mouth and Ninety Mile Beach. Indigenous dune field vegetation is similarly rare and restricted to areas such as North Cape, the North Heads of the Kaipara and Hokianga harbours and isolated areas on the east coast.

10.2 Regional Policy Statement Objectives

The Regional Policy Statement for Northland lists a number of key objectives in respect to the coastal environment.

- **The preservation of the natural character of the coastal environment, including protection from inappropriate subdivision, use and development.**

- **Prevention of damage to and loss of traditional fisheries habitats and tangata whenua resources of significance to the tangata whenua.**

- **Maintenance and enhancement of public use, enjoyment of and access to the coastal environment.**

- **The minimisation of the conflicts between uses in the coastal environment and their effects on public health and safety.**

10.3 Natural Character of the Coast: Main Points

Pressures

- Increasing coastal subdivision and use of the coastal area has resulted in increased pressures on coastal margins, particularly foredune environments (especially where there is unformed access).
- Extraction of sand has concentrated around the entrances to harbours and estuaries. Where extraction occurs close to the shore, there is potential for impact on the adjacent shoreline.
- Historically, development in coastal catchments, including land clearance and associated catchment development, has resulted in pressures on estuaries and harbours from sediment-laden waters.

State

- The greatest loss of natural character has occurred along the east coast of the Northland region.
- Where coastal erosion has been a problem, the coastline has been armoured with hard materials, and this has significantly degraded the natural character of the coastline.
- Coastal subdivision developments have degraded the natural character of many beaches in the region.
- Northland's west coast remains largely unmodified with only a few small settlements along its several hundred kilometre length.

Responses

- Regional and District Plans cover a range of issues related to coastal development and resource use.
- Studies are presently being undertaken to determine the sustainability of sand extraction in the Kaipara Harbour.
- Methods are being developed to assess the state of health within estuarine environments.
- A number of community coast care groups have been formed throughout the region.

10.4 Natural Character of the Coast

Natural character of the coast is often difficult to define as it is linked to human perceptions and values. Landforms and features along a coastline such as harbours, estuaries, dunes and beaches have been produced by natural coastal processes and are therefore considered as part of the natural character of the coast. Human-built structures such as buildings, roads and rock walls or revetments are not considered part of the natural character of the coast.

This section on natural character does not consider the biology or ecology of the coast or cultural values. It instead focuses on the physical environment.

10.4.1 Natural Character Issues

Preservation of the natural character of the coast is afforded a high priority in the New Zealand Coastal Policy Statement. It is also considered an issue of national importance in the Resource Management Act (1991).

Significant issues likely to affect the loss of natural character of the coast have been identified within the Regional Policy Statement for Northland. These include the impacts of residential development on coastal margins, the modification and disturbance of sand dunes through development, pedestrian and vehicle access, and the issue of increased rates of estuarine sedimentation.

Several of these issues fall under the responsibility of the District Councils. District plans must be consistent with the Regional Policy Statement for Northland. Issues such as controls on appropriate development of coastal margins and public access to the coast are addressed within district plans. The Northland Regional Council works closely with the district councils, principally through the district plan and resource consent process.

10.4.2 Pressures Affecting the Natural Character of the Coast

Coastal Residential Subdivision

Coastal baches have long been a New Zealand tradition. The numbers of these increased dramatically from around the 1950s. Through the years many of these baches have been added to or extended, often becoming houses. The most popular location for such baches has often been the soft sediment beaches and estuarine areas, in particular sand spits. Locating as close to the water as possible was seen as desirable, and for this reason the tops of foredunes were often modified and built upon.

Matapouri Bay

Examples of these areas can be found along the entire Northland coast. At the time many of the original baches were located, the changing characteristics of the coast were not well understood. The temporary nature of the end of sand spits in particular was often not appreciated, nor the periodic need for the beach to access sediments stored in foredunes.

Today, coastal locations are as desirable as ever, putting increased pressure to develop areas previously undeveloped. Obtaining the balance between accommodating these demands and preserving the natural character of the coast is difficult, and a much argued issue.

Sand Mining

Sand mining has occurred commercially in Northland since the mid 1900s. In 2001, there are 5 current resource consents for the extraction of sand in Northland. These are for areas within the Kaipara Harbour (2), at the entrance to Mangawhai Harbour (2), and at the entrance to Parengarenga Harbour. At present, the consents for sand extraction in the Parengarenga Harbour entrance and Pouto Point in the Kaipara Harbour are not being exercised.

The sands are used in a range of commercial purposes, most notably for construction. The Parengarenga Harbour site is among only a handful of sites in New Zealand that is a source of sand with a high silica content and very few impurities (<2%), that is highly valued in the manufacture of glass.

Extraction of sand has concentrated around the entrances to harbours and estuaries. These are often areas of well-sorted sediment, both of mineralogy and grain size. Where extraction occurs in nearshore environments, there is a potential for impact on the adjacent shoreline **(see Case Study: Pouto sand extraction and shoreline erosion).**

Catchment Landuse

Northland's landscape was once covered in extensive forest and wetlands. A high level of deforestation has occurred historically in Northland, with few remaining examples of coastal lowland native forest. In its place much of the region is now in pasture, with pastoral agriculture the dominant land use.

Where catchments drain towards estuaries and harbours, an increased rate of sedimentation of these waterways has occurred in the past and continues today. The beauty of many of Northland's harbour and estuarine areas makes them sought after areas for settlement. This results in increased pressures on these waterways from the runoff associated with such development.

Whangarei is the commercial capital of Northland with its harbour and extensive port facilities with the largest urban population in the region. Along with the Bay of Islands, these are the two greatest concentrations of population adjacent to coastal waters. Extensive areas of the Bay of Islands have been developed with high concentrations of housing and infrastructure in areas such as Paihia and Russell.

Coastal Structures

A direct impact on the environment, in particular to the natural character of the coastline, comes from the number of coastal structures along its length. The types of structures include: seawalls and rock revetments, boat ramps, buildings, jetties and wharves.

Table 19: Number and type of coastal consents granted and currently active in Northland

Consent Type	Number
Moorings	3,213
Structure (ramp, jetty, seawall etc)	704
Other Discharges	50
Stormwater Discharges	30
Marine Farms	34 (NRC Consented)
Reclamation	26
Culvert outfall	10
Dredging	9
Consent to occupy seabed	7
Sand Extraction	6
Marinas	5
Consent to take or use water	3
Other	29
Total	**4,126**

A typical coastal structure in Northland

Marine Farms

Since the introduction of the Resource Management Act in 1991, the Northland Regional Council has granted 34 resource consents for marine farms, primarily for cultivation of the Pacific Oyster. There are however approximately an additional 102 MAF-licensed marine farms that were granted licenses prior to 1991. These vary in condition from those that are currently in use to those that have been abandoned.

Marine farm at Whangaroa Harbour

Marine farm at Houhora Harbour

Table 20: Area occupied by marine farms in Northland Harbours

Harbour	No. of Marine Farms	Area of Marine Farms (ha)
Parengarenga	18	109
Houhora	10	42
Rangaunu	1	9
Whangaroa	13	122
Bay of Islands	57	101
Whangarei	1	3

Kaipara	31	120
Hokianga	5	36
	136	**542**

Note: Areas calculated include both MAF Licenses issued before 1991 and Coastal Permits subsequently issued by the Northland Regional Council. Areas are approximate only.

10.4.3 State of the Natural Character of the Coast

Northland's East Coast

By far the greatest concentration of Northland's population and development has occurred along the east coast. The many estuaries and embayments contain large numbers of residential houses. Often with these are associated structures such as jetties, boat ramps, seawalls and rock revetments.

In some areas rock walls have significantly altered the natural character of Northland's coastal environment

Through the years many of these locations have been extensively modified. Foredunes along soft sediment coastlines in particular have often been flattened to create suitable building platforms. Where coastal erosion has been a problem, the response has typically been to armour the coastline with hard materials. Historically, this has ranged from rock to concrete rubble to iron and steel. Much of this remains littered along certain areas, most notably the inside of several estuaries and harbours. Where this has occurred, this has contributed to a significantly degraded state of natural character.

Within the numerous harbours along the east coast, the greatest concentration of population and development has occurred within the Whangarei and Bay of Islands harbour environments. Large sections of the shoreline in these harbours have timber or concrete seawalls or rock revetments. Such features have resulted in a loss of natural character.

The Whangarei Harbour in particular is Northland's main shipping port. Considerable modification of sections of the inner harbour has occurred, through reclamations and the construction of port facilities. These practices continue, with the new deepwater port facilities under construction inside the entrance to Whangarei Harbour.

Reclamations underway for the new deepwater port at Marsden Point

Northland's West Coast

Northland's open west coast remains largely unmodified and in a natural state with only a few small settlements along its length of several hundred kilometres. Much of this length is dominated by extensive foredune habitat, backed by large eroding

Pleistocene cliffs. The North Kaipara Head in particular is a unique coastal landform with vast shifting sand dunes.

Pouto Peninsula, Kaipara Harbour

Within the shelter of the two major west coast harbours (Kaipara and Hokianga) a large number of small settlements can be found. Much of the coastal margin adjacent to these settlements has been modified through time, with seawalls and rock revetments.

Extensive flood protection works have been placed along the inside edge of the northern arm of the Kaipara Harbour. Within the Hokianga Harbour, hundreds of hectares of low lying salt marsh and tidal flats, particularly in the upper reaches, have been lost to reclamations, where this land has been turned into farm land. This has permanently changed the natural character of these areas.

10.4.4 Response to Natural Character Issues

Northland Regional Council

Coastal Monitoring

A significant portion of the monitoring of the shoreline and coastal waters is required by various resource consents such as those for the extraction of sand. Other monitoring within the coastal environment is carried out for specific projects, for example the review of coastal hazard information at various locations. Both types of monitoring provide valuable information on the 'state of Northland's environment'.

Beach profile survey of Pouto shoreline, Kaipara Harbour

Several programmes involving the monitoring of marine bathing and harbour water quality have been carried out. Marine bathing water quality is monitored annually across the summer period at some of the most popular bathing beaches in Northland (**see coastal water quality section**).

The Kaipara Sand Study

The Minister of Conservation granted resource consents in 1997 to Winstone Aggregates Ltd and Mt Rex Shipping to extract sand from an area inside the entrance to the Kaipara Harbour. A consent condition required that a study into the sustainability of sand extraction and an assessment of the sand reserves of the Kaipara Harbour inlet be undertaken.

Dredge operating on the Kaipara Harbour

The project is being carried out over a three to four-year period by the National Institute of Water and Atmospheric Research (NIWA) and is being funded by the consent holders, and the Auckland and Northland Regional Councils.

The first stage of the sand study commenced at the beginning of 2000 and involved the collection of detailed side scan sonar data showing the bathymetry and bed-forms in the study area. Sediment samples and water current data have also been collected and together with the side scan sonar data will allow sediment pathways to be mapped.

The next stage of the study will look at historical sand volumes in the Kaipara and will also include anecdotal information on sand movement within the Kaipara Harbour.

This study will provide information on the sand reserves and the transport and movement of sand within the Kaipara Harbour. This information is required in order to ensure that this resource is being used in a sustainable manner.

Estuarine Environmental Assessment and Monitoring: a National Protocol

Northland Regional Council, along with several other regional councils, is contributing towards the development of a national monitoring protocol to assess the state of health within estuarine environments. The Cawthron Institute is coordinating this project, with funding from the Ministry for the Environment Sustainable Management Fund and the various regional councils.

There are three main goals to this project:

- An assessment of the state of health of each estuarine environment.
- An estimate of the degree of change from the 'natural state'.
- A benchmark for monitoring change. This work will assist the development of the Ministry for the Environment environmental performance indicators.

The Otamatea arm of the Kaipara Harbour is the Northland estuarine habitat being used in this national study. The project is scheduled to take three years with completion intended for mid 2002.

Detailed aerial photography for the estuary has been collected with field studies of the vegetation and habitat classes carried out. Sampling at several sites along the length of the estuary has also been conducted. This involved the collection of comprehensive samples of various species and the nutrient and mineral content of the estuarine muds at each site.

This will provide a detailed analysis of estuarine species assemblages and their corresponding habitat state on both a regional and national scale. This will provide tools to establish the health of other estuarine and harbour environments within the Northland region.

Sediment surveys during the assessment of the state of the Otamatea estuary

Other Responses

Community Coast-Care Groups

A small number of community coast-care groups have been formed around the region. These groups are comprised of local community members and work with the Regional Council to carry out activities such as the revegetation of dune environments and other planting within the coastal margins. These groups often help with developing formed access points to the coastal marine area.

More information on community care groups can be found at http://www.nrc.govt.nz/land/care_groups.shtml.

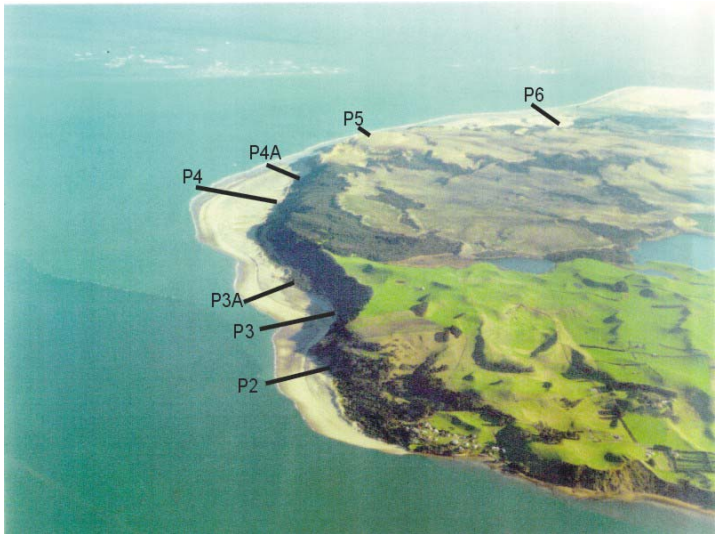
Case Study: Pouto Sand Extraction and Shoreline Erosion

Concerns have been raised over the level of erosion that is occurring along the Pouto shoreline. Recent episodes of erosion have made sections of the shoreline impassable by vehicle at times of high water. Local residents and iwi blame the extraction of sand as the cause of erosion. Monitoring has shown huge natural fluctuations in sand volumes along this section of shoreline.

Background

The extraction of sand from the Pouto shoreline has occurred for many decades. However, accurate records of extracted volumes are only available after 1974. Several companies have extracted sand from Pouto, particularly in the late 1970s, with Mt Rex Shipping Ltd, formerly Coledale Shipping (herein referred to as Mt Rex), being the largest extractor.

Mt Rex holds the sole resource consent for the continued extraction of sand from the Pouto shoreline, which was granted in 1992 and expires in 2004. The resource consent allows for a maximum of 60,000 m^3 to be extracted per year. Annual extraction volumes however are generally in the order of 40-50,000 m^3 per year. The area in which the resource consent allows extraction to occur is a subtidal, nearshore strip immediately adjacent to the shore and approximately between sections P3-P4. Due to the natural sorting of sediments and the favourable depths at which this desired sediment grainsize occurs within the consent area, extraction has not occurred over the entire consent area, but has concentrated in an area between P3A and P4.



Pouto shoreline showing location of survey P2-P6
Noel Hilliam

Monitoring of the Pouto shoreline began in 1990, at the request of the Department of Conservation, several years prior to the granting of the current consent. Monitoring has consisted of beach profile surveys at the sites P2-P6, at six-monthly intervals. These have documented changes in the intertidal and dune sand volumes. Recently GPS surveys of the dune line have been added to the monitoring programme.

Main Findings of Monitoring

Monitoring has shown the shoreline of Pouto to be extremely dynamic, with changes in volumes above mean sea level (MSL) of up to 1.5 million m^3/yr between profiles P2-P5. These oscillations in erosion and accretion are seen at periods ranging from between surveys (six monthly) to longer periods of erosion such as that seen from February 1994-August 1997 (see graph below). The long-term trend of the Pouto

shoreline (between P2-P5) as indicated by the net change in volumes, can be seen as one of net long-term retreat (erosion).

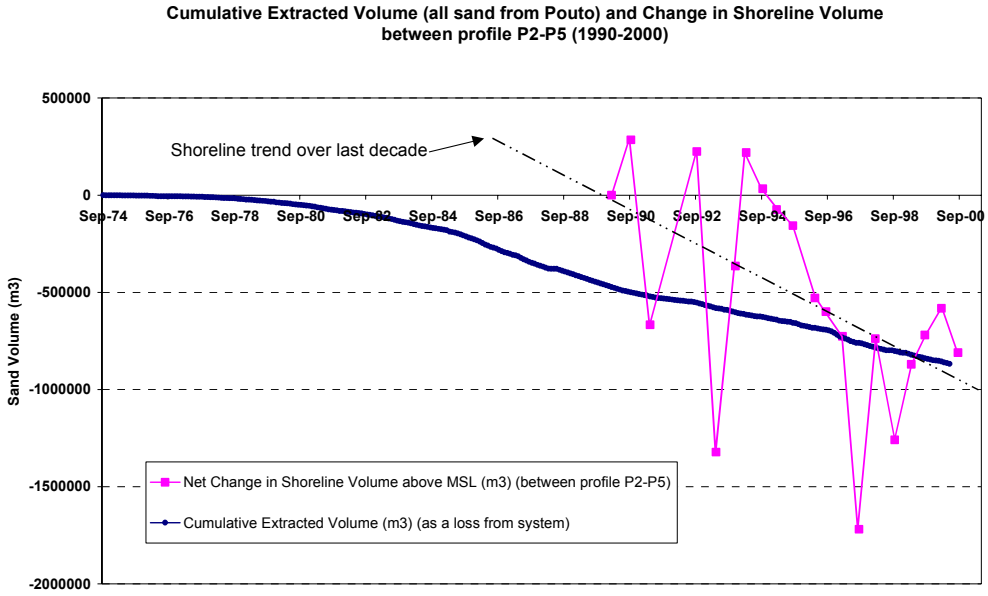


Figure 27: Extracted sand volume and change in shoreline volume between profile P2-P5 for the period 1990-2000

In addition to the overall changes in shoreline volume above MSL, significant cycles of accretion and erosion were seen at profiles P2, P3, P3A and P4. In particular the eastward migration along the shoreline of an embayment was observed. This was shown to be a cyclic event with a period of 7-10 years.

The total cumulative volume of sand extracted from the Pouto shoreline (based on known records) is just under 1,000,000m^3. The net change in shoreline volume (above MSL) over the last decade has been a loss of approximately 1,000,000m^3, approximately equaling the total volume that has been extracted.

Review of Resource Consent

Section 128 of the Resource Management Act (1991) provides for the consent authority to review the conditions of a resource consent to deal with any adverse effects that may be arising from the exercise of the consent. This is a formal review of the consent that includes affected parties and gives the consent holder the chance to review its practices and suggest alternatives to help mitigate any adverse effects. Mt Rex has currently voluntarily suspended sand extraction from the Pouto consent area, and is not intending to resume extraction there.

Conclusions

- The Pouto shoreline displays significant natural changes; some of these are cyclical.
- The Pouto shoreline is an eroding shoreline, currently displaying a period of long-term retreat.

- It is reasonable to assume that the extraction of large quantities of sand immediately adjacent to the shoreline is likely to be having an effect on the shoreline.
- It is not known however, what proportion of the erosion is due to natural causes or sand extraction.
- That being an eroding shoreline, the Pouto shoreline is not an appropriate area to extract sand.