Natural areas of Ahipara Ecological District

Reconnaissance survey report for the Protected Natural Areas Programme

NEW ZEALAND PROTECTED NATURAL AREAS PROGRAMME NO. 39

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Published by
Department of Conservation
Northland Conservancy
PO Box 842
Whangarei, New Zealand

ISSN 0112-9252
ISBN 0-478-21711-0

Cataloguing-in-Publication data

Natural areas of Ahipara Ecological District : Reconnaissance survey report for the Protected Natural Areas Programme/ Linda Conning. Whangarei, N.Z. : Dept. of Conservation, 1998.
1 v. ; 30 cm. (New Zealand Protected Natural Areas Programme, 0112-9252 ; no. 39.)
Includes bibliographical references.
ISBN 0-478-21711-0
1. Ecological surveys--New Zealand--Ahipara Ecological District. 2. Ahipara Ecological District (N.Z.). I. Conning, Linda. II. New Zealand. Dept. of Conservation. Northland Conservancy. III. Series: New Zealand Protected Natural Areas Programme (Series) ; no. 39.
574.99313 20
zbn98-031222

Foreword

The Ahipara Ecological District occupies a unique place in the geography of Northland. It encompasses the southern extremeties of Ninety Mile Beach, the mouths of the Herekino and Whangape harbours, and several high dissected plateaus whose ecology is dominated by the presence of kauri.

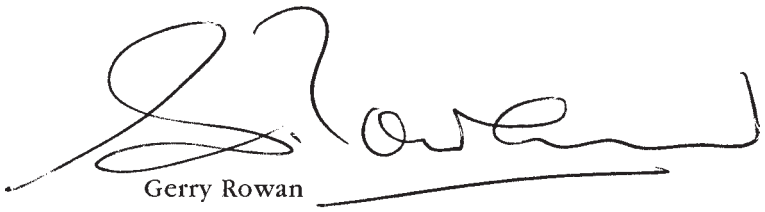
The contrast of landscapes is dramatic. These range from the huge golden dunes of Tauroa Point, the low windswept plateau of the Ahipara gumfields, and the volcanic massifs of Warawara and Herekino with their escarpments, bluffs and waterfalls.

The vegetation and wildlife of these areas is also significant. Herekino Forest contains the northernmost mature kauri and, together with Warawara, contains one of the larger areas of mature kauri forest outside Waipoua. The gumfields at Ahipara are the best remaining example of their type: a vegetation association which has been converted to farmland elsewhere in New Zealand. Dunelands, along with small remnant wetlands, are similarly significant because of the combination of plant and animal species present.

In spite of its very long human history which spans back to the earliest occupation of this country, this ecological district retains a high degree of naturalness. A large proportion of its area is predominantly natural, and much of this is administered by the Department of Conservation.

It may seem that sufficient land is already reserved. However, this view does not take into account the importance of these natural areas to New Zealand's biodiversity, the nationally and regionally uncommon biological associations, and the outstanding examples of nationally rare habitats.

It is features such as are contained in the Ahipara Ecological District which give Northland its unique character. Indeed, the Ahipara Ecological District can be seen as Northland in microcosm.



Gerry Rowan

Conservator - Northland

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FIGURE 1. LOCATION MAP OF AHIPARA ECOLOGICAL DISTRICT (BROOK 1996)

FIGURE 2. SURVEYED SITES, AHIPARA ECOLOGICAL DISTRICT .

OVERLAY. LAND ADMINISTERED BY THE DEPARTMENT OF CONSERVATION, AHIPARA ECOLOGICAL DISTRICT.

Abstract

The Ahipara Ecological District is located on the western coast of the North Island, south of Kaitaia, and covers approximately 27,762 ha, 88% of which comprise natural areas described in this report.

Natural areas of ecological significance were identified from a reconnaissance survey undertaken in 1994–96 together with information from existing databases.

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

Priority areas for protection include dunelands, gumlands, wetlands, coastal and kauri forests.

1. Introduction

1.1 THE PROTECTED NATURAL AREAS PROGRAMME

The Protected Natural Areas Programme (PNAP) was established in 1982 to implement s3 (b) of the Reserves Act 1977:

"Ensuring, as far as possible, the survival of all indigenous species of flora and fauna, both rare and commonplace, in their natural communities and habitats, and the preservation of representative examples of all classes of natural ecosystems and landscape which in the aggregate originally gave New Zealand its own recognisable character".

The goal of the programme is:

"To identify and protect representative examples of the full range of indigenous biological and landscape features in New Zealand, and thus maintain the distinctive New Zealand character of the country" (Technical Advisory Group 1986).

The specific aim of the PNAP is to identify, by a process of field survey and evaluation, natural areas of ecological significance throughout New Zealand which are not well represented in existing protected natural areas, and to retain the greatest possible diversity of landform and vegetation patterns consistent with what was originally present. To achieve this, representative biological and landscape features that are common or extensive within an ecological district

are considered for protection, as well as those features which are special or unique.

As knowledge and information about the presence and distribution of fauna and flora such as invertebrates and bryophytes is limited, the protection of the full range of habitat types is important to maintaining the diversity of lesser known species.

This report differs from previous PNAP reports in that it is based mainly on reconnaissance survey reports and existing published and unpublished data, and includes descriptions of most natural areas within the ecological district boundaries.

The natural areas described have been evaluated according to two levels of significance based on specified criteria (see Section 2), and are not confined to recommended areas for protection (RAPs), as defined in previous PNAP reports.

This approach was adopted so that the survey report better meets the broader information requirements of the Department of Conservation arising from the Resource Management Act 1991 (RMA) and the Convenion on Biological Diversity (1992).

The Purpose and Principles of the RMA are set out in Part II of that Act and include:

- safe-guarding the life-supporting capacity of air, water, soil and ecosystems;
- the preservation of natural character of the coastal environment, wetlands and lakes and rivers and their margins;
- the protection of outstanding natural features and landscapes;
- the protection of areas of significant indigenous vegetation and significant habitats of indigenous fauna;
- intrinsic values of ecosystems;
- maintenance and enhancement of the quality of the environment.

The Convention on Biological Diversity (1992), under the auspices of the United Nations Environment Programme, has promoted the concepts of biodiversity and ecosystems.

These concepts are reflected in this report in the size of many of the sites identified and surveyed in the fieldwork, and the emphasis on buffers and linkages in the identification and assessment of sites.

1.2 ECOLOGICAL DISTRICTS AND REGIONS

New Zealand's physical environment is very diverse and this is reflected in the diversity of indigenous plant and animal communities. In recognition of the biogeographic differences between various parts of New Zealand, a classification of ecological regions and districts has been established (McEwen 1987).

An ecological district is a local part of New Zealand where the topographical, geological, climatic, soil and biological features, as well as the broad cultural

pattern, produce a characteristic landscape and range of biological communities. Ecological Districts are grouped together into a series of Ecological Regions on the basis of shared general ecological and geological characteristics. In some cases, a single very distinctive ecological district is given the status of ecological region to emphasise its uniqueness (Technical Advisory Group 1986).

The New Zealand Biological Resources Centre co-ordinated the mapping of the country into more than 260 districts in 1982. Ecological regions and districts in northern New Zealand have recently been redefined to more accurately classify ecological variation within the Northland and Auckland areas (Brook 1996).

The PNAP uses the division of ecological districts as a framework throughout the country for determining ecological significance, including representativeness.

1.3 CONTENTS OF THIS REPORT

This report presents the findings of a reconnaissance PNAP survey of Ahipara Ecological District. It includes maps and brief descriptions of most of the indigenous natural areas within the ecological district, together with an analysis of the main vegetation types and information on threatened species and other taxa of scientific interest.

The natural areas described have been assessed according to ecological criteria outlined in Section 2.4. Sites meeting these criteria have been defined as Level 1 sites. All other sites are defined as Level 2 sites.

Although few sites were surveyed in detail, a large amount of data were collected, considerably expanding the information base for the ecological district.

Soil descriptions are given only for sites listed in Arand et al. (1993) as being of regional, national or international importance.

1.4 AHIPARA ECOLOGICAL DISTRICT

Ahipara Ecological District (Figure 1) covers approximately 27,762 ha. It 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.

Much of the 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, broadleaf-podocarp and coastal broadleaf forests, gumland shrubland, and coastal riparian vegetation. Of the natural areas identified, 71% is forest, 22.3% shrubland, 5.6% duneland, and less than 1% wetland.

In the western sector, the coastal influence is strong due to the presence of coastal species and assemblages. These give the area much of its character,

along with 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 several sites of threatened plants occurring. The coastal margin also provides a habitat for a large number of bird species, including the threatened New Zealand dotterel.

Apart from the coastal influence, the distinctiveness of the area is most obvious on 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 contains several threatened plants (see Section 3.4.5).

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.

2. Methodology

2.1 GENERAL APPROACH

To obtain information on the composition, extent and ecological values of indigenous natural areas within the northern sector of the Northland Conservancy, reconnaissance surveys using rapid semi-quantitative methods were carried out in 12 ecological districts between 1994 and 1996. Field work was carried out mainly by three Department of Conservation staff and co-ordinated in the Whangarei Office of the Northland Conservancy. The survey of Ahipara Ecological District was part of that larger study.

Natural areas were identified from topographic maps, existing databases, published and unpublished reports, aerial photographs and field and aerial observations. Areas were identified without regard for tenure. Consequently many natural areas which are administered by the Department of Conservation (Figure 1) as well as other protected areas were also surveyed (Figure 2) using the same methodology. This provided a consistent approach to determine repre-sentativeness of unprotected natural areas.

Each site was mapped and described. Having evaluated the sites (see Section 2.4), they were grouped according to one of two levels of ecological significance (see Section 4). Scientific names of species for which common names have been used are given in Appendix 8.4 (fauna) and Appendix 8.5 (flora).

In the writing of this report, extensive use was made of information from existing biological databases such as the Sites of Special Biological Interest (SSBI) Database, Rare Plants Database, Freshwater Fisheries Database,

Amphibians and Reptiles Database, Bio-sites, Geopreservation and Soils Inventories, published information and Department of Conservation internal reports. The SSBI database in the Northland Conservancy was the source of a considerable amount of information, particularly concerning fauna. Herbarium records from Auckland Institute and Museum and Landcare Research, Lincoln, were also consulted. Geographical and geological information was gained from existing published and unpublished maps.

2.2 CONSULTATION WITH LANDOWNERS

Because of the magnitude and geographic range of the surveys being undertaken (9 full and 3 part ecological districts to be completed in a 2 year period), personal contact with all landowners was not possible. Therefore all ratepayers were advised by mail by way of a leaflet (Appendix 8.2) informing them of the programme and the reason for it. The leaflet was signed by the Regional Conservator of the Department of Conservation, Northland Conservancy, and provided contacts for further information. A press release on the survey methodology and photograph of the survey team was issued and featured in the local newspapers (see Appendix 8.2).

In many instances permission for access was sought from landowners either by telephone or direct visit, and was generally given. In very few cases was access refused.

Consultation with Te Rarawa was undertaken by the Conservancy Manager (Protection) at hui attended throughout the district.

2.3 DATA ACQUISITION AND ANALYSIS

A rapid, reconnaissance field survey was carried out to record and map the ecological and geomorphological characteristics, habitat type and canopy vegetation of each identified natural area. Most of this work was carried out from roads, foreshores or high points using telescopes and binoculars. The district was covered in a methodical fashion based on geography, i.e. moving north to south and east to west. Where large mosaics occurred, several days were spent accessing the areas from several points.

Where the opportunity arose, e.g. at a landowner's request, some sites were inspected in more detail and transects within the habitat undertaken, while a few isolated sites were identified and described from aerial survey and photographs. Information on some sites in the latter category remains limited, and it is likely that some ecological units have not been recorded.

Natural areas were mapped using five broad categories of habitat types: forest, shrubland, wetland, duneland and estuary (See Appendix 8.6).

At each site, the composition and relative abundance of canopy plant species was recorded on the field survey sheet (see Appendix 8.1) in the following four categories: greater than 50% cover was defined as "abundant"; 20–50% cover as "common"; 5–20% cover as "frequent"; and less than 5% cover as "occasional".

Canopy composition based on percentage cover abundance is widely considered to be a valuable approach for description of forest stands. This technique and variations of it, for description of canopy composition, is well established and used throughout the world (see for example Kershaw & Looney 1985; Mueller-Dombois & Ellenberg 1974) as well as within New Zealand (see for example Atkinson 1962, 1985; Leathwick & Rogers 1996; Park & Walls 1978). The specific technique for vegetation description at each site is based on the approach set out in Myers et al. (1987).

This semi-quantitative method was favoured because of the time constraints for the field survey, the extensive areas to be covered and because it could be applied to all vegetation types, with ground cover plant species or substrate being recorded in non-forest habitats. More detailed, and therefore more time-consuming and expensive, methods would not necessarily provide more useful information for assessing representativeness. The disadvantage of this survey approach is that it did not provide a great deal of information on the distribution of uncommon and threatened species.

Because the low number of habitat sites in this district does not give a large enough sample to get an effective vegetation classification from the TWINSPAN programme (a two-way indicator species analysis programme), vegetation typing was done manually. Canopy species whose percentage cover was defined as "abundant" or "common" (see above) was used to define the vegetation component of the ecological units.

Landform and geology were classified using information from published and unpublished maps, reports and topographical maps. This information was combined with vegetation types to determine ecological units defined by particular vegetation-geomorphological characteristics, e.g kanuka forest on hillslope, *Spinifex* grassland on dunes. Most sites contain a range of ecological units.

Representativeness was assessed by determining the frequency of the different ecological units remaining in the ecological district, region, or nationally.

Because of resource constraints, the framework of land systems was not used in this survey or report.

Other relevant information such as fauna observations, threats and landowner information collected incidentally was also recorded on the survey sheet for each site. Once the field reconnaissance or survey had been completed, sites were numbered, and information from other databases, e.g. SSBI and threatened species information, was incorporated into the site descriptions.

Survey forms are held by the Department of Conservation, Northland Conservancy Office, Whangarei.

2.4 CRITERIA FOR ASSESSING HABITAT SIGNIFICANCE

The natural areas described here meet at least one of the following criteria:

- They are of predominantly indigenous character, by virtue of physical dominance or species composition.

- They provide habitat for a threatened indigenous plant or animal species.
- They include an indigenous vegetation community or ecological unit, in any condition, that is nationally uncommon or much reduced from its former extent.

The conservation values of these areas were then assessed using a two-level classification of habitat significance based on the PNAP ecological criteria of representativeness, rarity and special features, diversity and pattern, naturalness, habitat structure and characteristics important for the maintenance of ecosystems (buffer, linkage or corridor, size and shape).

The highest value areas (Level 1) are those which contain significant vegetation and/or significant habitats of indigenous fauna and are defined by the presence of one or more of the following ecological characteristics:

1. Contain or are regularly used by critical, endangered, vulnerable or rare taxa (i.e. species and subspecies), or taxa of indeterminate threatened status nationally (see Appendix 8.6).
2. Contain or are regularly used by indigenous or endemic taxa that are threatened, rare, or of local occurrence in Northland or in the ecological district.
3. Contain the best representative examples in the ecological district of a particular ecological unit or combination of ecological units.
4. Have high diversity of taxa or habitat types for the ecological district.
5. Form ecological buffers, linkages or corridors to other areas of significant vegetation or significant habitats of indigenous fauna.
6. Contain habitat types that are rare or threatened in the ecological district or regionally or nationally.
7. Support good populations of taxa which are endemic to Northland or Northland-Auckland.
8. Are important for indigenous or endemic migratory taxa.
9. Cover a large geographic area relative to other similar habitat types within the ecological district.

Level 2 sites are natural areas that support populations of indigenous flora and fauna not identified as meeting the criteria for level 1. They are sites which:

- contain common indigenous species;
- may be small and isolated from other habitats;
- may contain a high proportion of pest species;
- may be structurally modified, e.g. forest understorey grazed;
- have not been surveyed sufficiently to determine whether they meet the criteria for level 1 sites.

Categories of species rarity and threat are based on Molloy & Davis (1994), and Cameron et al. 1995 (see Appendix 8.3).

2.5 UPDATING OF DATA

Natural ecosystems and habitats are dynamic and are forever changing, both physically and biologically. Some areas are more dynamic than others, e.g. wetlands, which are particularly susceptible to changes in groundwater hydrology whilst others change more gradually, e.g. forest. The status and composition of species also changes over time and this could result in changes to the value of some habitats.

Human-induced activities and changes, both within or adjoining significant natural areas, can rapidly speed up the processes of change. Fire, followed by the invasion of adventive weeds, can dramatically modify shrublands. Drainage of adjoining land can alter the water tables of wetlands thus lowering the quality of the habitat and facilitating the establishment of weeds. Ongoing piecemeal destruction or modification of habitats and sustained grazing of bush remnants will, in the long term, completely eliminate some habitats.

The natural areas identified in this survey will require regular monitoring to note changes in both species and habitat composition and condition.

3. Ecological character

Ahipara Ecological District contains an exceptional biological diversity arising from the variety of habitat types it contains, including dunelands, gumlands, coastal and kauri forests.

3.1 TOPOGRAPHY/GEOLOGY

Steep-sided dissected massifs of allochthonous Tangihua Complex ophiolitic rocks (predominantly basaltic volcanics, breccia and subvolcanic intrusions) are the dominant landforms. Streams are deeply incised, and waterfalls and bluffs are common.

Herekino Range in the north-east is up to 560 m elevation, and is separated from the Ahipara massif by an eroded fault zone containing allochthonous Mangakahia Complex sedimentary rock units.

The top of the Ahipara massif at 330 m elevation is a dissected marine-cut peneplain sloping gently towards the west coast, and is locally capped by Pliocene-Pleistocene consolidated leached sands and silcrete pans.

Extensive areas of younger Pleistocene and Holocene dune sands mantle the western margin of the massif from Tauroa Peninsula to Herekino North Head. The ocean coast has long sandy beaches and intervening stretches of intertidal rocky reefs.

The Whangape massif to the south of Herekino Harbour entrance rises to 350 m elevation, and has eroded remnants of marine-cut terraces capped by Pliocene-

Pleistocene leached sands along its crest. The coastline of this massif has low rocky cliffs with gravel and sand pocket beaches, and is backed by narrow marine-cut terraces up to 60 m elevation. Whangape Harbour entrance separating the Whangape massif from Warawara Range to the southeast is 3.5 km long and fiord-like.

The Warawara Range rises to 740 m elevation (the highest point in the district), and is divided into two physiographic parts by valley systems eroded along a northwest- to southeast-trending fault zone. The southwestern part of the range has southwest-sloping peneplain remnants at 400–520 m elevation, whereas the northeastern part of the range has a series of northwest- to southeast-trending ridges and valleys. The ocean coast has low rocky headlands separated by sand beaches backed by narrow belts of Pleistocene and Holocene dunes (Brook 1996).

3.2 CLIMATE

The Ahipara Ecological District has a mild, humid and rather windy climate, winds being predominantly from the southwest, with exposed coastal areas tending to be very windy.

As no weather stations are located within the District, data from the nearest stations, being Kaitaia airport and Kaikohe, have been used in this section. Data from Waipoua Forest (also on the west coast, 25 km south of the southern boundary of the Ahipara Ecological District) have also been considered for this report because of the geographical similarities of that station to some of the higher parts of the Ahipara Ecological District.

Most of the district is close to the sea, causing the winds to be moist. However, rainfall varies, ranging from about 1400 mm per annum at low altitude coastal areas up to 2000 mm in the high altitude forests where moisture laden winds rise and condense.

The average rainfall is between 1400 and 1600 mm per year, with most rainfall occurring during winter (44% of the annual rainfall occurs between May and August). The driest months are December, January and March, each averaging 4–7% of the annual rainfall. Dry spells (period of 15 days or more having less than 1 mm of rain per day) occur at this time of the year.

The district is also subject to periodic cyclonic storms in late summer and early autumn, which bring heavy rainfall and may have widespread effects such as slips and windfalls. Heavy rainfall also occurs when northeasterly flows arise between ridges of high pressure to the east and troughs over the Tasman Sea.

The mean annual temperature is 15°C. February is the warmest month, with the mean temperature being 19°C, and July is the coldest month (11°C). However, with the temperature of the air decreasing at higher elevations, at about 500 m the mean annual temperature is 12°C, ranging from 17°C during January to 10°C during July.

Daily temperature variations are minor, with few extremes of temperature or frosts.

The district has about 2000 hours of bright sunshine per year, reduced to about 1700 hours in the higher areas (Moir et al. 1986).

3.3 VEGETATION

Botanical nomenclature in this report follows the *Flora of New Zealand* Vols 1-4 (see Bibliography) and Druce (1992). A full list of common names used in the text with their botanical reference is to be found in Appendix 8.5.

3.3.1 Historical

Prior to human settlement, much of the district was dominated by kauri (*Agathis australis*) forest (Clunie & Wardle 1983). Very little of this original forest 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 (N. Clunie pers. comm.). 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 europeus*) 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. Coastal lagoons, wetlands, and seeps have been irreversibly modified by grazing and land development and very few remain.

A hint of what has been lost is to be found in the 1851 diary of Jolliffe, crew on the ship *PANDORA*, where he describes the Opononi garden of the settler Webster as containing "a specimen of *Pisonia,* a cutting from the only one known, in Whangape." *Pisonia* (parapara), is recorded by Allen as occurring on the Three Kings and east coast, to East Cape. It is now seldom seen on the mainland, and not known to occur in or near this ecological district.

3.3.2 Broad pattern

There is a distinct coastal gradient, 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-broadleaf-podocarp forest and mature kauri forest.

Spinifex (*Spinifex sericeus*) and coastal toetoe (*Cortaderia splendens*) are the most common coastal plants on the dunelands along with manuka (*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 on more consolidated areas. A notable coastal feature is the absence of pohutukawa.

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

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

At about 600 m asl, puriri (*Vitex lucens*) and taraire are absent and the canopy is dominated by towai, tawa, *Quintinia serrata* and tawari (*Ixerba brexioides*).

3.3.3 Vegetation types

The main vegetation types are:

Sandfields

The Ahipara Ecological District contains one of the largest areas of relatively natural dunelands remaining in New Zealand, with large expanses of open sand.

The foredunes are dominated by spinifex with *Carex pumila*, knobby clubrush *(Isolepis nodosa*), and *Muehlenbeckia complexa*. Pingao (*Desmoschoenus spiralis*) occurs in isolated patches. In many areas marram (*Ammophilia arenaria*), lupin (*Lupinus luteus*), kikuyu (*Pennisetum clandestinum*) and other exotic species occur also. Coastal toetoe is common.

Wetlands

Wetland types include:

- Duneland wetlands. Tauroa Point Swamp consists of raupo (*Typha orientalis*) with *Eleocharis sphacelata.*
- Valley wetlands of raupo with *Baumea articulata* and occasional cabbage tree (*Cordyline australis*) bounded by manuka.
- Coastal seeps - jointed rush (*Leptocarpus similis),* knobby clubrush (*Isolepis nodosa),* giant umbrella sedge (*Cyperus ustulatus),* and some with *Euphorbia glauca.*
- *Juncus-Eleocharis-Isolepis* associations.
- Sedge-herb association on sand flats near stream mouths including *Myriophyllum votschii, Triglochin striata, Lilaeopsis novae-zealandiae* and *Eleocharis neozelandica.*

Coastal margins

On rocky margins once-common cliff-type associations can be found, including native iceplant (*Disphyma australe)*, taupata (*Coprosma repens*), tauhinu (*Ozothamnus leptophylla*), the coastal tussock *Stipa stipoides,* coastal brake fern *(Pteris* sp. cf. *comans),* maidenhair fern (*Adianatum diaphanum), Apium prostratum s.l.*, *Lobelia anceps, Senecio lautus* var. *lautus* and occasionally *Blechnum blechnoides,* which is rare in Northland.

Coastal shrubland

There are several types of coastal shrubland:

- The most common is manuka of low height with occasional flax (*Phormium tenax)*, coastal toetoe and cabbage tree. It is difficult to determine how

extensive this type was historically, as it is now at the initial succession stage following burning or clearance on coastal hillsides.

- Similar to the above, but containing kanuka (*Kunzea ericoides*) and somewhat taller, this type occurs on the edge of the dunelands and contains a greater range of species, with kowhai (*Sophora microphylla*), lancewood (*Pseudopanax crassifolius*) and occasional puriri and mangeao (*Litsea calicaris*). A range of divaricating shrubs occur in the understorey including *Lophomrytus obcordata,* which is uncommon in the northern part of the North Island although common elsewhere. *Pseudopanax ferox* is locally present.
- In more sheltered areas on hillslopes overlying Tangihua volcanics, the coastal shrublands consist of kanuka with *Olearia albida,* kohuhu *(Pittosporum tenuifolium),* akeake (*Dodonea viscosa*), whau (*Entelea arborescens*), kowhai, cabbage tree and occasionally *Pseudopanax ferox*, karaka (*Corynocarpus laevigatus*) and puriri.

Coastal forest

Typical coastal species include karaka, lancewood, kowhai and *Olearia albida.*

Key types are:

- manuka/kanuka dominant with mangeao, whau, rewarewa (*Knightia excelsa*), towai, taraire, puriri, akeake, and kohekohe (*Dysoxylum spectabile*);
- taraire dominant with kohekohe, kowhai, rewarewa and puriri – in some cases taraire is co-dominant with either puriri or karaka;
- karaka co-dominant with either taraire or kanuka – *Olearia albida* and rewarewa are frequent with occasional kowhai.

Broadleaf–podocarp forest

In inland forests, taraire and towai form the main forest types, either singly or co-dominant.

At higher altitudes, above around 300 m asl, taraire is no longer dominant and reduces in abundance. Puriri abundance is greatest in gullies and on more fertile sites. Other canopy species which occur typically in these forests are totara (*Podocarpus totara*), kahikatea (*Dacrycarpus dacrydioides*) and rewarewa. Kauri and/or northern rata (*Metrosideros robusta*) may or may not be present and are emergent at some sites. At higher altitudes, rimu (*Dacrydium cupressinum*) and northern rata are frequently emergent.

Tawa and northern rata may be locally common, especially at higher altitudes in towai dominant forests. On the eastern and southern flank of the Ahipara Massif, tawa and northern rata occur frequently at lower altitudes in taraire-dominant forest at Epikauri and Herekino Gorge.

Less frequently occurring canopy species in broadleaf-podocarp forests are miro (*Prumnopitys ferruginea*), matai (*P. taxifolia*), hinau (*Elaeocarpus dentata*) and kawaka (*Libocedrus plumosa*). The subcanopy is usually dominated by kohekohe, nikau (*Rhopalostylis sapida*), ponga (*Cyathea dealbata*) and

mamaku (*C. medullaris*). At higher altitudes, Smith's tree fern (*C. smithii*) replaces ponga and mamaku.

Kauri

Whilst often scattered within the broadleaf-podocarp forests, kauri is dominant mainly on ridge and plateau sites.

There are three main types of forest in which kauri dominates the canopy:

(i) Mature kauri forest in which large trees (greater than 1 m diameter) are totally dominant, either forming a closed canopy or emergent over Hall's totara (*Podocarpus hallii*), miro, rimu and tawa. Common understorey species in this forest type are tawari, *Quintinia serrata*, white maire (*Nestegis lanceolata*), *Mida salicifolia,* neinei (*Dracophyllum latifolium*), *Gahnia xanthocarpa*, kauri grass (*Astelia trinervia*), *Dicksonia lanata* "North", kiekie (*Freycinetia banksii*), mingimingi (*Leucopogon fasciculatus*), *Blechnum fraseri* and *Metrosideros albiflora*.

These are high altitude sites (>400 m asl) on ridges and plateaus in Warawara, and to a lesser extent in Herekino Forest.

(ii)At lower altitudes (<400 m asl), kauri is co-dominant in the canopy with rimu. Other species which may occur in association are *Quintinia serrata*, Hall's totara, lancewood, miro, northern rata, tawari and on drier sites, tanekaha (*Phyllocladus trichomanoides*) and kawaka. *Alseuosmia macrophylla*, karamu (*Coprosma robusta*), kanono (*C. grandifolia*) and mingimingi occur in the understorey along with *Gahnia, Astelia* and *Blechnum fraseri*.

(iii) Second growth forests in which kanuka and tanekaha are prominent may also contain dense stands of kauri on ridge sites, both at ricker and post-ricker stages. The understorey is generally more open with less *Gahnia* and *Astelia.*

Regenerating manuka or towai shrublands

Regeneration in the district is common on forest margins and is generally dominated by manuka and kanuka, which grades into secondary kanuka forest, except on the southern side of Herekino, where towai dominates the secondary growth.

The black tree fern or mamaku is usually present in regenerating areas, as well as rewarewa, kahikatea, and cabbage tree.

Gumland vegetation

The low manuka shrubland on the Ahipara plateau is a seral community on exposed sites, with severely limiting soils where frequent burning has occurred. In some areas gorse and prickly hakea occur to varying degrees. Other plants able to tolerate this harsh environment are *Dracophyllum lessonianum*, mingimingi, bracken (*Pteridium esculentum*), *Gleichenia* and sedges - *Baumea teretifolia, Schoenus brevifolius, S. tendo, Lepidosperma australe, Gahnia setifolia* and *Morelotia affinis.* (*S. brevifolius* and *D. lessonianum* are seldom found away from gumland soils.) Sundews (*Drosera* sp.) and "sun" orchids (*Thelymitra* species) are common.

Other species which occur here are *Pimelea* cf. *urvilleana* "Northern", *Leucopogon fraseri, Dianella nigra,* and *Lycopodium deuterodensum.* Several threatened plants *(Korthalsella salicornioides, Lycopodium serpentinum, Phylloglossum drummondii, Thelymitra "*Ahipara*", T. sanscilia* and *Calochilus paludosus)* are also found within this type.

Rocky outcrops

Amongst the sandfields and where streams have eroded to a rocky base, rock outcrops support a vegetation of monocotyledonous plants such as renga lily (*Arthopodium cirrhatum*), flax, *Astelia*, the wide-leaved sedge *Machaerina sinclairii*, *Cortaderia fulvida s.l.* (AK 222729) (streams), and *C. splendens* (sandfields).

3.3.4 Species of botanical interest

Herekino is the northern limit for *Pomaderris rugosa* (its range generally being Kawhia-Coromandel-Manaia) and possibly also for *Pittosporum virgatum*.

A large number of species of native orchid (25) occur on the Ahipara gumland plateau, some of which are endemic to Northland or the Far North. Apart from those listed below in Section 3.3.5 as Threatened, others include:

- *Corybas rotundifolia,* which is a distinctive species of limited distribution in Northland, as a component of gumland communities or sites of previous kauri forest, although it is no longer ranked Local. Ahipara is one of its strongholds (P. de Lange pers. comm. 1996).
- Four undescribed species confined to northern Northland (*Thelymitra* "darkie", *T.* "rough leaf" and 2 species both related to *T. longifolia*, *Thelymitra sp.* (aff *T. longifolia*)).

The bladderwort *Utricularia delicatula*, is also found on the Ahipara gumlands, and is of restricted distribution in Northland although it is no longer ranked as Local.

Olearia angulata, which is similar to, but with a chromosome difference from, *Olearia albida,* has small revolute, yellow-green leaves and an often suckering habit, is found at Ahipara and Warawara. This form, considered to be a separate taxon by P. de Lange and B. Molloy (pers. comm.1996), is also present at Te Paki and its stronghold is considered to be the Far North (P. de Lange pers. comm. 1996).

Another Northland endemic found in the district is makamaka (*Ackama rosifolia*), which is found at Ahipara, Warawara and Herekino.

3.3.5 Threatened plant species

(See Appendix 8.3 for Categories of Threat)

Calochilus herbaceous - Insufficiently known

A bearded orchid known only from Northland with recent records only in the Far North (P. de Lange, B. Molloy pers. comm.) and considered by de Lange & Molloy (1995) as a vagrant.

In this district it has been recorded from the Ahipara plateau.

Calochilus paludosus - Rare

A bearded orchid of mainly swampy and poorly drained habitats. Distribution is limited to the north and central parts of the North Island, and the north-west of the South Island (B. Molloy pers. comm. 1996). Also considered by de Lange & Molloy (1995) as a vagrant.

Calystegia marginata - Vulnerable

A slender climber with narrow pointed leaves found on margins in open, low shrubland (Wilson & Given 1987). Also found in eastern Australia, with sparse populations at Te Paki, Whangaroa, the Bay of Islands, near Leigh, Cuvier Island, Warawara and Ahipara.

Colensoa physaloides - Local

A distinctive blue-flowered, shrubby lobeliaceous plant with hydrangea-like foliage. It is a monotypic genus which is endemic to Northland, including some of its offshore islands as well as Rakitu Island to the east of Great Barrier Island (P. de Lange pers. comm.1996). It is found scattered throughout forest areas, generally beside streams and tracksides, and on talus slopes. Being vulnerable to browsing, it is usually removed where wild goats or stock are present.

Dracophyllum viride - Taxonomically indeterminate/Insufficiently known

This stoutly and much-branched species reaches 5 m (Allan 1961). Recorded from Herekino, where it is considered to be near its southern limit.

Eleocharis neozelandica - Vulnerable

A small endemic sedge occurring on the sandy margin of dune lakes, damp sandy flats and dune hollows or coastal stream flats (Wilson & Given 1989). Scattered records occur from Christchurch, Farewell Spit, Wellington, Manawatu, Auckland and in Northland from near Mitimiti, with its stronghold being at Te Paki (P. de Lange pers. comm. 1996). In the Ahipara Ecological district it is known from the Tanutanu area.

Euphorbia glauca - Rare

The New Zealand sea spurge is a soft herb of sporadic distribution around the coast on sand dunes and coastal seeps. Several sites have been recorded in this ecological district between Tauroa Point and Mitimiti (Wilson & Given 1989).

Hebe "**Bartlett**" - Local

An undescribed taxon which is confined to seepages in steep ravines on cliff faces. It is known from several sites in the Ahipara Ecological District, including stream gullies in the Ahipara Massif and Herekino Gorge, and also occurs in the Waima Range (P. de Lange pers. comm.1996).

Hibiscus diversifolius - Vulnerable

Also occurring in Australia and the Pacific, this prickly-stemmed shrub is found in New Zealand only in the Far North on coastal seeps and boggy areas, often on the inland edge of sandy beaches (Wilson & Given 1989).

Ileostylus micranthus - Local

A mistletoe with yellow-green flowers found throughout New Zealand and on Norfolk Island (Poole & Adams 1990). In Northland this species is extremely

uncommon despite it having once been widespread in the area (P. de Lange pers. comm. 1996). In this district it is found at Herekino.

Korthalsella salicornioides - Insufficiently known

A dwarf mistletoe usually parasitic on manuka and kanuka (Poole & Adams 1990), found on manuka in the Ahipara gumfields.

Leptinella rotundata - Rare

A small endemic creeping button daisy found growing amongst low vegetation on coastal cliffs (Wilson & Given 1989). Only 2 sites recorded in this ecological district, with the only known female plants occurring in this district (P. de Lange pers. comm.).

Lycopodium serpentinum - Vulnerable

One of the smallest club mosses, with few populations known north of Auckland, although it is also present in Australia and New Caledonia (Wilson & Given 1989).

It is found on open sites on gumland soils amongst *Gleichenia* and sundews.

Mazus novaezeelandiae - Vulnerable

Formerly considered to be *M. pumilio*, which was thought to have widespread distribution from Cape Maria van Diemen to Canterbury, as well as in Australia. This New Zealand form has sparse hairs on the leaves and is now considered a distinct species (Barker 1990). Four records are known from Northland, two from this Ecological District, one of which revealed no specimens in the course of this survey. The remaining site is amongst *Lobelia anceps* and *Isolepis,* and covers only 2 m^2.

Myosotis matthewsii - Rare

The only known population of this small, creeping, Northland endemic herb occurs on a very steep rock face near a waterfall at Warawara (J. Beachman pers. comm.). Its former distribution was in the "vicinity of Kaitaia" (Allan 1961).

Peperomia tetraphylla - Local

A small succulent herb with branches pubescent at the nodes, often a low epiphyte. It is very uncommon in Northland (L. Forester pers. comm. 1997) and is generally found in the East Cape-Bay of Plenty area and also occurs in Australia and Polynesia (Allan 1961). Known from only one site in this ecological district (on volcanic rocks near Kaeo), with single records also from Ahipara and Kaikohe Ecological Districts.

***Peperomia* "Purple Vein"** - Insufficiently known

Not yet described, this form has been found mainly on Great Barrier Island and near Taupo Bay (E.K. Cameron pers. comm.1996). In this district, it is found at Ahipara.

Phylloglossum drummondii - Rare

The only species in its genus, this fern ally is also found in Australia. In New Zealand it is restricted to low, open manuka north of Auckland, growing with sedges on seasonally damp gumland sites (Wilson & Given 1989).

Pimelea tomentosa s. str. - Rare

A slender shrub found in open shrubland from North Cape to Nelson/ Marlborough (Poole & Adams 1990) although there have been very few records from Northland. Recorded by Druce (1990) at Ahipara.

Pittosporum pimeleoides* subsp. *pimeleoides - Rare

A small shrub growing to 2 m with slender branches and narrow-oblong leaves crowded at tips or whorled (Poole & Adams 1990). It is found growing on dry and fairly open ridge sites, usually with mingimingi under tanekaha and kauri. Known only from North Auckland and now known mostly from north of Whangarei (Wilson & Given 1989). Recorded by Bartlett in 1977 from Herekino Gorge.

Pittosporum virgatum - Local

Confined to scattered locations in Coromandel and North Auckland, this species has a distinct juvenile form in which leaves and branchlets are densely hairy and the leaves diverse in form, often lobed. Plants may flower while still in the semi-juvenile stage (Allan 1961). Found at Herekino, which is near to, if not at, its northern limit.

Pseudopanax ferox - Local

The so-called "fierce lancewood", named from the hooked teeth of the juvenile form. It is of local distribution from Aupouri to the southern South Island (Poole & Adams 1990).

In this ecological district it is found in remnants of coastal shrubland adjoining sand dunes.

***Thelymitra* "Ahipara"** - Insufficiently known

This sun orchid has yet to be described, but is distinctive in its tolerance to seasonal flooding. In 1990 it was transferred to the Ahipara gumfields (and Lake Ohia in the Aupouri Ecological District) from a site in the adjacent Aupouri Ecological District (where it is considered endemic) as a protective measure due to its habitat loss from land development.

There are no known natural occurrences in the Ahipara Ecological District, and only two extant populations in the Aupouri Ecological District (de Lange et al. 1991).

Thelymitra malvina - Local

Also found in Australia, and at Lake Ohia in the adjoining Aupouri Ecological District, this sun orchid (with "pink whiskers") is found on gumland soils, generally in proximity of old kauri stumps.

Thelymitra sanscilia

Considered to be distinct from *T. pauciflora* (B. Molloy pers. comm. 1996) and known only from Ahipara, Kaimaumau and two sites at Peria. It is also considered to be threatened (Insufficiently known), although not as yet included on the current threatened plant list (P. de Lange pers. comm.1996).

Thelypteris confluens - Rare

The most recent record for this marsh fern is from Tauroa Point (Clunie & Wardle 1983). Once widespread, this fern is now confined to swamps north of

Auckland and in the Bay of Plenty, usually found in open areas amongst reeds and long grass (Brownsey & Smith-Dodsworth 1989).

Species previously recorded in the Ecological District but which have not been recorded for some time and are likely to be extinct in the Ecological District:

Caleana minor ** - Critical

A small duck orchid that grows on poor soils under manuka. Previously recorded at Herekino by Matthews in 1915 on open, poor clay amongst manuka. Now known only from Rotorua.

Myriophyllum robustum - Rare

This aquatic water herb is an endemic species which was once widespread throughout New Zealand. However, due to modification or loss of habitat it is known from only about eight individual sites in the North Island, including several dune lakes in the adjoining Aupouri Ecological District and from 15 sites along the west coast of the South Island (Wilson & Given 1989). It was recorded by Carse in 1911 from Hunahuna and may no longer be present in the district.

3.4 FAUNA

Information on fauna in this report has been compiled from SSWI and SSBI data bases, the 1984 Department of Lands and Survey Land Use Study, and from field observations during this survey. The status of individual species is derived from Bell (1986), and Molloy & Davis (1994). (See Appendix 8.3. Bell's "Threatened" equates to "Vulnerable".) Nomenclature follows the Checklist of the Birds of New Zealand (Ornithological Society 1990), and Pickard & Towns (1988) for reptiles.

A comprehensive discussion and checklist of fauna, particularly invertebrates, is beyond the scope of the present study. However, it is recognised that the invertebrate fauna, both common, e.g. tree weta, and less common, e.g. *Peripatus* and the forest ringlet butterfly (*Dodonidia helmsii*) are a significant facet of indigenous ecosystems. With the present state of knowledge of these species, the protection of the whole range of habitat types is considered important to ensure populations of invertebrates are maintained.

The individual site descriptions detail known significant fauna only. Most of the common bird species of Northland, both indigenous and introduced, are to be found in the district. A checklist of fauna recorded is included in Appendix 8.4.

3.4.1 Threatened birds

North Island brown kiwi *Apteryx mantelli*

Threatened endemic Category A

The main populations of kiwi in the district are present in Warawara and Herekino, but populations still exist at Whangape. There may be a small number of birds remaining in gullies in the Ahipara Massif/Herekino Gorge area.

New Zealand pigeon ***Hemiphaga novaeseelandiae novaeseelandiae***

Threatened endemic Category B

This species is subject to heavy hunting pressure in this district, particularly at Herekino.

North Island kaka ***Nestor meridionalis septentrionalis***

Threatened endemic Category C

Thought to have been present historically. Recent anecdotal reports of sightings in the Herekino and Ahipara areas are thought to be vagrants, rather than resident birds. Kaka populations are now restricted in Northland to the Hen and Chicken Islands (R. Pierce pers. comm.).

Red crowned parakeet ***Cyanoramphus novaezelandiae novaezelandiae***

Regionally threatened

Thought to have been present historically. Recent anecdotal reports of sightings in the Herekino and Ahipara areas are thought to be vagrants from the Three Kings or Hen and Chickens Islands, rather than from resident populations (R. Pierce pers. comm.).

New Zealand dotterel ***Charadrius obscurus aquilonius***

Threatened endemic Category B

Found scattered along the western coastline from Mitimiti to Tauroa Head, with greater numbers in the vicinity of the Hauturu Stream mouth.

Banded dotterel ***Charadrius bicinctus bicinctus***

Threatened endemic Category C

Found in the vicinity of the Hauturu Stream mouth. As there are few breeding areas north of Auckland (Ogle 1982), this population is significant.

Variable oystercatcher ***Haematopus unicolor***

Threatened endemic Category C

Found scattered along the western coastline from Mitimiti to Tauroa Head, with greater numbers in the vicinity of the Hauturu Stream mouth.

Caspian tern ***Sterna caspia***

Threatened Category O

Found along the western coastline from Mitimiti to Tauroa Head.

White-fronted tern ***Sterna striata***

Category C

Found along the western coastline from Mitimiti to Tauroa Head. Numbers of this endemic species have been greatly reduced over the past 20 years.

Reef heron ***Egretta sacra sacra***

Threatened Category O

Found in the vicinity of the Hauturu Stream mouth.

Australasian bittern ***Botaura poiciloptilus***

Threatened Category O

Recorded in duneland swamps in the northern part of the Ahipara area. Numbers thought to be small.

3.4.2 Bird species of regional and district significance

These are species not considered nationally threatened but which are rare in both the Ecological Region and District

North Island fernbird ***Bowdleria punctata vealeae***

Regionally threatened endemic

Dense population on the Ahipara plateau, possibly one of the most dense in the Western Northland Ecological Region. Also present in some gullies off the plateau.

Pied tit ***Petroica macrocephala toitoi***

Populations have been restricted by habitat fragmentation generally to large mature forested areas (Warawara, Herekino). The Herekino population is close to the northern range.

Rifleman ***Acanthisitta chloris granti***

Whilst common in forests south of Te Aroha, the tiny relict population in Warawara Forest is the only known population north of there apart from Little Barrier Island. It was amazingly only "discovered" in 1994.

The last record from Northland was more than 100 years ago.

3.4.3 Threatened mammals

Northern short-tailed bat ***Mystacina tuberculata aupourica***

Threatened endemic Category A

To date this species is known in this district only from Warawara.

There have been anecdotal reports of bats in Herekino Forest which have yet to be substantiated, and the species identified.

Long-tailed bat ***Chalinolobus tuberculata***

Threatened endemic Category B

Present in Warawara, and possibly Herekino (see above).

3.4.4 Threatened snails

Kauri snail ***Paryphanta busbyi busbyi***

Threatened endemic Category C

Found at Herekino and Warawara.

There are a number of small landsnail species endemic to Western Northland that occur in the Ahipara Ecological District, e.g. *Cytora aranea, Therasiella elevata,* and *"Phrixgnathus" larochei.*

3.4.5 Threatened fish

Koaro	*Galaxias brevipennis*	Category C
Banded kokopu	*G. fasciatus*	Category C

Both found at Warawara

3.5 THREATS

The coastal fringe is the part of the district under the greatest threat. These threats include cattle grazing of wetlands and herbfields, invasion of weeds, off-road vehicles, and the development of shrubland and regenerating areas for exotic forestry.

Although in the mature forested areas possums, goats, pigs and cattle constitute the main threat, feral dogs have also been sighted. (A list of introduced mammals is in Appendix 8.4.)

Habitats on margins or in successional stages are under threat from afforestation and the invasion of exotic species such as prickly hakea, gorse and pampas. Fire is also a major threat, with approximately 500 ha of shrubland in the southwest of the Ahipara plateau burnt in April 1997 (B. Waddell pers.comm.).

Apart from eliminating or reducing human-related threats, forest areas need to be managed to control animal pests and more open habitats managed for plant pests, to ensure long-term viability of the natural habitats. The physical and/or legal protection of all the significant areas will result in safeguarding the existing biodiversity of the district.

4. Site descriptions

Records of threatened flora and fauna have been sourced from herbaria and other databases mentioned in Section 2.1, the Kiwi Recovery Programme (for North Island brown kiwi), or were direct observations by Department of Conservation staff during the course of this survey.

The status of all records was checked prior to inclusion in this report. All records included were deemed to be valid as from 1992 or more recent, unless otherwise stated.

Only significant fauna data have been included in these site reports. See Appendix 4 for common fauna in the Ahipara Ecological District.

The percentage cover of ecological units has not been included in the site descriptions, because much of the information has been drawn from previous surveys and reports which did not record these data.

4.1 SCHEDULE OF SITES

	Name	Survey No.	Grid Ref.
Level 1 Sites			
	Reef Point	N04/001	N04 180 706
	Buchanan	N05/001	N05 300 503
	Whakakoro	N05/002	O05 301 513
	Owhata A	N05/003A	N05 265 530
	Owhata B	N05/003B	N05 275 535
	Herekino North Head	N05/006	N05 267 583
	Herekino Dunes	N05/007	N05 255 576
	Ahipara Massif	N05/008	N05 240 640
	Tauroa Peninsula	N05/014	N05 190 675
	Tauroa Lakes	N05/015	N05 170 693
	Herekino	O05/001	O05 335 670
	Warawara	O05/041	O05 390 470
	Ahoroa	O05/144	O05 325 447
	Puapua-Hauturu	O05/145	O05 325 455
Level 2 Sites			
	Owhata C	N05/003C	N05 277 546
	Owhata D	N05/003D	N05 290 548
	Hui Rd	N05/010	N05 295 633
	Whangape B	O05/040A	O05 305 524

4.2 LEVEL 1 SITES

REEF POINT

Survey no.	N04/001
Survey date	15 March 1995
Grid reference	N04 180 706
Area	4 ha (approx)
Altitude	Sea level

Ecological unit

Manuka shrubland on coastal sands.

Landform/geology

Unconsolidated coastal sand dunes.

Vegetation

A narrow strip of manuka above the edge of the beach where *Hibiscus diversifolius* is locally frequent. Other species which are of occasional

FIGURE 3. REEF POINT, N04/001.

EACH GRID IS 1000 M × 1000 M AND EQUALS 100 HA.

occurrence include cabbage tree, *Cortaderia splendens*, *Baumea articulata,* raupo and *Calystegia*.

Bartlett recorded *Thelypteris confluens* in 1977 at what is thought to be this site but its presence was not confirmed during this survey.

Fauna

Not surveyed.

Significance

Nationally Rare coastal vegetation type containing the threatened plant *Hibiscus diversifolius*.

BUCHANAN

Survey no.	N05/001
Survey date	12 December 1994
Grid reference	N05 300 503
Area	154 ha
Altitude	100–250 m asl

Ecological unit

(a) Karaka-taraire forest on steep coastal hillslope.

(b) Taraire-towai forest on steep coastal hillslope.

(c) Taraire-puriri forest on steep coastal hillslope.

(d) Towai forest on coastal hillslope.

(e) Manuka shrubland on steep coastal hillslope and ridge.

(f) Taraire forest on steep coastal hillslope.

(g) Kowhai-kanuka forest on steep coastal hillslope.

(h) Manuka-flax shrubland on steep coastal hillslope.

Landform/geology

Seaward-facing gullies and escarpments above fiord-like entrance to Whangape Harbour, on a steep coastal range of Tangihua Complex igneous rock.

Vegetation

There are 8 main vegetation types:

(i) Karaka-taraire forest with manuka and occasional nikau, mamaku and rewarewa. On the western slopes of the Whangape Gorge, puriri is frequent and northern rata, tanekaha, lancewood and rewarewa occasional.

(ii)Taraire-towai forest with occasional kauri, mahoe, nikau and mamaku.

(iii)Taraire-puriri forest with rewarewa and karaka and occasional titoki, kauri, kowhai, lancewood, nikau and *Olearia albida*

(iv)Towai forest with occasional kauri, rata, tanekaha and rewarewa.

FIGURE 4. BUCHANAN, N05/001.

EACH GRID IS 1000 M × 1000 M AND EQUALS 100 HA.

s = SHRUBLAND; f = FOREST.

(v) Coastal shrubland of manuka, varying from 1 to 6 m tall with occasional cabbage tree, kohuhu, mapou, rewarewa, puriri and karaka.

(vi) Taraire forest with frequent karaka and rewarewa occurs in the Waikare Stream gully, with occasional puriri, nikau, mapou and manuka.

(vii)Kanuka-kowhai forest with frequent karaka and occasional cabbage tree, nikau and kohuhu.

(viii)Manuka-flax shrubland with occasional mapou, rewarewa, toetoe, kohuhu and *Olearia albida*. The more exposed ridges consist of low manuka with flax and coastal toetoe.

The understory is mainly dense nikau with small leaf coprosmas, turepo and ferns.

Although the area was visited prior to fencing, stock damage in the interior was limited.

Fauna

North Island brown kiwi (Category A threatened species).

Significance

Approximately 95 ha of this site is protected under a QEII covenant.

Habitat for a threatened bird species.

This site is the largest and least modified example of coastal forest and shrubland in the part of the ecological district between Herekino and Whangape harbours, and a nationally uncommon vegetation type.

WHAKAKORO

Survey no.	N05/002
Survey date	February 1995
Grid reference	O05 301 513
Area	98 ha
Altitude	40–340 m asl

Ecological unit

(a) Manuka shrubland on elevated marine terrace.

(b) Manuka shrubland on steep coastal hillslope.

(c) Towai forest on steep hillslope.

Landform/geology

Northeast- and east-facing escarpments and gully heads on steep coastal range of Tangihua complex igneous rocks. Deeply leached sands overlie an elevated marine-eroded terrace remnant near Whakakoro Trig.

Vegetation

Around the Whakakoro trig the vegetation is low, manuka-dominant gumland shrubland, with occasional flax and *Dracophyllum lessonianum.*

Towai-dominant coastal forest, with puriri, tawa, taraire and emergent northern rata occurs in the gullies below the trig. Other species present are karaka, rewarewa, kohekohe, nikau and mamaku.

FIGURE 5. WHAKAKORO, N05/002.

EACH GRID IS 1000 M × 1000 M AND EQUALS 100 HA.

s = SHRUBLAND; f = FOREST.

On spurs between the gullies there is low, scattered manuka with occasional puriri and cabbage tree.

North of the trig is similar coastal forest with occasional kohekohe, cabbage tree and *Olearia albida.*

On either side is manuka shrubland to 6 m with occasional cabbage tree, puriri and mamaku. This area is apparently grazed with a discontinuous canopy.

Fauna

North Island brown kiwi (Category A threatened species).

Significance

Habitat for a threatened bird species.

Contains representative examples of coastal forest and gumland which are nationally uncommon habitat types.

OWHATA A

Survey no.	N05/003A
Survey date	12 December 1994
Grid reference	N05 265 530
Area	7 ha
Altitude	0–40 m asl

FIGURE 6. OWHATA A, N05/003A.

EACH GRID IS 1000 M × 1000 M AND EQUALS 100 HA.

Ecological unit
Leptocarpus-sedge association on coastal seep.

Landfrom/geology
Coastal cliffs of Tangihua Complex igneous rocks below elevated marine eroded terrace at 40–60 metres elevation.

Vegetation
Coastal seep, consisting of rough pasture and jointed rush (*Leptocarpus similis)* with *Muehlenbeckia complexa*, knobby clubrush (*Isolepis nodosa*) and giant umbrella sedge (*Cyperus ustulatus*) on a bank between pasture and coastal rocks. Also present are maidenhair fern (*Adiantum diaphanum)*, *Pteris* sp. cf. *comans*, tauhinu, coastal coprosmas, *Disphyma australe*, raupo, *Pimelea* cf. *urvilleana* "Northern", and *Stipa stipoides.*

Fauna
Not surveyed.

Significance
In spite of modification by cattle, this site contains a representative example of coastal seep vegetation, which is an uncommon vegetation type reduced from its former extent in both the ecological district and region.

OWHATA B

Survey no.	NO5/003B
Survey date	12 December 1994
Grid reference	N05 276 535
Area	88 ha
Altitude	100–280 m asl

Ecological unit
(a) Taraire-puriri forest on steep coastal hillslope.

(b) Taraire forest on steep coastal hillslope.

(c) Manuka forest on steep coastal hillslope.

(d) Towai forest on steep coastal hillslope.

(e) Manuka shrubland on steep coastal hillslope.

Landform/geology
Seaward-facing gullies and escarpments on a steep coastal range of Tangihua Complex igneous rocks.

Vegetation
Coastal remnant (i) - northernmost, and mostly fenced; windswept taraire-puriri forest with kohekohe, *Olearia albida,* kowhai, and kiekie on steep cliffs. Coastal shrubland occurs in the upper valley.

FIGURE 7. OWHATA B, N05/003B.

EACH GRID IS 1000 M × 1000 M AND EQUALS 100 HA.

s = SHRUBLAND; f = FOREST.

Coastal remnant (ii) - fenced on 3 sides, taraire dominant with karaka and rewarewa, and occasional puriri, towai, miro, tawa, kauri, lancewood, nikau and *Olearia albida.* Coastal shrubland occurs on the eastern side.

Coastal remnant (iii) - mostly coastal shrubland with a small remnant of taraire dominant forest.

Coastal remnant (iv) - fenced on 2 sides, towai dominant with rewarewa and taraire and a very diverse range of other canopy species including about 15 large

kauri trees and a dozen or more rickers. Coastal shrubland of varying heights occurs on the margins.

Fauna
Not surveyed.

Significance
Representative examples of coastal forest, which is a nationally uncommon vegetation type. Similar to N05/001 but smaller and fragmented, although collectively a viable size. Sites (ii) and (iv) in particular have a diversity of canopy species.

HEREKINO NORTH HEAD

Survey no.	N05/006
Survey date	1 February 1995
Grid reference	N05 267 583
Area	41 ha
Altitude	Sea level to 240 m

Ecological unit
(a) Kanuka forest on consolidated coastal dunes.

(b) Taraire-kanuka forest on steep coastal hillslope of volcanics and consolidated dunes.

(c) Kanuka shrubland on consolidated coastal dunes.

Landform/geology
Steep hillside on margins of Tangihua Complex igneous massif, bounded to seaward by Pleistocene consolidated longtitudinal dunes.

Vegetation
Coastal forest of 2 main types:

(i) Taraire dominant with rewarewa and kanuka. Associated species are karaka, *Olearia albida,* northern rata, puriri lancewood and towai.

(ii) Kanuka dominant with kowhai, cabbage tree, lancewood, *Olearia albida* and kohuhu.

Fauna
Not surveyed.

Significance
A unique site, representative of coastal forest on dunes, which is a very rare vegetation type regionally and nationally. This site contains a sequence from harbour edge to ridge and has a high degree of naturalness with a dense, even canopy, and is ungrazed (within plantation forest).

FIGURE 8. HEREKINO NORTH HEAD, N05/006.
EACH GRID IS 1000 M × 1000 M AND EQUALS 100 HA.
s = SHRUBLAND; f = FOREST.

HEREKINO DUNES

Survey no.	N05/007
Survey date	1 February 1995
Grid reference	N05 255 576
Area	57 ha
Altitude	Sea level–120 m

Ecological unit
(a) Manuka shrubland on coastal sands

Landform/geology
Eroded Pleistocene consolidated dunes overlain by Holocene unconsolidated dunes and sand drifts.

Vegetation
A sequence of dunes with coastal shrubland and some kikuyu on the edge of pine plantation.

Fauna
Not surveyed.

Significance
Dunes with coastal shrubland are an uncommon vegetation type regionally and nationally.

FIGURE 9. HEREKINO DUNES, N05/007.

EACH GRID IS 1000 M × 1000 M AND EQUALS 100 HA.

AHIPARA MASSIF

Survey no.	N05/008
Survey date	1 February 1995
Grid reference	N05 240 640
Area	6780 ha
Altitude	20–330 m asl

Ecological unit

(a) Manuka-kanuka shrubland on rolling to steep hillslope.

(b) Manuka shrubland on hillslope.

(c) Manuka shrubland on gumland plateau.

(d) Manuka shrubland on coastal sand.

(e) Manuka-bracken-gorse shrubland on gumland plateau and hillslope.

(f) Gorse-*Hakea* shrubland on gumland plateau.

(g) Manuka forest on hillslope.

(h) Kanuka shrubland on hillslope.

(i) Kanuka forest on coastal hillslope.

(j) Manuka-rimu forest on gently sloping plateau.

(k) Secondary kanuka-kauri forest on ridge.

(l) Kauri forest on hillslope and plateau.

(m) Taraire forest on moderate to steep hillslope.

(n) Taraire-kanuka forest on hillslope.

(o) Taraire-puriri forest on hillslope.

(p) Taraire-towai forest on steep hillslope.

(q) Taraire-tawa forest on steep hillslope.

(r) *Spinifex* grassland association on dunes.

(s) Raupo-*Baumea* association in swamp.

(t) *Juncus-Isolepis-Eleocharis* rush-sedgeland on sand.

(u) Herbfield-sedgeland association on damp sand flats.

(v) Herbfield-shrubland association on coastal cliffs.

(w) *Leptocarpus-Cyperus-Isolepis* sedgeland on coastal hillslope.

(x) Coastal toetoe tussockland on coastal sands.

Landform/geology

Igneous massif with steep sides, steep and deeply incised stream gullies, particularly on the coastal side; with a planed-off upper surface locally capped by deeply weathered podsolised Plio-Pleistocene sands, and Pleistocene consolidated dunes abutting the seaward margin.

Vegetation

A very large contiguous habitat forming a sequence of dunes with coastal shrubland to taller kanuka forest behind the dunes and coastal forest, gumland shrubland on the plateau, and further forest and shrubland on the inland side.

Type (a) Manuka-kanuka shrubland on rolling to steep hillslope

Dense manuka-kanuka of lower height occurs on spur crests and upper faces of deeply incised valleys on the western edge of the plateau.

From Herekino Gorge to Wainui, about two-thirds of the area is shrubland between 1 and 6 m tall, with occasional cabbage tree, mamaku, puriri, gorse, wild pine and tobacco weed grading into taraire-dominant forest on the steeper hillsides.

Type (b) Manuka shrubland on hillslope

Shrubland of varying height with kauri and *Olearia albida* occurs on the ridgeline south of the Waiatua Valley where the vegetation has been disturbed for exotic plantations and roading. Also present are *Solanum aviculare, Corokia buddleioides* and *Pittosporum umbellatum.* There are a few plants of *Acacia longifolia* along the roadside which should be eradicated before they become a nuisance.

Some of the gullies inland from the coast have tall manuka (up to 8 m) with puriri, kohekohe, mamaku and rewarewa or puriri-karaka with taraire and *Olearia albida.*

Type (c) Manuka shrubland on gumland soils

Comprises the majority of the habitat on the Ahipara Uplands and consists of manuka up to 1 m tall, with *Dracophyllum lessonianum* and *Schoenus brevifolius*. The other main species present are flax, *Schoenus tendo, Baumea teretifolia, Lepidosperma australe, L. laterale,* bracken, cutty grass, umbrella fern, mingimingi, *Leucopogon fraseri, Pimelea* cf. *urvilleana "*Northern*", Morelotia affinis, Dianella* and *Lycopodium deuterodensum.*

Noteworthy plants in poorly drained areas include the vulnerable *Lycopodium serpentinum* and the uncommon bladderwort *Utricularia delicatula*.

Orchids of the *Thelymitra* and *Corybas* genera also feature, including the threatened *T. malvina* and *T. "*Ahipara", the latter having being translocated (de Lange et al. 1990).

Type (d) Manuka shrubland on coastal sands

Behind Shipwreck Bay, about two-thirds of the area is coastal manuka shrubland with cabbage tree and coastal toetoe, from cliff edge at sea level through duneland on to the highest level of the ridge top.

The coastal hills to the south are covered mostly in low manuka (up to 1 m) with flax, bracken, coastal toetoe, knobby clubrush, and occasionally gorse, lupin and tauhinu. Kikuyu grass is present in varying proportions.

Around the stream mouth at the Hunahuna estuary, pasture and manuka-lupin shrubland occurs with some *Coprosma acerosa.*

FIGURE 10 (ABOVE AND OPPOSITE). AHIPARA MASSIF, N05/008.

EACH GRID IS 1000 M × 1000 M AND EQUALS 100 HA.

s = SHRUBLAND; f = FOREST; d = DUNES.

Type (e) Manuka-gorse-bracken shrubland on hillslope and gumland

Occurs in a small area west of the road at the top of the hill above Shipwreck Bay. An area of low shrubland with manuka, gorse, tobacco weed and bracken also occurs nearer the western end of Herekino Gorge.

Areas on the plateau which have been repeatedly burnt or are abandoned pasture, consist of gorse, manuka and bracken shrubland.

Type (f) Gorse and *Hakea*

In some areas on the plateau these also feature to varying degrees.

Type (g) Manuka forest on hillslope

In the main valley behind Shipwreck Bay, manuka forest of about 6 m tall can be found, with a diverse range of other species including mangeo, whau, kohuhu, kowhai, rewarewa, towai, taraire, puriri and akeake.

In the southeastern area of the plateau, manuka-dominant forest from 8 m occurs with frequent towai, and occasional kauri, rimu, rewarewa, kahikatea and cabbage tree.

Type (h) Kanuka shrubland on coastal hillslope

Tall shrubland occurs in more sheltered areas of deeply incised valleys on the western edge of the plateau with *Olearia albida, Pittosporum tenuifolium,* hinau, and karaka.

Type (i) Kanuka forest on hillslope

On the upper slopes around Tanutanu Stream, kanuka forest of up to 12 m in height occurs with five-finger, lancewood, broom and cabbage tree. In the gullies the other species present are mangeo, akeake, *Olearia albida,* taraire,

karaka, puriri and kohekohe. *Pseudopanax ferox* is found in isolated stands. The Local, as yet undescribed *Hebe* "Bartlett" is known from this catchment.

In the Waiatua Valley in the south there is tall kanuka forest behind the dunes grading into taraire forest.

Type (j)Manuka-rimu forest

A small area occurs on the eastern side of the plateau.

Type (k) Secondary kanuka-kauri forest

A small area occurs on the ridgetop at Epikauri.

Type (l) Kauri forest on plateau

Occurs in the south-east of the plateau. Associated species are kawaka, rimu, tanekaha and Hall's totara. This is possibly the last surviving fragment of kauri forest on gumland soils.

Type (m) Taraire forest on hillslope

In the Waiatua Valley, taraire-dominant forest with kohekohe, karaka and *Olearia albida* occurs in the steep, deeply incised valley to the edge of the Ahipara plateau.

Taraire is dominant on the coastal escarpment of the plateau. *Olearia albida* reflects the coastal influence. Other canopy species present are tawa, kohekohe, rimu, kauri, miro and Hall's totara.

In the south-eastern area of the plateau, taraire forest occurs with towai and northern rata, and puriri, kauri, matai, rimu and rewarewa.

On the Epikauri side, associated species are kohekohe, tawa and rewarewa. Other canopy species are kauri, towai, puriri and northern rata. In about 25% of the area at Epikauri, northern rata constitutes a higher proportion of the canopy, being frequent rather than occasional.

On the steeper hillsides of Herekino Gorge, associated species are kanuka and northern rata, with the occasional puriri, kahikatea, totara, towai, rewarewa, tawa and kauri.

Type (n) Taraire-kanuka forest

Occurs between Herekino Gorge and Wainui with puriri and occasional akeake, towai, northern rata, cabbage tree, kauri, kohekohe, rewarewa and karaka. Type (o) occurs in the gullies.

Type (o) Taraire-puriri forest

Occurs in gullies within Type (n) above with rewarewa, cabbage tree and mamaku.

Type (p) Taraire-towai forest

Occurs in the sheltered inland areas of the deeply incised valleys falling from the Ahipara Plateau towards the coast, with puriri, kohekohe, karaka and rewarewa. Kawaka occurs at three localities, and there are two large kauri in a tributary gully of the Waitaha stream.

Type (q) Taraire-tawa forest

Occurs in the southern part of the Herekino Gorge, on the steep escarpment wall above the wider part of the valley. Tawa constitutes between 20 and 50%

of the canopy, and northern rata up to 20%. Kowhai and kauri also feature, along with kanuka, puriri, kahikatea, totara, towai and rewarewa. Most of the area is grazed by ranging cattle.

Type (r) *Spinifex* on dunes

Occurs along the western Ahipara coastline. Associated species are *Carex pumila*, knobby clubrush, kikuyu, lupin, *Muehlenbeckia complexa* and other exotic herb species.

Type (s) Raupo-*Baumea* wetland

Occurs in lowland swamps near the coast.

Type (t) *Juncus-Eleocharis-Isolepis*

Juncus sp., *Eleocharis acuta*, and *Isolepis nodosa* occur on dampsandy areas. At the Hunahuna estuary, kuta, *Tetragonia* sp., *Coprosma acerosa* and the threatened *Mazus novaezeelandiae* are found.

Type (u) Herbfield-sedgeland association on damp sand flats

Where streams approach the coast, sparse herbfields of *Myriophyllum votschii* and *Triglochin striata* occur in the stream beds. The vulnerable *Eleocharis neozelandica* is found in association with *Carex pumila*.

Type (v) Herbfield-shrubland association on coastal rocks

In the rocky areas on the edge of the beach and on small cliffs, *Apium, Lobelia anceps,* tauhinu, iceplant and taupata are found. *Adiantum diaphanum* is found on some cliffs, and there are 2 sites of *Euphorbia glauca*. The fern *Blechnum blechnoides*, rare in Northland, is also found on coastal banks north of Hunahuna, as does the native sow thistle *Sonchus kirkii*, also uncommon in Northland.

Type (w) *Leptocarpus-Cyperus-Isolepis* association

Associated with Type (v), flax, knobby clubrush, giant umbrella sedge and raupo are found on seeps above the beach.

Type (x) Toetoe tussockland

Found between foredunes and coastal manuka shrubland, often on dune knolls.

Significant flora

- The orchids *T. malvina* (Local), and several northern Northland endemic species of this genera.
- The orchids *Calochilus herbaceous* (Insufficiently Known), *C. paludosus* (Rare), and *Corybas rotundifolius* (restricted distribution).
- The fern ally *Phylloglossum drummondii* (Rare), and the club moss *Lycopodium serpentinum* (Vulnerable).
- The mistletoe *Korthalsella salicornioides* (Insufficiently Known).
- The herb *Euphorbia glauca* (Rare), *Hebe* “Bartlett" (Local) and *Pseudopanax ferox* (Local).

Clunie & Wardle (1983) reported the Rare *Thelypteris confluens.*

Fauna

A dense population of fernbird (regionally significant species) occurs on the plateau.

White-fronted tern and variable oystercatcher (Category C threatened species), and pied stilt are all common along coastline.

NZ dotterel (Category B threatened species) is present.

NZ pigeon (Herekino side) (Category B threatened species), NI brown kiwi in low numbers in some parts (Category A threatened species).

Banded kokopu, koaro (Category C threatened species), red-finned bully, torrentfish.

Significance

This site includes the Ahipara Gumfields Historic Reserve (226 ha), which is also a nationally important Geopreservation Site being the best preserved area of kauri gum digging and processing (Kenney & Hayward 1993). It also includes stewardship land at Epikauri (647 ha), and approximately 75% of the Ahipara stewardship land (1753 ha). All of these areas are administered by the Department of Conservation.

The Ahipara Massif consists of an uninterrupted coastal sequence from the sea to Ahipara Plateau and contains a wide diversity of vegetation types, many of which are either confined to this part of the ecological district or are nationally uncommon. It includes:

- one of the largest and most diverse habitats of gumland vegetation in New Zealand, including the last stand of kauri on gumland soils - a characteristic of high scientific interest;
- the only example of manuka-rimu forest in the ecological district;
- luxuriant and diverse coastal forest, much of the canopy of which is dense and even, found in the valleys. The Waiatua Valley is probably the largest example of the deeply incised valleys running from the Ahipara Plateau to the sea and has the greatest degree of naturalness. Shipwreck Bay contains one of the most diverse examples of coastal manuka forest in this ecological district;
- the high proportion of tawa and rewarewa together with the northern rata in the Epikauri forest, and the taraire-tawa-northern rata forest of Herekino Gorge Bush, constituting a forest type not common in the ecological district or region;
- a very large contiguous habitat;
- coastal wetlands which are uncommon in the ecological district;
- coastal tussocklands which are uncommon in the ecological district.

Although modified, relative inaccessibility and low intensity use gives a wilderness quality, and an outstanding wilderness landscape.

Habitat for seven threatened plant species, three of Local and one of restricted distribution as well as several northern endemic orchid species.

Habitat for seven threatened species of fauna and one regionally significant bird species.

TAUROA PENINSULA

Survey no.	N05/014
Survey date	15 March 1994
Grid reference	N05 190 675; also NO4 180 706
Area	1082 ha
Altitude	Sea level to 200 m

Ecological unit

(a) Sand fields.

(b) *Spinifex*-marram-pingao association on coastal sands.

(c) Manuka-kanuka shrubland on coastal sands.

(d) *Stipa-Senecio* association on coastal rocks.

(e) Liliaceae-Cyperaceae association on rock outcrop.

Landform/geology

Extensive sandfield of Pleistocene consolidated longitudinal dunes overlain by unconsolidated Holocene transverse dunes and sand drifts. Tangihua Complex igneous rocks form wide intertidal platforms around Tauroa Point and outcrop in Makorau Stream valley and near Tauroa Trig.

FIGURE 11. TAUROA PENINSULA, N05/014.

EACH GRID IS 1000 M × 1000 M AND EQUALS 100 HA.

s = SHRUBLAND; d = DUNES.

Vegetation

This area includes the sandfields west of Waitaha and Tanutanu Streams, and excludes the developed pasture around the Tauroa lighthouse.

There are extensive sand dunes with spinifex, marram, pingao, and coastal toetoe. Ngaio, *Leptocarpus* and knobby clubrush also occur as do kikuyu, rice-grass, *Vulpia*, catsear and *Muehlenbeckia.*

Manuka-kanuka shrubland occurs on areas of consolidated sands. Cabbage tree, flax and coastal toetoe are common, with occasional puriri, lancewood and kowhai. Within these shrublands, divaricating shrubs, both forms of mingimingi (*Leucopogon fasciculatus* and *Cyathodes juniperina),* broom (*Carmichaelia australis*), *Muehlenbeckia complexa, Carex flagellifera,* hook grass and hopeless menace grass are common. Less common species occurring are the fierce lancewood *(Pseudopanax ferox), Hebe diosmifolia, Lophomytus obcordata* and *Corokia cotoneaster.*

The coastal rocks have *Stipa stipoides* and *Senecio lautus*, whilst inland rocky outcrops have renga lily, *Astelia*, flax, *Gahnia* and *Machaerina sinclairii.*

Fauna

Not surveyed.

Significance

This site includes approximately 25% of the Ahipara stewardship land (584 ha) administered by the Department of Conservation. Duneland ecosystems are nationally uncommon, especially on this scale.

The coastal manuka shrublands and monocotyledonous associations on the rock outcrops constitute assemblages verging on the unique.

Some parts have been heavily modified by ranging stock and off-road vehicles.

TAUROA LAKES

Survey no.	N05/015
Survey date	15 March 1995
Grid reference	N05 170 693
Area	5.8 ha
Altitude	50 m asl

Ecological unit

(a) Raupo reedland in peat swamp.

(b) Pond on coastal sands.

Landform/geology

Freshwater wetlands in hollows between Pleistocene consolidated longitudinal dunes.

FIGURE 12. TAUROA LAKES, N05/015.

EACH GRID IS 1000 M × 1000 M AND EQUALS 100 HA.

Vegetation

1. *Tauroa Point Swamp* is a peat swamp containing mostly raupo, with a small amount of *Eleocharis sphacelata,* cabbage tree and manuka, and very little open water. Unfenced, this lake is surrounded by grass, and located in a hollow between two areas of pine trees. It could be fenced with little difficulty.

2. *Centre Swamp* is a freshwater pond about a metre in depth with a few rushes, and may dry up at times. There are pine trees 20–30 m away on the western side, with grass around the remainder. Cattle have full access. There is an existing fence around the pines which could be extended to leave a small area for stock water. Formerly a breeding area for paradise and grey ducks.

Fauna

Bittern (Category O threatened species).

Significance

Duneland wetlands are Rare in the ecological district and Tauroa Point Swamp is the only wetland of its type known in the ecological district.

HEREKINO

Survey no.	O05/001
Survey date	November-December 1994
Grid reference	O05 335 670
Area	5939 ha
Altitude	60–300 m asl

Ecological unit

(a) Taraire forest on hillslope.

(b) Towai forest on hillslope.

(c) Towai-taraire forest on hillslope.

FIGURE 13 (ABOVE AND OPPOSITE). HEREKINO, O05/001.

EACH GRID IS 1000 M × 1000 M AND EQUALS 100 HA.

s = SHRUBLAND; f = FOREST.

(d) Taraire-towai-puriri forest on hillslope.

(e) Puriri-taraire-kanuka-towai forest on hillslope.

(f) Kanuka-puriri forest on hillslope.

(g) Secondary kauri-tanekaha-kanuka forest on ridge.

(h) Kauri forest on ridge.

(i) Kanuka forest on hillslope.

(j) Secondary kahikatea forest on toeslope.

(k) Manuka-kanuka shrubland on hillslope.

(l) Manuka shrubland on hillslope.

(m) Towai shrubland on hillslope.

(n) Secondary towai forest on hillslope.

(o) Towai-cabbage tree shrubland on steep hillslope.

(p) Towai-manuka shrubland on hillslope.

(q) Bracken-mamaku-mahoe fernland on hillslope.

Landform/geology

Igneous massif of Tangihua Complex rocks, with very steeply sloping flanks and an upper surface dissected by stream valleys. Marine-eroded terrace remnants, including some mantled by deeply leached sands are present at elevations of 120–170 metres on the northwestern flanks of the massif.

Vegetation

Type (a) Taraire forest

Tall taraire forest is the predominant vegetation type at lower altitudes. Associated species include:

(i) Frequent puriri and towai around the Okahu reservoir. Rimu, kahikatea, kauri and northern rata emergents are scattered throughout, as are totara and rewarewa. Behind the quarry the forest is similar but has fewer emergents, and less puriri and towai.

(ii) Frequent puriri east of Puketutu. Kawaka and northern rata are present.

(iii) Towai, tawa, kohekohe, emergent rata and rimu occur south of Puketutu.

(iv) Frequent towai and emergent northern rata on the lower slopes in the Tongaroa Stream catchment. Rimu, kahikatea and kauri are occasional emergents. Puriri, pukatea, rewarewa and totara also occur.

(v) Frequent towai at Orowhano, with a diversity of other species including puriri, kohekohe, northern rata, totara, rimu, kahikatea, tawa, kauri and kowhai.

(vi) Common towai and frequent kanuka on the western edge from Herekino Gorge to Wainui. Kauri, northern rata, rewarewa, totara, kahikatea, kohekohe and kowhai are present. A very large emergent totara is also present, and tawa, matai and emergent rimu occur locally.

Type (b) Towai Forest

(i) Occurs east of the Okahu quarry at higher altitudes. East of Puketutu, taraire is frequent. Kawaka and northern rata are present.

(ii) On the higher slopes of the Tongaroa Stream catchment, northern rata and taraire are frequent. Rewarewa, kauri, kohekohe, puriri, nikau, rimu and kahikatea also occur here.

(iii) At high altitude at Orowhano, frequent tree ferns and occasional rewarewa and pukatea occur.

Type (c) Towai-taraire forest

Occurs in the west between Herekino Gorge and Wainui, and there is also, on the lower slopes of the Tongaroa Stream catchment, a small area with frequent kanuka and northern rata.

Type (d) Taraire-towai-puriri forest

On the south eastern flank of Puketutu, frequent tawa occurs. Nikau and rata are also present.

Type (e) Taraire-towai-puriri-kanuka forest

Occurs at Herekino Gorge. Kauri, northern rata, rewarewa, totara, kahikatea, kohekohe and kowhai are present.

Type (f) Kanuka-puriri forest

Occurs on the edge of the forest near the Okahu quarry either with occasional tobacco weed, mamaku and cabbage tree, or towai, rewarewa and cabbage tree.

Type (g) Kanuka-tanekaha-kauri forest

Occurs east of the Okahu quarry with occasional puriri, rata, rewarewa and kahikatea. Tawa is also present here, but otherwise the species composition is similar to Type (a) at Okahu.

Type (h) Kauri forest

Mainly secondary forest with occasional tanekaha, kanuka and rewarewa. On some central and southwestern ridges, mature emergent kauri is dominant.

Type (i) Kanuka forest

At Pukepoto there is extensive kanuka forest with frequent towai and occasional kahikatea, puriri and cabbage tree.

Type (j) Secondary kahikatea forest

A small area occurs on the margins near the Tongaroa Stream catchment.

Type (k) Manuka-kanuka shrubland

From Herekino Gorge to Wainui there is a mosaic of varying heights. Species appearing occasionally in the shrubland canopy are cabbage tree, towai, puriri, rewarewa, and mamaku.

Type (l) Manuka shrubland

Low shrubland occurs on the margins in the Tongaroa Stream catchment and on the forest edge near Munn Rd, with occasional towai, bracken, mamaku and cabbage tree. Taller shrubland also occurs here.

Type (m) Towai shrubland

On the margins around the Diggers Valley Rd summit:

- extensive tall shrubland with frequent manuka and occasional cabbage tree, nikau, rewarewa, rimu, kahikatea and puriri
- low shrubland with pampas, mamaku and cabbage tree.

Type (n) Secondary towai forest

Near the Diggers Valley Rd summit is an extensive area of second growth up to 8 m tall. Other species occasionally appearing are cabbage tree, mamaku, pate, rewarewa, rimu, puriri, kahikatea and Mexican devilweed.

Type (o) Tall towai-cabbage tree shrubland

Occurs near Munn Rd with bracken and occasional puriri and mamaku.

Type (p) Towai-manuka-totara shrubland

A small area near Tongaroa Stream.

Type (q) Bracken-mamaku-mahoe fern-shrubland

Low vegetation occurs on the lower margin at Orowhano.

Significant flora

Hebe "Bartlett" (Local), *Colensoa physaloides* (Local), *Dracophyllum viride* (Taxonomically Indeterminate - Insufficiently Known), *Ileostylus micranthus* (Local), *Pittosporum virgatum* (Local), *P. pimeleoides* subsp. *pimeleoides* (Rare), *Pomaderris rugosa* and *Metrosideros umbellatum* (northern limit of distribution).

The area also contains many undescribed endemic mosses and liverworts including the only known site in New Zealand of *Dumortiera* (J. Braggins pers. comm. 1996).

Fauna

NI brown kiwi (Category A threatened species), NZ pigeon (Category B threatened species), pied tit (regionally significant species); Kauri snail (Category C threatened species). Likely to contain one or both species of indigenous bat (reported), both of which are threatened.

Significance

This site includes the 4360 ha Herekino Conservation Park and the 1.8 ha Orowhano Quarry Reserve, administered by the Department of Conservation.

A large and diverse contiguous habitat with numerous threatened and significant species of flora and fauna.

It is the only site in the ecological district where several forest vegetation associations occur, including taraire-towai-puriri, puriri-taraire-kanuka-towai, kanuka-puriri, kauri-tanekaha-kanuka, secondary kahikatea, as well as the various towai shrubland associations.

The site is nationally important because it contains the following soils:

(i) rendzinas under indigenous vegetation which are nationally uncommon;

(ii)a moderate range of brown granular clays (Te Kie Awapuku Mangonui) under indigenous vegetation;

(iii) the only example of Dairy Flat soils in the national inventory (Arand et al. 1993).

WARAWARA

Survey no.	O05/041
Survey date	1995
Grid reference	O05 390 470
Area	10 311 ha
Altitude	40–625 m asl

Ecological unit

(a) Towai forest on steep hillslope.

(b) Towai-taraire forest on steep hillslope.

(c) Taraire-puriri-nikau forest on hillslope.

(d) Taraire-kanuka forest on hillslope.

(e) Karaka-taraire forest on steep coastal hillslope.

(f) Karaka-kanuka forest on steep coatal hillslope.

(g) Towai-puriri forest on steep hillslope.

(h) Puriri forest on steep hillslope.

(i) Mature kauri forest on high podzol plateau.

(j) Towai-mamaku shrubland on steep hillslope.

(k) Manuka shrubland on steep coastal and inland hillslope.

(l) Flax-*Hebe* association on cliffs.

Landform/geology

Igneous massif of Tangihua Complex rocks, with very steeply sloping flanks and an upper surface deeply dissected by stream valleys, including a structurally controlled NW-SE trending valley system bisecting the massif.

Vegetation

Type (a) Towai forest

The most common forest type in the central part of the forest (Maungapohatu to Wharerimu Stream) and higher northern slopes. Rimu, miro, and northern rata are occasional emergents. Other frequent canopy species are tawa, hinau, rewarewa and Halls totara. The main subcanopy species include heketara, *Quintinia*, tawari, *Cyathea smithii*, mahoe and large-leaf mahoe.

The shrub and ground layers are generally represented by kanono, hangehange, *Cyathea smithii*, ramarama, *Gahnia*, kiekie, *Astelia*, *Alseuosmia macrophylla*, bush rice grass, *Blechnum discolor, B. filiforme* and *B.*"blackspot".

Several lowland species are rare or absent, being close to their altitudinal tolerance. (Only rarely do nikau, kohekohe, taraire and pigeonwood occur, with no puriri or karaka evident.) These species are found in abundance generally below 400 m asl.

Also present on the steep northern slopes, are nikau, mamaku, karaka, kowhai, tanekaha, and kawaka.

On the eastern side of the forest, mamaku occurs frequently, tawa sometimes so. Northern rata is frequent in patches at about 400 m asl and above. Numerous dead specimens are apparent. Other species occurring are puriri, taraire, kanuka, pukatea, kahikatea, kohekohe, mahoe and karaka.

On the southern side of the forest (Tauwhare), tawa is frequent with occasional northern rata, puriri, totara, rewarewa, kahikatea, kohekohe and mamaku.

Type (b) Towai-taraire forest

Occurs at lower altitude. At Tarakeha in the south, tawa and rewarewa are frequent. Puriri, northern rata, nikau and kanuka occur occasionally.

Along the Waihou and Wharerimu River catchment flats, the forest is on deep fertile soils and is considerably taller than the upland forest type, and the trees are a larger size. Northern rata (common), kahikatea and rimu (less common)

are emergent over a closed canopy of taraire, towai, pukatea, hinau and rewarewa. The subcanopy contains mahoe, nikau, wineberry, putaputaweta, wheki, kanono, *Coprosma areolata*, gully fern, supplejack, hookgrass, bush rice grass, *Blechnum filiforme, Blechnum fraseri* and *Deparia petersenii*. Nikau, titoki, rangiora and swamp maire are also present.

Type (c) Taraire-puriri-nikau forest

Occurs along the broader terraces of the Rotokakahi River. C*olensoa physaloides* (Local) and the fern *Loxsoma cunninghamii,* which is of limited distribution, are found here.

Type (d) Taraire-kanuka forest

Occurs below Poare, in the Moetangi Stream catchment, with frequent puriri, kohekohe, tawa, rimu and kahikatea. Miro, totara, kowhai, tanekaha, pukatea and northern rata are also present; ricker kauri dominate the ridges.

FIGURE 14 (ABOVE AND OPPOSITE). WARAWARA, O05/041.

EACH GRID IS 1000 M × 1000 M AND EQUALS 100 HA.

s = SHRUBLAND; f = FOREST.

Type (e) Karaka-taraire forest

At Matihetihe, *Olearia albida* and rewarewa occur frequently, with lacebark locally frequent. Nikau, puriri, cabbage tree, northern rata, titoki, kowhai, kohekohe and tawa are all present.

Type (f) Karaka-kanuka forest

Also at Matihetihe, with frequent *Olearia albida* and rewarewa. Tawa is local, and puriri, kowhai, taraire and kohekohe occasional.

Type (g) Towai-puriri forest

Occurs at lower altitude on northern slopes.

Type (h) Puriri forest

The peak Ongaru is characterised by this type, with tawa at higher altitude and taraire lower down. Kowhai, karaka, kahikatea and rata are occasional.

Type (i) Kauri forest

On the high western podzol plateau between 460 and 520 m asl is the largest stand of high altitude kauri in New Zealand. A large percentage of the original

kauri forest has been extensively milled and is now in a stage of vigorous podocarp-broadleaf regeneration. Some kauri is regenerating but not in the same abundance as the original kauri forest structure.

In the unmodified area the vegetation type can be best described as mature kauri, which is dominant and frequently occurs as either an emergent species or as a tall closed canopy. The subcanopy contains Hall's totara, miro, rimu, taraire, tawa and rewarewa. The main subcanopy species include tawari, *Quintinia serrata,* white maire, *Mida salicifolia*, neinei and the liane *Metrosideros albiflora.*

The ground layer species are dominated by kauri grass, *Dicksonia lanata* "North", *Gahnia*, kiekie, mingimingi, both small and large-leafed mahoe, kanono, umbrella fern and *Blechnum fraseri.*

At lower altitudes there are areas where kauri is common with frequent rimu emergent over Hall's totara, miro and *Quintinia serrata.* Broadleaf *Coprosma, Alseuosmia macrophylla* and mingmingi occur in the understorey along with *Astelia trinervia, Gahnia* and kiekie.

Type (j) Towai-mamaku shrubland

On previously cleared sites (possibly old slips), towai and mamaku area both common, with wineberry and mahoe also occurring.

Type (k) Manuka shrubland

(i) Occurs on the lower slopes of the hillsides flanking the Whangape harbour at Pawarenga, in varying stages of regeneration from 1 to 6 m tall. Occasional cabbage tree, puriri, rewarewa, and mamaku occur along with kahikatea, kauri, akeake and Cape honey flower in isolated sites.

(ii) Around Pangaru, shrubland occurs on the lower, gentle slopes.

(iii) Where the forest meets Runaruna Rd, the shrubland is taller with frequent kahikatea and totara, and occasional pate, puriri, tanekaha and mamangi.

(iv) On the western fringe of the forest the shrubland is of varying height, being lower and discontinuous nearer the coast, with locally frequent coastal toetoe, cabbage tree and flax. Puriri, karaka and mamangi occur occasionally.

Type (l) Flax-*Hebe* association

Occurs on steep cliffs near Matihetihe, with frequent *Olearia albida*, kanuka and karaka and occasional kohekohe and cabbage tree.

Significant flora

Myosotis matthewsii (Rare), *Calystegia marginata* (Vulnerable), *Colensoa physaloides, Ileostylus micranthus* (Local) and *Olearia angulata* (limited distribution).

Fauna

Habitat for NI brown kiwi (Category A threatened species), NZ pigeon (Category B threatened species), NI rifleman (the only known population in Northland), pied tit (regionally significant species); short-tailed bat (Category A

threatened species), long-tailed bat (Category B threatened species), kauri snail (Category C threatened species); Northland endemic snail *Liarea t. waipoua.*

Significance

This site includes the 6933 ha Warawara Conservation Park, the 823 ha Warawara Forest Sanctuary, and the 990 ha Te Hura Ecological Area, all administered by the Department of Conservation.

A large contiguous area of outstanding diversity, virtually comprising a sequence from coast to high altitude forest. The vegetation provides a water and soil protection function on very steep slopes.

Several species of flora and fauna which are either threatened or of restricted distribution occur here, including a relict population of North Island rifleman, the only known population in Northland.

Many associated plant species found within the kauri forest type are either absent or poorly represented elsewhere in the ecological district, including tawari, *Dicksonia lanata* "North", neinei, *Metrosideros albiflora* and the fan fern *Schizaea dichotoma.*

The vegetation type on Ongaru summit is unusual in this Ecological District, and the karaka-kanuka, towai-puriri, towai-mamaku, and flax-*Hebe* associations are the only examples of their type in the ecological district.

It is a nationally important soil site, being a very large area containing a moderate range of brown granular clays (Te-Kie Tutamoe Awapuku) under indigenous vegetation (Arand et al. 1993).

AHOROA

Survey no.	O05/144
Survey date	January 1996
Grid reference	O05 325 447
Area	9 ha
Altitude	c.20 m asl

Ecological unit

(a) *Leptocarpus*-sedge association on coastal seep (Moerewa Point).

(b) Flax-toetoe-*Leptocarpus* association on coastal dunes and cliffs.

(c) Manuka shrubland on coastal sands.

(d) Herbfield association on rock.

Landform/geology

Coastal headlands of Tangihua Complex igneous rock units.

Vegetation

At Moerewa Point and in small seeps are associations of jointed rush, giant umbrella sedge, flax, raupo and knobby clubrush.

FIGURE 15. AHOROA, O05/144.

EACH GRID IS 1000 M × 1000 M AND EQUALS 100 HA.

On rocky areas, *Lobelia anceps, Samolus repens*, and iceplant occur with isolated *Asplenium,* including *A. obtusatum* ssp. *northlandicum,* a fern of very restricted distribution and not commonly seen on the west coast.

A thicket of sedges, flax and toetoe occurs on rocky headlands and sandy banks above the shoreline with a surrounding buffer of coastal shrubland consisting of low manuka with flax and coastal toetoe.

Fauna

Not surveyed.

Significance

The largest and most intact example of coastal seep and headland vegetation between the Whangape harbour and Mitimiti.

Flora includes the Vulnerable *Mazus novaezeelandiae*, the Rare *Euphorbia glauca* and Rare *Leptinella rotundata.*

PUAPUA-HAUTURU

Survey no.	O05/145
Survey date	January 1996
Grid reference	O05 325 455

Area	62 ha
Altitude	c.20 m asl

Ecological unit

(a) Pingao-*Spinifex* association on dunes.

(b) *Isolepis* sedgeland on coastal sands.

(c) Manuka shrubland on coastal sands.

(d) Sandy beach.

Landfrom/geology

Wide sandy beach crossed by 2 major streams and backed by mobile dunes and bounded by rocky headlands

Vegetation

Scattered knobby clubrush and coastal toetoe with *Spinifex* and isolated pingao on mobile dunes, with succession to *Isolepis* and manuka dominant shrubland. The dune vegetation is considerably modified by stock.

FIGURE 16. PUAPUA-HAUTURU, O05/145.

EACH GRID IS 1000 M × 1000 M AND EQUALS 100 HA.

Scattered clumps of sedges and herbs including *Triglochin striata* and *Lilaeopsis novae-zelandiae* occur on extensive sand flats with meandering streams and swampy depressions.

Fauna

NZ dotterel (Category B threatened species), banded dotterel (Category C threatened species), variable oystercatcher (Category C threatened species), Caspian tern (Category C threatened species), reef heron (Category O threatened species), fernbird (regionally significant species).

Significance

Being adjacent to Warawara Forest (O05/041), this site provides a sequence from coast to forest.

Supports a diversity of bird species, many of which are threatened.

4.3 LEVEL 2 SITES

OWHATA C

Survey no.	N05/003C
Survey date	12 December 1994
Grid reference	N05 270 550 - 286 540
Area	18 ha
Altitude	200–280 m asl

Ecological unit

(a) Manuka shrubland on steep coastal hillslope.

(b) Puriri forest in gully.

Landform/geology

Landward-facing gully heads and escarpments on a steep coastal range of Tangihua Complex igneous rocks.

Vegetation

1. Puheke - low manuka shrubland with occasional flax, bracken, cabbage tree, toetoe, karamu and isolated pine. The main gullies are tall manuka with puriri, mamaku and cabbage tree.
2. Escarpment edge - mostly manuka shrubland to 3 m with towai and occasional puriri, mamaku, flax, akeake, bracken, *Coprosma* spp., *Hebe* and cabbage tree. Gully remnant of puriri with rewarewa and taraire and occasional totara and mamaku.

Fauna

Kiwi reported.

Significance

Remnants of indigenous vegetation on steep escarpments and gullies in an area south of the Herekino Harbour where there is little native vegetation.

A detailed survey would be needed to fully determine the botanical values and confirm the presence of kiwi.

FIGURE 17. OWHATA C, N05/003C.

EACH GRID IS 1000 M × 1000 M AND EQUALS 100 HA.

s = SHRUBLAND; f = FOREST.

OWHATA D

Survey no.	N03/003D
Survey date	12 December 1994
Grid reference	N05 290 548
Area	10 ha
Altitude	40–100 m asl

Ecological unit
Taraire-puriri forest on hillslope.

Landform/geology
Escarpment along a ridge of Tangihua Complex igneous rocks.

Vegetation
Broadleaf remnant on a hillside in the inland valley. Taraire dominant with puriri common and occasional kohekohe, rewarewa, karaka, kowhai, tawa, rata and cabbage tree.

Fauna
Not surveyed.

FIGURE 18. OWHATA D, N05/003D.

EACH GRID IS 1000 M × 1000 M AND EQUALS 100 HA.

Significance

Although not the best example of coastal forest in the ecological district, this compact remnant represents an uncommon vegetation type.

HUI RD

Survey no.	N05/010
Survey date	12 December 1994
Grid reference	N05 295 633
Area	9 ha
Altitude	60–120 m asl

Ecological unit

(a) Taraire forest on hillslope.

(b) Manuka-kanuka shrubland on hillslope.

Landform/geology

Steep hillside and gully on ridge of Tangihua Complex igneous rocks.

FIGURE 19. HUI ROAD, N05/010.

EACH GRID IS 1000 M × 1000 M AND EQUALS 100 HA.

Vegetation

Primarily taraire dominant with puriri and occasional kahikatea and cabbage tree, and including a small area of manuka shrubland.

It is located on the south and western flanks of a small pa site.

Fauna

Not surveyed.

Significance

Situated on a steep face implying water and soil values; seasonal food source for NZ pigeon.

WHANGAPE B

Survey no.	O05/040A
Survey date	February 1994
Grid reference	O05 305 524
Area	8 ha
Altitude	40–200 m asl

FIGURE 20. WHANGAPE B, O05/040A.

EACH GRID IS 1000 M × 1000 M AND EQUALS 100 HA.

Ecological unit
Karaka-*Olearia albida* forest on steep hillslope.

Landform/geology
Escarpment along a ridge of Tangihua Complex igneous rocks.

Vegetation
Coastal forest remnant of karaka and *Olearia albida* with puriri, kowhai, nikau and mamaku. This remnant has an open canopy and is heavily grazed.

Fauna
Not surveyed.

Significance
Remnant of coastal vegetation, and the only example of this vegetation association but heavily grazed and in a very degraded state.

5. Summary and conclusions

The Protected Natural Areas network in the Ahipara Ecological District is summarised in Table 1. Note that these sites are all larger than the area curently protected. A list of ecological units recorded in the Ahipara Ecological District and their current protection status is set out in Table 2 and a summary of the site evaluations is given in Table 3.

TABLE 1. PROTECTED NATURAL AREAS NETWORK IN THE AHIPARA ECOLOGICAL DISTRICT (AREA GIVEN IN HA).

	QEII	CP	SL	FS	HR	EA	Quarry	Total
Buchanan N05/001	95							95
Ahipara N05/008			647 1753		226			2626
Tauroa Peninsula N05/014			584					584
Herekino O05/001		4360					1.8	4361.8
Warawara O05/041		6933		823		990		8746
TOTAL	95	11,293	2984	823	226	990	1.8	**16,412.8**

QEII = Queen Elizabeth II National Trust covenant; CP = Conservation Park; SL = Stewardship Land; FS = Forest Sanctuary; HR = Historic Reserve; EA = Ecological Area.

5.1 PRIORITY NATURAL AREAS FOR PROTECTION IN THIS ECOLOGICAL DISTRICT

1. Habitat types and landforms which are nationally uncommon, including:

   - all freshwater wetlands (the district has very few wetland areas), in particular acid peatbogs and coastal wetlands and herbfields;

   - podzol gumfields (habitat for acid-loving orchids);

   - dunelands;

   - coastal broadleaf forest and shrublands;

   - assemblages on steep volcanic hillsides, especially coastal faces;

   - kauri forests.

2. Habitat types which are generally very poorly protected in the existing protected areas network and continue to be modified or lost due to land management practices or contain species which cannot tolerate habitat

change or adapt to other habitat types. These include coastal manuka and kanuka shrublands and coastal habitats of dunes, wetlands, and herbfields which are under the greatest threat from fire, clearance, grazing and off-road vehicles. Priority areas occur at Shipwreck Bay, Hunahuna, Herekino North Head, Owhata and Warawara.

3. Areas containing ecological units uncommon in the ecological district and in Northland including forest areas at Epikauri and Herekino Gorge, e.g. taraire-tawa forest and lowland forest types such as puriri and towai-puriri-nikau which occur outside the boundaries of the large protected forest areas.

TABLE 2. ECOLOGICAL UNITS RECORDED IN THE AHIPARA ECOLOGICAL DISTRICT AND PROTECTED STATUS

	DUNES	COASTAL	TANGIHUA VOLCANICSGUMLAND
Puriri forest			Warawara (UP) Owhata C (2, UP)
Karaka-taraire forest		Buchanan (QEII) Warawara (UP)	Buchanan (QEII) Warawara (UP)
Karaka-kanuka forest		Warawara (UP)	Warawara (UP)
Taraire forest		Whakaroro (UP) Owhata B (UP) Ahipara (SL, Pt)	Herekino (CP) Hui Rd (2, UP)
Taraire-towai forest		Buchanan (UP) Ahipara (SL, Pt)	Herekino (CP) Warawara (CP, EA)
Taraire-puriri forest		Buchanan (QEII) Owhata B (UP)	Ahipara (UP) (Herekino Gorge /Wainui) Owhata D (2, UP)
Taraire-tawa forest			Ahipara (UP) (Herekino Gorge)
Taraire-kanuka forest	Herekino North Head (also volcanics) (UP)		Ahipara (UP) (Herekino Gorge/Wainui)
Kanuka-puriri forest			Herekino (UP)
Secondary kahikatea forest			Herekino (UP) (margin near Tongaroa Str.)
Towai forest		Buchanan (UP) Whakakoro (UP) Owhata B (UP)	Herekino (CP) Warawara (CP, EA)

	DUNES	COASTAL	TANGIHUA VOLCANICS	GUMLAND
Towai-puriri forest			Warawara (UP) (lower northern slopes)	
Towai-taraire-puriri forest			Herekino CP(Pt)	
Towai-puriri-nikau forest			Warawara UP (Rotokakahi River)	
Towai-taraire-puriri-kanuka			Herekino Gorge (CP)	
Towai-mamaku shrubland			Warawara (CP, Pt)	
Towai associations: secondary forest, shrub-land, towai-cabbage tree, towai-manuka shrubland			Herekino (UP - most)	
Bracken-mamaku-mahoe shrubland			Herekino (CP, Pt) (Orowhano)	
Kauri forest - mature			Warawara (FS) Herekino (CP)	
Kauri forest - secondary			Herekino (CP) Warawara (FS, EA, CP)	
Kauri forest				Ahipara (UP)
Kauri-kanuka forest				Ahipara (UP) (ridge top Epikauri)
Manuka-rimu forest				Ahipara (UP)
Manuka shrubland		Buchanan (UP) Whakakoro (UP) Owhata B (UP)		
Manuka forest		Owhata B (UP)		Ahipara (UP)
Manuka shrubland	Herekino Dunes(UP) Ahipara (SL,Pt) Tauroa Peninsula (SL) Ahoroa (UP) Puapua-Hauturu (UP)	Owhata C (UP) Ahipara (SL,Pt)	Herekino (UP)	Ahipara (SL, HR, Pt)
Kanuka shrubland	Herekino North Head (UP)	Ahipara (SL) (sheltered valleys)		
Kanuka forest	Herekino North Head (UP)	Ahipara (SL)	Herekino (CP)	

	DUNES	COASTAL	TANGIHUA VOLCANICSGUMLAND
Manuka-kanuka shrubland			Ahipara (UP) (Herekino Gorge/Wainui) Herekino (UP) Hui Rd (2, UP)
Flax-*Hebe* association		Warawara (UP)	Warawara (UP)
Pond	Tauroa Lakes (UP)		
Raupo wetland	Tauroa Lakes (UP)		
Raupo-*Baumea* wetland	Ahipara (SL,Pt)		
***Juncus-Eleocharis-Isolepis* wetland**	Ahipara (SL,Pt)		
***Dysphyma* association**			(on cliffs) Ahipara (SL,Pt) Ahoroa (UP)
***Stipa-Senecio* association**		Tauroa Peninsula (SL)	
Liliaceae-Cyperaceae association		Tauroa Peninsula (SL) (rock outcrop)	
Herbfield	Ahipara (sand flats) (SL,Pt)		
***Leptocarpus-Isolepis-Cyperus* seeps**		Owhata A (UP) Ahipara (UP) Ahoroa (UP)	
Sandfield	Tauroa Peninsula (SL)		
***Pingao-Spinifex* duneland**	Puapua-Hauturu (UP)		
***Spinifex* duneland**	Ahipara(SL,Pt) Tauroa Peninsula (SL)		
Toetoe tussockland	Ahipara(SL,Pt)		
Flax-toetoe-*Leptocarpus*	Ahoroa (UP)	Ahoroa (UP)	
***Isolepis* sedgeland**	Puapua-Hauturu (UP)		

FS = Forest Sanctuary; CP = Conservation Park; EA = Ecological Area; SL = Stewardship Land; QEII = Queen Elizabeth II National Trust covenant; HR = Historic Reserve; Pt = Partly protected; UP = Unprotected; 2 = Level 2 site.

TABLE 3. SUMMARY OF SITE EVALUATIONS.

	Representativeness	Rarity/Special features
LEVEL 1 SITES		
Reef Point	Coastal shrubland unique in ED.	Uncommon vegetation type; *Hibiscus diversifolius*.
Buchanan	Coastal forest and shrubland.	Kiwi.
Whakakoro	Coastal forest; gumland.	Kiwi.
Owhata A	Seep on coastal margin.	Uncommon vegetation type.
Owhata B	Coastal forest and shrubland.	Uncommon vegetation type; kauri on coastal site.
Herekino North Head	Coastal forest on dunes.	
Herekino Dunes	Shrubland on dunes.	Uncommon vegetation type.
Ahipara Massif	Unique landform; gumlands with kauri forest; coastal forest, shrublands and wetlands.	Flora: 7 species threatened, 3 Local, Northland endemic orchids; Fauna: 7 threatened sp; fernbird stronghold.
Tauroa Peninsula	Sandfields; coastal vegetation.	Vegetation types nationally rare.
Tauroa Lakes	Wetlands.	Uncommon habitats in ED; bittern.
Herekino	Only site in ED for several vegetation types; best example of manuka-kanuka shrubland.	Flora: 2 threatened species, 4 local, 2 at northern limit; only site for *Dumortiera* liverwort. Fauna: 3 threatened species; bats likely; nationally important soil site.
Warawara	Mature kauri forest; only site in ED for several vege types; sizeable area of uncommon coastal forest.	Flora: 2 threatened species, 2 Local, 1 restricted; Fauna: 5 threatened species; only Northland rifleman; endemic snail; nationally important soil site.
Ahoroa	Seep on coastal margin.	2 threatened plant species.
Puapua-Hauturu	Coastal sands.	5 threatened bird species and 1 regionally significant.
LEVEL 2 SITES		
Owhata C		Kiwi reported.
Owhata D	Coastal broadleaf forest.	
Hui Rd	Broadleaf forest.	Possibly seasonal food source for NZ pigeon; on steep flanks of pa site
Whangape B	Coastal forest.	

Diversity and pattern	Naturalness	Buffer/link-age/corridor	Size & shape
			Narrow remnant.
8 ecological units.	Very intact.		> 150 ha.
	Partly discontinuous.		c. 100 ha.
	Grazed.		
5 ecological units; diversity of canopy species.	Not contiguous.		4 remnants c. 90 ha.
Harbour to ridge sequence.	Intact.		40 ha.
	Kikuyu present.	Buffer between beach and pines.	56 ha.
24 ecological units; 360+ native plant species (Druce 1992); sequence from coast to inland gorge.	Wilderness landscape.	Shrublands link other habitat types.	Very large contiguous area - 6780 ha.
4 ecological units.	Some stock/vehicle damage but mostly wilderness.		Large, dynamic area; >1000 ha.
	Tauroa Point Swamp intact.		Practical to fence.
c. 250 native species. disturbance regenerating.	High; mature forest; past		Large area, >5000 ha.
300+ native species; sequence from coast to high altitude forest.	Intact.		Very large, > 10 000 ha.
4 ecological units.	Least modified of its type in ED.		c. 9 ha; largest of its type in ED.
Bird species; 2 moderate size streams.	Remote but grazed.	Links coast to Warawara Forest.	Large beach; > 60 ha.
	Regenerating; scattered wild pine.		
Canopy includes kowhai, tawa, rata.	Unfenced.		Small, c. 10ha.
			Small, c. 9 ha.
	Degraded; heavily grazed; broken canopy.		Small, c. 8 ha.

4. Several sites related to these habitat types which are not fully represented in the protected areas network are also sites where threatened species are located. These sites are mostly located either on the Ahipara Plateau, or within 2 km of the coastal margin of the ecological district, from Reef Point in the north (seeps containing *Hibiscus diversifolius*, and possibly *Thelypteris confluens)* to Matihetihe in the south (one of the most extensive examples of coastal forest in the Ecological District, with a high degree of naturalness).

   The overall management of the coastal margin, especially seasonally, is also important for the small waders and sea bird species such as NZ dotterel, variable oystercatcher, and white-fronted tern, which breed there. Stock, including dogs, and off-road vehicles also pose threats to these species.

6. Acknowledgements

We thank the landowners who cooperated with this survey, in particular those who cheerfully provided field staff with transport around their properties, not to mention cups of tea and other refreshments.

Kaitaia Field Centre staff Bruce Waddell and Alan MacRae also provided valuable assistance from time to time with information and transport.

Special acknowledgement is due to the following three members of the survey team, without whom this report would not have been completed. Geomorphological data were compiled and written by Fred Brook, who was also scientific adviser to the survey and provided invaluable advice and guidance. Peter Anderson was a constantly positive and encouraging team leader and had considerable input into the Introduction section. Fraser Moors kept the paper, data analysis, and map production under control and contributed significantly to the compilation of the glossary.

Richard Parrish provided advice and assistance with regard to fauna distribution and status and Lisa Forester and Ewen Cameron were frequently called upon for plant identification and botanical advice. Nigel Clunie and Brian Molloy also provided useful information and comment and Neil Mitchell gave advice on methodology.

Further editorial comment was also provided by Lisa Forester, Peter Anderson, Ray Pierce, Peter de Lange and Joseph Arand.

Barbara Lyford helped prepare the text for publication and Terry Conaghan and Loraine Wells have prepared the maps.

Some mapping services were carried out by Eric Dutton with financial assistance of the Far North District Council.

7. Bibliography

Allan, H. H. 1961. *Flora of New Zealand Vol. 1*. Government Printer, Wellington.

Anderson, P. 1993. A Habitat Protection Strategy for the Northland Conservancy (Draft). Unpublished report, Northland Conservancy, Department of Conservation, Whangarei.

Anderson, P. et al. 1993. Report on Warawara Field Trip. Unpublished report, Northland Conservancy, Department of Conservation, Whangarei.

Arand, J., Basher, L., Wardle, R. and Wardle, K. 1993. Inventory of New Zealand Soil Sites of international, national and regional importance Part Two - North Island and northern offshore islands (1st edition). *Occasional publication 2, New Zealand Society of Soil Science*. Lincoln University.

Atkinson, I. A. E. 1962. Semi-quantitative measurements of canopy composition as a basis for mapping in *Proceedings NZ Ecological Society 9*: 1–8.

Atkinson, I. A. E. 1985. Derivation of vegetation mapping units for an ecological survey of Tongariro National Park, North Island, New Zealand. *New Zealand journal of botany 23*: 361–178.

Barker, W. R. 1991. A taxonomic revision of *Mazus* Low (Scrophulariaceae). In Banks, M. R., Smith, S. J., Orchard, A. E. and Kantvilas, G. *Aspects of Tasmanian botany - a tribute to Winifred Curtis*. Royal Society of Tasmania, Hobart: 85–94.

Bell, B. 1986. *The Conservation Status of New Zealand Wildlife*. NZ Wildlife Service.

Brook, F 1996 Classification of the Ecological Districts of Northland. Unpublished report, Northland Conservancy, Department of Conservation, Whangarei.

Brownsey, P. and Smith-Dodsworth, J. C. 1989. *New Zealand Ferns and Allied Plants*. David Bateman, Auckland.

Cameron, E. K., de Lange, P. J., Given, D. R., Johnson, P. N. and Ogle, C. C. 1995 (Revision). Threatened and Local Plants Lists. *NZ Botanical Society newsletter 39*: 15–28.

Chapman, V. J. 1978. *Mangroves and Saltmarshes of the Herekino, Whangape and Hokianga Harbours*. Department of Lands and Survey.

Clunie, N. M. U. and Wardle, P. 1983. Botany of the Ahipara Gumfields and Tauroa Peninsula. Unpublished report. Botany Division, New Zealand Department of Scientific and Industrial Research.

de Lange, P. J., Crowcroft, G, G. M. and Forester, L. J. 1991. *Thelymitra* "Ahipara", an endangered orchid transferred, with notes on its taxonomic status, distribution and ecology. *Department of Conservation Science and Research Internal Report No 113*. Wellington.

de Lange, P. J. and Molloy, B. P. J. 1995. Vagrancy within New Zealand threatened orchids: what are our conservation priorities? *NZ Botanical Society newsletter 40*: 13–14.

Department of Conservation. Internal reports, files and databases. Northland Conservancy Office, Whangarei.

Department of Conservation. 1995. Draft Conservation Management Strategy for Taitokerau, Northland. *Northland Conservancy management planning series no. 1*. Whangarei.

Department of Lands & Survey. 1984. *Ahipara: A Land Use Study*. Auckland.

Druce, A. P. 1991. Indigenous Higher Plants of Ahipara Gumfields and Tauroa Peninsula. Unpublished report. Wellington.

Druce, A. P. 1992. Indigenous Higher Plants of New Zealand. Unpublished checklist, Landcare Research, Lincoln, New Zealand.

Evans, R. B. 1993a *Geological Map of Northland Sheets N05 and O05: Herekino and Rawene.* Published by the author, PO Box 383, Kerikeri.

Evans, R. B. 1993b *Geological Map of Northland Sheets N04 and O04: Abipara and Kaitaia*. Published by the author, PO Box 383, Kerikeri.

Froude, V. A. 1995. Significant natural features gain protection. *New Zealand planning quarterly no. 119*: 20–23.

Harrison, M. 1995. National "Ecosystem" Mapping for Conservation. In: Firns, P. G. and Sutherland, N. C. Proceedings of the 1995 NZ Conference on Geographical Information Systems and Spatial Information Research. University of Otago, Dunedin.

Healy, A .J. and Edgar, E. 1980. *Flora of New Zealand Vol. III*. Government Printer, Wellington.

Johns, J. and Molloy, B. 1983. *Native orchids of New Zealand*. AH & AW Reed, Wellington.

Kenny, J.A. and Hayward, B. W. 1993. Inventory of Important Geological Sites and Landforms in the Northland Region. First edition. *Geological Society of New Zealand miscellaneous publication no. 67*. Lower Hutt.

Kershaw, K. A. and Looney, J.H.H. 1985. *Quantitative and Dynamic Ecology.* 3rd edn. Edward Arnold, London.

King, M. 1990. *A Handbook of New Zealand Mammals*. Oxford University Press, Auckland.

Leathwick , J. R. and Rogers, G.M. 1996. Modelling relationship between environment and canopy composition in secondary vegetation in central North Island, New Zealand. *NZ journal of ecology 20*: 147–162.

Lee, Jack. 1987. *Hokianga*. Hodder and Stoughton, Auckland.

McEwen, W. M. 1987. Ecological Regions and Districts of New Zealand. *New Zealand Biological Resources Centre publication no. 5*. Department of Conservation, Wellington.

Moir, R. W., Collen, B. and Thompson, C. S. 1986. The Climate and Weather of Northland. *New Zealand Meteorological Service miscellaneous publication 115 (2)*. 2nd edn. Ministry of Transport, Wellington.

Molloy, J. and Davis, A. D. 1994. *Setting Priorities for the Conservation of New Zealand's Threatened Plants and Animals*. 2nd edn. Department of Conservation, Wellington.

Molloy, L. 1988. *The Living Mantle*. Mallinson Rendel & NZ Society of Soil Science, Wellington.

Moore, L. B. and Edgar, E. 1970. *Flora of New Zealand Vol. II*. Government Printer, Wellington.

Mueller-Dombois, D. and Ellenberg, H. 1974. *Aims and Methods of Vegetation Ecology*. John Wiley & Sons, New York.

Myers, S., Park, G. and Overmars, F. 1987. A guidebook for the rapid ecological survey of natural areas. *New Zealand Biological Resources Centre publication no. 6*. Department of Conservation, Wellington.

Ogle, C. 1982. Wildlife and Wildlife Habitat Values of Northland. *Fauna Survey Unit report no. 30*. New Zealand Wildlife Service, Wellington.

Ornithological Society of New Zealand Checklist Committee (Turbott, E.G. Convenor) 1990. *Checklist of the Birds of New Zealand*. Random Century, Auckland.

Park, G. N. and Walls, G. Y. 1978. *Inventory of Tall Forest Stands on Lowland Plains and Terraces in Nelson and Marlborough Land Districts, New Zealand*. Botany Division, New Zealand Department of Scientific and Industrial Research.

Pierce, R. J., Atkinson, R. and Smith, E. 1993. Changes in bird numbers in six Northland forests 1979–93. *Notornis* 40: 285–293.

Poole, L. and Adams, N. 1990 (Revised edn.). *Trees and Shrubs of New Zealand*. DSIR Publishing, Wellington.

Shaw, W. B. 1994. Botanical Ranking for Nature Conservation. *Science and research series no. 72*. Department of Conservation, Wellington.

Technical Advisory Group. 1986. *A Scientific Focus*. New Zealand Department of Scientific and Industrial Research, Wellington.

Wardle, P. 1991. *Vegetation of New Zealand*. Cambridge University Press.

Webb, C. J., Sykes, W. R. and Garnock-Jones, P. J. 1988. *Flora of New Zealand Vol. IV*. Botany Division, New Zealand Department of Scientific and Industrial Research .

Willetts, D. 1986. *Warawara Forest Sanctuary and Te Hura Ecological Area*. New Zealand Forest Service, Auckland.

Williams, G. and Given, R. 1981. *The Red Data Book of New Zealand Rare and Endangered Species of Endemic Terrestrial Vertebrates and Vascular Plants of New Zealand*. Nature Conservation Council.

Wilson, C. M. and Given, D. R. 1989. Threatened Plants of New Zealand. DSIR Publishing, Wellington.

8. Appendices

8.1 FIELD SURVEY FORM

8.2 LETTER TO RATEPAYERS/NEWS MEDIA ITEM

8.3 CATEGORIES OF THREAT

New Zealand Threatened Plant List

In this report categories of threatened plants are taken from the New Zealand Threatened Plants Committee (Cameron et al. 1995), which are based on those used by the Conservation Monitoring Centre of the International Union for Conservation of Nature and Natural Resources (IUCN) in their worldwide survey of threatened species. The categories are as follows:

Presumed extinct
Taxa which are no longer known to exist in the wild or in cultivation after *repeated* searches of the type localities and *other known or likely places*.

Critical
Taxa which face *an extremely high probability of extinction* in the wild within the immediate future.

Endangered
Taxa in danger of extinction and whose survival is unlikely if the causal factors continue operating. Included are taxa whose numbers have been reduced to a critical level or whose habitats have been so drastically reduced that they are deemed to be in immediate danger of extinction.

Vulnerable
Taxa believed likely to move into the Endangered category in the near future if the causal factors continue operating. Included are taxa of which most or all of the populations are decreasing because of over-exploitation, extensive destruction of habitat or other environmental disturbance; taxa with populations that have been seriously depleted and whose ultimate security is not yet assured; and taxa with populations that are still abundant, but are under threat from serious adverse factors throughout their range.

Rare
Taxa with small populations which are not Endangered or Vulnerable but *are at risk*. These taxa are usually localised within restricted geographical areas or habitats, or are thinly scattered over a more extensive range. Rare species are often endemics with a narrow distribution whereas Vulnerable and Endangered species have often been formerly more widespread.

Insufficiently known
Taxa that are *suspected* but *not definitely known* to belong to any of the above categories because of lack of information. An "Insufficiently known" taxon does not have to be *proved* to be in any of the four categories - Critical, Endangered, Vulnerable, or Rare. It is hoped that listing a taxon as "Insufficiently known" will stimulate studies to find out its true category of threat.

Taxonomically indeterminate
This includes: (1) Taxa about which there is doubt regarding a taxonomic status and which require further investigation; and (2) genetic variants which are distinct at a level which may not warrant formal taxonomic recognition. Species within this category are then defined by probable category of threat.

Local
This is not an IUCN Threat Category. It has been compiled by the New Zealand Threatened Plants Committee (Cameron et al. 1995) and is regularly updated. It is designed to act as a "watchlist" for taxa which are sufficiently restricted to warrant noting and some monitoring. It may include taxa which occupy habitats potentially threatened in the future, and those found in sensitive habitats which are prone to damage.

Molloy & Davis (1994) categories of threat

The Molloy & Davis categories were developed to identify species which should be assessed for conservation action. It includes taxonomic groups not ranked under IUCN categories, such as bryophytes and invertebrates.

The Categories are as follows:

Category A	Highest priority threatened species (score >47 out of a possible 83).
Category B	Second priority threatened species (score 39–47 inclusive).
Category C	Third priority threatened species (score 30–38 inclusive).
Category X	Species which have not been sighted for a number of years but which may still exist.
Category I	Species about which little information exists, but which,based on existing evidence, are considered to be threatened.
Category O	Species which are threatened in New Zealand, but which are known to be secure in other parts of their range outside New Zealand.
Category M	Species that are rare or localised, and of cultural importance to Maori.

8.4 FAUNA

A. CHECKLIST OF THE BIRDS OF NORTHLAND RECORDED IN THE AHIPARA ECOLOGICAL DISTRICT.

NI brown kiwi	*Apteryx australis mantelli*	X	*wild turkey	*Meleagris gallopavo*	
NZ dabchick	*Poliocephalus rufopectus*		*tufted guineafowl	*Numida meleagris*	
Australasian little grebe	*Tachybaptus novaehollandiae*		*Californian quail	*Callipela californica*	X
blue penguin	*Eudyptula minor*		*brown quail	*Synoicus ypsilophorus*	X
Australasian gannet	*Morus serrator*		weka	*Gallirallus australis*	
black shag	*Phalacrocorax carbo*	X	banded rail	*Rallus philippensis*	
pied shag	*Phalacrocorax varius*	X	spotless crake	*Porzana tabuensis*	
little black shag	*Phalacrocorax sulcirostris*		marsh crake	*Porzana pusilla*	
little shag	*Phalacrocorax melanoleucos*		pukeko	*Porphyrio porphyrio*	X
white heron	*Egretta alba*	X	Australian coot	*Fulica atra*	
white-faced heron	*Ardea novaehollandiae*		pied oystercatcher	*Haematopus ostralegus*	
reef heron	*Egretta sacra*	X	variable oystercatcher	*Haemotopus unicolor*	X
Australasian bittern	*Botaurus poiciloptilus*	X	spur-winged plover	*Vanellus miles*	X
royal spoonbill	*Platalea regia*		pied stilt	*Himantopus himantopus*	X
*black swan	*Cygnus atratus*		banded dotterel	*Charadrius bicinctus*	X
*feral goose	*Anser anser*		NZ dotterel	*Charadrius obscurus*	X
paradise shelduck	*Tadorna variegata*	X	Pacific golden plover	*Pluvialis fulva*	X
*mallard	*Anas platyrhynchos*	X	grey plover	*Pluvialis squatarola*	
grey duck	*Anas superciliosa*	X	lesser knot	*Calidris canutus*	
Australasian shoveler	*Anas rhynchotis*		curlew sandpiper	*Calidris ferruginea*	
grey teal	*Anas gracilis*		wrybill	*Anarhynchus frontalis*	
brown teal	*Anas aucklandica*		turnstone	*Arenaria interpres*	
NZ scaup	*Aythya novaeseelandiae*		Terek sandpiper	*Tringa terek*	
Australasian harrier	*Circus approximans*	X	sanderling	*Calidris alba*	
*pheasant	*Phasianus colchicus*	X	sharp-tailed sandpiper	*Calidris acuminata*	
*peafowl	*Pavo cristatus*		pectoral sandpiper	*Calidris melanotos*	

* introduced

red-necked stint	*Calidris ruficollis*	
eastern curlew	*Numenius madagascariensis*	
whimbrel	*Numenius phaeopus*	
bar-tailed godwit	*Limosa lapponica*	X
black-tailed godwit	*Limosa limosa*	
Hudsonian godwit	*Limosa haemastica*	
marsh sandpiper	*Tringa stagnatilis*	
greenshank	*Tringa nebularia*	
wandering tattler	*Tringa incana*	
Siberian tattler	*Tringa brevipes*	
Arctic skua	*Stercorarius parasiticus*	
pomarine skua	*Stercorarius pomarinus*	
black-backed gull	*Larus dominicanus*	X
red-billed gull	*Larus novaehollandiae*	X
Caspian tern	*Sterna caspia*	X
white-fronted tern	*Sterna striata*	X
fairy tern	*Sterna nereis*	
little tern	*Sterna albifrons*	
grey ternlet	*Procelsterna cerulea*	
NZ pigeon	*Hemiphaega novaeseelandiae*	X
*rock pigeon	*Columba livia*	
*Barbary dove	*Streptopelia roseogrisea*	
kaka	*Nestor meridionalis*	
*eastern rosella	*Platycercus eximius*	X
red-crowned parakeet	*Cyanoramphus novaezelandiae*	
shining cuckoo	*Chrysococcyx lucidus*	X
long-tailed cuckoo	*Eudynamis taitensis*	X
morepork	*Ninox novaeseelandiae*	X
*kookaburra	*Dacelo novaeguineae*	
kingfisher	*Halcyon sancta*	X
welcome swallow	*Hirundo tahitica*	X
rifleman	*Acanthisitta chloris*	X
silvereye	*Zosterops lateralis*	X
grey warbler	*Gerygone igata*	X
*blackbird	*Turdus merula*	X
*song thrush	*Turdus philomelos*	X
*dunnock	*Prunella modularis*	X
*skylark	*Alauda arvensis*	X
NZ pipit	*Anthus novaeseelandiae*	X
fernbird	*Bowdleria punctata*	X
fantail	*Rhipidura fuliginosa*	X
tomtit	*Petroica macrocephala*	X
NZ robin	*Petroica australis*	
kokako	*Callaeas cinerea*	
tui	*Prosthemadera novaeseelandiae*	X
bellbird	*Anthornis melanura*	
*house sparrow	*Passer domesticus*	X
*chaffinch	*Fringilla coelebs*	X
*redpoll	*Carduelis flammea*	
*goldfinch	*Carduelis carduelis*	X
*greenfinch	*Carduelis chloris*	
*yellowhammer	*Emberiza cintrinella*	X
*starling	*Sturnus vulgaris*	X
*myna	*Acridotheres tristis*	X
*Australian magpie	*Gymnorhina tibicen*	X

B. Other fauna in the Ecological District.

Lizards/geckos

forest gecko	*Hoplodactylus granulatus*	Widespread. Record from Warawara.
shore skink	*Oligosoma smithii*	Found along the Ahipara coast.

Aquatic fauna

freshwater crayfish	*Parenephrops planifrons*	banded kokopu	*G. fasciatus*
longfinned eel	*Anguilla dieffenbachii*	inanga	*G. maculatus*
torrentfish	*Cheimarrichthys fosteri*	common smelt	*Retropinna retropinna*
koaro	*Galaxias brevipennis*	red finned bully	*Gobiomorphus huttoni*

Introduced mammals

mouse	*Mus musculus*	feral dog	*Canis familaris*
ship rat	*Rattus rattus rattus*	cattle	*Bos taurus*
Norway rat	*Rattus norvegicus*	goat	*Capra hircus*
weasel	*Mustela nivalis*	possum	*Trichosurus vulpecula*
stoat	*Mustela erminea*	pig	*Sus scrofa*
ferret	*Mustela furro*	hedgehog	*Erinaceus europeus occidentalis*
feral cat	*Felis catus*		

8.5 COMMON AND SCIENTIFIC PLANT NAMES USED IN THE TEXT

This is not a definitive list of common names used for plants from the ecological district. Rather it is a guide to the reader as to exactly which species is referred to when the common name is used in the text.

Indigenous

akeake	*Dodonaea viscosa*
bracken	*Pteridium esculentum*
cabbage tree	*Cordyline australis*
coastal brake fern	*Pteris* sp. (cf. *comans)*
cutty grass	*Gahnia setifolia*
flax	*Phormium tenax*
giant umbrella sedge	*Cyperus ustulatus*
gully fern	*Pneumatopteris pennigera*
Hall's totara	*Podocarpus hallii*
hangehange	*Geniostoma rupestre* var. *ligustrifolium*
heketara	*Olearia rani* var. *rani*
hinau	*Elaeocarpus dentatus*
hook grass	*Uncinia uncinata*
hopeless menace	*Oplismenus imbecillus*
iceplant	*Disphyma australe*
kahikatea	*Dacrycarpus dacrydioides*
kanono	*Coprosma grandifolia*
kanuka	*Kunzea ericoides s.l.*
karaka	*Corynocarpus laevigatus*
karamu	*Coprosma robusta*
kauri	*Agathis australis*
kauri grass	*Astelia trinervia*
kawaka	*Libocedrus plumosa*
kiekie	*Freycinetia banksii*
knobby clubrush	*Isolepis nodosa*
kohekohe	*Dysoxylum spectabile*
kohuhu	*Pittosporum tenuifolium* var. *tenuifolium*
kowhai	*Sophora microphylla*
kuta	*Schoenoplectus tabernaemontani*
lancewood	*Pseudopanax crassifolius*
large-leaf mahoe	*Melicytus macrophylla*
mahoe	*M. ramiflorus*
maidenhair fern	*Adiantum diaphanum*
mamaku	*Cyathea medullaris*
mamangi	*Coprosma arborea*
mangeo	*Litsea calicaris*
manuka	*Leptospermum scoparium*
mapou	*Myrsine australis*
matai	*Prumnopitys taxifolia*
mingimingi	*Leucopogon fasciculatus*
miro	*Prumnopitys ferruginea*
neinei	*Dracophyllum latifolium*
nikau	*Rhopalostylis sapida*
northern rata	*Metrosideros robusta*
pate	*Schefflera digitata*
pigeonwood	*Hedycarya arborea*
pingao	*Desmoschoenus spiralis*
ponga	*Cyathea dealbata*
pukatea	*Laurelia novae-zelandiae*
puriri	*Vitex lucens*
putaputaweta	*Carpodetus serratus*
ramarama	*Lophomyrtus bullata*
rangiora	*Brachyglottis repanda*
raupo	*Typha orientalis*
renga lily	*Arthropodium cirratum*
rewarewa	*Knightia excelsa*
rice grass	*Microlaena avenacea*
rimu	*Dacrydium cupressinum*
Smith's tree fern	*Cyathea smithii*
spinifex	*Spinifex sericea*
sundew	*Drosera* sp.
supplejack	*Ripogonum scandens*
swamp maire	*Syzygium maire*
tanekaha	*Phyllocladus trichomanoides*
taraire	*Beilschmiedia tarairi*
tauhinu	*Ozothamnus leptophylla*
taupata	*Coprosma repens*
tawa	*Beilschmiedia tawa*
tawari	*Ixerba brexioides*
titoki	*Alectryon excelsus*
toetoe	*Cortaderia splendens*
totara	*Podocarpus totara*
towai	*Weinmannia silvicola*
turepo	*Rhabdothamnus solandri*
umbrella fern	*Sticherus cunninghamii*
whau	*Entelea arborescens*
wheki	*Dicksonia squarrosa*
white maire	*Nestegis lanceolata*
wineberry	*Aristotelia serrata*

Adventives

blackberry	*Rubus fruticosus*
Cape honey flower	*Melianthus major*
catsear	*Hypochaeris radicata*
gorse	*Ulex europeus*
kikuyu	*Pennisetum clandestinum*
lupin (yellow lupin)	*Lupinus luteus*
marram	*Ammophila arenaria*
Mexican devil	*Ageratina adenophora*
pampas	*Cortaderia selloana*
pine	*Pinus radiata*
prickly hakea	*Hakea sericea*
tobacco weed	*Solanum mauritianum*

8.6 GLOSSARY

Allochthonous

Geologic units that have been transported to their present position.

Biodiversity

The variability among living organisms from all sources including, *inter alia*, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems (IUCN 1993).

Bog

Infertile/acid wetland. Usually characterised by a peat substrate, sedges, manuka and *Gleichenia* fern. Water arrives via rainfall rather than by streams and other run-off.

Buffer

A zone surrounding a natural area which reduces the effects of external influences on it. For example shrubland, scrub and exotic trees around native forested areas provide a gradation of habitats from fully modified to a natural state. This effect also applies to waterways - riparian vegetation and wetlands protect both water quality and habitat from influences arising from the surrounding land.

Community

An association of populations of plants and animals which occur naturally together in a common environment.

Diversity and Pattern

Diversity is the variety and range of species of biological communities, ecosystems and landforms. Pattern refers to changes in species composition, communities, and ecosystems along environmental gradients.

Duneland

Area of both mobile and consolidated sand dunes, which may include small interdune lakes, wetlands and shrubland communities.

Ecological District

A local part of New Zealand where geological, topographical, climatic and biological features and processes, including the broad cultural pattern, interrelate to produce a characteristic landscape and range of biological communities.

Ecological Region

A group of adjacent Ecological Districts which have diverse but closely related characteristics, or in some cases a single very distinctive Ecological District.

Ecological unit

Vegetation type occurring on a particular landform or soil or rock type.

Ecosystem

Any inter-related and functioning assemblage of plants, animals and substrates (including air, water, and soil) on any scale including the processes of energy flow and productivity (Myers et al. 1987).

Endemic

Occurring naturally in, and restricted to, a particular country, region or locality.

Estuary

A sheltered embayment where streams and rivers enter tidal waters.

Exotic

Introduced from outside New Zealand.

Fernland

Dominated by ferns such as *Gleichenia*, bracken, tree ferns, with occasional woody plants.

Foredune

Mobile and fixed transverse dunes along coastal margins.

Forest

A tall, predominantly closed canopy consisting mainly of tree species (a tree being a woody plant which attains a 10 cm diameter at breast height - Atkinson 1985).

Much of Northland's forest consists of or includes secondary growth which has developed following disturbance or destruction of the original forest. This may include secondary manuka/kanuka forest where those species have reached tree size and may contain other canopy species.

Habitat

The part of the environment where a plant or animal lives. It includes both the living and non-living features of the area.

Herbfield

Vegetation in which the dominant cover is of non-woody or semi-woody plants < 1 m tall.

Igneous

Rocks which have crystallised from magma.

Indigenous

Native to and occurring naturally within the New Zealand biogeographic region.

Landform

A part of the land's surface with distinctive naturally formed physical characteristics, e.g. a hill, valley, etc.

Linkages/Corridors

Vegetated or aquatic areas (can be forest, shrubland, wetland, streams, beach or exotic vegetation such as pine) that link up two or more habitats. With a link

between habitats, the gene pool for a species is greater, which enhances the viability of that population. The corridor does not have to be continuous for many species to utilise it. Small remnants can act as stepping stones between two larger habitats so that birds such as kiwi can move from remnant to remnant up to 500 m apart.

Massif

Range formed of igneous rock units.

Natural Area

A tract of land which supports natural landforms and predominantly native vegetation or provides habitat for indigenous species; identified as a unit for evaluation of ecological quality and representativeness and has potential to be ecologically significant.

Naturalness

The degree to which a habitat is modified and disturbed by human activity or introduced plants and animals and to which natural values are retained despite these factors, i.e. to what extent native species are functioning according to natural processes.

Ophiolite

Sequence of rock units consisting of deep sea sediments and basaltic pillow lavas.

Peneplain

Extensive area of low relief.

Podzol

Soil profile formed at an advanced stage of leaching.

Rarity

This is a measure of commonness and may apply to entire ecosystems through to single species. It may refer to the threatened status of a species (see Appendix 8.3) or habitat type in any one of the following ways: formerly common but now rare; rare elsewhere but common in the district; rare in the district but common elsewhere; confined to a limited geographic area; at the limit of its range; or with a contracting or fragmented range.

For example, old-growth alluvial swamp forests are an extremely rare ecosystem type in Northland, and indeed nationally, even though they contain no species which are regarded as rare in themselves.

Reedland

A swampy area dominated by reeds such as raupo.

Refuge

Native bush enclaves in production pine forest become a refuge for some native species during the logging phase, e.g. allowing bird species, such as kiwi, a retreat from logged areas.

Representativeness

The extent to which an area represents or exemplifies the components of the natural diversity of the ecological district. This implies consideration of the full range of natural ecosystems and landscapes that were originally found in the ecological district, how well they are represented in today's environment, and the extent to which they are included in the protected areas network.

Riparian functions

Riparian vegetation performs important functions such as providing corridors linking habitats and providing shading to streams. This is important in Northland, as many streams have small catchments and the water temperature can rise depleting the available oxygen, leading to the death of aquatic life. Litter debris enters the nutrient cycle and supports invertebrates such as mayfly, caddisfly and stonefly feeding on it. Riparian vegetation also acts as a buffer for non-point water discharges.

Riparian zone

An area of land immediately adjacent to a watercourse.

Riverine forest

Forest situated on a floodplain alongside a stream/river and subject to periodic inundation by floodwaters.

It is characterised by species such as cabbage tree, lowland ribbonwood (*Plagianthus regius*), kowhai (*Sophora microphylla*), kahikatea, pukatea, kaikomako (*Pennantia corymbosa*), titoki (*Alectryon excelsus*), and divaricating shrubs. On drier areas totara, taraire, kohekohe, matai and kanuka may occur. It commonly occurs only as narrow strips due to the deforestation of flat land for pasture.

Rush/Sedgeland

Swampy areas dominated by rushes, sedges, rush-like sedges or restiads, e.g. *Baumea, Juncus* (rush), *Carex*, *Schoenus, Isolepis, Bolboschoenus*, *Empodisma* and *Leptocarpus.*

Scrub

Refers to seral communities, often dominated by or with a large component of exotic species such as gorse, *Hakea,* tobacco weed, etc. and/or commonly lacking a closed canopy and in which an understorey is either absent or composed primarily of exotic species.

Secondary vegetation

Native vegetation established after destruction or disturbance of the previous vegetation and which is essentially different from the original vegetation (see Succession, below).

Seral

Describes a plant community in the process of succession.

Shrubland

Vegetation in which the canopy is dominated by woody plants less than 10 cm diameter at breast height.

There are 2 main types:

(i) Successional vegetation dominated by seral species such as manuka, kanuka, mahoe, etc. or shrubs such as hangehange, bracken, kumerahou.

As used in this report it implies a closed canopy and in more advanced stages contains an understorey of indigenous species.

(ii)Seral vegetation where the rate of further succession is extremely slow, being limited by abiotic factors such as soil structure and fertility, wind shear, etc. e.g. gumland manuka shrubland, *Muehlenbeckia* shrubland on dunes.

Silcrete

Hard, silica-rich weathering zone.

Site

An area of habitat identified during the rapid field inventory phase of the PNAP.

Its boundaries may be defined by the edge of the habitat (where discrete), catchment or other geographical feature, e.g.river, vegetation type or legal title.

Succession

The process of change in the appearance, composition, and structure of a community, usually over a period of time. Change may be due to natural or human-induced factors, or both. For example, the colonisation of bare rock or soil by algae and lichens, ending with a stable climax community in equilibrium with the environment. Secondary succession occurs where the original vegetation has been destroyed, e.g. by fire.

Survey no.

The identifier number given to each site. The first three figures refer to the NZMS 260 topographical map sheet that the habitat is on.

Sustainability

The long-term ecological viability of a natural area. This is related to the size and shape of the area as well as to threats from introduced pests.

Swamp

Fertile or eutrophic wetland, usually dominated by raupo, *Carex*, *Baumea articulata*, flax, and cabbage tree.

Swamp forest

A forest type containing water-tolerant trees and swamp species such as kahikatea, swamp maire, and pukatea. It may occur on alluvial valley areas but also occurs on poorly drained, semi-level sites within forests at higher altitudes.

Swamp shrubland

A transitional type with woody co-dominants like *Coprosma propinqua*-manuka-*Cordyline* with putaputaweta, *Coprosma tenuicaulis*, and other divaricating shrubs.

Toeslope

The area at the base of a slope where debris and topsoil has accumulated and where it may be more fertile than higher up the slope.

Vegetation type

Defined by the dominant canopy species and the structure of the vegetation, e.g taraire forest, manuka shrubland.

Viability

The ability of an area's natural communities to maintain themselves in the long term in the absence of particular management efforts to achieve this. Regeneration and vigour of species within these communities and stability of communities and processes contribute to viability.

Wetland

An area of land that is permanently or intermittently waterlogged and supports flora and fauna adapted to wet conditions. Wetland is used as a broad definition for several types of aquatic systems, e.g. swamps, bogs, and ephemerals.

9. Index of sites