2 Regional Profile

2.1 Climate

Northland, with its proximity to the sea, almost subtropical location and low elevation, is characterised by a mild, humid and rather windy climate. Summers tend to be warm and humid. Winters are characteristically mild with many parts of the region having only a few light frosts each year. The prevailing wind for most parts of the region is from the south west. However, in summer tropical cyclones give rise to north-easterly winds and heavy rainfall.

The mean annual rainfall ranges from about 1000-1300mm in low-lying coastal districts to over 2500mm on some of the higher country. Approximately one-third of the yearly rainfall total falls in the winter months of June, July and August. The region experiences high-intensity rains which can cause severe flooding. Droughts are common in Northland during the summer months. High pressure weather conditions are prevalent during this period, often resulting in several weeks or months of dry and hot or windy weather. Records indicate that parts of the region on average have a drought of economic significance every three years.

Mean annual temperatures range from 15.5°C to 16°C in the far north and eastern areas, to between 14°C and 15.5°C in the south west and coastal districts, giving it the highest mean annual temperatures in New Zealand. Daily and annual temperature variations are low. Whangarei, the major settlement of the region, has around 1,900 sunshine hours per year, and receives an annual rainfall of approximately 1,300mm, about average for New Zealand.

2.2 Landforms

Northland consists of a narrow peninsula, only 80km across at its widest point, bounded by the Tasman Sea and Pacific Ocean. The region is unlike most of New Zealand in that there are few mountain ranges and the highest point, Te Raupua in the Waima Range, is only 774 metres above sea level.

Typical Northland estuary

Typically, inland areas are dominated by rolling hill country with landforms ranging from the ancient uplifted east coast greywacke rocks to relatively young volcanic lava and active coastal dunes. Many rivers, streams, tidal inlets and harbours dissect and break the pattern of hills. Modest areas of flat low-lying land are restricted to areas adjacent to the Awanui and Northern Wairoa rivers.

The Northland region has a large number of lakes. Most are situated along the west coast, having been formed between stabilised sand dunes. There are also several shallow inland lakes which originated through the damming of valleys by lava flows.

Northland's coast is arguably its most distinctive physical feature. No part of Northland is more than 40km from the sea. The coastline is some 1,700km long and its many harbours, together with a climate, set the Northland coast apart from other areas of New Zealand.

Matai Bay

The west coast of the region has a relatively smooth outline broken by the mouths of several extensive shallow harbours. In contrast, Northland's eastern coast forms an irregular line with rocky headlands, sheltered deep water harbours, sandy bays and mangrove forests.

There are numerous islands along the region's east coast. The major island groups are those in the Bay of Islands, Poor Knights, Hen and Chickens and Cavalli Islands.

2.3 Land Use

Northland's economy is largely based on the productive capacity of the land. Pastoral agriculture accounts for over half (53%) of land use in the Northland region. Indigenous forest, mangroves and wetlands are the next dominant (23%) land use.

Exotic (planted) forest is also significant at 130,700 ha (10%). It is estimated that the Northland economy currently earns $71 million a year from forestry. This is predicted to increase to over $380 million a year over the next twenty years.

The region has a well developed horticultural industry, centred mainly around the growing of avocados, citrus, kiwifruit, kumara, squash and flowers. Around 2,300 ha

are currently planted in fruit crops and 3,500 ha in market gardens. Most fruit crops, particularly citrus and kiwifruit are grown in the Bay of Islands and Whangarei areas.

2.4 Soils

Over 100 different soil types have been identified in the Northland region (NZMS 290 map series). This variety is due to differences in underlying rock, the low relief and the influence that the warm moist climate and original vegetation has had on soil forming conditions.

The composition of the original indigenous forest is probably the prime influence on soil properties. Areas which were forested by trees such as kauri, totara and kahikatea tend to have produced soils which are strongly leached and infertile. However, areas forested by broadleaf trees such as puriri, kohekohe, taraire and tawa generally have fertile topsoils due to the ability of these trees to retain nutrients. The main exceptions to these soil types are those formed as a result of volcanic activity and recent stream and river deposits.

Northland has significant areas of strongly leached, heavy clays overlying unearthed rock with thin topsoil and low subsoil fertility.

2.5 Ecosystems

2.5.1 Rivers, Lakes and Wetlands

Most of the rivers and streams in Northland, with the exception of the Northern Wairoa, are relatively short with small catchments. While river flows vary considerably, Northland's rivers are generally characterised as being slow flowing and muddy. The rivers with the highest conservation value are those whose catchments are the least modified, and include the Wairau, Waipapa and Waipoua rivers.

Dune lakes and associated freshwater wetlands are numerous on the coastal sands of the region. Northland also has many inland wetlands, the most significant being those linked with the mid catchments of the larger rivers such as Lake Owhareti, Ngawha Springs wetlands, Motatau wetlands, Waitangi wetland complex, Punakitere wetlands and Mangonui River wetlands.

The original area of wetlands has been greatly reduced due to drainage and conversion for agricultural purposes. The remaining wetlands show evidence of these practices in that they are small, scattered and vulnerable to changes in hydrological regimes. The most significant areas of dune lakes and wetlands remaining are Aupouri Peninsula, Kaimaumau Swamp, Lake Ohia, Kai Iwi Lakes and on the Pouto Peninsula.

These lake and wetland ecosystems are important habitats for a wide variety of plant and animal species, which are regionally or nationally significant because of their rarity. These include birds such as the brown teal, banded rail, NZ dabchick, marsh crake, fern bird and bittern, the aquatic plants *Hydatella inconspicua*, *Myriophyllum robustum* and native freshwater fish: black mudfish, banded kokopu, short jawed kokopu and dwarf inanga.

2.5.2 Forests and Shrublands

Nearly 14% of the land area of Northland remains in native forest and shrubland, and this includes over half of the nation's remaining kauri forest. The region's forest and associated shrublands are notable for their high native content, species diversity, structural complexity and tropical links.

Podocarp/hardwood/kauri forests are the most extensive forest type in Northland. These comprise a wide variety of hardwoods including rewarewa, kohekohe, tawa, pukatea and taraire among others. Podocarp species such as rimu, totara, miro and matai are scattered throughout the region, along with kauri which often grow in small clumps on steep sites. Other distinctive forest types are evident on the coast, such as manuka/kanuka shrublands found at Te Paki in the Far North. Volcanic broadleaf and alluvial flood forests are two types which have been severely diminished by land development. The coastal forest generally comprises pohutukawa, houpara and kowhai together with karaka, puriri and kohekohe. Kauri and podocarps occur in some coastal areas as does a transition to estuarine mangrove forest. The majority of these forested areas have been modified by human influences through logging and forest clearance.

These forest and shrubland areas support a rich diversity of wildlife. They are home to large populations of nationally rare or declining species such as the North Island Brown Kiwi, North Island Kokako, Native Pigeon or Kukupa and Hochstetter's frog, as well as small residual populations of more threatened species such as the red and yellow crowned parakeets, kaka and long and short tailed bats. Some forests in the region also support the only naturally breeding populations of species including flax snail, kauri snail and the Northland green gecko. Survival of these and other species is threatened by adverse effects of human activity such as forest clearance, the activities of animal pests (e.g. possums, wild cats, and poorly controlled domestic dogs) and plant pests.

2.5.3 Coastal

The west coast of Northland is exposed to almost continuous onshore oceanic swells that cause turbulence, turbidity and sediment movement in shallow marine and intertidal habitats. Marine species occupying this type of environment are consequently few and hardy.

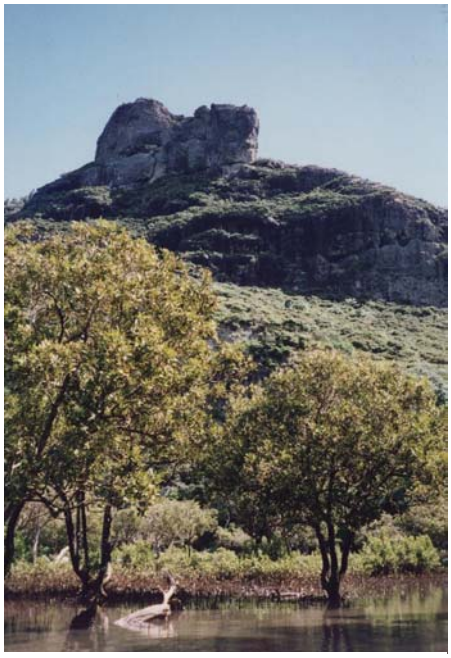
Cape Maria van Diemen

Beach and dunefield habitats are significant in several respects. 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.

Harbours and estuaries within drowned river valleys are common along the east coast of Northland. Most are ecologically similar to those on the west coast, but Parengarenga, Houhora and Rangaunu Harbours differ in having large intertidal sand flats and shell banks.

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



Whangaroa Harbour

The east coast of Northland is predominantly rocky with intervening sandy beaches. Marine habitats containing locally endemic species and New Zealand endemics that are very rare elsewhere are present at the Three Kings Islands and in the Cape Reinga area. These areas and also 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.

Indigenous, terrestrial coastal 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.

2.6 Water Resources

2.6.1 Rivers and Streams

Northland has a dense network of rivers and streams, many of which are relatively short, and with small catchments. Most of the major rivers have their outlets into harbours, few have outlets discharging directly to the open coast. This has significant implications for coastal water quality. Flows in the rivers vary considerably with rainfall, high intensity storm rainfall causing flash floods and prolonged dry spells leading to very little flow in many smaller catchments.

Punakitere River

2.6.2 Lakes

The Northland region has a large number of small and generally shallow lakes. They were formed either by dune activity, volcanic activity or are artificially made.

The dune lakes are in four main groups situated on the Aupouri Peninsula, Karikari Peninsula, Kai Iwi lakes and Pouto Peninsula. They generally range in size between 5 and 35 hectares and are usually less than 15 metres deep. Lake Taharoa of the Kai Iwi group is one of the largest and deepest in the country, covering an area of 237ha and being 37 metres deep. These lakes usually have little or no continuous surface inflows or outflows being fed primarily by direct rainfall or from surrounding wetlands. As a result, water levels fluctuate considerably with climatic patterns. Because the lakes are relatively small and shallow they have limited capacity to assimilate any contaminants. They are prone to nutrient enrichment from stock and fertiliser particularly where lakeside vegetation has been grazed or removed and where there is direct stock access to the lake.

Lakes Omapere and Owhareiti near Kaikohe were formed by lava flows damming the valleys.

Further to the north are two large artificially made lakes associated with the Kerikeri irrigation scheme, which are a major water resource for that area.

2.6.3 Groundwater

Groundwater is water running through and stored in soil and rocks. It is a valuable water resource to Northland, being utilised for numerous town and rural water supplies, irrigation and stock water. Whangarei, Kaitaia, Mangonui, Kaikohe, Okaihau, Maungakaramea and Ruawai all take groundwater for community water supplies. Groundwater is also an important water source for many coastal areas, such as Russell, Taipa and Matapouri.

In general there are three main types of water-bearing geological formations (aquifers). These are:

- **Sands and gravels** which are found along both coasts. Old coastal dune formations, where they are thick and extensive such as on the Aupouri Peninsula, can yield large quantities of water. Smaller, shallower areas such as those behind east coast beaches like Taipa and Matapouri also provide sufficient quantities of water for small scale community and individual domestic supplies.

- **Volcanic cones and related lava flows** are younger features, which occur particularly around Kaikohe and Whangarei, yielding significant quantities of water capable of supplying smaller towns and intensive horticultural and farming areas.

- **Sedimentary rocks** such as greywacke and crystalline limestone. Significant quantities of water can be obtained from weathered and/or fractured greywacke, such as at Russell, or from crystalline limestone, such as at Hikurangi.

- **Geothermal fields** represent an unusual variation in which water is subject to heat and pressure as a result of geothermal activity. Northland has one geothermal field centred on Ngawha Springs to the east of Kaikohe. It is different from most other fields in the country in that a relatively thick (500m) impermeable caprock covers the geothermal reservoir preventing the formation of major surface hot springs. The surface of the Ngawha geothermal field is characterised by small gas and hot water seepages and springs.

  These surface emissions have considerable cultural and spiritual value to tangata whenua and are used for bathing by local residents and visitors, some for therapeutic purposes.

  Under the Resource Management Act, geothermal resources are treated in similar manner to other water resources. The Regional Council is given primary responsibility for controlling the taking or use of geothermal fluids including geothermal energy. It is also responsible for controlling any discharges of contaminants that may result from the use of geothermal fluids.

2.7 Coastal Marine Waters

Northland's most distinctive physical feature is its long and varied coastline, with 1700 kilometres of rugged cliffs, sandy beaches and sheltered harbours.

Ngunguru Estuary

The east coast, bounded by the Pacific Ocean, is characterised by enclosed mangrove-lined harbours and estuaries, rocky headlands and sheltered bays. Offshore islands, including those in the Bay of Islands, the Cavalli Islands and the world-renowned Poor Knights Islands offshore from Tutukaka Harbour, are a distinctive feature. The east coast is sheltered from the prevailing westerly winds, but 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 shallow harbours. It is more exposed to the elements than the east coast, with long sandy beaches swept by oceanic swells from the Tasman Sea.

2.8 Population

The Northland region is home to about 137,000 people, which represents 3.8 percent of the population of New Zealand (Statistics New Zealand, 1999). There are some 30 townships with populations of more than 500 people. The largest centre is the city of Whangarei with a population of just over 45,000. Other major centres include Kaitaia (5200), Taipa-Mangonui (1600), Kerikeri (2600), Paihia (2900), Kawakawa (1500), Kaikohe (4000), and Dargaville (4800). The population is generally concentrated along the region's east coast, particularly in the Whangarei and Bay of Islands areas.

Between the 1986 and 1996 Censuses, Northland's population increased by 14,220 people (Statistics New Zealand, 1999). Most of the increase has been in the last five years with the population rising by 8.1 percent. This is higher than the national increase of 7.2 percent over the same interval.

Whangarei City viewed from Mount Parahaki

Northland is the least urbanised region in New Zealand (Statistics New Zealand, 1999). Only 52 percent lived in urban areas in 1996. Over the last 10 years Northland's usually resident population has become increasingly rural. There were 45 percent of people living in rural areas in 1986, compared with 48 percent 10 years later. The fastest growth has been in the Far North district which has a large rural population base. The growth can partly be explained by the high population of Maori in the area (Maori generally have higher birth rates) and the return of Maori to ancestral lands.

At the 1996 Census, 32.3 percent of the population were Maori, compared with 15.1 percent nationally. European ethnicities made up 78.8 percent of the population, below the national 83.1 percent. Some ethnicities, such as those associated with the Pacific Islands, are under-represented in the population. This can be related to the fact that as Northland has many rural settlements, overseas immigrants who traditionally settle in urbanised areas have not made an impact on Northland's population. However, in the early years of New Zealand settlement, a significant number of Dalmatian settlers chose to settle in Northland for kauri gum digging. Even today, the influence of Dalmatians is reflected in the family names and the settlement of Dargaville.