SIGNIFICANT INDIGENOUS VEGETATION AND HABITATS OF THE FAR NORTH DISTRICT - VOLUME 1

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SIGNIFICANT INDIGENOUS VEGETATION AND HABITATS OF THE FAR NORTH DISTRICT – VOLUME 1

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CONTENTS

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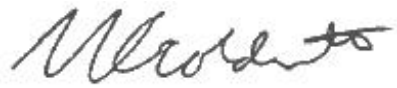

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Nick Goldwater
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1. INTRODUCTION

District Councils are required under Section (6c) of the Resource Management Act 1991 to identify and provide for "the protection of areas of significant indigenous vegetation and significant habitats of indigenous fauna" on land under their administration. The Far North District Council is reviewing its operative District Plan. In undertaking the review, the Far North District Council (FNDC) and other Territorial Authorities in the region (Kaipara District Council (KDC) and Whangarei District Council (WDC)) must give effect to the Northland Regional Policy Statement in their District Plans when identifying issues related to controlling the effects of land use and subdivision. In regards to this project, this relates specifically to the maintenance and protection of significant biodiversity.

To achieve this, the councils (FNDC, KDC and WDC) seek to identify and map areas of significant indigenous vegetation and significant habitats of indigenous fauna (Significant Natural Areas - SNAs) within their districts. Due to biodiversity management being a cross boundary issue, the councils have agreed to work collectively to address aspects of the RPS requirements. Once mapped, the councils are required to develop appropriate controls on activities within those areas to ensure their protection.

This report provides a review of Significant Natural Areas (SNAs) in the Far North District that have been mapped and described in reports prepared for the Protected Natural Areas Programme (PNAP) from 1990 to 2012. It also draws on natural areas identified and described in additional reports prepared by Wildland Consultants Ltd, including structure plans, forestry certication surveys, and land management for iwi (Te Roroa). The review updates ecological information for these sites, updates mapping of these sites onto 2017 aerial photographs, reporting on any reduction in area of any of these sites, and also includes identification and mapping of any new, or potentially new sites, and provision of site information sheets with summaries of key information for all existing and new sites.

The current report is intended to comprise a stand-alone report which will contain all known information on SNAs in the Far North District to negate the need to search previous SNA reviews and information sources.

2. METHODS

2.1 Review of significance criteria

Significance criteria in the Northland RPS, along with relevant sections of the RPS were reviewed relating to the assessment of ecologically significant sites, primarily relevant policies within regional policy statements and district plans. Guidelines for the application of significance criteria in identifying SNAs in other parts of the country were also reviewed. Wildland Consultants subsequently prepared a report that contained significance criteria and guidelines for the application of significance criteria for the Northland Region (Wildland Consultants 2019).

2.2 Collation of existing information to update site information

Readily available literature on the indigenous biodiversity of the Far North District was searched for, reviewed, and used to update site information and to ensure that information required for the significance assessments was utilised. This information gathering included internet searches, review of relevant Wildland Consultants Limited reports, and review of relevant Regional and District Council publications. The information sources are cited in the 'References' section and include:

- The Northland Regional Policy Statement.
- Databases of records of herpetofauna and threatened plants (Department of Conservation Bioweb).
- Threatened Environment Classification GIS layer (LENZ Level 4).
- Queen Elizabeth II Open Space Covenant GIS layer.
- Heathlands (potential and confirmed) GIS layer and report (Wildland Consultants 2017a).
- China Forest natural areas GIS layer and report (Wildland Consultants 2017b).
- Rayonier Forest natural area GIS layer and report (Wildand Consultants 2009).
- Northland Biodiversity Rankings GIS layer.
- Structure plants for Doubtless Bay, Kerikeri-Waipapa, and Waitangi - GIS layers and reports (Wildland Consultants 2008, 2009a and 2009b).

Personal knowledge of the ecologists working on the project was also utilised for relevant sites.

2.3 Site assessments

A site assessment sheet was prepared for each site using the information available. The site sheets include information on the ecological values of the site and likely threats to the site. An example site sheet with definitions of the headings is presented below (Table 1).

At the top of each sheet, information is provided on the protection status, extent of the site, altitudinal range, and Ecological District. Following this, there is a table which lists descriptions of vegetation and habitat types, and landforms present at the site. Records of nationally Threatened, At Risk, or regionally uncommon plant species or features of vegetation present at the site are presented in the "flora" section of the main table on the site sheets. There are similar sections for "fauna", threats or pressures that the site may be subject to, and additional notes/comments. Each site sheet also includes an assessment of ecological significance.

Table 1: Example site information sheet with definition of each heading.

SITE NAME

Site Number:	Number of site, as shown on GIS layer and site map in 2019.
Protection Status:	Protected (type of protection, e.g. Department of Conservation, Ngā Whenua Rāhui kawenata, and QEII covenant) and/or unprotected.
Area (ha):	Total extent of site in hectares.
Altitude Range (m):	Range of altitude within the site, in metres above sea level, from the lowest to highest point.
Ecological District:	Ecological District which the site occurs in. If a site is in multiple ecological districts, then all of the ecological districts which the site occurs in are listed.

VEGETATION TYPE	**LANDFORM**
Vegetation types as determined from existing information or aerial photographs	Landform as determined from existing information or aerial photographs
(Reference to sources used for vegetation types)	

Flora:	Key botanical features of the site. Notes on threatened or uncommon plant species which are present or have been recorded at the site. In some cases, dated records are included in this section as an indication of what has been recorded at the site previously. The text has been composed in a way which indicates whether the species are likely to remain present or not, or if this is unknown.
Fauna:	Notes on threatened or uncommon animal species which are present or have been recorded at the site. In some cases, dated records are included in this section as an indication of what has been recorded at the site previously. The text has been composed in a way which indicates whether the species are likely to remain present or not, or if this is unknown.
Notes/Comments:	Additional notes about the site.
Significant:	Yes, or Possible, based on the assessment against the criteria), as justified below.
Significance Assessment:	**Criteria Met** / **Justification** Number of criterion / An explanation of the reason/(s) why the site meets this criterion. Number of criterion / An explanation of the reason/(s) why the site meets this criterion.
Threats/Modifications/ Vulnerability (desktop assessment):	Threats which have been recorded at the site or are likely to threaten the ecological values of the site.
References:	References about the site and/or records from the site. Species threat classifications are not listed here because they are provided in the main report.
Assessment for Significance Based On:	Sources of information used to make the significance assessment.
Boundary Changes Since 1999:	Information on changes in the site boundaries since 1999, which have been observed based on comparison of 2017 aerial photographs.

National-level threat classifications which were used are as follows:

- Robertson *et al.* (2017), for avifauna.
- Dunn *et al.* (2018), for freshwater fish.
- de Lange *et al.* (2018), for vascular plants.
- O'Donnell *et al.* (2010), for bats.
- Hitchmough *et al.* (2016), for herpetofauna.
- Mahlfeld *et al.* (2012), for terrestrial snails and slugs (Gastropoda).

Site maps are presented with each site sheet in Volumes 2-4 of this report, categorised by ecological district. Within each of these sections, sites are presented by site number in ascending order.

2.4 GIS assessment and site mapping

The boundaries of each sites that were digitised were remapped at a scale of 1:5,000 on ArcGIS Desktop 10.7 using the 2017 aerial photographs (with protected area boundaries imported from the Department of Conservation, Ngā Whenua Rāhui, and QEII covenant GIS layers). During the remapping, the boundaries of these sites were adjusted to 1:5,000 scale as required, based on the higher quality photographs which in many cases enabled better definition of sites than the previous aerial photographs.

Paper roads and river parcels which are within Department of Conservation administered areas were included in the protected sites where they appeared to meet the significance criteria.

Areas which did not obviously meet the significance criteria (such as exotic plantation forestry, residential dwellings, and pasture) were excluded from the sites.

Unprotected areas that are contiguous with Department of Conservation administered sites or QEII covenants were included with the protected site if they appeared to have similar vegetation and habitat types. An explanation of whether the site includes protected area(s) and/or unprotected areas was included on each site sheet.

Details about each site were captured in an attribute table. Fields in the attribute table are listed and defined in Table 2.

Table 2: Fields of the attribute table associated with each site.

Attribute	Definition
Date	Date of digital mapping (for future reference).
DIG_SCALE	Digitised scale, 1:5,000.
BASE_MAP	Base map. 2017 aerial photographs.
SiteName	Name (most appropriate name if site has had different names in the past).
SiteNumber	Unique identifier (Site No.). (Each site throughout the region has a unique number).
EcologicalDistrict	Ecological District which the site occurs in. If a site is in multiple ecological districts, all ecological districts the site occurs in are listed.
Area_HA	Area (hectares).
MIN- ALT	Minimum altitude of the site (metres above sea level, m asl).
MAX- ALT	Maximum altitude of the site (metres above sea level, m asl).
MEAN- ALT	Mean altitude of the site (metres above sea level, m asl).
ProtectionStatus	Protected, unprotected, or part protected.
ProtectionType	If protected, provides the type of protection. For example, Department of Conservation, Ngā Whenua Rāhui kawenata, or QEII covenant. If unprotected, NA.
FIELD_CHK_B	Field check required to confirm site boundaries. Yes or No.
FIELD_CHK_SB	Field check required to confirm significance and site boundaries. Yes or No.
Criterion_1a(I)	Y (Yes) or N (No), depending on whether criterion is met.
Criterion_1a(ii)	Y (Yes) or N (No), depending on whether criterion is met.
Criterion_1(a)iii	Y (Yes) or N (No), depending on whether criterion is met.
Criterion_1(b)	Y (Yes) or N (No), depending on whether criterion is met.
Criterion_1b(ii)	Y (Yes) or N (No), depending on whether criterion is met.
Criterion_2a(i)	Y (Yes) or N (No), depending on whether criterion is met.

Attribute	Definition
Criterion_2a(ii)	Y (Yes) or N (No), depending on whether criterion is met.
Criterion_2a(iii)	Y (Yes) or N (No), depending on whether criterion is met.
Criterion_2b	Y (Yes) or N (No), depending on whether criterion is met.
Criterion_2c(i)	Y (Yes) or N (No), depending on whether criterion is met.
Criterion_2c(ii)	Y (Yes) or N (No), depending on whether criterion is met.
Criterion_2d(i)	Y (Yes) or N (No), depending on whether criterion is met.
Criterion_2d(ii)	Y (Yes) or N (No), depending on whether criterion is met.
Criterion_2d(iii)	Y (Yes) or N (No), depending on whether criterion is met.
Criterion_2d(iv)	Y (Yes) or N (No), depending on whether criterion is met.
Criterion_3a(i)	Y (Yes) or N (No), depending on whether criterion is met.
Criterion_3a(ii)	Y (Yes) or N (No), depending on whether criterion is met.
Criterion_3b	Y (Yes) or N (No), depending on whether criterion is met.
Criterion_3c	Y (Yes) or N (No), depending on whether criterion is met.
Criterion_4a	Y (Yes) or N (No), depending on whether criterion is met.
Criterion_4b	Y (Yes) or N (No), depending on whether criterion is met.
Criterion_4c	Y (Yes) or N (No), depending on whether criterion is met.
NOTE	Other relevant information.

3. ECOLOGICAL CONTEXT - AN OVERVIEW

3.1 Overview

The Far North District covers *c*.668,984 hectares reaching from the most northern tip of New Zealand at Cape Reinga, south to Waipoua on the west coast, and just south of Paihia in the Bay of Islands on the east coast. Coastal environments are a significant feature of the district comprising large stretches of sandy beach at Ninety Mile Beach and extensive harbours and estuarine habitats at Hokianga and Kaimaumau.

Far North District is the best protected of the three Northland Districts with approximately 18.5[1] percent, comprising 879 sites within protected areas, including Department of Conservation estate, QEII covenants, and Ngā Whenua Rāhui Kawenata (Table 3). There are some large protected areas within Department of Conservation estate such as Waipoua Forest, Puketi Forest, Omahuta Forest, Herekino Forest and the northern tip of Aupouri Peninsula at Te Paki. These large protected areas are SNAs. In addition, there are 244 QEII covenants and 23 Ngā Whenua Rāhui Kawenata within the District.

Table 3: Number and size of protected areas within Far North District.

Protection Type	Number of Sites	Area (hectares)	Percent of District
Council Covenant	0	0	0
Department of Conservation	612	112,423.7	16.8
Ngā Rāhui Whenua Kawenata	23	6,597.9	1.0
QEII covenant	244	5,329.0	< 1
Total	**879**	**124,350.7**	**18.5**

[1] Note all numbers of sites and areas (hectares) given are interim and will be updated on completion of the desktop study of significant areas of the Northland Region, which is currently in progress.

3.1.1 Land cover

Landcover Database (LCDBv4.1) was accessed for the Far North District (Table 4). The predominant landcover (as per Land Cover Database v.4.1) within the district comprises 'High Producing Exotic Grassland' (*c.*251,285[1] hectares) followed by 'Indigenous Forest' (*c.*151,921 hectares) and 'Mānuka and/or Kānuka' (*c.*98,649hectares), and 'Exotic Forest' and 'Forest - Harvested' (*c.*105,083[1] hectares combined, Table). There are smaller areas of 'Broadleaved Indigenous Hardwoods', 'Low Producing Grassland', and 'Sand or Gravel'.

Table 4: Amount of different landcover types within Far North District.

Landcover Type	Area (hectares)	Percentage of District
Broadleaved Indigenous Hardwoods	12,745.18	1.74
Built-up Area (settlement)	3,032.03	0.41
Deciduous Hardwoods	960.18	0.13
Estuarine Open Water	15,553.47	2.13
Exotic Forest	88,341.99	12.07
Fernland	124.93	0.02
Flaxland	48.27	0.01
Forest - Harvested	16,804.82	2.30
Gorse and/or Broom	5,057.41	0.69
Gravel or Rock	9.57	<0.001
Herbaceous Freshwater Vegetation	6074.78	0.83
Herbaceous Saline Vegetation	2,343.13	0.32
High Producing Exotic Grassland	251,719.33	34.40
Indigenous Forest	151965.96	20.77
Lake or Pond	2,589.26	0.35
Landslide	7.34	<0.001
Low Producing Grassland	10,809.37	1.48
Mangrove	10,139.96	1.39
Mānuka and/or Kānuka	99,008.68	13.53
Matagouri or Grey Scrub	114.64	0.02
Mixed Exotic Shrubland	2,043.29	0.28
Orchard, Vineyard or Other Perennial Crop	3,325.88	0.45
River	291.53	0.04
Sand or Gravel	9,170.07	1.25
Short-rotation Cropland	613.36	0.08
Surface Mine or Dump	287.99	0.04
Transport Infrastructure	82.91	0.01
Urban Parkland/Open Space	668.63	0.09
Total	**693,934.96**	

3.1.2 Threatened land environments

The threatened land environment classification is used to provide information on the context of loss and protection of indigenous biodiversity components identified on the ground. In conjunction with site surveys, it enables the identification of places that are priorities for formal protection against clearance and/or incompatible land uses, and for ecological restoration to restore linkages, buffers and lost species. The

classification also provides a standardised national framework for assessment of biodiversity representativeness and protection (Cieraad *et al*. 2015). Remaining indigenous vegetation in the first two categories of the classification (land environments with less than 20% indigenous cover remaining) has been identifed in national conservation policy as a national priority for biodiversity protection on private land (MfE 2007).

Overall, the Far North District has more indigenous cover remaining than the other two Northland districts with almost thirty percent of Far North District occurring on 'Less Reduced and Better Protected' land environments (Table 5), which is slightly higher than the Northland Region as a whole (23.6 percent). Approximately 15.6 percent of Far North District in on 'Acutely Threatened' and 'Chronically Threatened' land environments. These areas are highly modified with less than 20 percent indigenous vegetation, and the vegetation that does remain is typically highly fragmented and often degraded.

Table 5: Threated Land Environments within Far North District

Category	Name	Criteria	Area of District (hectares)	Percent of District
1	Acutely Threatened	Less than 10 percent indigenous cover left	25,986.80	3.88
2	Chronically Threatened	10-20 percent indigenous cover left	78,435.40	11.72
3	At Risk	20-30 percent indigenous cover left	143,288.60	21.42
4	Critically Underprotected	Greater than 30 percent left and less than 10 percent protected	164,595.30	24.60
5	Underprotected	Greater than 30 percent left and 10-20 percent protected	56,849.70	8.50
6	Less Reduced and Better Protected	Greater than 30 percent left and greater than 20 percent protected	192,997.20	28.85
n/a	Unclassified	n/a	6,830.90	1.02

3.1.3 Fauna

There is currently no consolidated information on the significant fauna of Far North District available.

3.2 Ecological districts of Far North District

Far North District encompasses all or part of 13 cological districts (Table 6). The ecological district with the largest extent within FND is Aupouri, followed by Maungataniwha. The Ecological District with the smallest extent within FND is Whāngārei, which covers only 750 hectares.

Table 6: Ecological Districts within Far North District.

Ecological District	Area (hectares) of ED	Area (hectares) of ED Within FND	Percent of ED Within FND
Ahipara	32,358	32,358	100
Aupouri	119,303	101,012	85
Hokianga	88,085	75,930	86
Kaikohe	67,197	67,025	100
Kerikeri	65,859	65,859	100
Maungataniwha	98,170	98,170	100
Puketi	24,493	24,493	100
Tangihua	166,875	63,561	38
Te Paki	30,909	30,622	99
Tutamoe	81,658	38,297	47
Whāngārei	81,291	750	1
Whangaroa	30,895	30,912	100
Whangaruru	116,329	39,930	34
Total	**1,524,750**	**668,984**	

4. INFORMATION ON EACH ECOLOGICAL DISTRICT

4.1 Overview

The following information is presented for each Ecological District in Sections 4.2-4.14:

- Background information and overview.
- Geology, physiography, and soils.
- Landform units or land systems.
- Vegetation (historic and present).
- Fauna (where information is available).

4.2 Ahipara Ecological District

(adapted from Conning 1998)

4.2.1 Overview

The Ahipara Ecological District covers *c*.32,358 hectares and is located west and south of Kaitaia and runs from Tauroa Head in the north to Matihetihe in the south, taking in all of Warawara and Herekino forests. It adjoins the Aupouri Ecological Region to the north and Maungataniwha and Hokianga Ecological Districts to the east and south.

The ecological district is characterised by volcanic massifs with steep escarpments and gullies, and an extensive wild coastline. There is a high diversity of vegetation types and plant species, including some nationally rare ecosystems such as gumlands, dunelands and mature kauri forests, which provide the district with its distinctiveness. Broadleaved species-podocarp forest and mānuka shrubland are the most common vegetation types.

Much of Ahipara Ecological District is in a natural or semi-natural state, with large areas of indigenous vegetation cover including tall, old-growth forest containing mature kauri stands, broadleaved species-podocarp and coastal broadleaved species forests, gumland shrubland, and coastal riparian vegetation. Of the natural areas identified by Conning (1998), 71 percent is covered in forest, 22.3 percent in shrubland, 5.6 percent in duneland, and less than one percent in wetland.

The western part of the ecological district is characterised by dunelands and coastal shrublands and forest. Although some of the valleys and adjoining coastal hills are grazed or reverting from pasture, the coastal margin from Tauroa Head to Mitimiti is a wild, semi-natural area with pockets and gullies of coastal forest and coastal riparian vegetation, with threatened plants present at several sites. The coastal margin also provides a habitat for a large number of bird species, including the threatened New Zealand dotterel.

Another distinctive area is the Ahipara Massif, where the combination of landform, gumland soils, vegetation, size and relative lack of development result in a semi-wilderness. This area has one of the highest densities of fernbird in the Western Northland Ecological Region and also provides habitat for several threatened plant species.

Whilst forested areas have been exploited in the past, particularly for timber or for farming, large areas have been retained in the Herekino and Warawara Forests. Regeneration on the margins is vigorous, and these areas are of great value because of their size and diversity.

4.2.2 Vegetation

Historic

Prior to human settlement, much of the district was dominated by kauri (*Agathis australis*) forest (Clunie & Wardle 1983).

Present Day

Very little of the original forest cover persists, partly through natural changes over time, with the soils on the Ahipara plateau becoming podzolised and the formation of a hard pan preventing kauri peg roots from penetrating, and resulting in stunted forest. There is evidence that this area has experienced fire for many thousands of years, and it has been repeatedly burned since human occupation. The area now comprises infertile, poorly-drained soils, and supports acid-tolerant species. Repeated burning has favoured fire-spread exotic species such as gorse (*Ulex europaeus*) and prickly hakea (*Hakea sericea*).

Human intervention has also resulted in the clearance of forest elsewhere in the district and once extensive coastal forest is now restricted to a few gullies and headlands. Coastal lagoons, wetlands, and seeps have been irreversibly modified by grazing and land development and very few remain.

Currently, there is a distinct coastal gradient in vegetation and habitats, with sequences of varying continuity from rocky coastline, sandy beaches and dunes, through coastal shrubland and forest, to gumland vegetation of the Ahipara Massif. At Warawara, the coastal sequence merges into mixed kauri-broadleaved species-podocarp forest and mature kauri forest.

Spinifex (*Spinifex sericeus*) and coastal toetoe (*Austroderia splendens*) are the most common coastal plant species on the dunelands along with mānuka (*Leptospermum scoparium*) shrublands. The coastal shrub *Olearia albida*, which does not seem to be present more than a few kilometres from the coast, is conspicuous in more consolidated areas. A notable coastal feature is the absence of pōhutukawa (*Metrosideros excelsa*).

An altitudinal gradient is also apparent. Much of the district lies between 100 and 300 metres above sea level (a.s.l.), with most of Herekino Forest being above 200 metres and Warawara mostly above 300 metres.

In the forests, taraire (*Beilschmiedia tarairi*) is generally the dominant tree species at lower altitudes. An altitudinal change occurs above about 300 metres above sea level, where tōwai (*Weinmannia silvicola*) becomes the dominant canopy species; taraire becomes uncommon or rare, and tawa (*Beilschmiedia tawa*) becomes more abundant.

At about 600 metres above sea level, pūriri (*Vitex lucens*) and taraire are absent and the canopy is dominated by tōwai, tawa, tāwheowheo (*Quintinia serrata*) and tāwari (*Ixerba brexioides*).

4.3 Aupouri Ecological District

(adapted from Conning and Holland 2003)

4.3.1 Overview

The Aupouri Ecological District covers *c*.119,903 hectares (including the Parengarenga, Houhora, and Rangaunu Harbours, which a combined area of 18,168 hectares). It is one of the most distinctive ecological districts in New Zealand due to its topography, particularly the length of coastline relative to land area, the large number of dune lakes and wetlands, three of New Zealand's least modified harbours, and the dominance of sand peninsulas.

Although wetlands and dune lakes occur frequently in this ecological district, nationally they are uncommon and diminishing habitat types and, together with dunefields, are poorly represented in the existing protected areas network. These areas continue to be modified or lost due to land development practices or contain species which cannot tolerate environmental change or adapt to other habitat types (e.g. acid-loving orchids of peat bogs). Wetland species are particularly susceptible to changes in groundwater hydrology, and several sites reveal a trend of becoming drier since the Department of Conservation's survey of freshwater wetlands in 1991.

A conspicuous plant species is the indigenous hemi-parasitic vine, māwhai (*Cassytha paniculata*), commonly seen sprawling across large areas of kānuka and mānuka shrubland in both this and the adjoining Te Paki Ecological District.

4.3.2 Vegetation

Historic

The large tombolo which comprises the Aupouri Peninsula is a dynamic system which has gone through many cycles of sand dunes and forest over thousands of years, and been subject to climate change and sea level rise and fall. At the end of the Ice Age, between 20,000 and 4,000 years ago, the sea level rose to a peak of about two metres above its present level, until about 1,000 years ago. When the tombolo was at its greatest extent, inland kauri forest developed (Sale 1985).

Ancient (30,000-40,000 year old) kauri logs in Lake Ohia, extensive gumdigging, and pollen samples of rimu (*Dacrydium cupressinum*), beech (*Nothofagus* sp.), bog pine (*Halocarpus bidwillii*), kahikatea (*Dacrycarpus dacrydioides*), and kauri indicate the former presence of kauri-podocarp forests.

As most of the bird remains have been found in pre-human deposits, but not in middens, it is thought that the forest may have retreated somewhat by the time humans arrived, although there is archaeological evidence that the early Māori found food and shelter in forest at least until the last few hundred years (Coster 1983).

However, human settlement interrupted the natural sequence of sand accretion and the spread and retreat of vegetation. Sale (1985) explains that:

> …the most significant change in the environment say 1000 years ago was not in climate…but the effect of the arrival in New Zealand of the major tide of human settlement…fire - deliberate, accidental or spontaneous - now became the major factor not only in completing the destruction of the natural forest but in rendering its recovery ever less likely."

In 1770, Joseph Banks on the Endeavour described the land as "almost entirely occupied by vast sands" (Sale 1985).

Farming and gum-digging by European settlers saw increased burning of the vegetation, resulting in the present mobile dune system. Four major fires have been recorded at Kaimaumau since the 1940s (Hicks *et al*. 2001). In 1963, there was a report of a fire lit by drovers which resulted in destruction of dune vegetation and scorching of several large pōhutukawa at Te Arai (Barnett 1985, p. 17). From the 1930s until that time, there were reports of sand drifts engulfing some pōhutukawa, karaka and dune lakes. Dunes were used as a winter run-off for horses and cattle (Sale 1985).

The planting of marram grass (*Ammophila arenaria*) and lupin (*Lupinus arboreus*) began in 1922, although large-scale development for exotic forestry did not get under way until 1960s. The conversion of the sandfields to pine forest or farmland is almost total. Today approximately 25 percent of the land area on the Aupouri Peninsula comprises exotic forest (NRC 1991). Wetlands have undergone a similar fate, of either total destruction or considerable reduction in extent. At the same time, exotic species, particularly pampas and Sydney golden wattle (*Acacia longifolia*) have aggressively invaded open habitats. The changes which have occurred in the last

50 years have significantly impeded the dynamics of this constantly changing pre-human habitat.

Present Day

There is no distinct coastal gradient, but many of the sites are coastal, adjacent to the coast, or linked to the coast either by contiguity of habitat or by watercourse, and the predominant substrate is sand. Indigenous forest is largely absent from this ecological district, although dunelands are common. The Aupouri Ecological District is the Northland stronghold for wire rush (*Empodisma minus*), a sedge that is common is alpine and lowland bogs throughout much of New Zealand and in parts of Australia. Another distinctive feature is the predominance of pest plant species.

Broad vegetationand habitat types present within the ecological district include:

- Sandfields.
- Coastal shrublands.
- Estuarine vegetation including mangrove scrub/forest and saltmarsh, saltmeadows, and seagrass beds.
- Freshwater wetlands including dune lakes, fertile wetlands, peat bogs, intermediate wetlands, and coastal turfs.
- Shrublands - predominantly kānuka and/or manuka.
- Coastal forest including pōhutukawa forest, either dominant or with various co-dominant species, kohekohe forest, kānuka forest, and kānuka-pūriri forest.
- Inland broadleaved species forest including kohekohe-pūriri-taraire forest, pūriri forest, pūriri-taraire, and pūriri-karaka forest.
- Podocarp-broadleaved forest including kahikatea-kānuka forest and kahikatea forest.

Several distinctive vegetation types occur on islands including:

- Grasslands, including buffalo grass, *Zoysia pauciflora* and *Poa pusilla*.
- Herbfields, including indigenous iceplant, glasswort, and Cook's scurvy grass.
- Sedgeland - giant umbrella sedge sedgeland.
- Shrubland including taupata shrubland, mixed indigenous shrubland with taupata, *Melicytus novae-zelandiae, Coprosma macrocarpa*, tī kōuka, hangehange, pōhuehue, harakeke, toetoe, bracken, sedges, and sometimes kanuka.
- Karo scrub.
- Pōhuehue vineland.
- Harakeke flaxland.
- Tawapou forest.

4.4 Hokianga Ecological District

(adapted from Conning *et al.* 2004)

4.4.1 Overview

The Hokianga Ecological District covers approximately 86,000 hectares encompassing the Hokianga Harbour, Whangape and Herekino Harbours and surrounding lands. North of the Hokianga Harbour, the boundary of the ecological district follows the inland edge of the Warawara Range, taking in the coastal dune system of Hokianga North Head to Pawarenga, then the inland edge of the Warawara Range, and then a path east of the coastal hills between the Whangape and Herekino Harbours. To the northeast, the boundary of the ecological district borders the southern boundary of Herekino Forest to just south of Diggers Valley before skirting southwest of the Maungataniwha Range through Broadwood, Mangamuka and Umawera to the hill country of Rangiahua in the east. South of the Hokianga Harbour, the eastern boundary follows the Punakitere-Waima River system as far south as Three Bridges then turns west to follow the northern edge of the Waima/Mataraua Range to rejoin the harbour at Pakanae.

Hokianga adjoins six other ecological districts: Ahipara to the northwest, Maungataniwha to the north, Puketi in the northeast, Kaikohe to the southeast, Tangihua in the far southeast, and Tutamoe to the southwest.

The Hokianga Ecological District is characterised by low, broken hill country with fragmented forest remnants and regenerating shrublands and forests; there is an apparent absence of any definitive ecological gradients in the terrestrial habitats, and much of the vegetation is characterised by a mosaic of canopy species. Of the natural areas identified, 29.5 percent are covered in forest, 19 percent in shrubland, three percent in duneland, and 48.6 percent in wetlands including harbours (0.9 percent excluding harbours). Conning *et al.* (2003) recorded 26,100 hectares (including harbours), or 13,629 hectares (excluding harbours), of natural areas in the district.

Natural features of particular note in the Hokianga Ecological District are:

- The large west coast harbour systems of Hokianga, Whangape, and Herekino, which cover approximately 14.5 percent of the ecological district. The Hokianga Harbour, which is the fourth largest harbour in New Zealand, and habitat for a large number of indigenous species, some of which are threatened, is especially significant.

- Rare low-lying swamp forest/swamp shrubland habitats which have suffered the most of any habitat type from past drainage and reclamation. Since the survey of Conning *et al.* (2003), one of the few remaining areas of this type of coastal marginal zone was partly destroyed at Rangiahua. The harbours hold some of the last remaining examples of these uncommon associations.

- A 2,130 hectare forest to the north of the Waima Range (Classens/Duddys Bush), which is the largest contiguous area of forest in this ecological district, performing upper catchment and water quality protection and providing habitat for threatened species such as North Island brown kiwi (*Apteryx mantelli*) and regionally significant plants like stinging nettle (*Urtica incisa*).

- Tapuwae Forest and its outliers (1,174 hectares), which form the second largest forest remnants found within the ecological district and contain one of the best examples of unmodified old-growth forest in Northland remaining outside of the large forest tracts.

- Motuti and Te Karaka Point Coastal Forest where a strong coastal influence is evident, pōhutukawa, karaka, nīkau (*Rhopalostylis sapida*), and kōwhai (*Sophora chathamica*) appear as canopy species, and some uncommon coastal plants are found in the understorey.

- A raupō-dominated freshwater wetland at Lower Waihou, which is one of the few examples of this ecosystem type left within the ecological district. It is a good representative example of a rare and threatened habitat type and supports large numbers of the nationally threatened spotless crake.

- Habitats of North Island brown kiwi, including most of the larger sites, as well as many of the remnant forests and shrublands, throughout the ecological district.

4.4.2 Vegetation

Historic

Prior to human settlement, most of Hokianga Ecological District was forested, apart from the huge dunes on the northern side of the harbour entrance and extensive wetlands on the harbour margins.

Some of the earliest European visitors noted that kauri abounded "as far as my eye could reach" (Ensign McCrea from the *Dromedary* in 1820 (Sale 1978)). A later party recorded "the lofty and luxuriant cowry grows in great profusion close to the water's edge" (Sale 1978).

In 1851, Jolliffe, surgeon on the ship *Pandora*, wrote

> the greater part of the low ground and the hills invariably are all most thickly covered with almost impenetrable forests of fine timber trees particularly the "kauri" and other Pines [rimu and kahikatea]; here and there are cleared patches of land well planted by the natives with corn, potatoes, taro, onions and many other useful vegetables (Lee 1987)

Heavy growth of kauri grew close to the Mangamuka, Orira and Waima Rivers (Lee 1987).

Harakeke (*Phormium tenax*) was common in the wetlands.

Present Day

Today few large tracts of forest remain, representing fragmented remnants of the former extensive woodlands. However, the remaining forest remnants fulfil a collectively significant role by providing 'stepping stones' or partial linkages between the large forest tracts, e.g. between Herekino Forest in Ahipara Ecological District and Raetea Forest in the Maungataniwha Ecological District. In the Broadwood area, there are numerous sites in close proximity creating linkages from Raetea Forest to Warawara Forest in the Ahipara Ecological District; other linkages occur from Tapuwae through Mangamuka to Puketi, and from Mataraua, east into Tangihua and Kaikohe Ecological Districts.

A feature of the ecological district is the persistence of the emergent structure in many of the forests remaining, in comparison with that remaining in other ecological districts in the Far North. Research efforts over the last decade (O'Donnell and Dilks 1987; Spurr *et al*. 1992; Warburton *et al*. 1992) have clearly indicated the importance of large, old, emergent trees, especially rimu, to a variety of bird species. Bat species show a preference for old podocarps, kauri, and beech for roosts (O'Donnell 2001). As most of the forests in Northland have been heavily logged, especially for emergent podocarp and kauri, any remaining large trees assume an even greater ecological importance. Several of the sites identified by Conning *et al.* (2003) are characterised by emergent trees, which contributes considerably to their ecological significance.

Kahikatea is more conspicuous in Hokianga Ecological District than in adjacent ecological districts, especially those in Eastern Northland, and kauri is less common.

Freshwater wetlands are rare. Significant areas of mangrove forest, tidal flats and coastline have also been lost or modified through stop-banking, clearance and grazing. For example, approximately 27 percent of the Hokianga Harbour's intertidal zone has been lost to reclamation, while the vegetated intertidal zone has been reduced by 45 percent (Chapman 1978). A noticeable feature of the ecological district is the small number of wetlands outside of the margins of the harbours.

Much of the remaining habitat in the Hokianga Ecological District comprises secondary shrubland and forests on steep, dissected hillsides, uneconomical for production, but which was extensively cleared in the heyday of agricultural subsidies.

However, the dominating feature of the ecological district is the Hokianga Harbour itself, New Zealand's fourth largest harbour, and the associated wetlands, riparian forests and shrublands adjacent to it, which reflect a coastal influence, and are of great ecological importance.

There are also very few records of plant species that are threatened or regionally significant compared to adjacent ecological districts.

4.5 Kaikohe Ecological District

(adapted from Conning and Miller 2000)

4.5.1 Overview

The Kaikohe Ecological District covers 62,800 hectares to the south of Puketi Forest, with Lake Omapere located roughly in its centre. It stretches from the Waima River in the west to Pakaraka in the east, and includes the upper catchments of the Waitangi River. In the south, it includes the Punakitere Valley to Lake Tauanui. The underlying geology comprises Mangakahia Complex sedimentary and basaltic volcanic rock.

To the south and east of Lake Omapere, volcanic cones and basalt lava flows have produced some of the best examples of volcanic broadleaved species forest in the Northland Region, which are important for the sustenance of kūkupa/kererū (Hemiphaga novae-zelandiae), as well as for their representative values.

Where water flow has been impeded, remnants of swamp forest and wetland can sometimes be found.

The geothermal and gumland heaths of Ngawha Springs are unique within the Northland Region, as are several of the volcanic broadleaved species forest remnants on the eastern side of the ecological district.

In the west, Pukewharariki Forest and its associated outliers contain some of the best examples of mixed kauri-podocarp-broadleaved species forest remaining in private ownership in Northland. Other forest remnants and exotic plantations form large contiguous mosaics.

Kaikohe Ecological District is one of Northland's strongholds for North Island brown kiwi.

Of the 13,790 hectares of natural areas identified, 51 percent are covered in forest, 34 percent in shrubland, 1.5 percent in swamp forest and swamp shrubland, 3.5 percent in wetland, and 10 percent in lakes or open water.

4.5.2 Vegetation

Historic

The gumland vegetation at Ngawha formerly supported kauri forest, destroyed by fires hundreds of years before European settlement, with small swampy areas of sedge and fern (Clunie 1983).

It is likely that kauri was also dominant on the present gumlands at Aratoro and Punakitere.

Broadleaved species forest formerly covered the volcanic flats east of Lake Omapere, with swamp forest on low-lying land.

The hill country in the west of the ecological district was forested with mature kauri "as far as my eye could reach" near the shores of the Hokianga Harbour (Ensign McCrea from the sailing ship *Dromedary* in 1820, as recorded in Sale 1978).

Present Day

In the west of the ecological district, regenerating shrublands cover broken hill country, with pockets of broadleaved species-podocarp forest occurring in gullies, and kauri on higher ground.

Remnants of broadleaved species-podocarp forest occur on volcanic soils east of Lake Omapere, and mānuka and sedges (Cyperaceae) dominate the gumlands south of Kaikohe. Significant wetlands remain south and east of Kaikohe.

The volcanic broadleaved species forest, with its combination of pūriri and taraire, is preferred by the threatened kūkupa, and supports dense kūkupa populations, having a sustained fruiting potential. The two species collectively contribute over 75 percent of the observed kūkupa diet in winter (taraire), spring (both) and summer (pūriri) (Pierce and Graham 1995).

Broad vegetation types recorded by Conning and Miller (2001) in Kaikohe Ecological District are:

- Shrublands, predominantly mānuka and/or kānuka occasionally with co-dominants such as māhoe, bracken, māmāngi, and tōwai.
- Gumlands.
- Broadleaved forest including mānuka-kānuka forest, taraire forest, taraire-karaka forest, taraire-pūriri forest, taraire-pūriri-tōwai forest, tōwai-tawa forest, kōwhai forest with various co-dominants (pūriri and kānuka), tītoki forest with other co-dominants.
- Broadleaved-podocarp forest including mānuka-kānuka-tōtara forest, mānuka-kānuka-tānekaha forest, mānuka-kānuka-tōwai forest, mānuka-kānuka-tōtara-kahikatea forest, taraire-tōtara forest and taraire-kahikatea forest, tōtara-taraire-pūriri forest, tōwai-tōtara forest and tōwai-tānekaha forest.
- Podocarp forest including tōtara forest, kahikatea forest, kahikatea-tōtara forest, tānekaha forest.
- Kauri forest.
- Swamp shrubland and forest including mānuka shrubland, mānuka-*Coprosma propinqua* shrubland, manuka-kōhūhū-putaputawētā shrubland, manuka-cabbage tree-*Carex* sp. shrubland, mānuka-*Machaerina* sp. shrubland, kahikatea forest.
- Wetlands including raupō reedland, harakeke flaxland, mānuka-harakeke shrubland, *Machaerina* sp. sedgeland, *Juncus* rushland, *Eleocharis sphacelata* rushland, oioi sedgeland, *Carex* spp. Sedgeland, and crack willow treeland.

4.6 Kerikeri Ecological District

(adapted from Smale *et al.* 2009)

4.6.1 Overview

The Kerikeri Ecological District extends from Tauranga Bay in the north to Kawakawa, Otiria, and Opua in the south, extending inland as far as the eastern boundary of Puketi Forest (in Puketi Ecological District).

Kerikeri Ecological District adjoins the Whangaroa Ecological District to the north, the Kaikohe Ecological District to the west, and both the Tangihua and Whangaruru Ecological Districts to the south.

The Kerikeri Ecological District includes the offshore islands from Cone Rock (off the entrance to the Whangaroa Harbour) to Cape Wiwiki, and the inshore islands of the northern Bay of Islands and Kerikeri Inlet.

Natural areas cover approximately 21 percent of the ecological district. Of these, 31 percent are covered in forest, 52 percent in shrubland, seven percent in estuarine wetlands, four percent in freshwater wetlands, and 6 percent in island habitats. A high degree of fragmentation is a feature of many of the natural areas in the Kerikeri Ecological District.

The coastal influence is very apparent in the eastern part of the ecological district, with the most significant habitats being the islands (see below).

On the mainland, the most important habitats are sandy beaches where the threatened New Zealand dotterel (*Charaius obscurus*) breeds, and estuarine and shrubland sequences which provide habitat for matuku (Australasian bittern; *Botaurus poiciloptilus*), North Island fernbird (*Bowdleria punctata*), and in many of the shrubland areas, North Island brown kiwi. For example, the Te Puna Inlet is an important wildlife area—for waders in the saltmarsh areas, and kiwi in the coastal shrublands.

Kerikeri Ecological District has a considerable length of coastline, but it is hard to find any original coastal vegetation on the mainland. The coastal vegetation that remains has generally been severely modified, and is frequently dominated by exotic species. A tiny remnant of coastal forest near Poraenui Point illustrates what was originally present, whereas the majority of the coastal vegetation in the area (where it is not exotic weeds) consists of mānuka/kānuka, with scattered pōhutukawa and occasional pūriri and karaka. Protection and restoration of coastal vegetation is a high priority in Kerikeri Ecological District.

Although many areas of vegetation regenerating scrub are infested by pest plants, they provide habitat for some of the densest kiwi populations in Northland, especially on the Purerua Peninsula. North Island brown kiwi is a threatened species and Kerikeri Ecological District is now regarded as one of its strongholds.

Whilst mangroves (*Avicennia marina* subsp. *australasica*) are generally common in the upper inlet areas, the total area of saltmarsh in this ecological district is small.

Constructed ponds and associated wetlands are also a feature of the Purerua area, as well as numerous natural raupō (*Typha orientalis*) wetlands. These areas have high value as wildlife habitat.

Across the Kerikeri Inlet, the large wetland sequences and associated threatened species within the Waitangi Forest are unique. They are ponded lava flows and contain several wetland types and constitute one of the largest freshwater complexes in Northland.

Other features of Kerikeri Ecological District include a large flood-plain associated with the Kawakawa River, a unique gumland association surrounding the Kerikeri airport, and some large forested upper catchments in the west, which are also important for kiwi. Rivers, such as the Takou and Kerikeri, have much of their value arising from a high proportion of indigenous vegetation in the riparian zones of both the main river and tributaries.

4.6.2 Vegetation

Historic

In the past, much of Kerikeri Ecological District was dominated by broadleaved species-podocarp-kauri forest, which has been extensively cleared. Sale (1978) reports the east coast of Northland being heavily clad in kauri, especially on the ridges, but rarely coming down to the coast. Sale suggests that some of the early shipments of timber from the Bay of Islands were in fact kahikatea, which was more plentiful and in easier reach of the shore. Along the coast, broadleaved species forest including pōhutukawa occurred on cliffs and in valleys behind small sandy beaches. Inland, broadleaved species forest flourished on the volcanic soils.

The vegetative cover on the islands, e.g. Harakeke in the Cape Wiwiki Group, offers an insight into what the coastal belt may have once looked like.

Early botanists (e.g. Richard and Alan Cunningham) found the area floristically diverse, with the type locality of many species being from Kerikeri Ecological District.

Present Day

Possibly because all of Kerikeri Ecological District is at low altitude, there are no strong altitudinal gradients in vegetation present. Even the coastal influence is muted because of the degree of disturbance.

Broadleaved species forest is found primarily in river valleys and gullies, but this is considered to reflect previous disturbance—the Kerikeri area has been influenced by human settlement for hundreds of years, with colonists developing land for nearly 200 years.

The vegetation types identified by Smale *et al*. (2009) are summarised as follows:

- Coastal wetlands including saltmeadows with glasswort, *Selliera radicans*, sea primrose (*Samolus repens*), saltmarsh with sea rush (*Juncus kraussii*) and/or oioi, and mangrove forest and scrub.
- Freshwater wetlands including raupō reedland, *Machaerina articulata* reedland, *Machaerina* sp.-*Isolepis* sp.-*Juncus* sp. rushland, *Eleocharis sphacelata* rushland, *Epilobium* sp. herbfield, *Machaerina* sp.-*Isolepis* sp.-*Juncus* sp.-mānuka-*Coprosma tenuicaulis* shrubland, *Machaerina* sp.-*Juncus* sp.-*Carex* sp.-tī kōuka-*Coprosma propinqua* shrubland, mānuka-harakeke shrubland, *Machaerina* sp.-*Tetraria* gumland bog, and *Machaerina* sp.-mānuka-*Gleichenia* sp. bog.
- Coastal forest including pōhutukawa forest in varying forms with associations including kānuka, kohekohe, kōwhai, wharangi, whau, karo, ngaio, and taupata.
- Shrublands comprising predominantly mānuka shrubland, but also kānuka shrubland, tōwai shrubland, and māmāngi (*Coprosma arborea*) shrubland.
- Forests including kauri forest, tānekaha forest, taraire forest, taraire-tōwai forest, taraire-pūriri forest, taraire-tōwai-pūriri forest, taraire-tōtara forest, taraire-pūriri-tōtara forest, taraire-tōtara-tōwai forest, pūriri-kahikatea forest, pūriri-taraire-tōtara-kahikatea forest, and mānuka-kānuka forest.
- Podocarp forest including tōtara forest and rimu-tōtara-kahikatea forest.
- Fernlands including bracken fernland and mamaku treefernland.

4.7 Maungataniwha Ecological District

(adapted from Conning 2002)

4.7.1 Overview

The Maungataniwha Ecological District encompasses approximately 101,900 hectares extending east from Kaitaia and Herekino Forest to the southern boundary of Raetea Forest at Broadwood and the head of the Mangamuka River. East of Mangamuka, the southern boundary of the ecological district runs north of Omahuta and Puketi Forests extending almost to the Kaeo Valley, then runs north to the coast at Mangonui.

It adjoins the Aupouri Ecological Region to the north, the Ahipara and Hokianga Ecological Districts to the west, Puketi Ecological District to the south, and Whangaroa Ecological District to the east.

Maungataniwha Ecological District is distinctive for the high number of small fragmented remnants of natural forests and shrubland. Natural areas identified by Conning (2002) totalled 204, constituting approximately one-third of the district, of which 66 percent are forest, 31 percent shrubland, 2.5 percent estuarine and less than one percent wetland.

The ecological district is characterised by extensive linkages between areas of indigenous vegetation, especially in the southern part of the district (e.g. Paroanui, Oruru, Kohumaru, Te Ranga, and the Waihuka Valley). The Maungataniwha Range dominates the southern part of the ecological district, with contiguous vegetation extending east as far as Kenana, broken only by roads.

In the western part of the district, the habitats are much more fragmented, with numerous small remnants of bush. These remnants are mostly taraire-dominant, but pūriri and kahikatea are often common or frequent. On the alluvial flats there are a few very small stands of secondary kahikatea forest, in an area where much of the original vegetation cover was probably alluvial or swamp forest. Many of the other remnants are also small, and the vast majority were unfenced at the time of survey. Their long-term sustainability is doubtful. Even if fenced, many would need restoration and shelter planting to guarantee long-term survival.

However, small remnants in Maungataniwha Ecological District are currently fulfilling a significant and distinctive ecological function. North Island brown kiwi persist in a broad belt of fragmented sites across the district east from Kaitaia, and are found to be utilising sites of only a few hectares in size. Such remnants are also providing a food supply for indigenous birds, especially the kūkupa, which is particularly threatened in this district. Although individually small, the cumulative resource is substantial. Many of the larger remnants fulfil a dual role of protecting both ecological and soil and water values, as they are usually located in gullies or alongside watercourses.

The Maungataniwha Range contains most of the tall, mature, and in some parts largely unmodified forest in the ecological district. Northern rātā, rimu, and occasionally totara, kahikatea and kauri are emergent over tōwai (at higher altitudes) or taraire (lower altitudes), with frequent tawa, rewarewa (*Knightia excelsa*), and pūriri, and occasional kawaka (*Libocedrus plumosa*) and mataī (*Prumnopitys taxifolia*). Kohekohe (*Dysoxylum spectabile*), nīkau, and tree ferns are common in the understorey. Kauri is found throughout the ecological district, but generally occurs only as isolated trees within broadleaved species-podocarp forest. As kauri-dominant stands are limited in number, they are all significant.

Many of the large contiguous natural areas comprise mainly secondary forest and regenerating shrubland, with only small pockets of mature forest found within them. Mānuka and kānuka are the dominant species in regenerating areas, with tōwai dominant in wetter sites and at higher altitudes. The diversity of other canopy species present either in the canopy or as saplings and seedlings varies according to the frequency of previous clearance, proximity to suitable seed sources, and possibly the presence of large seed-dispersal agents (e.g. kūkupa). Very little secondary vegetation occurs within areas currently protected.

Apart from forming the early stages of future forests, these regenerating areas often provide habitat for the threatened North Island brown kiwi and the endemic Northland green gecko (*Naultinus grayii*), a species of limited distribution. Shrubland on gumland soils provides habitat for several species of indigenous ground orchids. These areas, as with many sites for which there is little information, require further

detailed survey. It is highly likely that further sites containing threatened species or species of limited distribution or other scientific interest will be found.

4.7.2 Vegetation

Historic

In the past, much of Maungataniwha Ecological District was dominated by broadleaved species-podocarp-kauri forest which, apart from the central area of the Maungataniwha Range, has been extensively logged, particularly for podocarps, and to a lesser extent pūriri (used extensively for fence posts) and kauri.

On the lowland flats near Kaitaia there was extensive kahikatea-dominant swamp forest, with broadleaved species forest on the drier land. These forests contained a wide diversity of divaricating plants in the understorey. Many of the inland river valleys also contained extensive swamp forest and wetland systems. Along the drier eastern coast, coastal broadleaved species forest occurred on consolidated sands.

The podzolised marine terraces south of Awanui and gumland between Oruru and Peria may have once held extensive kauri forests, but outside of this area, it is likely that kauri was less abundant in this ecological district than in many other parts of Northland. Kauri was more prevalent in the south-eastern part of the ecological district, with Kaingaroa being the most northerly of the kauri timber mills (Sale 1978).

Areas of human settlement have a long history of vegetation disturbance. By the time of European settlement, extensive areas were covered in mānuka-kānuka shrubland or bracken fern, probably as a result of fire, either natural, accidental, or caused by Māori to facilitate the growth of bracken fern as a food source or to clear areas for gardens.

Some of the original ecosystems have been almost entirely lost, and remnants are often substantially modified, e.g. riverine and wetland ecosystems in the lower Awanui catchment. Most of the flat land in the District is now being used for agriculture—these areas could have comprised a diversity of wetlands, alluvial, podocarp or swamp forest, but exactly which it is now impossible to determine. Similarly, most of the hill country forests, apart from some areas of the Maungataniwha Range, have been cleared or logged. Much of the remaining habitat consists of secondary shrubland and forests on steep, dissected hillsides, uneconomical for production, but extensively cleared in the heyday of agricultural subsidies.

Carse's 1911 paper 'On the Flora of the Mangonui County' gives some insights into the effect of habitat loss and modification on species. He described the mistletoes *Ileostylus micranthus* and *Korthalsella salicornioides* ('Threatened-Nationally Critical) as "not infrequent", and tawāpou (*Planchonella costata*, 'At Risk-Relict') as one of "the more prominent plants on or near the sea cliffs … Here and there along the coast is found *Fuchsia procumbens*." Wharangi (*Melicope ternata*) and ngaio (*Myoporum laetum*) were plentiful. These species are now Sparse, uncommon, or not known at all within the ecological district. Two species of the orchid *Prasophyllum*,

and king fern (*Ptisana salicifolia*) were "not uncommon". The former is now uncommon and the latter Declining.

The bladderwort *Utricularia delicatula* ('At Risk-Relict') was present on the Peria gumhills (present nearest population is the Ahipara gumlands), and *Calystegia marginata* ('At Risk-Naturally Uncommon') was considered not uncommon at Fairburn, and on the coast near Mangonui (probably now extinct in the ecological district). Kaikomako was "common in lowlands" and swamp maire was common in swampy forests. Small-leaved milk (*Streblus heterophyllus*) tree was "abundant". All of these species are now infrequent.

Some species which occur rarely now, however, were also sparse in earlier days, e.g. silver pine (*Manoao colensoi*), reported by Carse from near Fairburn, "one tree (full grown) and a few young ones, and a single tree near Victoria Valley and *Caleana minor* ('Threatened-Nationally Critical') "on clay hill, Kaitaia; rare".

Present Day

Not surprisingly for an ecological district of this size, a large number of different vegetation types were identified. The complex geological pattern, the wide diversity of species, and the interaction of environmental gradients are reflected in the mosaic nature of the vegetation of the ecological district. Regenerating vegetation seems to occur in an abundance of variation reflecting random human disturbances as well as the factors mentioned above.

Topographic influences are apparent, with Develice (1989) identifying gradients of altitude, landform and aspect (as reflected in solar radiation), and Willetts (1985) classifying broadleaved species-podocarp forests according to low-, mid-and high-altitude situations. Temperature and rainfall gradients determined by altitude have been confirmed by Burns and Leathwick (1996) elsewhere in Northland. Their study also demonstrated that vegetation patterns were strongly influenced by soil fertility and drainage. Observations during the course of this survey suggest that these gradients also apply in the Maungataniwha Ecological District, although no quantitative analysis has been undertaken, apart from Develice (1989), who studied mature forested areas only.

Although kauri is present, it does not constitute a prominent feature of the ecological district. Scattered trees and a few small stands of regenerating kauri forest exist amongst a mosaic of broadleaved species-podocarp and secondary forest.

Another apparent pattern is the distribution of secondary tōtara forest, which is common north of the Maungataniwha Range. Within the Range itself, tōwai is more commonly occurring.

Conning (2002) recorded the following vegetation types in Maungataniwha Ecological District:

- Wetlands including raupō reedland, coastal wetlands with oioi and/or sea rush, and mangrove scrub/forest.

- Bracken fernland and ring fern (*Paesia scaberula*) fernland.
- Shrublands including mānuka and/or kānuka shrubland, and gumlands.
- Broadleaved-podocarp forest including tōwai forest and taraire forest with miro, mataī, pukatea, hīnau, tawa, Hall's tōtara, and kawaka.
- Kānuka forest.
- Podocarp forest including secondary tōtara forest, tōtara-kānuka forest, tōtara-kahikatea forest, kahikatea forest, and rimu forest (occurs at one site in this ED).
- Kauri forest.
- Tānekaha forest.
- Pūriri forest.
- Pōhutukawa forest.

4.8 Puketi Ecological District

(adapted from Conning and Moors 1998)

4.8.1 Overview

The Puketi Ecological District covers approximately 24,000 hectares. It is centred on the Puketi-Omahuta Conservation Forests located north of Kaikohe between Hokianga Ecological District to the west and Kerikeri Ecological District to the east and adjoins the Maungataniwha Ecological District to the north.

The district includes upper catchments of the Waihou and Mangamuka rivers, which drain into the Hokianga Harbour. The northern flanks of the district form the upper catchments of the Waiare and Omaunu Streams which drain to the Whangaroa Harbour. The district has few wetlands.

The majority of the district (approximately 92 percent) consists of indigenous vegetation, much of which is dense tall forest containing several unusual forest types including a kauri/hard beech association, and a number of locally endemic species. Puketi-Omahuta contains outstanding examples of low altitude kauri forest. It is an exceptionally diverse habitat floristically, with more than 360 species of indigenous vascular plants.

Extensive areas of logged and regenerating forest, which are mostly contiguous with each other, link habitats with little modification forming a very large tract of indigenous vegetation in the Northland Region where habitats have been severely fragmented. Although a considerable part of the area is already protected in the Puketi-Omahuta Conservation Forest, the increased habitat provided by the larger contiguous area is of great value for maintaining and enhancing biodiversity. For example, pied tit, widespread to the south, but confined north of Waikato-Coromandel to large forest tracts, thrive in this ecological district.

The threatened North Island brown kiwi, whose habitat has also been reduced and fragmented, can be found in most parts of the district.

After various reports in the late 1970s and early 1980s, the Wildlife Service found at least 100 North Island kōkako in the Waipapa catchment (Anderson 1984). However, since then the population has collapsed to only one known breeding pair and several single birds (S. McManus pers. comm.).

The presence of a short-tailed bat colony near the forest sanctuary at Omahuta is noteworthy, with short-tailed bats being recorded to date in Northland only at Puketi-Omahuta and Warawara. This threatened species has been identified as a pollinator of *Dactylanthus taylorii*, also listed as endangered, and its pollen was found within bat droppings at a bat roost in 1975. Anecdotal evidence suggests that *Dactylanthus* was present in Omahuta in the 1980s, but no plants have been located in recent years (L. Forester pers. comm. 1996).

The Waipapa River catchment (a tributary of the Waihou) drains most of the Puketi Forest and is considered by Conning and Moors (1998) to be one of the least modified freshwater ecosystems in Northland, with almost the entire catchment under indigenous vegetation. Twelve species of indigenous fish, an indigenous freshwater mussel (*Echyridella* sp.), kōura (freshwater crayfish; *Paranephrops* sp.), limpet (Latiidae), and freshwater shrimp (*Paratya curvirostris*) are known from the district.

4.8.2 Vegetation

Historic

In the past, the area dominated by kauri forest was much greater, extending towards Kerikeri. At Omahuta, the majority of the large kauri was milled between World War II and 1979.

Fires following logging have resulted in extensive secondary growth. However, some of the acid bogs and gumland vegetation may have existed on poorly drained plateau areas for some considerable time. This was probably the main wetland type in this ecological district and it is likely that it has never been widespread. There are very few wetlands today.

Outside of the reserve, the forest was first cut over for timber, then later cleared for agriculture, during the nineteenth and early twentieth centuries. Much of this land has been reverting to indigenous shrubland and secondary forest.

In the 1950s and 1960s, large areas along Mokau Ridge and at Omahuta were cleared for exotic forestry.

Present Day

The Puketi Ecological District contains a sequence of indigenous forest, from the Waihou Valley, which is close to sea level, to the highest point, which is over 500 metres above sea level.

Taraire is generally the dominant forest species at lower altitudes where pūriri is locally common. An altitudinal gradient is apparent above 300 metres, when tōwai becomes the dominant canopy species with Hall's tōtara and miro (*Prumnopitys ferruginea*), whilst taraire becomes uncommon or rare. Kauri is dominant primarily on ridges, and kawaka, and podocarps such as monoao (*Halocarpus kirkii*) and silver pine (*Manoao colensoi*) are largely confined to higher altitudes.

Makamaka (*Ackama rosifolia*), uncommon in other parts of the Northland Region, is abundant on forest margins in higher areas.

The main vegetation types reported by Conning and Moors (1998) are summarised below:

- Kauri forest.
- Broadleaved-podocarp-kauri forest comprising Hall's tōtara, tōwai, tawa and rewarewa with occasional emergent kauri, rimu, kahikatea, and northern rātā.
- Kauri-hard beech forest.
- Broadleaved-podocarp forest including tōwai forest and taraire forest with varying associations of pūriri and kohekohe below 300 metres above sea level and tawa, kōhūhū, and hīnau above 300 metres above sea level.
- Podocarp forest including mataī-kahikatea forest, rimu forest, northern rātā-rimu-Hall's tōtara forest, and miro-Hall's tōtara forest.
- Mānuka-kānuka-tōwai shrublands.

4.9 Tangihua Ecological District

(adapted from Goldwater *et al.* 2009)

4.9.1 Overview

Tangihua Ecological District is located inland and covers *c.*167,024 hectares of mainly rolling and dissected, slump-prone hill country. Isolated, steep-sided volcanic hills including the Tangihua, Mangakahia, Motatau, and Houto ranges rise up to 700 metres above sea level. Pre-human vegetation would have comprised broadleaved-podocarp forest with local areas of kauri on the hills, and raupō swamps, swamp shrubland, alluvial forests and other wetlands in the fertile valleys. The ranges remain mostly forested while the lower hills have a mix of indigenous and exotic forest as well as large areas of indigenous scrub. Extensive riverine freshwater wetlands and swamp forests in this ecological district include some of the best flood-plain wetland complexes remaining in the North Island. The alluvial riverine forest remnants in this ecological district are also notable. Currently *c.*24 percent of the Tangihua Ecological District has an indigenous vegetation cover, with *c.*19 percent forest, *c.*4.8 percent shrubland and less than one percent wetland vegetation (MfE 2004).

Tangihua Ecological District adjoins eight other ecological districts: Hokianga to the north-west, Kaikohe and Kerikeri to the north, Tutamoe to the west, Kaipara to the south-west, Tokatoka to the south, Whāngārei to the east, and Whangaruru to the north-east.

Significant ecological features of Tangihua Ecological District include:

- Several large, botanically diverse forest tracts such as Mangakahia Forest and Te Tarahiorahiri (3,643.3 hectares), Hikurangi and Tokawhero Forests (3,481 hectares), South Houto Forest and Maungaru Range (783.2 hectares), and Tangihua Forest (3,931 hectares).
- Several large, relatively unmodified wetland systems, particularly those which are part of the Motatau wetland complex (e.g. Taikirau Wetland and Shrublands and Taikirau Swamp), which is probably the largest and most significant mineralised freshwater wetland system remaining in Northland.

4.9.2 Vegetation

Historic

Little information is available on the vegetation history of Tangihua Ecological District, but based on landform and current patterns it is assumed that this ecological district would have comprised a mosaic of broadleaved-podocarp forest, with a few discrete areas of kauri forest. In the fertile valleys, extensive swampy habitats of raupō, swamp shrubland, alluvial forest and other wetlands are likely to have occurred (Conning 2001). On a regional scale, mixed lowland kauri-podocarp-broadleaved forest was the most common forest type found in Northland, comprising more than 50 percent of the original forested area (Conning 2001). It is estimated that there was originally *c*.200,000 hectares of kauri-dominated forest in what is now the Northland Conservancy of the Department of Conservation.

Logging of forests on the coast to the east of Tangihua Ecological District began in the 1830s, but it was not until the late 1800s that large quantities of timber were extracted from the ecological district. In the 1860s, timber mills were established in the 'heavy bush' of the Hikurangi area, and in 1872, Dargaville was founded by Joseph McMullen Dargaville, a timber merchant. Kauri was felled and processed using pit saws, and transported either to Whāngārei or Dargaville. The Northern Wairoa River and the Kaipara Harbour formed an important access route, linking Northland's kauri forests and gum fields to Helensville and Auckland. In 1875, construction of a road from Hikurangi to Whāngārei facilitated the carting of the timber to the eastern coast of Northland. In the 1890s, the government sold 2,360 cubic metres of standing kauri to sawmillers alone, and during the same period acquired, subdivided and sold hundreds of blocks of land to new settlers. In Northland, many of these blocks contained areas of indigenous forest, which were mostly felled or burnt to create pasture, or felled and the timber sold to gain income for development (Haigh 1991).

Despite the proliferation of timber mills and the huge volume of timber exported, the extraction of timber was only one contributing factor in the loss of Northland's forests. Forests were burned to clear land for pasture or to facilitate the extraction of kauri gum, and during dry summers many of these fires burned uncontrolled. *"By 1840, 58 percent of the forest land had been converted into permanent open plains, rolling downs and uplands"* (Haigh 1991). From the 1840s through to as late as the 1940s, fires swept across large areas of Northland, not only burning large tracts of forest, but also threatening homes. The bush fires of the summer of 1901-1902 destroyed hundreds of square miles of standing kauri in the Te Kopuru, Kaipara, and Dargaville areas. Drained swamps also burned, the fires burning the peat deep down into the ground, only halting when reaching the water table (Metcalfe 1981).

Although the kauri industry was the economic mainstay of Northland in the late 19th century and early 20th century (Anderson & Moran 1983), kauri timber was soon to be supplanted by radiata pine. The first exotic plantings in Northland occurred in 1904, but it was not until the 1920s and 1930s that the Region, and New Zealand as a whole, experienced the first minor wave of afforestation. Several forestry companies were formed in Northland at this time, and they acquired land and funded planting either by way of bondholding or by offering shares for purchase. The following decades saw the industry grow steadily, with involvement from both the state (New Zealand Forest Service) and the private sector (from Wheeler and Moran 1985). Pine plantation currently occupies *c*.43,350 hectares in Tangihua Ecological District (MfE 2004), the majority of which is owned by private companies such as Carter Holt Harvey.

Present Day

As with most other parts of Northland, the current vegetation of Tangihua Ecological District is mostly secondary in origin. The largest areas of indigenous vegetation are on hill country above 100 metres above sea level, while the remaining landforms have small and highly modified examples of their former vegetation.

Of the natural areas identified by Goldwater *et al.* (2009), 80 percent (25,816 hectares) are forest or treeland, 16.3 percent (5,265 hectares) are shrubland and 3.1 percent (994 hectares) are freshwater wetland. The total area of sites recorded in this report is 32,214 hectares (19.3percent of the ecological district).

Extensive forest tracts occur on the steeper massifs, often joined by plantation forests, resulting in a vast mosaic of production and protection forestry (Conning 2001). Kauri, rimu, kahikatea, tānekaha, tōtara, miro, and northern rātā characteristically occur as infrequent emergent trees. Kānuka, mānuka, kauri, rimu, tānekaha, rewarewa, and tōtara associations are prevalent on ridges within these ranges, while upper slopes support forest dominated by tōtara, kānuka, karaka, kohekohe, pūriri, and/or tānekaha. Tawari (*Ixerba brexioides*), tāwheowheo (*Quintinia serrata*), mangeao, and *Dracophyllum* species occur at the highest altitudes where sub-montane conditions exist. Tawa is a feature of high-altitude forest in Mangakahia Forest, which is unusual in Northland. Lower hillslopes and gullies are characterised by broadleaved forest containing taraire, pūriri, tōtara, tawa, kohekohe, pukatea, and kahikatea. Kohekohe, māmāngi (*Coprosma repens*), pigeonwood (*Hedycarya arborea*), māhoe, nikau (*Rhopalostylis sapida*), and ponga (*Cyathea dealbata*) are generally the

prominent understorey species. Shrubland is relatively common in Tangihua Ecological District, where it is dominated by mānuka and/or kānuka. At cooler higher altitudes, from about 550-600 metres above sea level (e.g. Hikurangi Forest, Tokawhero Forest, and Mangakahia Forest), kauri is either sparse or absent (Conning 2001).

Riverine flood and alluvial vegetation are limited to numerous small, scattered forest remnants and shrubland along riparian and wetland margins, and occasionally on floodplains away from main river channels. Although it would have been relatively common in low lying swampy plains and valleys throughout Tangihua Ecological District, it is now one of the rarest, most fragmented and under-represented forest types occurring in Northland (Conning 2001). Kahikatea is the dominant species in this habitat type, occurring with associations of taraire, tōtara, kānuka, mānuka, tī kōuka (*Cordyline Australis*), and harakeke.

Shrubland comprises a smaller component of vegetation cover in Tangihua Ecological District and throughout Northland (less than 10 percent). The vast majority of this comprises mānuka-kānuka in successional stages and as corridors, buffers, and ecotones to mature forest and wetlands. Mingimingi, hangehange (*Geniostoma ligustrifolium*), māpou, *Coprosma rhamnoides*, and horoeka/lancewood (*Pseudopanax crassifolius*) are commonly found in shrubland habitats (Conning 2001).

Gumlands are seasonally waterlogged, infertile and acidic habitats which are characterised by 'heathland' species such as mānuka, sedges, *Gleichenia* species and *Dracophyllum lessonianum*. This habitat type is unique to Northland, Auckland and Coromandel and is one of the rarest habitat types in Northland. The Department of Conservation has estimated that less than one percent of its original extent remains today. Gumland is known from three sites in Tangihua Ecological District, although it is likely to more common than the records indicate.

Tangihua Ecological District contains *c*.994[1] hectares of freshwater wetlands, which in the Northland Region is second only in extent to Aupouri Ecological District with *c*.2,734 hectares (MfE 2004). While many of the wetlands are small and degraded, there are at least four sites (greater than 100 hectares) which are excellent examples of relatively intact inland freshwater swamps that provide significant habitat for indigenous fauna and flora. Raupō reedland is the most common wetland vegetation type.

4.10 Te Paki Ecological District

(adapted from Lux *et al.* 2009)

4.10.1 Overview

Te Paki Ecological District covers approximately 30,917 hectares. It is located at the northern extremity of North Island, bounding the Aupouri Ecological District to the south. The boundary runs from the northern end of Ninety Mile Beach at Te Paki

[1] This figure is based on the information obtained during the PNAP reconnaissance survey. The amount of wetlands remaining as stated in the NZ Landcover Database (MfE 2004) is *c*.680 hectares.

Stream, skirting the north and eastern flank of the Te Paki sand dunes then crossing to Thom's Landing. The boundary then follows the edge of the Parengarenga Harbour northwards to Ohao Point. It takes in all of the land north of Parengarenga Harbour.

The area from Te Rerenga Wairua (Cape Reinga) to North Cape shows visible evidence of past occupation by Māori, with numerous camps, pā, terraces, middens and garden systems. Te Rerenga Wairua itself is a deeply significant place for Māori. The spiritual pathway of Te Ara Wairua winds its way up both the east and west coasts to join at Te Rerenga Wairua. The solitary pōhutukawa that rests on the slopes at Te Rerenga Wairua is the departure point for the spirits of the dead before the travel back to Hawaiki-Nui.

A striking physical feature of Te Paki Ecological District is that unlike other ecological districts, especially in the North Island, over 75 percent of it is under some form of indigenous vegetative cover, with the vast majority regenerating after modification from predominantly natural and human-induced fires and cultivation and agriculture practices. Indigenous cover includes remnant forest containing kauri stands, broadleaved species-podocarp and coastal broadleaved species forests, gumland, shrubland, wetlands and dunes. The extensive and unbroken tract of indigenous shrubland provides conditions where natural regeneration can occur largely unimpeded by human activity.

A total of 23,234.5 hectares of significant natural areas were identified; approximately four percent are forest, 83.7 percent shrubland, seven percent duneland/sandfield, five percent freshwater wetland and less than 0.1 percent estuarine habitat.

Contained within these habitats are at least 20 locally endemic plants and many more locally endemic invertebrates such as the large landsnails *Paryphanta watti* and *Placostylus ambagiosus.*

The northernmost forms of several vegetation types occur in this ecological district, and some cool climate species occur well beyond their usual distribution limits. These species are thought to be relicts of earlier wide distribution during cool periods of the Pleistocene (Gardner and Bartlett 1980).

The Parengarenga Harbour is regarded as part of Aupouri Ecological District and is therefore not included within Te Paki Ecological District. However, it is important to recognise the significance of vegetation sequences which cross the ecological district boundary, i.e. from mangrove forest and saltmarsh in the harbour (Aupouri Ecological District) to freshwater wetlands and terrestrial shrubland and forest in several catchments of Te Paki Ecological District. This protective buffer of indigenous vegetation is a significant factor in the high water quality of Parengarenga Harbour and contributes to its importance as a refuge, feeding and breeding ground for a large number of birds and fish.

Key features of Te Paki Ecological District are outlined in Millar and Rough (1976) as follows:

- Distinctive and unique plant communities on the serpentine soils at North Cape, including a high degree of local endemism and dwarfism.
- Northernmost mainland broadleaved species forest, with and without conifers.
- High number of threatened plant species.
- Examples of vegetation types uncommon elsewhere, such as gumland vegetation.
- Sub-fossil remains of ancient kauri trees.
- Extensive wetlands.
- Sandy beaches and dunelands unmodified by exotic species such as marram grass and lupin.
- Paucity of indigenous forest bird fauna.
- Colonies of large indigenous landsnails (e.g. *Placostylus ambagiosus*; *Paryphanta watti*).
- High number of endemic species of landsnail and other invertebrates.
- Holocene dune sequences containing abundant subfossil bird and landsnail remains.
- This is one of the most distinctive ecological districts in New Zealand because of its:
    - Physical characteristics of geography and geology.
    - High degree of local endemism of flora and molluscan fauna on serpentine soils.
    - Relatively extensive dunes, wetlands and gumfields.
    - High floristic diversity, with 330 indigenous vascular species in the North Cape-Waikuku area alone (Cameron and Jones 1996).

4.10.2 Vegetation

Historic

Much of Te Paki Ecological District was once covered in dense kauri forest (Millar and Rough 1976), some of which was destroyed by rising sea levels (e.g. Waikuku Flat) and most of the remainder by human activity. Conifers were likely to have been predominant on ridges and spur crests in the western area, on less fertile soils in eastern areas, and locally on floodplains. Mixed broadleaved species forest was likely to have occurred elsewhere (Clunie 1984), with kohekohe, karaka, tawapou, and pōhutukawa increasing in abundance towards the coast (Kelly 1967).

The early botanist/naturalist Dieffenbach described a large expanse of mānuka and bracken with taller vegetation in the gullies "…*in not very remote times the kauri pine…must have covered all these hills, as is proved by the burnt remains of large trees of this species*" (1843—quoted in Gardner and Bartlett 1980).

Repeated burning has transformed the area into primarily shrubland communities which are subject to frequent erosion. Only pockets of broadleaved species forest remain in some gullies and on coastal cliffs. The reduction in pollinating and seed-dispersing bird and insect species, and the survival of mainly fire-resistant plant species has slowed regeneration to forest (Clunie 1984). Due to a long period of vegetation clearance, pasture establishment, and extensive grazing, much of the Mokaikai area for instance, is only relatively recently 'reverting' from pasture.

The very large number of archaeological sites is indicative of intensive occupation since the time of early Polynesian settlement.

Present Day

Today only isolated pockets of indigenous forest remain. Several centuries of human occupation, with its associated burning and clearance of vegetation, have resulted in a landscape that is now dominated by regenerating shrubland.

A collection of kauri forest remnants occurs south of Te Paki Trig. In this vicinity at Radar Bush emergent kauri over a canopy of kānuka with frequent kawaka and monoao occurs.

Within Unuwhao Bush and Shrublands taraire occurs in the gullies and coastal broadleaved species forest occurs closer to the coast. Emergent pōhutukawa (20-metre-tall) over pūriri, kohekohe, taraire, and karaka occurs west of Te Huka.

Secondary forest in Te Paki Ecological District is dominated by kānuka.

Whilst in prehistoric times, kauri forest occupied most of Waikuku Flat (N02/005(b)), today, peaty depressions are predominantly covered in mānuka shrubland and *Machaerina arthrophylla*, *M. juncea,* and *Eleocharis sphacelata* sedgelands.

Mānuka and kānuka dominate shrubland areas. Kānuka is dominant in the older shrublands. Areas affected more recently by fires are dominated by kānuka and mānuka with various amounts of prickly hakea and gorse.

Gumland shrubland occurs on more impoverished soils. Mānuka is dominant in association with species including māwhai, *Dracophyllum* spp., *Machaerina* spp., *Epacris pauciflora* and *Pimelea* spp.

A distinctive feature of Te Paki Ecological District is the serpentine shrubland on the cliffs and plateau area between Kerr Point and Surville Cliffs. Like many parts of Te Paki, this area has also been repeatedly burnt (natural and human-induced). Many endemic plant species are exclusively associated with the ultramafic substrate and many of the non-endemic plant species are affected by the substrate which results in prostrate and dwarf growth forms. For example, common forest plants such as

tānekaha, kanuka, and houpara (*Pseudopanax lessonii*) grow in a stunted form within this habitat.

The foredunes support a variety of indigenous species including pīngao, spinifex, pōhuehue, and *Coprosma acerosa*. Harakeke, coastal toetoe, rārahu (bracken, *Pteridium esculentum*), and various sedges and rushes occur behind the foredunes on consolidated dunes.

Wetlands are well represented in Te Paki Ecological District. Te Werahi Wetland is the largest wetland system in Te Paki Ecological District and one of the largest mineralised wetland system (swamps) in Northland (the Motatau Wetland Complex in the Tangihua Ecological District and Kaipeha Swamp in the Kaikohe Ecological District are also very large systems).

Paranoa Swamp is a large mesotrophic swamp contained within a fully vegetated catchment. This wetland is essentially undisturbed by anthropogenic processes.

4.11 Tutamoe Ecological District

(adapted from Miller and Holland 2008)

4.11.1 Overview

The Tutamoe Ecological District comprises approximately 82,035.56 hectares of western Northland from South Head of Hokianga Harbour to south of Maunganui Bluff. The western boundary is along the west coast (Tasman Ocean), the southern boundary follows the eastern side of Kai Iwi Lakes and across to Kaihu Forest and the southern Hokianga Harbour entrance forms the northern boundary. The Marlborough and Mataraua Forests form the eastern boundary on the Waima Range.

The Hokianga Ecological District adjoins Tutamoe Ecological District along the north and north-eastern boundary, while the Tangihua Ecological District is located to the east and south-east, and the Kaipara Ecological District abuts the southern boundary.

The ecological district includes the largest contiguous tract of indigenous forest in Northland, including large areas of unmodified forest, featuring the largest mature kauri trees in the world and many threatened plants and animals. This forest tract contains the highest point in Northland (Te Raupua in the Waima Range at 781 metres above sea level) with an altitudinal sequence running unbroken from the swamp forest tablelands of the Mataraua Forest down to coastal dune complexes south of Waimamaku. Waima Forest contains plant species which are found nowhere else. *Olearia crebra* was discovered for the first time in 1982 followed by *Coprosma waima* in 1986, and turoa onamata (*Ackama nubicola*) in 2000. These plants are generally restricted to the cold, south-facing, windblasted cliffs of the Waima Range (over 500 metres above sea level) and due to their restricted distribution and threat from browsing animals are classified as being 'Threatened' by de Lange *et al*. (2018).

Waipoua Forest supports the largest population in the country of the 'At Risk' North Island brown kiwi, possibly between 1,000-2,000 birds, while the Waipoua/Mataraua plateau contains the most viable population of North Island kōkako ('At Risk-Recovering') in Northland.

The largely vegetated catchment of the Waipoua River is reflected in its high-water quality, and because of this is considered to be the least modified of all the large river systems in Northland. It contains a rich diversity and density of macroinvertebrate life (Seitzer 1996). Short-jawed kokopu (*Galaxias postvectis*), classified as 'Threatened' by Dunn *et al.* (2018), occur within the river.

Just to the south of this largest forest tract in Northland, a further 11,000 hectares within the Marlborough and Kaihu Forests adds significantly to the protected natural areas of the Tutamoe Ecological District as well as providing sizeable habitat for a wide diversity of species and vegetation types. The Tutamoe plateau environs contain the closest equivalent to submontane forest in Northland.

The Tutamoe Ecological District contains approximately 32 kilometres of unbroken coastline, which includes the outstandingly diverse coastal forest, shrubland and associations of Maunganui Bluff. Many threatened plant and animal species are found at Maunganui Bluff including a large population of titirangi/napuka (*Veronica speciosa*). This plant now only occurs on the west coast of the North Island at South Hokianga Heads and Maunganui Bluff in Tutamoe Ecological District and on the cliffs west of Aotea Harbour, Mokau and at Titirangi Bay in the Marlborough Sounds (de Lange 2006).

Trounson Kauri Park Scenic Reserve has been managed as a 'mainland island' since 1996. It is the only one of New Zealand's six official mainland islands that represents old growth kauri. Many North Island brown kiwi have been tracked from Trounson moving into Waipoua and Marlborough Forests thus acting as a regenerative source for kiwi.

Of the natural areas identified by Miller and Holland (2008), 90.4 percent (42,669.8 hectares) are forest, 8.7 percent (4,116.3 hectares) shrubland (including coastal associations on bluffs and beaches), 0.4 percent (186.5 hectares) duneland/sandfield and 0.41 percent (196 hectares) freshwater wetland. Estuarine habitats do not occur in the Tutamoe Ecological District.

4.11.2 Vegetation

Historic

Large areas of unmodified indigenous forest remain in the Tutamoe Ecological District. In particular, there are some magnificent examples of unmodified kauri forest and associated forest types found within the Waipoua, Mataraua and Waima Forest tract.

The largest kauri that survives today is Tane Mahuta (Lord of the Forest) at a circumference of 13.77 metres and a trunk height of 51.5 metres (Halkett and Sale 1986).

Māori and in particular European settlement resulted in significant modification to the ecological district through agriculture, kauri extraction and the gum industry.

These excerpts from Eadie, Burns and Leathwick (1987) describe landscape effects of Māori and European occupation in the Waipoua area.

> *Much of the coastal and inland areas that are in scrub today had their forest cover first burnt in pre-European times. Other areas cleared and inhabited can be recognised by the presence today of large kānuka and coppices of karaka (used for food).*
>
> *Historical evidence indicates regular, extensive burning of the current scrub prior to European occupation. Much of the lower Waipoua River Valley and coastal area was a well-developed grassland at the time of the first gumdigger. The gumdiggers themselves lit numerous small fires to clear vegetation and hence make digging easier.*
>
> Eadie, Leathwick and Burns (1987) suggest that kauri, kānuka, miro and Hall's tōtara forest may be very similar to the original coastal forest type in the Waipoua area.
>
> The Waipoua Forest was originally purchased from Māori in 1876. World War II initiated the beginning of intensive logging within the forest and this continued until 1948. It is likely that the forest was 'saved' prior to World War II because of difficulties in accessing and removing timber. It was not until 1952 that the forest was finally protected (Eadie, Burns and Leathwick 1987).
>
> Maunganui Bluff became a reserve in 1911.
>
> *It is likely that the original vegetation on the more sheltered parts was similar in nature to that of Waipoua Forest, i.e. kauri (dense in places and sparse at others) with podocarps and northern rata reaching far above a canopy of tawa and taraire where the kauris are few. It is evident that all useable timber was removed, probably early this century.*
>
> *Since then there have been many fires. Cattle have grazed and browsed all the accessible parts for a very long time, probably continuously since the land was reserved.*
>
> (Esler and Dobbins 1977)

Present Day

The Tutamoe Ecological District is notable for the fact that over 50 percent (57.4 percent) of the ecological district comprises natural areas including areas of old growth, unmodified forest.

The Waipoua/Mataraua/Waima Forest tract represents 38.9 percent of the land area of the ecological district or 67.7 percent cover of the natural areas identified by (Miller and Holland 2008).

The uniqueness of Tutamoe Ecological District is reflected particularly in its vegetative associations e.g. high-altitude swamp forest on the Tutamoe Plateau defined by kiekie, supplejack and tōwai with maire tawake and emergent rimu. In Waipoua Forest Sanctuary and the expanded protected areas, the intricate relationship between soil processes, altitude and forest type, are well described by Eadie, Burns and Leathwick (1987). They recognise 13 different forest types, which include two lowland coastal types described as māmāngi-māpou-kānuka and taraire/kohekohe-karaka-nīkau forest. On well-drained, lowland areas kauri/māmāngi-kānuka-tōwai and taraire-tōwai/kohekohe forest is prevalent and grades into extensive areas of taraire/kohekohe and kauri/taraire forest at mid-altitude. Also, at middle altitudes are variants of tōwai-kānuka-miro-Hall's tōtara forest with different frequencies of taraire and kauri. At high altitude, tōwai-tawa forest is found with varying proportions of rimu, miro, northern rata and maire tawake. Seven shrubland types with different mixtures of *Gleichenia-Machaerina*-mānuka-*Dracophyllum*-tōwai and rewarewa (*Knightia excelsa*) (depending on soil type and topography) were also identified.

Coastal and dune vegetation within Tutamoe Ecological District is much reduced from its former extent. A large amount of the tertiary back dunes has been developed for farmland or plantation forestry and primary coastal forest is restricted to the Maunganui Bluff and the lower Wairau River-Ohae Stream area, although much of the latter have been subject to historic modification.

Shrubland on coastal hillslopes and cliffs is perhaps best represented at Maunganui Bluff where an intricate mix of coastal associations occupies the coastal cliffs to an altitude of over 300 metres above sea level. Dominant species include harakeke, toetoe, indigenous iceplant, kōwharawhara, *Isolepis* spp., *Juncus* spp., māpou, taupata, kiekie, hangehange, *Rhabdothamus solandri, Veronica* spp., mānuka, mingimingi, māhoe, and pōhutukawa.

Similar associations are to be found around Hokianga South Head, but these have been subjected to much more intense modification and are restricted to small remnants.

Associations on dune complexes within Tutamoe Ecological District include various mixtures of primary sand-binding and woody stabilising plants. A good example of the diversity of plant associations can be found around the Muriwai Lagoon, south of the Waipoua River-mouth. Here, small wetlands have formed in the "slacks" between the back dunes, some within adjacent farmed land. *Machaerina articulata*, harakeke, raupō, kiokio, and mānuka rapidly loose dominance to toetoe, knobby clubrush, *Ozothamnus*, and pōhuehue moving towards the coast. Small pockets of pōhutukawa remain in places between back dunes, the understorey and groundcover consisting of kōwharawhara, NZ spinach, *Coprosma macrocarpa, C. rhamnoides*, ngaio, and hangehange.

Closer to the foredunes, oioi, *Coprosma acerosa*, *Pimelea prostrata*, and *Leucopogon fraseri* make an appearance before giving away to the true sand-binders of the foredune such as spinifex, pīngao, and shore bindweed (*Calystegia soldanellais*).

Freshwater wetlands are few, but the best examples being amongst the consolidated dune sands south of the Waipoua River. Where deep dune lakes have formed, vegetation is largely restricted to a peripheral reed zone usually comprising raupō, *Machaerina articulata* or *Eleocharis sphacelata.* Where the adjoining land is not grazed, rush-like sedge associates melt into mānuka, whekī (*Dicksonia squarrosa*) and tī kōuka dominant associations. Harakeke and bracken (*Pteridium spp.*) also dominate in the more fertile drier sites.

4.12 Whāngārei Ecological District

(adapted from Manning 2001)

4.12.1 Overview

The Whāngārei Ecological District covers approximately 81,800 hectares (including Whāngārei Harbour 12,130 hectares). Whāngārei Harbour borders four ecological districts (Whāngārei, Whangaruru, Manaia, and Waipū). Most of the harbour is included within the Whāngārei Ecological District, apart from the islands and coastal margin adjacent to Manaia and Whangaruru Ecological Districts.

The Whāngārei Ecological District is located west of Whāngārei city and extends from Akerama southwards to Mata, encompassing Whāngārei Harbour and as far inland as the Wairoa and Mangakahia Rivers. It adjoins the Whangaruru Ecological District to the north and east, Tangihua Ecological District to the west, and both the Tokatoka and Waipū Ecological Districts to the south.

Indigenous natural areas cover approximately one-fifth of the ecological district (19 percent), but only nine percent of land if the Whāngārei Harbour is excluded. Of the identified natural areas described in this report, 43 percent are forest, nine percent are shrubland, 47 percent are estuarine, and less than one percent are freshwater wetland.

Much of Whāngārei Ecological District has been modified, with very few large areas of natural vegetation remaining. The northern part of the ecological district contains the last remnants of the once extensive Hikurangi Swamp, associated with the Wairua River flood plain. It is habitat for the threatened black mudfish (*Neochanna diversus*), and is the only New Zealand site for the newly discovered, critically endangered swamp hebe (*Veronica* aff. *bishopiana*) and one of the largest populations in the country of heart-leaved kōhūhū (*Pittosporum obcordatum*).

Whāngārei Ecological District is characterised by the Whāngārei Harbour, a large drowned river estuarine ecosystem of international importance that features extensive areas of mudflats and mangroves. At times, the harbour supports over 10,000 waterbirds including a wide variety of coastal and wading birds such as New Zealand dotterel, wrybill, banded rail, and Caspian tern. Large numbers of international migrant waders including bar-tailed godwit and knot also utilise the expanses of mudflats and shellbanks for feeding and roosting. However, there is very little of the original coastal vegetation remaining in the ecological district, as this area suffered high impacts from urban and rural development.

A distinctive feature of the area are the volcanic broadleaf forests, restricted to the Whāngārei and Kaikohe Ecological Districts in Northland and to the Pukekohe area in Auckland. These occur as small fragmented remnants or as groups of individual trees on the rich volcanic soils of the scoria cones and surrounding flats. Taraire and to a lesser extent pūriri are the species which largely make up the broadleaf remnants. These two species are pivotal for the survival of kukupa in Northland.

Pukenui Forest dominates the area by being the only large forest tract remaining in the Whāngārei Ecological District. It has high diversity, with 32 vegetation types recorded for the forest, and forms protection for the upper catchments of the Mangere River and Waiharohia Stream. The area supports a large population of long-tailed bats (*Chalinolobus tuberculatus*).

The endangered North Island brown kiwi, whose habitat has also been reduced and fragmented, is found in low densities in some of the larger forest tracts and in moderate densities in forest remnants adjacent to the kiwi management sites in the neighbouring Tangihua Ecological District.

4.12.2 Vegetation

Historic

Historical records of the vegetation in the Whāngārei Ecological District refer largely to kauri forest. This is, no doubt, due to the interest of the early settlers in the kauri forest as a source of both high-quality timber and kauri gum. Many other forest types would almost certainly have also been present in the District, but records of these are scarce.

In February 1827, the French explorer Dumont D'Urville, described Whāngārei Harbour as he viewed it from Reotahi, Whāngārei Heads: "Here in Nature's favourite spot, there is a verdant mantle in every shade of green and sedge that clothes hillside and downland and water's edge, in due season spangled with the crimson of pōhutukawa and rata, the snow of clematis, and the gold of kōwhai, and lined by the shoreline of golden sand, white limestone and dark volcanic rock" (Vallance 1964).

In 1827, Earle the artist, traversed the kauri forests of Northland four times from coast to coast. He described the fine character of the forests in these words: "We travelled through a wood so thick that the light of heaven could not penetrate the trees that composed it. They were so large and close together that in many places we had some difficulty to squeeze ourselves through them…. Not a gleam of sky was to be seen: all was a mass of gigantic trees, straight and lofty, their wide-spreading branches mingling overhead, and producing throughout the forest an endless darkness and unbroken gloom." (Hutchins 1919).

In her book of Whāngārei County's First 100 years, Florence Keene presents an account of the early timber industry. Logging of kauri, primarily for boat masts and other spars in the British navy, began in Whāngārei in the 1830s. "Timber was in abundance and available for building, especially kauri and tōtara…"

The timber industry continued to flourish into the 20th Century, as the following extract from the Northern Advocate shows: "4/13/1913 …The beautiful barque, Joseph Craig, timber laden with timber for Australian ports…carried 537,206 feet of sawn kahikatea." (Keene 1976).

The Whāngārei area has been influenced by human settlement for hundreds of years, with more intensive development since European settlement nearly two centuries ago. The natural forest cover was extensively cleared in colonial times for the production of timber and expansion of agricultural land.

Present Day

As well as the underlying topographical and geomorphological factors, the present vegetation pattern is largely the result of disturbance from clearance and burning. Past and present human influences have modified and fragmented the original vegetation pattern to the extent that there is no longer a strong pattern of ecological gradients apparent in this ecological district, apart from the geological influence. The entire ecological district lies within the lowland bioclimatic zone, from sea level to 395 metres above sea level (Maunu Mountain), so there are no major altitudinal sequences present.

The geological influence is strongly apparent in the vegetation pattern. Stands of volcanic broadleaf forest dominated by taraire are restricted to the rich volcanic soils and cones of the mid-central and eastern areas of the Whāngārei Ecological District. These forests are a unique feature of Northland and are restricted to the Whāngārei and Kaikohe Ecological Districts, where they have been reduced to remnants.

The majority of forest areas in Whāngārei Ecological District consist of secondary regenerating forest, with very little primary forest stands remaining. The most common vegetation types are forests dominated by taraire, tōtara, or kahikatea, and taraire-tōtara, kahikatea-tōtara, or pūriri-taraire. The Whāngārei Ecological District trict has a high diversity of podocarp-broadleaf forest types which include various combinations of the above species, as well as tī kōuka, mamaku, pukatea, kōwhai, rimu, karaka, and mataī occurring rarely. Rare podocarp-broadleaf forest types include:

- karaka-totara forest on rhyolite.
- kōwhai-matai forest on alluvium.
- kōwhai-totara forest alluvium.

Overall, Manning (2001) identified 23 different vegetation types, with some variations of those vegetation types present (e.g. podocarp-broadleaved forest):

- Kānuka/mānuka shrubland.
- Mamaku treefernland.
- Tōtara shrubland.
- Mānuka shrubland.
- Tōtara forest.
- Kahikatea forest.

- Tānekaha forest.
- Rimu forest.
- Mataī forest.
- Taraire forest.
- Mānuka/mānuka forest.
- Tōwai forest.
- Pūriri forest.
- Maire tawake-pukatea swamp forest.
- Kōwhai-karaka forest.
- Podocarp-broadleaved forests (taraire dominant with totara and/or tōwai, kahikatea dominant with kānuka/mānuka; pūriri, tōtara and/or taraire, tōtara dominant with taraire, titoki, tōwai and/or tānekaha; kānuka/mānuka dominant with tōtara or tānekaha).
- Kauri forest.
- Kauri-podocarp (tānekaha, rimu, totara or kahikatea) forest.
- Kauri-podocarp-broadleaf forest.
- Raupō reedland.
- Harakeke flaxland.
- Mangrove forest.
- Oioi-sea rush rushland.
- *Machaerina juncea* rushland.
- *Machaerina* spp.-*Juncus* spp. Rushland.

4.13 Whangaroa Ecological District

(adapted from Conning 1999)

4.13.1 Overview

The Whangaroa Ecological District covers approximately 33,200 hectares extending from Hihi to Tauranga Bay and encompassing the Whangaroa Harbour and surrounding hill country. It comprises the northernmost portion of the former Eastern Northland Ecological District, and adjoins the Maungataniwha Ecological District to the west, the Kerikeri Ecological District to the south, and has a short boundary with the Puketi Ecological District to the southwest.

The district is characterised by massive volcanic rock outcrops, the most prominent of which are Taratara, Akatere, Orotere, St Paul's Rock and the awe-inspiring Duke's Nose, all of which dominate the landscape.

Indigenous natural areas cover approximately one third (36 percent) of the district. Of the natural areas described in this report, 36 percent are forest, 55 percent are shrubland, eight percent are estuarine, and less than one percent are freshwater wetlands.

Apart from forming the early stages of future forests, the extensive areas of regenerating indigenous vegetation in the district often provide habitat for the threatened North Island brown kiwi, Northland green gecko, and tusked wētā (*Anisoura nicobarica*). North Island brown kiwi, which was formerly abundant, is still

found throughout most of the district, but generally in small numbers, even in the reserves.

There is considerable plant diversity, as demonstrated by the forest on the northern side of the Whangaroa Harbour which contains over 300 indigenous plant species, including the endemic species, *Coprosma neglecta* subsp. "whangaroa", and *Pseudopanax gillesii*, both of which exhibit a very restricted distribution.

Although a coastal district, it is hard to find any original coastal vegetation. The coastal vegetation that does occur has generally been severely modified, either by repeated clearance or by the ravages of goats *(Capra aegagrus hircus*) and possums. Protection and restoration of coastal vegetation is a high priority in this district.

The coastline is predominantly rocky, but the threatened New Zealand dotterel can still be found on most of the sandy beaches, although in rather low numbers. Whilst mangroves have generally thrived in the upper Whangaroa Harbour where stock have not intruded, the area of saltmarsh is small, possibly because of the extensive reclamations carried out in earlier years. Freshwater wetlands are also rare in this district, and are a high priority for protection.

Many sites for which there is little information require further detailed survey. It is highly likely that further sites of threatened species, species of limited distribution, or other taxa of scientific interest will be found.

4.13.2 Vegetation

Historic

In the past, much of the Whangaroa Ecological District was dominated by broadleaved species-podocarp-kauri forest which has been extensively logged, particularly for kauri.

Whangaroa, one of the former "great kauri ports", probably has the longest history of kauri extraction of any area in New Zealand. The first shipment of kauri from New Zealand was taken from Kaeo on the sailing ship *Dromedary* in 1820. Although the area from the north of the harbour to Mangonui was rich in kauri, and the ridges were heavily clad, it was not common on the coast. Captain Skinner of the *Dromedary* noted "the timber here appears remarkably fine…a considerable distance from the banks of the river;…none seem to grow near the sea." (Sale 1978).

No mature kauri forest remains today and the largest tree remaining in the district is of only average size in comparison with trees at Puketi or Waipoua Forests.

Early botanists (e.g. Richard and Alan Cunningham, Colenso, and Thomas Kirk) found the area floristically diverse, with the type locality of many species being from this district.

Along the coast, broadleaved species forest including pōhutukawa occurred on cliffs and in valleys behind small sandy beaches. Pōhutukawa would have been much more plentiful, especially within the harbour. In his diary of 1868, Thomas Major Lane

recorded going to the Wairakau for pōhutukawa knees for boat framing, boat building being a major early industry at Whangaroa (Winch 1993).

Estuarine wetlands including mangrove (*Avicennia marina* var. *australasica*) forests were also more extensive than at the present time. So little remains of freshwater wetlands that one can only speculate on their original extent. It is likely that they occurred mainly in the coastal valleys grading into the saltwater influence.

The Whangaroa area has been influenced by human settlement for hundreds of years, with more intensive development since European settlement nearly 200 years ago.

Much of the remaining natural habitat consists of secondary shrubland and forests on steep, dissected hillsides, uneconomical for production, but extensively cleared in colonial times and in the heyday of agricultural subsidies between the Second World War and the early 1980s.

Present Day

A high degree of contiguity is a feature of many of the habitats in the Whangaroa Ecological District, with extensive linkages between areas of indigenous vegetation in the Hihi area in the north and especially in the Kaeo area, with unbroken vegetation from Kaeo to Tauranga Bay, and vegetation broken only by roads south of Kaeo.

Many of the large contiguous areas contain only pockets of mature forest, with secondary forest and regenerating forest being a main feature of the vegetation in Whangaroa Ecological District. Mānuka and kānuka are the predominant species in regenerating areas, with tōwai featuring less predominantly. The diversity of other canopy species present either in the canopy or as saplings and seedlings varies according to the frequency of previous clearance and proximity to suitable seed sources.

A characteristic of the district is the very conspicuous regeneration of kānuka forest in which ricker kauri stands often dominate on ridges. Tānekaha (*Phyllocladus trichomanoides*) and white maire (*Nestegis lanceolata*) usually grow in association with regenerating kauri, and occasionally rimu (*Dacrydium cupressinum*). Podocarps are generally in low abundance in Whangaroa Ecological District, but in several areas, along with tānekaha, tōwai, and kauri, are close to the 'break out' stage within tall kānuka forest. This is particularly noticeable in the Kaeo area, where some of the secondary forest is approaching 100 years old.

The entire ecological district falls within either the coastal or lowland bioclimatic zones. There is no strong pattern of ecological gradients apparent in Whangaroa Ecological District, apart from the coastal influence, which is limited in extent, partially reflecting the amount of disturbance of coastal habitats. Elsewhere some species are uncommon below about 100 metres above sea level, e.g. kawaka (*Libocedrus plumosa*) and *Pseudopanax gillesii*, but this may be a reflection of habitat disturbance, or drainage.

Similarly, broadleaved species forest is found primarily in valleys and gullies, but this is considered to reflect previous disturbance. Broadleaved-podocarp remnants occur mainly in the west of the district in the Kahoe-Pupuke area.

The wide variety of habitat and vegetation types is generally dictated by geomorphological, topographical and historical disturbance factors. Many of these vegetation types are present at only one site or at most in a few sites, and cover only a small geographical area, e.g. *Astelia* associations on cliffs, broadleaved species associations on coastal margins, broadleaved species and *Metrosideros* associations on rock outcrops, most of the wetland areas, as well as many forest types, e.g. taraire - tānekaha and taraire-tawa.

Regenerating forest, much of it kānuka at a fairly advanced stage, is the vegetation type covering the largest area. A feature of Whangaroa Ecological District is that māmāngi occurs frequently, and is sometimes common, in the canopy of mānuka-kānuka shrubland, and is a common, and sometimes abundant, subcanopy species in more mature forest. This is indicative of previous major disturbance (P. de Lange pers. comm. 1996).

4.14 Whangaruru Ecological District

(adapted from Booth 2005)

4.14.1 Overview

The Whangaruru Ecological District covers approximately 115,782 hectares. It lies to the east of Whāngārei, and runs from Russell and Cape Brett in the north to Parua Bay in the south. It adjoins the Kerikeri Ecological District to the north, Tangihua and Whāngārei Ecological Districts to the west, and Manaia and Waipū Ecological Districts to the south.

Much of Whangaruru Ecological District has been modified, with the degree of modification increasing towards the southern end of the area. The northern third of the ecological district contains some large expanses of indigenous forest, including Russell Forest and the Cape Brett Peninsula. Moving southwards, forested areas become smaller, and give way to pasture and plantation forestry.

Of the identified significant areas, inland forest and shrubland covers 40,795 hectares, mainland coastal forest and shrubland covers 6,960 hectares, island coastal forest and shrubland covers 443 hectares, riverine and swamp forest covers 439 hectares, estuarine habitats cover 3,289 hectares, dunelands cover 173 hectares, and wetlands cover 565 hectares.

Significant natural features of particular note in Whangaruru Ecological District include:

- Numerous islands, the largest of which are in the Bay of Islands. Other significant islands include Motukokako Island off Cape Brett, and Rimariki Island off Mimiwhangata. These islands have a diverse range of coastal forest and shrubland types, many of which are rare or absent on the mainland. They also support a high diversity of plants, birds, lizards, and invertebrates, many of which are threatened.

- Several relatively unmodified duneland systems, the most significant of which is Ngunguru Sandspit, which supports numerous threatened species.

- Thirteen estuarine systems, the largest of which is the Eastern Bay of Islands Estuary, covering 1129 hectares, and forming part of a continuous gradient from old-growth forest in Russell Forest to tidal flats. There are also significant estuaries at Whangaruru, Whananaki, Ngunguru, Horahora, Pataua, and Taiharuru. All of these estuarine sites provide habitat for threatened species, especially birds. They are also an important link between freshwater and oceanic habitats, particularly for diadromous fish species.

- Large, contiguous forest areas at Russell Forest and Cape Brett, both of which form an unbroken gradient to the coast. Both of these sites are home to numerous threatened species, especially birds, invertebrates, and plants.

- Numerous coastal forest remnants along the east coast, many of which contain old-growth pōhutukawa forest, which is a nationally rare forest type. The largest areas of coastal forest are at Cape Brett Peninsula, with extensive areas also at Bland Bay and Whangaruru North Head.

- Three areas of forest and shrubland on limestone, with unique vegetation types, and several threatened terrestrial snail species endemic to these sites.

- A small number of swamp forest remnants, containing primarily kahikatea, with one area of pukatea (*Laurelia novae-zelandiae*)-swamp maire (*Syzygium maire*). Swamp forest is a very rare vegetation type nationally, due to draining and development.

- Alluvial and riverine forest remnants, providing riparian protection and linkage functions.

4.14.2 Vegetation

Historic

Historical records of the vegetation in the Whangaruru Ecological District refer almost exclusively to kauri forest. This is, no doubt, due to the interest of the early settlers in the kauri forest as a source of both high-quality timber and kauri gum. Many other forest types would almost certainly have also been present in the ecological district, but records of these are scarce.

In her book of early settlers in and around Whangaruru, Malcolm (1982) presents several accounts of the original kauri forest. The Whangaruru area was described as "the once great forest where kauri abounded", with the top of Helena Bay Hill "once covered in heavy kauri bush". The ranges behind the Whangaruru Harbour were also recorded as being covered in kauri forest. Logging of kauri, primarily for spars for boats, began in Whangaruru in the 1820s (Malcolm 1982).

As with much of Northland, kauri forest would have dominated much of the inland hill country, and coastal wetlands and forests would have been more extensive and less modified. One of the greatest changes to the ecological landscape has been the loss of swamp and alluvial forest, and the almost total loss of shrublands and wetlands at the head of the Hikurangi Swamp.

Present Day

The most common vegetation type in the Whangaruru Ecological District is secondary podocarp-broadleaved species forest dominated by tōtara, taraire, or tōwai. The largest areas of this forest type are in the northern end of the ecological district, with smaller, scattered areas to the south. Kauri forest is often present on ridges within the podocarp-broadleaved species areas, especially at inland sites.

Kānuka-mānuka shrubland is another common vegetation type throughout the ecological district, especially around the Waikare Inlet, and in the northern coastal areas. There are numerous other sites with this vegetation type, usually within or adjacent to podocarp-broadleaved species forest remnants.

Coastal forest remnants are found along the coastline, and on some of the numerous small islands in the ecological district. These tend to be dominated by pōhutukawa forest, with other remnants dominated by kānuka-mānuka or tōtara forest. Much of the coastal areas were once farmed, and have now been retired or split into smaller lifestyle blocks, many of which are now regenerating kānuka-mānuka shrubland.

Mangrove forest or shrubland dominates the numerous estuarine sites, which also contain diverse saltmarsh vegetation types.

5. KEY FINDINGS

5.1 Extent and number of sites

A total of 685 Significant Natural Areas (SNAs) within Far North District covering an area of *c.*282,696 hectares (*c.*42% of the area of Far North District) have been identified and described in this report. The total area and number of sites identified as SNAs within each ecological district in Far North District are shown in Table 7. Each site identified as a SNA in 2019 is listed in Table 8. Where SNAs straddle the boundary between two or three Districts, site prefixes have been arranged according to the District in which most of a site lies. For example, site FNW005 straddles the boundary between Far North and Whāngārei, with most of the site occurring in the Far North.

Table 7: Summary of the number of SNAs and extent (hectares) of sites identified as SNAs in the Far North District in 2019.

Ecological District	Number of SNAs[1]	Total Area of SNAs (ha)[2]	% of Ecological District covered by SNAs
Ahipara	17	26,514.03	83%
Aupouri	128	25,068.51	25%
Hokianga	100	23,611.03	31%
Kaikohe	90	17,159.02	26%
Kerikeri	95	17,359.19	26%
Maungataniwha	135	42,732.02	44%
Puketi	13	19,405.34	79%
Tangihua	93	15,796.16	25%
Te Paki	46	23,859.77	79%
Tutamoe	19	28,169.92	74%
Whāngārei	3	42.83	6%
Whangaroa	52	14,470.10	47%
Whangaruru	38	28,382.31	73%
Total	829	282,570.23	

Table 8: Sites and extent (hectares) identified as SNAs in the Far North District in 2019.

Site Name	Site Number	Ecological District[3]	Area (Ha)
Adams Road Wetland	FN001	Tangihua	2.97
Ahitahi	FN002	Maungataniwha	1.20
Airstrip Riley Road and Fisher Road	FN003	Maungataniwha	95.34
Airstrip Road Remnant and Otangaroa 177	FN004	Maungataniwha	8.42
Airstrip Road Swamp	FN005	Maungataniwha	0.74
Airstrip Shrubland	FN006	Aupouri	68.41
Akerama Bridge Riverine Forest	FN007	Whangarei	32.00
Akerama Bridge Riverine Forest	FN007	Whangaruru	12.68
Akerama Bush	FN008	Tangihua	2.27
Akerama Bush	FN008	Whangaruru	213.82
Amazon Road Forest	FN009	Hokianga	16.56
Arai te Uru Coastal Strip and Te Kaiatewhetu Shrublands	FN010	Hokianga	1.82
Arai te Uru Coastal Strip and Te Kaiatewhetu Shrublands	FN010	Tutamoe	721.71
Arai te Uru Coastal Strip and Te Kaiatewhetu Shrublands	FN010	(blank)	79.08
Araiwhenua Stream Swamp Forest Remnants	FN011	Tangihua	7.20
Aratoro Bush	FN012	Tangihua	12.36
Aratoro Stream Bush	FN013	Kaikohe	695.80

[1] Some sites occur in more than one Ecological District in which case the total number of SNAs appears higher than the total number record in the whole of the Far North District.
[2] Based on the actual extent of each site in each Ecological District.
[3] Listed in order of Ecological Districts which the largest to smallest area of the site occurs in.

Site Name	Site Number	Ecological District[3]	Area (Ha)
Aratoro Stream Bush	FN013	Kerikeri	100.65
Arawhata Road	FN014	Maungataniwha	38.30
Arethusa Swamp	FN015	Aupouri	18.26
Atchinson's Bush	WFN001	Tangihua	187.53
Atkins/Ohaio Bush	FN016	Kaikohe	58.81
Atkins/Ohaio Bush	FN016	Kerikeri	91.30
Awakino Trust Farm Wetland	FN017	Tangihua	7.32
Awanui River Forest Remnants	FN018	Aupouri	42.32
Awapoko Estuary	FN019	Aupouri	70.62
Awaroa River Road Remnant	FN020	Hokianga	117.28
Awaroa Road Bush	FN021	Hokianga	6.86
Bacica Road Lake	FN022	Aupouri	9.58
Backriver Road and Aputerewa Forest	FN023	Maungataniwha	284.22
Beer Bush and Tapuwae Forest and Outliers	FN024	Hokianga	1895.22
Big Flat Shrubland	FN025	Aupouri	11.77
Black and Battleship Rocks Groups	FN026	Kerikeri	7.97
Blackridge Road Wetland	FN027	Kerikeri	3.22
Blue Gorge Forest	FN028	Maungataniwha	28.45
Blue Gorge Wetland	FN029	Maungataniwha	5.78
Blue Mountain Road Bush	FN030	Hokianga	625.05
Boulder Bed Stream Bush	FNW001	Tangihua	308.33
Braithwaite's Bush and Te Rore Stream	FN031	Maungataniwha	92.39
Brampton Shoal Coastal Vegetation	FN032	Kerikeri	46.93
Bridge et al	FN033	Whangaroa	29.62
Broadwood Riparian Remnants	FN034	Hokianga	52.07
Broadwood Riparian Remnants	FN034	Maungataniwha	0.80
Broadwood Road	FN035	Maungataniwha	8.43
Broughton's Gully Wetland	FN036	Te Paki	7.87
Browns Road Wetland	FN037	Kaikohe	2.38
Buchanan and Whakakoro	FN038	Ahipara	485.19
Bullman Road Broadleaved Remnants	FN039	Kaikohe	81.10
Burma Road Vegetation	FN040	Maungataniwha	327.65
Burrill	FN041	Kerikeri	56.20
Butlers Point Forest	FN042	Maungataniwha	26.56
Callaghan Road Bush	FN043	Tangihua	18.39
Camp Bay	FN044	Whangaroa	1.96
Cape Brett Peninsula Forest and Elliot–Pahi–Umuheke Beaches	FN045	Whangaruru	2790.64
Cape Brett West Island	FN046	Whangaruru	2.24
Cape Karikari Shrublands	FN047	Aupouri	368.02
Cape Road Wetlands and Shrubland	FN048	Te Paki	24.77
Cape Wiwiki Group	FN049	Kerikeri	18.20
Carrs/Waimahe Stream Bush	FN050	Hokianga	12.61
Carrs/Waimahe Stream Bush	FN050	Kaikohe	188.75

Site Name	Site Number	Ecological District[3]	Area (Ha)
Cavalli Islands - Eastern Group	FN051	Kerikeri	6.56
Cavalli Islands - Motukawanui cluster	FN052	Kerikeri	307.98
Cavalli Islands - Northern Group	FN053	Kerikeri	65.47
Cavalli Islands - Southern Group	FN054	Kerikeri	19.64
Cemetery Road	FN055	Maungataniwha	84.29
Cemetery Road Pond	FN057	Aupouri	6.39
Central Waiotehue Road Bush	FN058	Hokianga	46.96
Champion Road	FN059	Maungataniwha	54.09
Church Road East	FN060	Maungataniwha	65.36
Church Road Remnants - Far North	FN061	Maungataniwha	44.90
Church Road Swamp Forest	FN062	Maungataniwha	29.99
Churton-Atkinson Road, Riley Road East and Mangatete Stream Forest and Treeland	FN063	Maungataniwha	109.89
Clarke Road Wetland	FN064	Aupouri	23.46
Classens/Duddys Bush	FN065	Hokianga	2335.85
Classens/Duddys Bush	FN065	Kaikohe	13.77
Clough Road Bush	FN066	Maungataniwha	22.34
Cone Island	FN067	Whangaroa	9.25
Cooks Airstrip Block	FN068	Kaikohe	323.51
Cooks Road Bush No. B	FN069	Kaikohe	33.63
Cooks TV Block, and Okoro and Te Toke Stream Bush	FN070	Hokianga	150.66
Cooks TV Block, and Okoro and Te Toke Stream Bush	FN070	Kaikohe	797.40
Cowell and Snelgar Road Forest	FN071	Maungataniwha	84.16
D Cooks Bush	FN072	Kaikohe	65.90
David Carson Kauri Grove	FN073	Tangihua	5.68
Davis Road Swamp and Bush	FN074	Tangihua	294.46
Dawson Road and Te Ahuponga Forest and Scrub	FN075	Maungataniwha	1038.11
Day Point and Wharau Shrublands	FN076	Kerikeri	145.49
Diggers Valley Bush, Werawhakamau Stream, Otaneroa Stream Remnants	FN077	Ahipara	4.28
Diggers Valley Bush, Werawhakamau Stream, Otaneroa Stream Remnants	FN077	Hokianga	53.03
Diggers Valley Bush, Werawhakamau Stream, Otaneroa Stream Remnants	FN077	Maungataniwha	425.34
Donaldsons Road Bush	FN078	Kaikohe	142.86
Doubtless Bay Coastal Vegetation	FN079	Maungataniwha	116.11
East Beach	FN080	Aupouri	747.39
Eastern Bay of Islands Estuary	FN081	Kerikeri	183.62
Eastern Bay of Islands Estuary	FN081	Whangaruru	1179.17
Edwards/Tikitikioure Coastal Habitat	FN082	Whangaruru	1806.53
Emauhu Point Shrublands	FN083	Aupouri	32.52
Empire Street and Kaitaia Recycle	FN084	Maungataniwha	8.68
Fairburn 204, and Foley	FN086	Maungataniwha	71.23
Fairburn “199”	FN085	Maungataniwha	286.85
Far North Road Shrublands and Wetlands	FN087	Aupouri	95.55
Ferguson Forest	FN088	Tangihua	5.93

Site Name	Site Number	Ecological District[3]	Area (Ha)
Flat Rock Island	FN089	Whangaruru	1.59
Forest Road Bush	FN090	Kaikohe	60.08
Forest Road Bush	FN090	Puketi	1.34
Fryer and Munn Roads	FN091	Maungataniwha	115.47
Gammon Road Bush	FN092	Tangihua	247.60
Gammons Road Remnant	FN093	Tangihua	32.39
Gleeson's Lake	FN094	Aupouri	3.31
Goldie/Clarkson, Mangapiko-Whangaroa and Kaeo Bush	FN095	Whangaroa	1453.90
Great Exhibition Bay	FN096	Aupouri	1015.51
Grounds - Haumanga Road Bush	FN097	Hokianga	23.49
Gully Lake	FN098	Aupouri	25.03
Guthries Block	FN099	Kaikohe	253.05
Harrison Road Bush	FN100	Kaikohe	34.89
Haumanga Road Wetland	FN101	Hokianga	68.57
Haupatoto/Whareana Bay Wetlands	FN102	Te Paki	17.71
Hauriri Road	FN103	Kerikeri	31.70
Hautau Stream Remnant	FN104	Hokianga	61.63
Hayes BrothersÔÇÖ Farm	FN105	Maungataniwha	197.72
Hayes BrothersÔÇÖ Farm	FN105	Whangaroa	66.95
Headquarters Pond	FN106	Aupouri	6.42
Heath Road Powerline Swamp	FN107	Aupouri	46.85
Henderson and Kowhai Bay's	FN108	Aupouri	452.10
Henderson Bay Road Wetlands	FN109	Aupouri	7.42
Henderson Bay Shrubland	FN110	Aupouri	186.33
Henly Bush	FN111	Tangihua	34.26
Hently Road Forest Remnants	WFN002	Whangaruru	3.16
Herberts Swamp	FN112	Aupouri	2.13
Herekino	FN113	Ahipara	6316.35
Herekino	FN113	Aupouri	51.63
Herekino	FN113	Hokianga	275.44
Herekino	FN113	Maungataniwha	81.47
Herekino North Head	FN114	Ahipara	48.12
Herekino North Head	FN114	Hokianga	0.06
Herekino River South Remnants	FN115	Hokianga	94.34
Hikurangi and Tokawhero Forest and Lovatt Road Wetland	FNW002	Tangihua	3548.13
Hobson Road Bush	FN116	Maungataniwha	37.25
Hokianga North Head Coastal Associations	FN117	Ahipara	62.10
Hokianga North Head Coastal Associations	FN117	Hokianga	1318.85
Honeymoon Valley	FN118	Maungataniwha	1451.08
Horahora Road Gumland	FN119	Tangihua	201.81
Horahora Stream Swamp Association	FN120	Tangihua	97.56
Horeke Road East Bush	FN121	Kaikohe	287.59
Horeke Road Shrubland	FN122	Kaikohe	3.52

Site Name	Site Number	Ecological District[3]	Area (Ha)
Horeke Road Swamp	FN123	Kaikohe	5.82
Houhora Heads Road Wetland	FN124	Aupouri	7.23
How Road Bush	FN125	Kaikohe	52.94
Huehue and Maungakawakawa Forest	FN126	Hokianga	16.70
Huehue and Maungakawakawa Forest	FN126	Kaikohe	129.92
Huehue and Maungakawakawa Forest	FN126	Tangihua	1563.93
Huehue Stream Riparian Forest and Wetland	FN127	Hokianga	62.46
Huehue Stream Riparian Forest and Wetland	FN127	Tangihua	111.89
Hui te Werawera Stream Bush	FN128	Kaikohe	1024.34
Hui te Werawera Stream Bush	FN128	Kerikeri	74.17
Hukatere Lookout	FN129	Aupouri	187.93
Humphrey's Bush	FN130	Hokianga	639.11
Hupara Road Bush Remnants	FN131	Kaikohe	1.93
Hupara Road Bush Remnants	FN131	Kerikeri	199.29
Hurihanga Stream Forest Remnants	FN132	Tangihua	263.55
Hutia Creek Coastal Vegetation	FN133	Kerikeri	347.66
Inkster Road Remnants	FN134	Tangihua	60.91
Iwitaua Stream Headwaters	FN135	Maungataniwha	1.31
Iwitaua Stream Headwaters	FN135	Whangaroa	71.03
Jackson Point Shrubland	FN136	Aupouri	62.09
James Road Bush	FN137	Tangihua	308.68
Johansson-Kahoe	FN138	Whangaroa	60.64
Jones Lake	FN139	Aupouri	3.49
Kaeo River Mouth	FN140	Whangaroa	19.78
Kahutoto Stream Remnant	FN141	Kaikohe	9.57
Kaiaka	FN142	Maungataniwha	413.36
Kaiherehere and Tokatokoa Streams	FN143	Maungataniwha	141.90
Kaikau Forest, Patutahi River System, and Kahuwera Stream Shrubland	FNW003	Tangihua	156.34
Kaikou Forest Mosaic	WFN003	Tangihua	413.75
Kaikou Riverine Bush, Koteretahi Bush and Ngarurunui Shrublands	FNW004	Tangihua	871.98
Kaikoura Farms Wetland	FN144	Aupouri	6.66
Kaimaumau-Motutangi Wetlands	FN145	Aupouri	4066.67
Kaingapipiwai	FN146	Maungataniwha	67.99
Kaipeha Swamp, Punakitere-Ninihi Road Bush, and Ninihi Road Swamp and Catchment	FN147	Hokianga	772.81
Kaipeha Swamp, Punakitere-Ninihi Road Bush, and Ninihi Road Swamp and Catchment	FN147	Kaikohe	413.82
Kaipohue Island	FN148	Aupouri	11.18
Kapowairua	FN149	Te Paki	153.02
Kapowairua Wetland and Lagoon	FN150	Te Paki	21.94
Karaka Island	FN151	Kerikeri	3.39
Karakamatamata Scenic Reserve	FN152	Kaikohe	122.09
Karangi	FN153	Whangaroa	62.85
Karangi Bush Remnants	FN154	Hokianga	128.30

Site Name	Site Number	Ecological District[3]	Area (Ha)
Karatia Wetland	FN155	Aupouri	44.75
Karatia Wetland	FN155	Te Paki	5.58
Kareponia	FN156	Maungataniwha	119.43
Karikari Beach Vegetation	FN157	Aupouri	227.59
Kawaka Stream Remnant	FN158	Hokianga	81.82
Kearney Forest	FN159	Maungataniwha	55.07
Kenana Road Swamp	FN160	Maungataniwha	1.13
Kerikeri Airport Gumland	FN161	Kerikeri	100.16
Kerikeri Inlet Road Pond	FN162	Kerikeri	2.81
Kerikeri River Forest and Scrub	FN163	Kerikeri	177.24
Kerikeri Stream Bush	FN164	Kerikeri	785.06
Kerikeri Stream Bush	FN164	Puketi	22.69
Kerr Point Road Shrubland	FN165	Aupouri	0.98
Kerr Point Road Shrubland	FN165	Te Paki	8.81
Kiekie Bush	FN166	Tangihua	78.81
Kohangaatara Point Island	FN167	Whangaruru	2.15
Kohe and Tamaho Road Bush	FN168	Hokianga	450.91
Kohe Stream Remnants	FN169	Hokianga	15.01
Kokota Spit	FN170	Aupouri	1434.74
Komutu Swamp	FN171	Whangaroa	50.67
Kopenui Stream Remnants	FN172	Kaikohe	103.15
Kopuakai Forest and Scrub	FN173	Maungataniwha	59.26
Korowhata Stream Pond	FN174	Kaikohe	2.36
Koturetawhenua Stream	FN175	Maungataniwha	107.14
Koutu Shrubland	FN176	Hokianga	29.70
Kowhai Swamps	FN177	Aupouri	52.83
Kowhatuhuri Point Island	FN178	Kerikeri	2.97
Lacolmville	FN179	Maungataniwha	50.83
Lake Austria and Shrubland	FN180	Aupouri	25.17
Lake Heather	FN181	Aupouri	23.29
Lake Kihona and Forest Remnants	FN182	Aupouri	25.73
Lake Manuwai	FN183	Kerikeri	42.01
Lake Morehurehu and Wetland	FN184	Aupouri	65.48
Lake Ngakapua Complex	FN185	Aupouri	45.96
Lake Ngakeketa and Te Paki Lake and Surrounds	FN187	Aupouri	0.17
Lake Ngakeketa and Te Paki Lake and Surrounds	FN187	Te Paki	368.36
Lake Ngatu Complex	FN188	Aupouri	135.53
Lake Ohia	FN189	Aupouri	1675.42
Lake Omapere and Environments	FN190	Kaikohe	1331.02
Lake Owhareiti and Jacks Lake	FN191	Kaikohe	131.97
Lake Rotokawau and Pond	FN192	Aupouri	20.23
Lake Rotokereru Remnants	FN193	Tangihua	28.44
Lake Rotokereru Remnants	FN193	Whangaruru	4.95

Site Name	Site Number	Ecological District[3]	Area (Ha)
Lake Rotoroa and Wetlands	FN194	Aupouri	54.86
Lake Te Kahika	FN195	Aupouri	35.21
Lake Wahakari	FN196	Aupouri	280.04
Lake Waihopo and Shrublands	FN197	Aupouri	49.65
Lake Waikanae	FN198	Aupouri	372.07
Lake Waingata North	FN199	Tutamoe	2.14
Lake Waiparera and Wetlands	FN200	Aupouri	220.18
Lake Waiporohita	FN201	Aupouri	25.90
Lambs Road Swamp	FN202	Aupouri	8.60
Landcorp Paponga Remnants	FN203	Hokianga	229.24
Link Road	FN204	Kerikeri	6.91
Link Road	FN204	Whangaroa	9.61
Linssen and the Wainui River	FN205	Maungataniwha	128.45
Lion Rock	FN206	Kerikeri	2.66
Lower Waiare Road	FN207	Whangaroa	82.30
Lower Waihou Swamp and Shrubland	FN208	Hokianga	186.28
Mahenotiti Island	FN209	Whangaruru	0.99
Mahimahi	FN210	Kerikeri	616.45
Mahinepua Bay and Estuary	FN211	Kerikeri	4.94
Mahinepua Peninsula and Environments	FN212	Kerikeri	91.13
Mahinepua Peninsula and Environments	FN212	Whangaroa	9.29
Maitai Bay	FN213	Aupouri	36.33
Mangahoihere Stream Bush and Turangahou Trig Bush	FN214	Maungataniwha	159.01
Mangahoihere Stream Bush and Turangahou Trig Bush	FN214	Puketi	22.42
Mangaiti	FN215	Maungataniwha	11.02
Mangaiti	FN215	Whangaroa	157.56
Mangakahia Forest and Te Tarahiorahiri	WFN004	Tangihua	3.15
Mangakahia Road Wetland	FN216	Tangihua	1.53
Mangakahia Tributary Bush	FN217	Tangihua	33.04
Mangamuka-Mangataipa Mosaic	FN218	Maungataniwha	1104.04
Mangaraupo Stream Bush	FN219	Tangihua	64.72
Mangataipa Scenic Reserve	FN220	Maungataniwha	148.17
Mangatawa Bush	FN221	Hokianga	479.16
Mangatawa Bush	FN221	Tutamoe	2.04
Mangatawa Stream Forest Remnants	FN222	Hokianga	40.43
Mangatawa Stream Forest Remnants	FN222	Kaikohe	43.17
Mangatoa Stream Bush	FN223	Kaikohe	85.28
Mangatoa/Punakitere Riverine	FN224	Hokianga	0.08
Mangatoa/Punakitere Riverine	FN224	Kaikohe	123.19
Mangatoetoe Road	FN225	Maungataniwha	42.19
Mangatoetoe Wetlands	FN226	Maungataniwha	2.49
Mangonui Harbour Vegetation	FN227	Maungataniwha	866.59
Mangonui Harbour Vegetation	FN227	Whangaroa	3.37

Site Name	Site Number	Ecological District[3]	Area (Ha)
Mangonuiowae Bush	FN228	Hokianga	399.27
Mangu Road Bush	FN229	Tangihua	27.55
Mangu Road Wetland	FN230	Tangihua	7.56
Maraeoa Swamps	FN231	Hokianga	9.77
Maraeoa Swamps	FN231	Kaikohe	4.95
Marapiu-Patunga	FN232	Maungataniwha	302.12
Marawhiti Point Lake	FN233	Kerikeri	6.17
Marlow Road Bush	WFN005	Tangihua	3.17
Maromaku Forest Remnants	FN234	Tangihua	17.77
Marriott Island	FN235	Whangaruru	1.68
Martins Road '339'	FN236	Whangaroa	226.66
Mata Road Intersection Remnant	FN237	Hokianga	27.80
Mataka Wetlands and Shrublands	FN238	Kerikeri	127.21
Matapia Island	FN239	Aupouri	2.71
Mataraua Road Bush Remnants	FN240	Tangihua	10.86
Matauri Bay Bush	FN241	Kerikeri	463.47
Matauri, and Waiaua Bays and Estuary	FN242	Kerikeri	29.90
Matawaia Bush	FN243	Tangihua	340.16
Matawaia Maromaku Road Bush	FN244	Tangihua	105.41
Matawaia Maromaku Road Wetland	FN245	Tangihua	2.21
Matawera Road Bush	FN246	Hokianga	228.56
Matingirau	FN247	Whangaroa	87.85
Matthews Mission Bush	FN248	Maungataniwha	47.35
Maungamiemie and Barrons Bush	FN249	Maungataniwha	179.40
Maungamiemie and Barrons Bush	FN249	Whangaroa	610.01
Maungapohatu Bush	FN250	Hokianga	370.37
Maungapohatu Bush	FN250	Maungataniwha	18.73
Maungatiketike Point Islands	FN251	Te Paki	2.85
McDonald Road Bush, and Yuretich Road and “137” Awaroa River Shrublands	FN252	Hokianga	714.97
McKenzie Road	FN253	Kerikeri	50.21
Metcalfe Road	FN254	Maungataniwha	31.09
Mihi Road Bush	FN255	Kaikohe	269.62
Mihirau Bush	FN256	Hokianga	73.99
Milford Island	FN257	Whangaroa	32.35
Mini and Round Lakes	FN258	Aupouri	17.13
Mitimiti Stream and Streak Hill Shrubland	FN259	Aupouri	61.46
Moehau Wetland and Forest Mosaic	FN260	Hokianga	66.08
Moehau Wetland and Forest Mosaic	FN260	Kaikohe	91.23
Mokaikai Scenic Reserve and Surrounds	FN261	Aupouri	11.37
Mokaikai Scenic Reserve and Surrounds	FN261	Te Paki	4689.98
Monument Bush	FN262	Kaikohe	191.56
Monument Road Forest	FN263	Whangaruru	107.65
Motatau Forest	WFN006	Tangihua	3.69

Site Name	Site Number	Ecological District[3]	Area (Ha)
Motatau Road Raupo Wetland	FN264	Tangihua	2.14
Motu Puruhi and Terakautuhaka Islands	FN265	Aupouri	8.76
Motuarahi Island	FN266	Kerikeri	2.73
Motuarohia Island	FN267	Whangaruru	61.60
Motueka (Flat) Island	FN268	Kerikeri	8.70
Motuekaiti Island	FN269	Kerikeri	1.31
Motuiwi Island	FN270	Kerikeri	1.73
Motukahakaha Bays	FN271	Whangaroa	18.55
Motukaraka Remnant	FN272	Hokianga	42.66
Motukauri Island (a)	FN273	Whangaruru	3.64
Motukiekie Island	FN274	Whangaruru	34.22
Motukiore Bush Association	FN275	Hokianga	26.91
Motukiore Bush Association	FN275	Kaikohe	468.80
Motukokako Island	FN276	Whangaruru	5.85
Motukorari Island	FN277	Whangaruru	0.74
Motukumara Island	FN278	Whangaruru	2.23
Motumaire and Taylor Islands	FN279	Kerikeri	7.20
Motuopao Island and Rock Stack	FN280	Te Paki	34.20
Motupapa Island	FN281	Kerikeri	2.47
Moturahurahu Island	FN282	Whangaruru	3.66
Moturoa Island Group	FN283	Kerikeri	57.34
Moturoa Islands	FN284	Aupouri	43.66
Moturua Island and surrounds	FN285	Whangaruru	170.99
Motuterakihi Island	FN286	Kerikeri	0.48
Motuti Coastal Remnants	FN287	Hokianga	510.53
Motutui Island	FN288	Kerikeri	2.05
Motuwheteke Island	FN289	Whangaruru	1.23
Mt Camel	FN290	Aupouri	304.77
Mudgeway Road Bush	FN291	Hokianga	27.38
Murimotu Island	FN292	Te Paki	8.13
Murray	FN293	Maungataniwha	66.89
Myers	FN294	Kerikeri	26.67
Ngakengo Beach	FN295	Aupouri	10.28
Ngakengo Beach	FN295	Te Paki	197.24
Ngarahu and Burlaces Reserve	FN296	Maungataniwha	732.89
Ngarahu and Burlaces Reserve	FN296	Puketi	26.12
Ngarahu and Burlaces Reserve	FN296	Whangaroa	892.95
Ngaraumaunu Stream	FN297	Maungataniwha	130.36
Ngaraumaunu Stream	FN297	Whangaroa	89.84
Ngatauhe Stream Remnants	FN298	Hokianga	576.22
Ngatieke Airstrip Bush	FN299	Hokianga	66.64
Ngatuwhete Lake	FN300	Aupouri	10.20
Ngatuwhete Wetland	FN301	Aupouri	7.59

Site Name	Site Number	Ecological District[3]	Area (Ha)
Ngaungau Pa Bush	FN302	Kaikohe	12.23
Ngawha Bush	FN303	Kaikohe	55.48
Ngawha Geothermal Field	FN304	Kaikohe	207.71
Ngawha Swamps	FN305	Kaikohe	25.07
Ngawhitu Bush	FN306	Kaikohe	112.94
Ninety Mile Beach and Dunes	FN307	Ahipara	0.95
Ninety Mile Beach and Dunes	FN307	Aupouri	2324.10
Ninety Mile Swamp	FN308	Aupouri	2.27
North Cape Scientific Reserve and Surrounds	FN309	Te Paki	1040.40
North Whangaroa	FN310	Whangaroa	2918.23
Northern Mataraua Forest	FNK001	Hokianga	1841.29
Northern Mataraua Forest	FNK001	Kaikohe	52.14
Northern Mataraua Forest	FNK001	Tangihua	15.29
Northern Mataraua Forest	FNK001	Tutamoe	26228.46
Northern Mataraua Forest	FNK001	(blank)	0.81
Northern Tokerau Swamp	FN311	Aupouri	88.62
Ohauroro (Peach Island)	FN312	Whangaroa	11.14
Okahu Island	FN313	Whangaruru	32.97
Okaihau Stream	FN314	Whangaroa	101.72
Okaka Road Wetland	FN315	Kaikohe	3.85
Okakako Road Remnants	FN316	Kaikohe	45.54
Olsen Forest	FN317	Maungataniwha	62.50
Omahanui	FN318	Kerikeri	125.60
Omahu Stream Riverine Forest	WFN007	Tangihua	8.36
Omahuta Wetland	FN319	Maungataniwha	0.64
Omahuta Wetland	FN319	Puketi	4.94
Omao Bush	FN320	Kaikohe	118.34
Onewhero Bay	FN321	Kerikeri	4.36
Opara Road QEII Remnant	FN322	Hokianga	150.59
Opua Forest	FN323	Kerikeri	4841.22
Opua Forest	FN323	Whangaruru	0.42
Opurehu River	FN324	Maungataniwha	62.37
Orakau Road Forest Remnants	FN325	Kaikohe	0.65
Orakau Road Forest Remnants	FN325	Tangihua	50.02
Oraoa Stream Saltmarsh	FN326	Maungataniwha	1.09
Orawau	FN327	Hokianga	10.07
Orawau	FN327	Maungataniwha	135.51
Orira River Remnants	FN328	Hokianga	305.15
Oromahoe Forest	FN329	Kerikeri	75.40
Oromanga Road Wetlands	FN330	Aupouri	6.54
Oromanga Sandfield	FN331	Aupouri	2.37
Orotere and Taraire Road	FN332	Kerikeri	36.28
Orotere and Taraire Road	FN332	Whangaroa	307.34

Site Name	Site Number	Ecological District[3]	Area (Ha)
Oruaiti Headwaters	FN333	Maungataniwha	72.74
Oruaiti SH10 (Burgess)	FN334	Whangaroa	25.84
Oruatemanu Island	FN335	Kerikeri	0.75
Oruatemanu Island	FN335	Whangaroa	0.28
Oruru Forest and Scrub	FN336	Maungataniwha	1398.28
Otaenga Road/Awarua Riverine Forest	FN337	Tangihua	136.75
Otaenga Swamps	FN338	Tangihua	6.02
Otaha-Ohiritoa	FN339	Maungataniwha	528.28
Otamarangi Stream and Scotts Road Bush and Remnants	FN340	Kaikohe	356.53
Otamarangi Stream and Scotts Road Bush and Remnants	FN340	Kerikeri	4.18
Otaneroa Scenic Reserve	FN341	Hokianga	32.36
Otangaroa	FN342	Maungataniwha	68.54
Otautu Stream Headwaters	FN343	Kaikohe	267.85
Otawhiti Bush	FN344	Hokianga	58.58
Otepo, Sunnynook, and Oharae Stream	FN345	Maungataniwha	47.16
Otianga Wetland and Riparian Forest	FN346	Maungataniwha	12.20
Otiwhero Bush and Otaenga Bush	FNWK001	Tangihua	182.90
Oturia, Oturia Wahi Tapu, Umawera, and Rotokoma Stream Bush Areas	FN347	Hokianga	154.40
Oturia, Oturia Wahi Tapu, Umawera, and Rotokoma Stream Bush Areas	FN347	Maungataniwha	134.03
Oturu	FN348	Maungataniwha	452.35
Otuwhanga Island	FN349	Whangaruru	5.59
Outu Bay Stack	FN350	Whangaruru	0.72
Owhata A	FN351	Ahipara	14.08
Owhata B, Owhata C, Owhata D	FN352	Ahipara	163.90
Owhata B, Owhata C, Owhata D	FN352	Hokianga	7.19
Pōhutukawa Remnant	FN380	Aupouri	30.04
Pahara Shrublands	FN353	Aupouri	43.49
Paingatai Channel Wetlands	FN354	Aupouri	4.51
Paingatai Channel Wetlands	FN354	Te Paki	13.67
Pairatahi Road	FN355	Aupouri	12.23
Pairatahi Road	FN355	Maungataniwha	147.13
Pakaraka Bush and Werowero Swamp	FN356	Kaikohe	3.15
Pakaraka Bush and Werowero Swamp	FN356	Kerikeri	81.11
Pakaru Road Forest	FN357	Whangaruru	195.87
Pakewakewa	FN358	Maungataniwha	18.80
Pamapuria and Thompson Road Forest Remnants	FN359	Maungataniwha	101.61
Panguru Bush Remnant	FN360	Ahipara	2.40
Panguru Bush Remnant	FN360	Hokianga	278.67
Panther Road	FN361	Maungataniwha	27.18
Papanui/Umuwhawha Forest	WFN008	Whangaruru	311.69
Paparore Wetland and Shrubland	FN362	Aupouri	80.04
Paponga-Mata Road Association, Pukekohe Stream Bush, and Pahangahanga Remnant	FN363	Hokianga	872.25

Site Name	Site Number	Ecological District[3]	Area (Ha)
Paraha Road Wetland	FN364	Tangihua	0.68
Paranoa Swamp, Waitahora Lagoon and Waitahora Lakes Wetland Complex	FN365	Te Paki	295.51
Paranui Stream Vegetation	FN366	Maungataniwha	42.59
Paranui-Oruru Vegetation	FN367	Maungataniwha	329.78
Paranui-Toatoa Road and Paranui Forest and Scrub	FN368	Maungataniwha	781.00
Parapara	FN369	Ahipara	10790.18
Parapara	FN369	Hokianga	608.53
Parengarenga Shrubland	FN370	Aupouri	23.18
Pareokawa Bush	FN371	Hokianga	213.66
Parker Road Riverine Association and Forks Bush	FNK002	Tangihua	31.83
Patakorokoro Hill Bush	FN372	Tangihua	331.22
Pawarenga Road Shrubland	FN373	Hokianga	25.36
Pekerau	FN374	Maungataniwha	37.35
Peria River	FN375	Maungataniwha	191.67
Peria Valley Road, Chadwick 274 and Tuataranui and Tangikoko Streams	FN376	Maungataniwha	198.61
Pine (Awarau South) Swamp	FN377	Tangihua	0.76
Pipiwai Stream Swamp	FN378	Maungataniwha	18.93
Podocarp Forest	FN379	Tangihua	32.56
Pokapu Road Wetland	FN381	Tangihua	4.46
Ponaki Wetland	FN382	Te Paki	56.27
Popo Scenic Reserve	FN383	Kerikeri	70.93
Popo Stream Bush	FN384	Maungataniwha	153.13
Popoti Stream	FN385	Maungataniwha	12.26
Poroporo Island	FN386	Whangaruru	7.76
Porotu Road Forest and Wetlands	FN387	Kerikeri	28.10
Pouerua Bush	FN388	Kaikohe	66.05
Pouerua Cone	FN389	Kaikohe	6.65
Poutawhera Pa Shrubland	FN390	Hokianga	49.22
Pretty Lake	FN391	Aupouri	41.65
Puhangatohoraka and Te Awapuku Stream	FN392	Maungataniwha	250.23
Puhitia Road Bush	FN393	Tangihua	550.75
Pukekura Stream Wetlands	FN394	Aupouri	15.49
Pukemiro Remnants	FN395	Hokianga	128.90
Pukemiro Remnants	FN395	Maungataniwha	3.61
Puketōtara River Bush	FN397	Kerikeri	483.47
Puketōtara Road Alluvial Remnants	FN398	Kerikeri	1.66
Puketōtara/Patukauwae Te Keene Stream Swamp	FN399	Kaikohe	47.45
Puketōtara/Patukauwae Te Keene Stream Swamp	FN399	Kerikeri	17.32
Puketona Forest and Wetlands	FN396	Kerikeri	219.33
Pukewhararikī Bush	FN400	Kaikohe	2769.31
Pukewhau	FN401	Kerikeri	314.80
Punakitere Valley Swamp Forest	FN402	Kaikohe	146.57

Site Name	Site Number	Ecological District[3]	Area (Ha)
Punakitere Valley Swamp Forest	FN402	Tangihua	24.90
Pungaere Road Bush	FN403	Kerikeri	28.16
Pungaere Stream Bush	FN404	Kerikeri	72.02
Pupuke-Mangapa	FN405	Maungataniwha	47.64
Purerua Dams	FN406	Kerikeri	5.76
Purerua Peninsula Shrublands	FN407	Kerikeri	140.60
Puriri Block Road Bush	FN408	Maungataniwha	27.70
Puriri Farm Bush	FN409	Kaikohe	94.45
Putahataha Island	FN410	Whangaruru	0.63
Puwheke Beach and Rotokawau Lakes	FN411	Aupouri	412.16
Raetea Forest	FN412	Hokianga	165.53
Raetea Forest	FN412	Maungataniwha	14671.66
Rakautao Bush	FN413	Kaikohe	537.79
Rakautao Bush	FN413	Tangihua	4.56
Rakautao Forest	FN414	Kaikohe	8.62
Rakautao Forest	FN414	Tangihua	312.63
Rangi Point Remnants	FN415	Hokianga	126.38
Rangiahua Wetland	FN416	Hokianga	8.05
Rangitane Coastal Vegetation	FN417	Kerikeri	545.83
Rarawa Beach	FN418	Aupouri	89.75
Rata Tipene Road Harakeke Swamp	FN419	Tangihua	21.57
Rata Tipene Shrubland	FN420	Tangihua	164.59
Ratakamaru and Puketi-Omahuta Forest	FN421	Hokianga	29.50
Ratakamaru and Puketi-Omahuta Forest	FN421	Kaikohe	38.13
Ratakamaru and Puketi-Omahuta Forest	FN421	Kerikeri	16.31
Ratakamaru and Puketi-Omahuta Forest	FN421	Maungataniwha	2663.91
Ratakamaru and Puketi-Omahuta Forest	FN421	Puketi	18513.62
Rawhia Remnants	FN422	Hokianga	26.80
Remuera Settlement Road Remnants	FN423	Kaikohe	61.48
Reservoir Bush	FN424	Kaikohe	122.81
Riley Road Bush	FN425	Maungataniwha	18.72
Rotokakahi River and Surrounds	FN426	Hokianga	282.54
Runaruna Road Shrubland	FN427	Hokianga	236.30
Runaruna Scenic Reserve	FN428	Hokianga	81.81
Rurunga Stream Forest	FN429	Kaikohe	69.06
Russell Forest	FNW005	Whangaruru	19554.99
Saleyards 236	FN430	Maungataniwha	149.89
Salt Lake	FN431	Aupouri	8.83
Salt Road Shrubland	FN432	Aupouri	20.96
Salvation Road Swamp	FN433	Aupouri	31.14
Sandhills Road Wetland No 1	FN434	Aupouri	21.73
Sandhills Shrubland	FN435	Aupouri	49.85
Schluter/Vinac Pekerau	FN436	Maungataniwha	32.82

Site Name	Site Number	Ecological District[3]	Area (Ha)
Scott Point Shrubland and Coastal Associations	FN437	Aupouri	1.37
Scott Point Shrubland and Coastal Associations	FN437	Te Paki	1039.08
Scott Point Shrubland and Coastal Associations	FN437	(blank)	0.01
Selwyn Flat Wetland	FN438	Aupouri	15.67
Shenstone Block	FN439	Aupouri	40.27
Shenstone Block	FN439	Te Paki	890.48
Shepherd Road	FN440	Maungataniwha	279.20
Smith Road Forest Remnants	FN441	Hokianga	185.22
Smoothy Road Bush	FN442	Tutamoe	29.34
Snail Island	FN443	Kerikeri	1.70
South Omapere Kahikatea Remnant	FN444	Kaikohe	2.00
South Urlich Road Wetland	FN445	Aupouri	27.45
Southern Tokerau Swamp	FN446	Aupouri	99.99
Split Lake Wetland	FN447	Aupouri	16.76
Sporle Renwick	FN448	Ahipara	4.35
Sporle Renwick	FN448	Maungataniwha	15.13
Stanners Road Lake Vegetation	FN449	Kerikeri	13.09
Stephens Bush	FN450	Hokianga	32.96
Stephenson Island	FN451	Whangaroa	123.44
Sweetwater station	FN452	Aupouri	24.14
Sweetwater Station Depressions	FN453	Aupouri	23.24
Switzer Road	FN454	Maungataniwha	22.78
Tahawai Shrubland	FN455	Maungataniwha	22.84
Tahawai Shrubland	FN455	Whangaroa	82.65
Taheke River Wetlands	FN456	Hokianga	20.20
Taheke River Wetlands	FN456	Kaikohe	149.69
Tahoranui River	FN457	Kerikeri	103.05
Tahuna Channel Wetlands	FN458	Aupouri	0.03
Tahuna Channel Wetlands	FN458	Te Paki	4.13
Taikirau Railway Wetland	FN459	Tangihua	7.15
Taikirau Swamp	FN460	Tangihua	869.88
Taikirau Wetland and Shrublands	FN461	Tangihua	419.90
Taipa Puriri Forest	FN462	Maungataniwha	1.63
Taipa River and Ryders Creek Vegetation	FN463	Maungataniwha	384.96
Taipuhi Road Remnants	FN464	Whangaruru	98.25
Taita Road Bush	FN465	Tutamoe	36.17
Takakuri Stream	FN466	Maungataniwha	47.76
Takou Bay Estuary and Environments	FN467	Kerikeri	257.62
Takou Stream Bush and Lonsdale Park	FN468	Kerikeri	424.99
Tangitu-Landcorp	FN469	Maungataniwha	5.62
Tangitu-Landcorp	FN469	Puketi	20.96
Tangoake Shrubland	FN470	Aupouri	119.47
Tangonge Wetland	FN471	Aupouri	396.53

Site Name	Site Number	Ecological District[3]	Area (Ha)
Tapeka Point Coastal Habitat	FN472	Whangaruru	177.05
Tapotupotu Beach	FN473	Te Paki	6.49
Tapotupotu Stream Wetland and Estuary	FN474	Te Paki	25.62
Tapuaetahi	FN475	Kerikeri	228.21
Tapuwae River Bush	FN476	Hokianga	100.46
Tapuwae Scenic Reserve	FN477	Hokianga	428.42
Tarakihi Wetland and Environments	FN478	Tangihua	849.03
Tarakihi Wetland and Environments	FN478	Whangaruru	3.56
Taramawa Forest	FN479	Kerikeri	919.14
Taratara	FN480	Maungataniwha	52.47
Taratara	FN480	Whangaroa	453.93
Taratara Flax Swamp	FN481	Maungataniwha	0.17
Taratara Flax Swamp	FN481	Whangaroa	0.71
Tauanui Volcanic Broadleaved Remnant	FN482	Kaikohe	17.98
Tauanui Volcanic Lake and Environs	FN483	Kaikohe	38.97
Tauanui Volcanic Lake and Environs	FN483	Tangihua	1.73
Taumata Bush	FN484	Maungataniwha	34.63
Taumatataraire Stream Bush	FN485	Kaikohe	61.80
Taumatawhauwhau Forest Outlier	FN486	Hokianga	393.15
Taumatawhauwhau Forest Outlier	FN486	Tutamoe	0.03
Taupiri Island	FN487	Te Paki	3.71
Taupiroroa Range Shrublands	FN488	Aupouri	560.86
Taupo Bay Cliffs	FN489	Whangaroa	17.31
Taupo Bay Estuary	FN490	Whangaroa	5.20
Tauranga Bay Estuary	FN491	Whangaroa	12.32
Tauranga Valley	FN492	Kerikeri	44.68
Tauranga Valley	FN492	Whangaroa	156.52
Tauroa Lakes	FN493	Ahipara	15.43
Tauroa Peninsula, Ahipara Massif and Herekino Dunes	FN494	Ahipara	8570.37
Tauroa Peninsula, Ahipara Massif and Herekino Dunes	FN494	Aupouri	19.35
Tauroa Peninsula, Ahipara Massif and Herekino Dunes	FN494	Hokianga	35.07
Tautoro Wetland	FN495	Kaikohe	3.71
Tawai Stream and Mangakotukutuku Stream Forest	FN496	Hokianga	211.95
Tawai Stream and Mangakotukutuku Stream Forest	FN496	Maungataniwha	55.64
Tawiriwiri Island	FN497	Whangaruru	2.01
Te Ahu Ahu Wetlands and Environments	FN498	Kaikohe	157.31
Te Ahu Ahu Wetlands and Environments	FN498	Kerikeri	0.02
Te Ahu Ahu Wetlands and Environments	FN498	Tangihua	425.41
Te Ahu Road	FN499	Aupouri	306.17
Te Arai Sandfields and Shrubland	FN500	Aupouri	1250.85
Te Aute Road Forest	FN501	Kerikeri	38.85
Te Hapua Road Wetland	FN502	Te Paki	1.72
Te Hapua Settlement Wetland	FN503	Aupouri	0.07

Site Name	Site Number	Ecological District[3]	Area (Ha)
Te Hapua Settlement Wetland	FN503	Te Paki	23.73
Te Hapua Wetland	FN504	Te Paki	33.20
Te Huia Falls Bush	WFN009	Tangihua	20.35
Te Hurewai Stream Wetland	FN505	Te Paki	4.79
Te Hurunga Forest	FN506	Hokianga	710.75
Te Huruwai Stream Wetland	FN507	Aupouri	0.06
Te Huruwai Stream Wetland	FN507	Te Paki	18.79
Te Kahikatoa and Butterfly Bay	FN508	Whangaroa	244.49
Te Kao Shrublands	FN509	Aupouri	360.32
Te Kao South Swamp	FN510	Aupouri	115.26
Te Karae Station Remnants	FN511	Hokianga	53.91
Te Karaka Point and Ngakarapu Stream Shrubland	FN512	Aupouri	201.12
Te Karaka Point Coastal Forest	FN513	Hokianga	81.96
Te Karoa	FN514	Maungataniwha	5071.00
Te Karoa	FN514	Whangaroa	2.12
Te Konoke Bush	FN515	Hokianga	90.41
Te Mairepaopao, Dykin Road Bush and Upper Mangatete Valley	FN516	Maungataniwha	186.42
Te Moho Rock Bush	FN517	Tutamoe	3.33
Te Moho-Kaurinui-Hikurangi Vegetation	FN518	Maungataniwha	550.24
Te Ngaire	FN519	Kerikeri	7.88
Te Oi Bush	FN520	Kaikohe	83.57
Te Oi Bush	FN520	Tangihua	231.74
Te Opou Stream Forest	FN521	Tangihua	181.02
Te Pahi Island Group	FN522	Kerikeri	13.82
Te Paki Dunes	FN523	Aupouri	2033.14
Te Paki Dunes	FN523	Te Paki	50.78
Te Paki Dunes	FN523	(blank)	0.03
Te Paki Shrublands and Forest Remnants	FN524	Aupouri	10.43
Te Paki Shrublands and Forest Remnants	FN524	Te Paki	10843.87
Te Paki Stream	FN525	Aupouri	19.32
Te Paki Stream	FN525	Te Paki	8.02
Te Pewa and Four Crossroads	FN526	Maungataniwha	164.81
Te Pua Point P┼ihutukawa Remnant	FN527	Aupouri	2.38
Te Puhi	FN528	Maungataniwha	3.72
Te Puhi Swamp and Bush	FN529	Maungataniwha	98.55
Te Rahui	FN530	Maungataniwha	224.27
Te Rahui	FN530	Puketi	9.84
Te Raite Wetland	FN531	Aupouri	19.11
Te Ramanuka Lakes and Shrubland	FN532	Aupouri	432.16
Te Ranga	FN533	Maungataniwha	1731.17
Te Ranga	FN533	Puketi	0.24
Te Ripanga Stream	FN534	Maungataniwha	12.88
Te Rore Remnants	FN535	Maungataniwha	31.15

Site Name	Site Number	Ecological District[3]	Area (Ha)
Te Rore Wetland	FN536	Maungataniwha	1.07
Te Ruakokopu Stream Bush	FN537	Tangihua	22.36
Te Taro Wetlands and Scrub	FN538	Kerikeri	110.08
Te Tii Shrubland	FN539	Kerikeri	209.73
Te Tio Road Bush	FN540	Hokianga	60.31
Te Toa Bush	FN541	Tangihua	184.24
Te Umukukupa	FN542	Whangaroa	121.13
Te Wai-O-Te Marama Scenic Reserve and Surrounds	FN543	Tutamoe	20.01
Te Wakatehaua (The Bluff) Island	FN544	Aupouri	9.66
Te Werahi Beach and Cape Maria van Diemen	FN545	Te Paki	408.46
Te Werahi Wetland	FN546	Te Paki	706.72
Te Whatianga Swamp and Environments	FN547	Tangihua	393.81
Te Whau and Upukorau Airstrip	FN548	Kerikeri	13.96
Te Whau and Upukorau Airstrip	FN548	Whangaroa	393.71
Tepene Bush	FN549	Kerikeri	23.36
Tetehakehake Stream Shrubland	FN550	Aupouri	55.14
The Big Lake	FN551	Te Paki	0.97
Titihuatahi	FN552	Kaikohe	1127.29
Toatoa Stream	FN553	Maungataniwha	5.01
Toatoa Wetland	FN554	Maungataniwha	3.54
Tokawhero Road Forest Remnants	FN555	Tangihua	126.85
Tokerau Beach	FN556	Aupouri	521.74
Tokerau Beach	FN556	Maungataniwha	0.11
Tom Bowling Bay	FN557	Te Paki	115.10
Toretore Island	FN558	Whangaruru	2.75
Totara Bush Associations	FN559	Tangihua	322.32
Tracey/Edwards Road	FN560	Maungataniwha	13.17
Tuataranui Headwaters	FN561	Maungataniwha	23.92
Tupou Bay	FN562	Whangaroa	16.22
Tupou Bush	FN563	Whangaroa	103.39
Turks Lake and Wetland	FN564	Aupouri	24.58
Turntable Hill Bush	FN565	Kaikohe	71.26
Turntable Hill Bush	FN565	Kerikeri	207.48
Tutaematai Bush	WFN010	Whangaruru	24.07
Tutaetohia Stream Remnant	FN566	Hokianga	366.11
Tutaetohia Stream Remnant	FN566	Maungataniwha	0.05
Tutekehua Bush	FN567	Maungataniwha	5.05
Tutu	FN568	Whangaroa	157.72
Twilight Beach	FN569	Te Paki	392.96
Twin Bridges Riparian Forest	WFN011	Tangihua	29.25
Uekehea Habitat Mosaic	FN570	Tangihua	262.82
Unuwhao Bush and Shrublands	FN571	Te Paki	1508.11
Upokowhawha Forest Remnant	FN572	Hokianga	9.41

Site Name	Site Number	Ecological District[3]	Area (Ha)
Upper Herekino River Remnants	FN573	Ahipara	19.56
Upper Herekino River Remnants	FN573	Hokianga	50.29
Upper Kapowairua Wetland	FN574	Te Paki	13.09
Upper Karatia Swamp	FN575	Aupouri	57.36
Upper Karatia Swamp	FN575	Te Paki	1.39
Upper Mangakotukutuku Stream	FN576	Hokianga	5.99
Upper Mangawero Stream Tributary Remnant	FN577	Hokianga	27.03
Upper Pungaere Shrubland	FN578	Kerikeri	134.40
Upper Pungaere Shrubland	FN578	Whangaroa	0.34
Upper Tahoranui Valley	FN579	Kerikeri	220.44
Upper Te Puna Inlet	FN580	Kerikeri	209.30
Upper Uwhiroa Catchment Remnants	FN581	Ahipara	0.01
Upper Uwhiroa Catchment Remnants	FN581	Hokianga	86.42
Upukorau Bush	FN582	Kerikeri	15.05
Upukorau Bush	FN582	Whangaroa	339.63
Urupukapuka Island and surrounds	FN583	Whangaruru	137.99
Utakura Bush	FN584	Kaikohe	125.55
Utakura River Bush	FN585	Kaikohe	64.44
Victoria Valley Remnants	FN586	Maungataniwha	20.20
Victoria Valley Road	FN587	Maungataniwha	41.20
Waewaetorea Island	FN588	Whangaruru	23.26
Wagene's Swamps	FN589	Aupouri	50.27
Waiare Road Quarry	FN590	Puketi	93.15
Waiare Shrubland	FN591	Maungataniwha	2.25
Waiare Shrubland	FN591	Puketi	111.65
Waiare Shrubland	FN591	Whangaroa	126.45
Waiare Valley	FN592	Kerikeri	30.57
Waiare Valley	FN592	Puketi	536.59
Waiare Valley	FN592	Whangaroa	0.75
Waiaruhe Bush Remnants	FN594	Kaikohe	24.32
Waihaha Road Swamp Forest	FN595	Whangaruru	0.55
Waihakari Wetland	FN596	Te Paki	7.29
Waihapa Bay	FN597	Whangaroa	212.11
Waihapa Quarry	FN598	Maungataniwha	85.53
Waihapa Quarry	FN598	Whangaroa	0.07
Waiharakeke Stream Alluvial Forest	FN599	Kerikeri	81.80
Waiharakeke Stream Alluvial Forest	FN599	Tangihua	64.25
Waiheuheu Catchment Wetlands	FN600	Aupouri	0.35
Waiheuheu Catchment Wetlands	FN600	Te Paki	54.42
Waihoanga Bush	FN601	Kaikohe	207.01
Waihoanga Road Bush	FN602	Kaikohe	28.59
Waihoanga Stream Forest Outlier	FN603	Kaikohe	55.26
Waihoanga Stream Forest Outlier	FN603	Kerikeri	2.45

Site Name	Site Number	Ecological District[3]	Area (Ha)
Waikaraka Stream Bush	FN604	Kaikohe	101.60
Waikaramu Road Bush	FN605	Kaikohe	277.72
Waikawa and Manoao Stream	FN606	Maungataniwha	75.31
Waikawa Bush	FN607	Ahipara	2.42
Waikawa Bush	FN607	Maungataniwha	117.46
Waikuku Beach	FN608	Te Paki	207.72
Waikuku Flat and wetlands	FN609	Te Paki	393.41
Waikuku Road Bush	FN610	Kaikohe	154.34
Waimamaku Riverine Forest Remnant	FN611	Tutamoe	5.17
Waimamaku Scenic Reserve	FN612	Tutamoe	30.08
Waimanga Stream	FN613	Kerikeri	12.52
Waimango Swamp	FN614	Aupouri	417.61
Waimate Broadleaf Remnants	FN615	Kaikohe	47.20
Waimimiha Lakes	FN616	Aupouri	24.54
Waingaruru Stream Swamp	FN617	Kaikohe	5.14
Waingatepua Channel	FN618	Aupouri	0.38
Waingatepua Channel	FN618	Te Paki	6.03
Waiomio Limestone Caves Forest and Ruapekapeka Forest	FN619	Tangihua	8.78
Waiomio Limestone Caves Forest and Ruapekapeka Forest	FN619	Whangaruru	1336.33
Waiotehue Road Bush	FN620	Hokianga	274.86
Waiotehue Stream Bush	FN621	Hokianga	16.70
Waiotemarama Gorge Forest	FN622	Tutamoe	446.54
Waiotemarama Stream Bush	FN623	Tutamoe	13.67
Waiotu Riverine Forest	FNW006	Whangarei	10.82
Waiotu Riverine Forest	FNW006	Whangaruru	53.20
Waipara and Dead Lakes	FN625	Aupouri	7.02
Waiparera Creek Wetland	FN626	Aupouri	20.01
Waipokapoka Stream	FN627	Maungataniwha	68.69
Waipoua Coastal Strip and Taha Moana Scenic Reserve	FNK003	Tutamoe	178.93
Waipoua Coastal Strip and Taha Moana Scenic Reserve	FNK003	(blank)	46.17
Wairahi Swamp and Lake Taeore	FN628	Aupouri	195.21
Wairupe Forest Remnant	FN629	Hokianga	61.05
Waitaheke Road Bush	FN630	Kaikohe	21.76
Waitangi River Riparian Vegetation	FN631	Kaikohe	4.08
Waitangi River Riparian Vegetation	FN631	Kerikeri	225.50
Waitangi Stream Wetland and Riparian Strip	FN632	Te Paki	87.38
Waitangi Wetlands and Environments	FN633	Kerikeri	537.30
Waitapu, Upper Touwai Stream, Teheoriri, Radar Hill North, Wainui South and Whakarara	FN634	Kerikeri	1477.34
Waitapu, Upper Touwai Stream, Teheoriri, Radar Hill North, Wainui South and Whakarara	FN634	Whangaroa	1187.19
Waiwhakaruku Bush	FN635	Hokianga	17.27
Waiwhatawhata Bush	FN636	Tutamoe	438.99
Waiwiri Island	FN637	Whangaruru	1.22

Site Name	Site Number	Ecological District[3]	Area (Ha)
Walker Island	FN638	Aupouri	58.47
Waoku Coach Road Wetlands	FN639	Hokianga	4.74
Waoku Road Bush	FN640	Hokianga	530.69
Waoku Road Bush	FN640	Tutamoe	5.03
Wehirua Road Bush	FN641	Kaikohe	65.43
Wekaweka Bush	FN642	Tutamoe	8.30
Wells Stream	FN643	Maungataniwha	22.54
West Coast Road Lake	FN644	Aupouri	5.20
West Coast Road Shrubland	FN645	Aupouri	39.98
Whaengaere Road, Rangihoua, Oneroa/Tangitu and Patunui Bay	FN646	Kerikeri	237.97
Whakaangi, Berghan Point, Taemaro, Opakau Point, Waimahana and Paikauri Bush	FN647	Whangaroa	3194.54
Whakanekeneke River Bush	FN648	Kaikohe	224.28
Whakaoma/Huraunui Stream Secondary Forest Remnant	FN649	Hokianga	9.23
Whakaruangangana Gumfield	FN650	Kaikohe	233.44
Whakatau Wetland	FN651	Maungataniwha	3.51
Whakatereohao Stream Swamp	FN653	Aupouri	30.06
Whakateterekia Stream	FN654	Maungataniwha	20.56
Whakateterekia Stream	FN654	Puketi	41.78
Whangae Bush Remnants	FN655	Kerikeri	114.28
Whangape B	FN656	Ahipara	14.34
Whangaroa-St Pauls	FN657	Whangaroa	106.59
Whangatupere Bay	FN658	Aupouri	1028.60
Whareana Bay	FN659	Te Paki	55.99
Wharekauere Bush Remnants	FN660	Hokianga	358.52
Whatakau Stream	FN661	Maungataniwha	1.94
Whawhakou Channel Shrublands	FN662	Aupouri	140.85
Wheoki Stream/Pukemaire Remnants	FN663	Hokianga	143.51
Whitecliffs	FN664	Kaikohe	71.82
Whitecliffs Ltd Bush and Pukewhao and Wairere Stream Forest Mosaics	FN665	Hokianga	43.38
Whitecliffs Ltd Bush and Pukewhao and Wairere Stream Forest Mosaics	FN665	Kaikohe	846.37
Whiwhero Stream	FN666	Maungataniwha	91.11
Wiseman and Pearce Block Remnants	FN667	Hokianga	78.40
Woolshed Swamp	FN668	Aupouri	2.06
Young's Kahikatea Remnant	FN669	Kaikohe	7.48
Grand Total			**282,696.33**

5.2 Likely significant sites and new sites

Five sites identified in the original SNA GIS layer were identified as 'Likely' significant (Table 9). An additional 40 sites which were not identified in the original SNA GIS layer are listed in Table 10. Additional sites include natural areas which

may not have been visible on older aerial photographs, but could now potentially meet the significance criteria.

These sites could benefit from a site assessment to update site information and ensure that non-significant vegetation is excluded from these sites. Site inspections will enable the vegetation and habitat types present, fauna values, and potential threats to the continued existence of these sites to be determined. In order to accurately identify the values required to confirm significance and site boundaries, on-site field visits should be undertaken rather than site checks from publically accessible vantage points. This avenue of field visits would require landowner consultation and consent, and development of a field assessment programme in conjunction with a suitably qualified ecologist(s).

Table 9: Likely significant sites identified as SNAs in the Far North in 2019.

Site Name	Site Number	Ecological District	Area (ha)	Comment
Vujcich Road Swamp	FNL032	Hokianga	1.96	Likely significant, but requires a survey to confirm wetland significance.
Tī kōuka Remnant	FNL029	Kerikeri	1.24	Likely significant, but requires a survey, to determine whether there is sufficient indigenous species.
Motutapu Island	FNL022	Kerikeri	0.41	Likely significant, but requires a survey to confirm whether this SNA is dominated by indigenous vegetation.
Rangiputa Forest and Scrub	FNL027	Aupouri	76.66	Likely significant, but requires a survey to confirm the presence of heathland vegetation and to better determine the prevalence of exotic plant species.
Hikurangi	FNL038	Maungataniwha	97.66	Requires a survey to confirm vegetation types.
Total			**177.93**	

Table 10: New sites identified as SNAs in the Far North in 2019.

Site Name	Site Number	Ecological District	Area (ha)	Comment
Browns Road Wetland	FN037	Kaikohe	2.38	Potentially raupō reedland on alluvium.
Horeke Road Shrubland	FN122	Kaikohe	3.52	Requires a survey to confirm vegetation types.
Matawaia Maromaku Road Bush	FN244	Tangihua	105.41	Requires a survey to confirm vegetation types.
Matawaia Maromaku Road Wetland	FN245	Tangihua	2.21	Requires a survey to confirm vegetation types.
Far North New Site 01	FNL001	Kaikohe	9.27	Requires a survey to confirm vegetation types.
Far North New Site 02	FNL002	Kerikeri	2.10	Requires a survey to confirm vegetation types.
Far North New Site 03	FNL003	Kerikeri	5.85	Requires a survey to confirm vegetation types.
Far North New Site 04	FNL004	Kaikohe	7.68	Requires a survey to confirm vegetation types.
Far North New Site 05	FNL005	Aupouri	5.85	Requires a survey to confirm vegetation types.

Site Name	Site Number	Ecological District	Area (ha)	Comment
Far North New Site 06	FNL006	Tangihua	4.57	Requires a survey to confirm vegetation types.
Far North New Site 07	FNL007	Tangihua	7.73	Requires a survey to confirm vegetation types.
Far North New Site 08	FNL008	Tutamoe	21.09	Requires a survey to confirm vegetation types.
Far North New Site 09	FNL009	Kaikohe	2.71	Requires a survey to confirm vegetation types.
Far North New Site 10	FNL010	Kaikohe	4.53	Requires a survey to confirm vegetation types.
Far North New Site 11	FNL011	Tangihua	12.95	Requires a survey to confirm vegetation types.
Far North New Site 12	FNL012	Hokianga	6.34	Requires a survey to confirm vegetation types.
Far North New Site 13	FNL013	Tutamoe	0.94	Requires a survey to confirm vegetation types.
Far North New Site 13	FNL013	Hokianga	84.60	Requires a survey to confirm vegetation types.
Far North New Site 14	FNL014	Hokianga	8.74	Requires a survey to confirm vegetation types.
Far North New Site 14	FNL014	Tutamoe	4.34	Requires a survey to confirm vegetation types.
Far North New Site 15	FNL015	Tutamoe	29.33	Requires a survey to confirm vegetation types.
Far North New Site 16	FNL016	Tutamoe	2.26	Requires a survey to confirm vegetation types.
Far North New Site 17	FNL017	Tutamoe	37.20	Requires a survey to confirm vegetation types.
Far North New Site 18	FNL018	Tutamoe	31.63	Requires a survey to confirm vegetation types.
Far North New Site 19	FNL019	Tutamoe	34.00	Requires a survey to confirm vegetation types.
Ludbrook Road Wetland	FNL020	Kaikohe	3.73	Requires a survey to confirm vegetation types.
Mataraua Road Pond	FNL021	Kaikohe	3.31	Requires a survey to confirm vegetation types.
Okahu Heathland and Scrub	FNL023	Aupouri	4.82	Requires a survey to confirm whether this SNA is dominated by indigenous vegetation.
Okahu Heathland and Scrub	FNL023	Maungataniwha	31.64	Requires a survey to confirm ecological values.
Orakau Road Wetland and Scrub	FNL024	Tangihua	30.14	Requires a survey to confirm ecological values.
Purerua Road Swamp	FNL025	Kerikeri	2.37	Requires a survey to confirm wetland significance.
Rangihamama Road Wetland	FNL026	Kaikohe	2.74	Requires a survey to confirm wetland significance.
Te Paki Stream Wetland	FNL028	Te Paki	10.46	Requires a survey to confirm vegetation types.
Trig Road Heathland	FNL030	Aupouri	10.00	Requires survey to confirm the presence of heathland vegetation and to better determine the prevalence of exotic plant species.
Trig Road QEII Covenant	FNL031	Aupouri	1.43	Requires a survey to confirm vegetation types.
Waikaramu Road Wetland	FNL033	Kaikohe	6.02	Requires a survey to confirm ecological values.
Waima River Remnants	FNL034	Hokianga	44.62	Requires a survey to confirm vegetation types.
Waimahutahuta Stream Wetland	FNL035	Kaikohe	2.93	Requires survey to determine vegetation types and confirm wetland significance.

Site Name	Site Number	Ecological District	Area (ha)	Comment
Waiotane Road Riparian Vegetation	FNL036	Tutamoe	4.99	Requires survey to determine vegetation types and confirm wetland significance.
Wairoa Stream Wetland	FNL037	Kerikeri	4.13	Requires survey to determine vegetation types and confirm wetland significance.
Total			**600.56**	

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