Natural areas of Kerikeri Ecological District

Reconnaissance Survey Report for the Protected Natural Areas Programme

NEW ZEALAND PROTECTED NATURAL AREAS PROGRAMME 42

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Foreword

Kerikeri Ecological District is one of the very few places in New Zealand where kiwi can still be found in backyards and under verandahs. This very special experience is one we must celebrate and nurture, especially at a time when kiwi populations are shrinking by 6% per year.

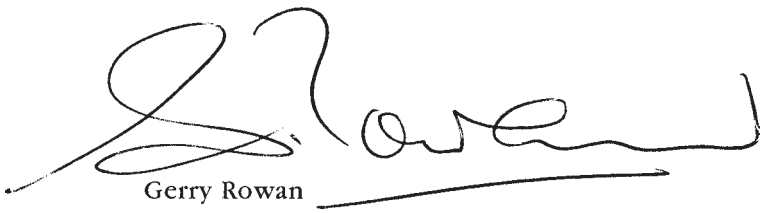
The islands of the Bay of Islands and outer coast are internationally renowned for their scenic and recreational values, but these high-use areas also support distinctive plants and animals, some of which, such as the New Zealand dotterel, are particularly sensitive to disturbance.

A multitude of islands and rock stacks, with high recreational, landscape and archaeological values as well as outstanding ecological values, occur within the Ecological District boundaries. These areas are particularly valuable, as they contain plant species and associations, reptiles and birds, which have virtually disappeared from the mainland.

Other areas of special and unique natural character in the Ecological District include the extensive Kerikeri Wetlands, and the gumlands adjoining Kerikeri Airport.

More common habitats such as forests, regenerating shrublands, and riverbanks are important for supporting a wide diversity of native species and the natural character of the Ecological District.

This report briefly describes these special places, and assigns a level of significance to each within the context of the Kerikeri Ecological District. However, in itself, the report will not ensure that they survive into the future for successive generations to enjoy. The challenge remains for us all to appreciate their inherent value and to manage those values with sensitivity to maintain a strong biological resource for the years to come.



Gerry Rowan

Conservator - Northland

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FIGURE 1. LOCATION MAP OF KERIKERI ECOLOGICAL DISTRICT.

FIGURE 2. MAP OF SURVEYED SITES, KERIKERI ECOLOGICAL DISTRICT.
Land administered by the Department of Conservation shown in green.

Abstract

This report has been produced as part of the Protected Natural Areas programme which was set up under the Reserves Act 1977, and is one of a series arising from rapid ecological surveys carried out in Northland between 1994 and 1996.

Coastal, island and wetland habitats are a feature of the Kerikeri Ecological District which covers approximately 67,600 ha centred on the northern and central Bay of Islands. Natural areas described in this report cover 21% of the district. One-quarter of these have some formal protection.

Several deeply incised river valleys cut through volcanic landforms from the west towards the Bay. The district is a stronghold for the North Island brown kiwi, and many habitats derive their significance from this.

A total of 97 natural areas were identified. Of these, 86 are considered to be of regional or national significance. Some of the remaining areas are constructed wetlands or lakes and did not meet the criteria for significance because of their small size, artificial nature, or degree of modification. However, others could not be fully surveyed and therefore their significance is unknown.

Priority areas for protection include island and coastal habitats, wetlands, the gumlands, and habitats supporting kiwi.

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:

- safeguarding 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 REGIONS AND DISTRICTS

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 Kerikeri 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 was collected, considerably expanding the information base for the Ecological District.

1.4 KERIKERI ECOLOGICAL DISTRICT

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

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

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

Natural areas constitute approximately 21% of the Ecological District. Of these, 31% are forest, 52% shrubland, 7% estuarine, 4% freshwater wetlands, and 6% island habitats. A high degree of fragmentation is a feature of many of the habitats in the Kerikeri Ecological District.

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

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

Even in this Ecological District, which has a considerable length of coastline, it is hard to find any original coastal vegetation on the mainland. The coastal vegetation that does occur has generally been severely modified, and is frequently dominated by exotic species. A tiny remnant of coastal forest near Poraenui Point (P05/098) illustrates the original vegetation type, whereas the majority of the coastal vegetation in the area (where it is not exotic weeds), consists of manuka/kanuka, with scattered pohutukawa and occasional puriri and karaka. Protection and restoration of coastal vegetation is a high priority in this Ecological District.

Many areas of vegetation may appear to be no more than "scrub" and full of weeds, but actually provide habitat for some of the most dense kiwi populations in Northland, especially on the Purerua Peninsula. The North Island brown kiwi is a threatened species for which this Ecological District is now regarded as one of its strongholds.

Whilst mangroves (*Avicennia marina* var. *resinifera*) are generally common in the upper inlet areas, the area of saltmarsh in this Ecological District is small.

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

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

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

Islands

The islands afford secure refuge for a diverse range of threatened indigenous plants and animals such as land snails, reptiles, freshwater fish, numerous bird species, and plants restricted to northern New Zealand and coastal habitats. Many of these species are no longer resident on the adjoining mainland or are found in such depleted numbers that their long-term survival there is in question.

Although none of the islands remains in a pristine state, several are relatively weed-free and lack introduced predators, which is reflected by the range of threatened species present. Because of the absence of possums, the islands support substantial healthy populations of mature and regenerating pohutukawa (*Metrosideros excelsa*) forest, a sight rarely seen on the mainland these days.

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

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 Kerikeri 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 as well as other protected areas were also surveyed using the same methodology. This provided a consistent approach to determine representativeness of unprotected natural areas.

Each site was mapped and described. Once the sites were evaluated (see Criteria 2.4 below), 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 & 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 iwi was undertaken by the Conservancy Manager (Protection) at hui attended throughout the Ecological 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 Ecological District was covered in a methodical fashion based on topographical map grid squares. Most of the islands were surveyed from a boat.

Where the opportunity arose, e.g. at landowner's request, some sites were inspected in more detail and transects within the habitat were undertaken, while a few isolated sites were identified and described from aerial survey and photographs only. 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 and 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.

Classification of canopy vegetation types was done by a combination of manual sorting and computer analysis using TWINSPAN (Hill 1979). TWINSPAN is a multivariate analysis programme for two-way classification of site and species data. It provides an indicator species analysis at each partitioning of data during classification, and displays the final result in an ordered two-way species-by-site table.

In the present study, TWINSPAN was used to classify sites according to canopy vegetation composition, as determined from field surveys. Abundance categories of canopy species were coded numerically in the data set as follows: 4 - Abundant (> 50% of the canopy); 3 - Common (20–50%); 2 - Frequent (5–20%); 1 - Occasional (<5%). Vegetation types were determined according to the "abundant" and "common" categories. In many instances, no one species was classified as "abundant" but more than one species was "common".

Site groupings determined in the analysis enabled the identification of common and less common vegetation types within the District and 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, raupo reedland in swamp. 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 in this report 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; they 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, whereas others change more gradually, e.g. forest. The status and composition of species also change 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

3.1 TOPOGRAPHY/GEOLOGY

The main rock types are Paleozoic–Mesozoic Waipapa Terrane greywacke and overlying upper Neogene Kerikeri Volcanics basaltic scoria cones and lava flows. There are also some deeply weathered rhyolite domes. The Ecological District comprises rolling to moderately dissected hill country up to 329 m elevation, with an extensive area of deeply weathered basalt flows cut by steep-sided stream valleys between Matauri Bay and Kerikeri. The majority of the significant areas occur below 200 m above sea level (asl).

The open coast is mostly steep and rocky, but includes a 1.5 km long sand beach and associated small estuary at Takou Bay, and several other shorter sand beaches. There are a number of inshore islands, including Stephenson Island, the Cavalli Islands, and Flat Island. The Bay of Islands in the southern part of the Ecological District has a deeply indented rocky coastline with small estuaries in the upper parts of inlets (Brook 1996).

Land systems within the Ecological District are few, mainly dissected hill country with a limited area of alluvial valleys, estuaries, sandy beaches, and rocky shores.

3.2 CLIMATE

The Kerikeri Ecological District has a mild, humid and rather windy climate, winds being predominantly from the southwest.

Data are from weather stations in the Ecological District at Kerikeri Airport and Waitangi Forest, and from Puketi Forest in the adjoining Puketi Ecological District.

The mean annual rainfall at Waitangi Forest is 1495 mm. Most rainfall occurs during winter (with 45% of the annual rainfall occurring between May and August). Higher rainfall tends to occur at higher elevations, with the mean annual rainfall at Puketi headquarters (347 m asl) being 2300 mm.

The driest months are from November to January, with only 17% of the mean annual rainfall. Dry spells (periods of 15 days or more having less than 1 mm of rain per day) may occur at this time of the year.

The district is 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 at Kerikeri Airport is 14.9°C, February being the warmest month with the mean temperature of 19°C. July is the coldest month, with a mean temperature of 11°C. Daily temperature variations are minor, with few extremes of temperature or frosts.

The district has about 2000 hours of bright sunshine per year (Source: 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 (unpublished). 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

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

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

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

Also of historical interest is that Raoul collected from *Metrosideros* in the Bay of Islands an Australian epiphytic and parasitic species of *Muellerina* (B. Molloy pers. comm.).

Augustus Earle, who spent several months in the Bay of Islands and southern Hokianga in 1827, noted "the total absence of quadrupeds. There are [sic] abundance of birds, which are so numerous at times as almost to darken the air, - many of them possessing very sweet notes; and wild ducks, teal, &c. cover the various streams. Wherever I went I did not discover any grass; almost every part being covered either with fern or flax." (McCormick 1966). Earle also recorded seeing "a large hawk" and commented on the large number of "poor half-starved curs, that were all night long committing depredations on the poultry, pigs and goats" [not to mention the indigenous wildlife]. He notes that "goats were beginning to increase".

3.3.2 Broad pattern

Possibly because all of the Ecological District is at low altitude, there is no strong pattern of ecological gradients based on altitude apparent. Even the coastal influence is muted, because of the degree of disturbance.

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

Analysis of ecological units reflects a wide variety of habitat and vegetation types, generally dictated by geomorphological, topographical, and historical disturbance factors.

As this study was in the nature of an overview rather than in depth, the main vegetation types are described below in general terms.

3.3.3 Vegetation types

Wetlands

Wetlands occur mainly in the east of the Ecological District. The main wetland types are:

Coastal

- Saltmeadow-glasswort (*Sarcocornia quinqueflora*), *Selliera radicans,* sea primrose *(Samolus repens)* and *Paspalum vaginatum* with knobby clubrush (*Isolepis nodosa*) may be found grading into saltmarsh or mangrove.
- Saltmarsh-sea rush (*Juncus maritimus* var. *australiensis)* and/or *Leptocarpus similis*, with occasional shore ribbonwood (*Plagianthus divaricatus*), often grading into freshwater wetlands which are primarily raupo dominant (see fertile swamps below).
- Mangrove swamps—the main sites occur in the Bay of Islands.

On the open coast, these estuarine areas are smaller, and the vegetation is often limited to a narrow band on either side of the estuary.

Freshwater—fertile

(i) Raupo dominant

This is the most frequently found freshwater wetland type in the Ecological District. Cabbage tree (*Cordyline australis*), flax (*Phormium tenax*), kahikatea, and wheki (*Dicksonia squarrosa*) occur occasionally. This type may occur as narrow strips in alluvial valleys, either isolated or in a series; as a fringe or in clumps around open water; in more extensive swathes; and may grade into manuka (*Leptospermum scoparium*) shrubland.

Raupo sometimes occurs in association with other species:

Raupo–*Baumea articulata*, with occasional *Carex* (Porotu Rd swamp)

Raupo–swamp millet (*Isachne globosa)* with occasional *Carex* (Kerikeri Inlet Rd pond)

Raupo–swamp maire (*Syzygium maire)* with flax, manuka and occasional cabbage tree (Waitangi)

Raupo–kuta (*Schoenplectus tabernaemontani*)(Matauri Bay)

Fertile raupo swamps may also occur with naturalised species which are often abundant, e.g willow weed (*Polygonum* spp.), reed sweet grass (*Glyceria maxima)*, crack and weeping willow (*Salix fragilis* and *S. babylonica*). Cabbage tree and flax may also occur in these associations, which provide some excellent habitat for waterfowl, crakes, and bittern.

(ii) *Baumea articulata* dominant, which may include occasional raupo or flax (Blackridge Rd swamp, Te Taro pond, Waitangi wetlands and Lodore wetland).

(iii) *Baumea–Isopelis–Juncus* (Waitangi)

(iv) *Eleocharis sphacelata* (Waitangi and Kerikeri Inlet Rd pond)

(v) *Epilobium* herbfields—either *Epilobium–Eleocharis acuta* (Waitangi) or *Epilobium–Isolepis–Polygonum* (Te Taro pond)

(vi) Fertile swamp–shrublands:

- *Baumea–Isolepis–Juncus*–manuka–*Coprosma tenuicaulis* with flax and occasional swamp maire, cabbage tree, swamp kiokio (*Blechnum novae-zelandiae*), *Gleichenia* and *Hebe* (Waitangi)
- *Baumea–Juncus–Carex*–cabbage tree with *Coprosma propinqua* (Waitangi Estate)
- Manuka–flax (Lodore)

Freshwater–acid bogs

(i) *Baumea–Tetraria* gumland bog

(ii) *Baumea*–manuka–*Gleichenia*

In this Ecological District, these bogs are found only at Kerikeri Airport.

Open freshwater

Natural open water is found only in the Waitangi wetlands–Inlet Rd area, but the Ecological District contains a number of constructed ponds and irrigation lakes which are mostly open water, usually with raupo and other reeds, such as *Eleocharis*, on the margins.

The wider the buffer of vegetation on the margins (a reflection of the depth), and the greater the diversity of species, the more value these areas have as wildlife habitat.

Coastal vegetation

Associated with the coastal wetlands and small estuaries, are dune associations (*Spinifex sericea,* shore bindweed (*Calystegia soldanella*), marram (*Ammophila arenaria*), harestail (*Lagarus ovatus*)) and sandy beaches providing habitat for shorebirds. These are mostly on the open coast.

Pohutukawa (*Metrosideros excelsa*) forest

On the mainland, the original coastal vegetation is either non-existent or much reduced and degraded. Pohutukawa is scattered along the coast, frequently amongst grass or gorse (*Ulex europaeus*) or isolated within manuka shrubland. Occasionally flax occurs in association with pohutukawa, and in rare situations, with coastal astelia (*Astelia banksii).*

However, there are a few sites where indications of the original vegetation can be seen:

- Pohutukawa occurs frequently in coastal manuka forest and shrubland at Mahinepua and Te Ngaire.
- At Matauri Bay, pohutukawa grows on a sandbank with an understorey of *Coprosma macrocarpa, Haloragis erecta, Muehlenbeckia complexa* and *Ipomoea cairica.*
- At Orokaraka Bay in a coastal gully, it occurs with puriri (*Vitex lucens)*, karaka (*Corynocarpus laevigatus*), and *Astelia,* with occasional puriri and kawakawa (*Macropiper excelsum).*
- At Day Point, a small area of pohutukawa forest persists.
- On the northern side of the Kerikeri Inlet, pohutukawa and kanuka (*Kunzea ericoides*) are found with kohekohe (*Dysoxylum spectabile*), houpara (*Pseudopanax lessonii*), mapou (*Myrsine australis*), mahoe (*Melicytus ramiflorus*), *Pittosporum umbellatum,* and occasionally kowhai (*Sophora microphylla).*
- At Poraenui Point is a small remnant of coastal forest comprising pohutukawa, kohekohe, karaka, coastal astelia, with puriri and kawakawa.

On the islands, pohutukawa is commonly found emergent over flax, cabbage tree, taupata (*Coprosma repens*), hangehange (*Geniostoma rupestre var. ligustrifolium*)(Cavallis), houpara (Cape Wiwiki), coastal astelia, or introduced grasses. Houpara, cutty grass (*Gahnia lacera*), and cabbage tree are likely to be frequent, and rengarenga lily (*Arthropodium cirratum*) and coastal tussock (*Chionochloa bromoides*) present. Pohutukawa treeland is common on headlands and cliffs.

Associated species in addition to those mentioned above include bracken (*Pteridium esculentum*), coastal mahoe (*Melicytus novae-zealandiae*), karaka, and kowhai.

As forest, pohutukawa is found in association with kanuka, houpara, and flax.

Islands

Not surprisingly, coastal species predominate on the islands. They include pohutukawa, flax, cabbage tree, coastal astelia, rengarenga lily, coastal tussock, coastal toetoe (*Cortaderia splendens*), houpara, karo (*Pittosporum crassifolium*), wharangi (*Melicope ternata*), whau (*Entelea arborescens*), ngaio (*Myoporum laetum*), coastal maire (*Nestegis apetala*), large-leaved milk tree (*Streblus banksii*), coastal mahoe, taupata, tawapou (*Planchonella costata*), parapara (*Pisonia brunoniana*), and *Coprosma macrocarpa*.

Most of the coastal vegetation types occurring on the islands are not present on the mainland.

Apart from pohutukawa forest, manuka/kanuka forest is present on both the mainland and the islands, but on the islands, the associated species include pohutukawa, cabbage tree, houpara, flax, coastal tussock, kohekohe, and kowhai as frequent or occasional, with karaka, karo, rengarenga lily, and coastal astelia also occasional.

Unlike the mainland, manuka/kanuka shrubland is not a well-represented vegetation type—in fact, it does not occur at all. The shrubland types occurring on the islands are mainly houpara (Cape Wiwiki) or taupata (Cavallis and Cape Wiwiki). Associated with taupata are flax, houpara, karaka, coastal mahoe, rengarenga lily, coastal tussock, and native iceplant (*Disphyma australe*).

Flax is a conspicuous species on the islands from Cone Island to Cape Wiwiki, a contrast to its paucity on the mainland, and is found in a different habitat type - on rocky and dry substrates, as opposed to wetland sites on the mainland. It is often in association with other monocotyledonous plants—coastal tussock, rengarenga lily, oioi (*Leptocarpus similis*), coastal astelia, toetoe, and cabbage tree, as well as pohutukawa and taupata (see above).

Other island vegetation types are:

- Bracken fernland, colonising Stephenson and Motuterakihi Islands, and found with flax on Motukawanui.
- Pohuehue *(Muehlenbeckia complexa*), also colonising Stephenson Island. This vineland type is also found on Nukutaunga in the Northern Cavallis.
- Cabbage tree–*Coprosma macrocarpa* association—this occurs on Motukawanui.
- Houpara–kanuka forest (Cavalli Islands) with associated species being pohutukawa, cabbage tree, flax, karaka.
- Karaka–coastal mahoe forest (Cone Island).

Shrublands

Shrubland vegetation occurs at about half of the sites in the District.

Manuka-dominant shrubland is by far the most common. In at least half of the sites it occurs on the periphery, forming a buffer from developed areas and along rivers and the coast, or acts as a linkage between pockets of bush. Exotic species such as gorse, tobacco weed (*Solanum mauritianum*), *Hakea, Acacia*, and, on the coast, *Polygala,* commonly occur in these areas, and may be locally abundant. (A number of these 'weedy' sites contain NI brown kiwi.)

Elsewhere a range of species appear scattered in the canopy including cabbage tree, mamaku (*Cyathea medullaris*), tanekaha (*Phyllocladus trichomanoides*), towai (*Weinmannia silvicola*), rewarewa (*Knightia excelsa*), mahoe, puriri and in coastal areas, pohutukawa, kowhai, and karaka.

Kanuka occurs as a co-dominant at several sites. It is a sole dominant only rarely. At Oromahoe, kohuhu (*Pittosporum tenuifolium*) is co-dominant with manuka and kanuka.

Gumland vegetation occurs at Kerikeri Airport where manuka is abundant and other species tolerant of infertile soils such as *Hakea*, *Dracophyllum lessonianum*, mingimingi (*Leucopogon fasciculata*), *Gleichenia, Schoenus,* and *Lycopodium* occur.

Manuka on infertile soils also occurs at Upper Pungaere Rd, an apparently better drained site than Kerikeri Airport, with the habitat characterised by acid-loving orchids.

Towai shrubland occurs mainly in the north of the district where it is also co-dominant with manuka. Secondary manuka–kanuka–towai vegetation occurs at three sites in the Puketona area where totara (*Podocarpus totara*) and rewarewa are likely to be present.

At Rangitane and Taramawa, towai is found in association with mamaku tree fern.

Mamangi (*Coprosma arborea*) shrubland occurs at one site, Mahinepua.

Forest

Virtually all of the forest in this Ecological District is cutover.

Kauri forest

Of the Level 1 mainland sites, only six contain localised sites of kauri dominance or co-dominance, primarily on ridges and spurs.

Kauri is scattered throughout most of the forested sites in the northern and southern (but not central) sections of the district. Where kauri is dominant, manuka and kanuka occur frequently and rimu (*Dacrydium cupressinum*), totara, tanekaha, towai, and northern rata (*Metrosideros robusta*) may be occasional.

Regenerating kauri is co-dominant with tanekaha in the Kerikeri Stream Bush, with occasional towai, and co-dominant with towai and kanuka, with frequent tanekaha in the Puketona Reserve.

Tanekaha forest

Whilst widespread throughout the district, tanekaha is only locally common, in the upper Takou valley, Puketona, and Opua–Moerewa. It is found as a sole dominant at only one site (Taramawa Forest) and co-dominant at six sites (with kauri, towai, and manuka/kanuka, with totara often frequent).

Broadleaf–podocarp forest

Taraire (*Beilschmiedia tarairi*) forms the main forest type, being a dominant canopy species at about half of the sites, but occurs as a sole dominant mainly in the northern part of the District.

Within this type, kanuka, tanekaha, totara, tawa (*Beilschmiedia tawa*), kahikatea, or puriri may be frequent.

Canopy species usually present within broadleaf–podocarp forest also include rimu, northern rata, rewarewa, nikau, and mamaku. Towai, karaka, kohekohe, kauri, titoki (*Alectryon excelsus*), and white maire (*Nestegis lanceolata*) may also occur.

In the northern part of the Ecological District, towai occurs with taraire as a co-dominant. Kanuka, manuka, and totara may be frequent. In the upper catchments of the Takou and Kerikeri Rivers, towai can be found as a sole dominant, and co-dominant with totara at Pungaere Stream and Puketotara River, where kanuka occurs frequently.

Co-dominance with puriri is more common on the central and southern parts of the district, probably reflecting the more fertile volcanic soils. Rewarewa and towai occur frequently in about half of these areas. Rimu, totara and kahikatea may also be frequent within this type. Other canopy species occurring are tawa, northern rata, titoki, pukatea (*Laurelia novae-zelandiae*), and rarely, kawaka (*Libocedrus plumosa*), and kauri.

Taraire, puriri, and towai occur as co-dominants with other species in a variety of sites, with no clear pattern of distribution apparent:

Taraire–totara	Five sites north of the Bay of Islands, all remnants
Taraire–tawa	Pukewhau
Taraire–puriri–towai	Waitangi River
Taraire–puriri–totara	Puketona
Taraire–towai–totara	Mahimahi and Opua
Puriri–kahikatea	Puketotara (on alluvium)
Puriri–taraire–totara–kahikatea	Pakaraka

Secondary manuka–kanuka forest occurs mainly in the north and east of the district, from Radar Hill to Waitangi. Towai, totara, and tanekaha may occur frequently, with rimu locally frequent. Puriri, kahikatea, tanekaha, kohekohe, rewarewa, taraire, kauri, nikau (*Rhopalostylis sapida*), cabbage tree, karaka, and pohutukawa may also be present.

At five sites scattered throughout the Ecological District, totara and kanuka are co-dominant, with a wide range of canopy tree species present.

Secondary podocarp forest

These sites all tend to occur either on alluvium, fertile flats, or associated with river valleys.

Totara occurs in dominant regenerating stands at about ten sites throughout the Ecological District. It is co-dominant with rimu at four sites in the south-east of the district and with kahikatea at two sites in river catchments (Kawakawa Flood Plain and Kerikeri River).

At Pakaraka, rimu, totara, and kahikatea all occur together.

Three areas of secondary kahikatea also occur at Pakaraka. A very small area of kahikatea swamp forest occurs along the Puketotara River.

Fernland

Bracken (*Pteridium esculentum*) fernland occurs at four sites from the Bay of Islands south. Co-dominants are mamaku tree fern, *Gleichenia,* and gorse.

Mamaku tree fern is dominant at four sites in the central part of the district. Totara, towai, pate (*Schefflera digitata*), and five-finger (*Pseudopanax arboreus*) are locally common.

3.3.4 Species of botanical interest

This district contains several threatened species (see 3.3.5 below*).*

Kerikeri Ecological District is the type locality for a large number of species, particularly those collected by Alan and Richard Cunningham. They include both common species such as taraire, tawa, puriri, lacebark (*Hoheria populnea*), karo (*Pittosporum crassifolium*), and kumerahou (*Pomaderris kumeraho*), as well as less common species such as the threatened *Korthalsella salicornioides* and *Pittosporum pimeleoides* subsp. *pimeleoides* (see Appendix 8.5B).

Other interesting collections made by the Cunninghams include Cook's scurvy grass recorded from the shores of the Bay of Islands, wharangi (*Melicope ternata*) on the hills around the Bay of Islands, and the mistletoe *Tupeia antarctica* from trees on riverbanks in the Bay of Islands. Raoul also recorded a mistletoe, *Muellerina*, on *Metrosideros* in the Bay of Islands. Neither of these mistletoe species appears to have persisted where they were initially found.

Hebe acutiflora, a species found in damp soil along streams flowing through kauri forest and thought to be restricted to Puketi and Kerikeri, is now known to have a Northland-wide distribution, and its Vulnerable status may no longer be warranted (L.Forester pers. comm. 1998).

Stellaria "Poor Knights", a glabrous, creeping chickweed previously considered restricted to the Poor Knight's islands, but now found to be more widespread, has been recorded from the Cavallis (L.Forester pers. comm. 1997).

Other uncommon species of botanical interest include:

- *Thelymitra* "rough leaf". An undescribed orchid considered to be distributed throughout Northland and possibly Australia. It can be found at Mahinepua and Waitangi.
- tawaroa (*Beilschmiedia tawaroa*) A E Wright. A coastal tree which occurs from Mangonui to East Cape, including offshore islands thought by some to be a form of *B. tawa*. In this Ecological District it occurs in Opua Forest.
- *Ranunculus urvilleanus.* Found in damp sites and forest margins from Waikato north, this species is present at Rangitane, and near Kerikeri.
- the endemic monotypic fern *Loxsoma cunninghamii,* known from Thames to Kaitaia, is found at Rainbow Falls.

Islands

Botanically, the islands (and others that lie along Northland's east coast) are very interesting, for here can be seen ancient linkages with other Pacific countries. Species such as tawapou (*Planchonella costata*), coastal maire

(*Nestegis apetala*), parapara (*Pisonia brunoniana*), and coastal mahoe (*Melicytus novae-zelandiae*) are also native to Norfolk Island, with parapara extending further afield to New South Wales, Kermadec Islands, and Hawaii.

Several other species formerly widespread on the mainland that have since disappeared or survive only as relict populations, flourish on the islands. These include the large-leaved milk tree (*Streblus banksii*), whau (*Entelea arborescens*), kohekohe (*Dysoxylum spectabile*), coastal coprosma (*Coprosma macrocarpa*), rengarenga lily (*Arthropodium cirratum*), native bindweed (*Calystegia marginata*), NZ spinach (*Tetragonia teragonioides*), and ngaio (*Myoporum laetum*).

Locally uncommon species include native morning glory (*Ipomoea cairica*), *Psilotum nudum*, koru (*Colensoa physaloides*), *Cassytha paniculata* (Moturoa Island), and *Asplenium obtusatum* subsp. *northlandicum.* The last species is confined to coastal cliffs and rocks in the northern North Island (Brownsey & Smith-Dodsworth 1989).

Also present on several islands is *Hebe* 'Whangarei', a Northland endemic of restricted distribution that is found only in coastal areas between Whangaroa and Whangarei. In the Kerikeri Ecological District, it is found only on off-shore islands.

3.3.5 Threatened plant species

(See Appendix 8.3 for Categories of Threat)

Calystegia marginata - Vulnerable

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

In this Ecological District a small number of plants have been found near the coast on the northern side of the Bay of Islands and on Moturoa Island.

Centipeda minima - Local

A small prostrate herb from the Asteraceae family found in waste places and damp stream or lake margins from North Cape to 45°. Recorded in 1949 from "Kerikeri Swamp" by Mason and Moar (thought to be the Waitangi wetlands). Also recorded in Northland from Kai Iwi Lakes, and from Kawau Island.

Colensoa physaloides - Local

A distinctive blue-flowered, shrubby lobeliaceous plant with hydrangea-like foliage. It is a monotypic genus, endemic to Northland, some of its offshore islands as well as Rakitu Island, east of Great Barrier Island (P. de Lange pers. comm. 1996). It is found scattered through forest areas, generally beside streams and tracksides, and on talus slopes.

Cyclosorus interruptus - Rare

This fern grows in intermediate wetlands amongst other aquatic sedges and rushes, in very damp or shallow water. It has been found in the Kaimaumau, Karikari Peninsula, and some Aupouri Forest wetlands. There are also records

from Mt Camel and Tangonge. It requires a warm and frost-free environment, with colonies occurring as far south as Taupo, although in the colder southern sites it is restricted to the warm waters of the geothermal areas (Wilson & Given 1989). There is an unconfirmed but reliable record from the Waitangi wetlands in the 1980s.

Fuchsia procumbens - Local

This prostrate, sprawling plant is found in open coastal habitats on the mainland from North Cape to Maunganui Bluff on the west coast, Coromandel on the east coast, and at Great Barrier Island (Godley & Berry 1995). Found at Mahinepua, Matauri Bay (type locality), the Bay of Islands, and Whangaruru to Bream Head.

Hebe acutiflora - Vulnerable

A North Island endemic plant found in damp soil along streams flowing through kauri forest and thought to be restricted to Puketi and Kerikeri, it is now known to have a Northland-wide distribution. Competition from abundant mistweed (*Ageratina riparia*) is the major threat to this species (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 Ecological District it is found at Opua, on *Coprosma.*

Korthalsella salicornioides - Insufficiently Known

A dwarf mistletoe usually parasitic on manuka and kanuka (Poole & Adams 1990), found at Mahinepua, Waitangi, Opito Bay, and Motukawanui.

Lepidium oleraceum - Endangered

A small herb with fleshy leaves, and toothed tip (Cook's scurvy grass), restricted mainly to offshore islands. Although it is widely distributed (from Kermadec to Auckland Islands), extant populations are small and much reduced from their former extent. Recorded by Cunningham from the mainland Bay of Islands, but now known in this Ecological District only from the Cavalli Islands.

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 of New Zealand. It occurs in both Australia and Polynesia (Allan 1961). Known from only one site in this Ecological District, with single records also from Ahipara and Whangaroa Ecological Districts.

***Pimelea tomentosa* s.str.** - Rare

A slender shrub found in open shrubland from Three Kings (P. de Lange pers. comm. 1997) to Nelson/Marlborough (Poole & Adams 1990). There have been few records from Northland, but recorded in this Ecological District at Opito Bay (1958) and Moturoa Island (1990).

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 only on 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). Present at Opua, Opito Bay, Rangitane, and Moturoa Island.

Streblus banksii - Local

Endemic coastal tree, reaching 12 m, now largely restricted to offshore islands. Distribution occurs Mangonui south to the Marlborough Sounds. Recorded on several islands in this Ecological District.

Thelypteris confluens - Rare

Once widespread, this marsh fern is now confined to coastal areas north of Auckland and Bay of Plenty/Rotorua. Present in the Waitangi Wetlands.

Todea barbara - Vulnerable

A fern with leathery fronds found on dry sites within gumland vegetation, and also known from Australia (Wilson & Given 1989). In this Ecological District known from Waitangi.

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

Crassula hunua - classified as Endangered, this species was recorded from Kawakawa by Kirk last century, and recent records are restricted to Auckland.

The Endangered *Atriplex billardierei* agg. (Cameron et al. 1995) was recorded in this district from Takou Bay in 1889 and is considered extinct in the Ecological District. Populations occur at North Cape, the Chathams, as well as in Victoria and Tasmania. It has been reported rom Aupouri Ecological District. The northern plants belong to a different taxon, and are currently being studied (P. de Lange pers. comm. 1997).

3.4 FAUNA

Information on fauna in this report has been compiled from SSWI and SSBI data bases, as well as from field observations during this survey. Information on common fauna present is given in Appendix 8.4.

Information on the status of individual species is derived from Bell (1986), and Molloy & Davis (1994). (See Appendix 8.3 For IUCN categories. 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.

3.4.1 Threatened bird species

Most of the common species of Northland, both indigenous and introduced, are to be found in the District. A checklist of birds is included in Appendix 8.4.

North Island brown kiwi ***Apteryx australis mantelli***

Threatened Endemic Category A

Kiwi, although much reduced from former numbers due to habitat loss, predation by dogs, small predators, and possibly pigs, are found throughout the Ecological District (Miller & Pierce 1995). Shrubland and regenerating forest areas are as important habitat as the mature forests.

If the Kerikeri Ecological District is to remain a stronghold for this species, the fundamental requirement of habitat availability is a prerequisite.

North Island weka ***Gallirallus australis greyi***

Threatened Endemic Category B

Dwindling numbers at Opua, and occasionally reported elsewhere.

Brown teal ***Anas chlorotis***

Threatened Endemic Category C

Once widespread in swampy streams and tidal estuaries, only a small number of birds remain in the wild outside of great Barrier Island. A few birds may persist at Takou Bay, and there are 12 birds established on Moturoa Island from releases in 1984 and 1986 (S. Anderson pers. comm. 1998).

Variable oystercatcher ***Haematopus unicolor***

Threatened Endemic Category C

Found in small numbers along the eastern coastline and in the Bay of Islands.

New Zealand dotterel ***Charaius obscurus aquilonius***

Threatened Endemic Category B

Found in small numbers on some eastern coast beaches, Oneroa Bay, and Urupukapuka Island.

Banded dotterel ***Charaius bicinctus bicinctus***

Threatened Endemic Category C

Recorded from Takou Bay.

Wrybill ***Anarhynchus frontalis***

Threatened Endemic Category B

After breeding in Canterbury and North Otago, small flocks move north, mainly to the Firth of Thames, and Manakau and Kaipara Harbours. Record from Takou Bay (1993).

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

Threatened Indigenous Category C

Found along the coastline, numbers of this endemic species have been greatly reduced over the past 20 years.

Caspian tern ***Sterna caspia***

Threatened Indigenous Category O

Occurs along coasts and estuaries. An important roost of up to 20 birds is known from Haumi River estuary.

Reef heron ***Egretta sacra sacra***

Threatened Indigenous Category O

Thought to breed at Takou Bay.

Australasian bittern ***Botaura poiciloptilus***

Threatened Indigenous Category O

Recorded from Waitangi wetlands and likely to occur elsewhere.

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

Threatened Endemic Category B

Over recent years the population of New Zealand pigeon has been severely depleted from the combined effects of predation, competition, and heavy poaching.

North Island saddleback ***Philesturnus carunculatus rufusater***

Threatened Category C

Previously widely distributed, but reduced to only one population, on Hen Island, by about 1910. Reintroductions to several islands have occurred (Heather & Robertson 1996), including to Moturoa Island in August 1997.

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

Pycroft's petrel ***Pterodroma pycrofti***

Endemic Conservancy ranked second priority (CMS)

Nests on offshore islands (Stephenson, Poor Knights, Hen and Chickens, and Mercury Is), with an estimated population of about 5000 birds, including about 1500 pairs (Heather & Robertson 1996).

Little shearwater ***Puffinus assimilis***

Conservancy ranked second priority (CMS)

The New Zealand subspecies breeds on islands around the northern North Island from Whangaroa to the Bay of Plenty. In this Ecological District, it breeds on the Cavallis (Heather & Robertson 1996).

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

Regionally threatened endemic

Found in wetlands at Waitangi, Kerikeri Airport gumlands.

Spotless crake ***Porzana tabuensis plumbea***

A species with restricted distribution, being confined on the mainland largely to raupo swamps. Found in wetland areas throughout the Ecological District.

Banded rail ***Rallus philippensis assimilis***

A species which was once widespread and for which Northland is its national stronghold.

Found in wetlands at Waitangi and in saltmarsh and mangrove swamps.

Pied tit ***Petroica macrocephala toitoi***

Populations have been restricted by habitat fragmentation generally to large mature forested areas. Present in Opua forest.

3.4.2 Invertebrates

A comprehensive discussion and checklist of 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.

This Ecological District is the present northern limit for the large land snail *(Placostylus hongii)* (R. Parrish pers. comm. 1996). It is the southern limit for the endemic Northland green gecko (*Naultinus grayi*), which, at Opua and Moerewa, is found to hybridise with the more common Auckland green gecko *(Naultinus elegans elegans*), and live animals have been found to contain characteristics of both species (Forester & Anderson 1993).

Kauri snail ***Paryphanta busbyi busbyi***

Threatened endemic Category C

Found throughout the Ecological District.

Flax snails

Placostylus ambagiosus pandora

Threatened Category A

The only known natural populations are confined to Te Paki. The species was introduced to Motutakupa Island in the Cavallis in 1984.

Placostylus hongii

Threatened endemic Category C

This species was formerly collected from the banks of the Kerikeri River, but the only known site where it persists in this Ecological District is on a small island off the Purerua Peninsula. It is found in greater numbers in the southern Bay of Islands in the Whangaruru Ecological District (F. Brook pers. comm. 1997).

3.4.3 Reptiles

McGregor's skink ***Cyclodina macgregori***

Threatened Category B

Once widespread, now restricted to a few offshore islands (Cavallis, Bream Island, Sail Rock, and Mana Island) (Gill & Whitaker 1996). Present on Motuharakeke Island.

Duvauvel's gecko ***Hoplodactylus duvaucelii***

The largest living lizard in New Zealand, and formerly widespread but now restricted to islands along the north-east coast of the North Island and in Cook Strait (Gill & Whitaker 1996). In this Ecological District it is found on Cone and Stephenson Islands and in the Cavallis.

Moko skink ***Oligosoma moco***

Found mainly on offshore islands from the Bay of Plenty northwards (Gill & Whitaker 1996). In this Ecological District occurs on islands off the coast from Whangaroa to Purerua Peninsula.

Suter's (egg-laying) skink ***Oligosoma suteri***

Found mainly on offshore islands from the Three Kings to the Aldermans (Gill & Whitaker 1996) and is known from only a few mainland sites. In this Ecological District, it is found in the Cavallis.

3.4.4 Fish

Banded kokopu ***Galaxias fasciatus***

Category C

Recorded from Waitangi and Moturoa Island.

Mudfish ***Neochanna*** **sp.**

Category A (provisional)

Recent studies of mudfish from Ngawha (Kaikohe Ecological District) and Kerikeri Airport indicate these populations are physically and genetically different from *Neochanna diversus* (black mudfish—a Category C species found also in coastal and lowland peaty sites of Pleistocene era such as Kaimaumau, Hauraki Plains, and Waikato) and have a greater similarity to high altitude species, south of Mokau. As a new species of restricted distribution, it is likely to become a Category A species (R. Parrish pers. comm. 1997).

Fish species of restricted distribution in the Ecological District

Giant bully ***Gobiomorphus gobioides***

Intermittent distribution around the New Zealand coast, with few records from Northland; found in the Kerikeri River.

Blue-gilled bully ***Gobiomorphus hubbsi***

Conservancy ranked medium priority, as although its range covers all of New Zealand, there are few records from Northland. Recorded from the Kerikeri River in 1965.

3.5 ISLANDS

Nine threatened species of birds, including some recent reintroductions, breed on the islands or use them as feeding or roost sites. They include North Island brown kiwi, NZ dotterel, NZ pigeon, brown teal, North Island saddleback, variable oystercatcher, white-fronted tern, Caspian tern, and reef heron.

The islands are also important nesting sites for several seabird species, including Pycroft's petrel, little shearwater, blue penguin (*Eudyptula minor*), grey-faced petrel (*Pterodroma macroptera*), common diving petrel (*Pelecanoides urinatrix*), fluttering shearwater (*Puffinus gavia*), and possibly the sooty shearwater (*Puffinus griseus*).

Native land snails found on the islands include the threatened flax snails *Placostylus ambagiosus pandora* and *P. bongii*. Several reptile species are present in varying numbers including the threatened McGregor's skink, moko skink, Suter's skink, copper skink, shore skink, Duvaucel's gecko, Pacific gecko, and common gecko.

Freshwater fish species are represented in low numbers on two of the largest islands, Motukawanui and Moturoa. These include banded kokopu, red-finned bully, and long-finned eel.

3.6 THREATS

The clearance of land for agriculture and human settlement has resulted in considerable fragmentation of habitats, opening them up to stock, drying winds, and the spread of weeds. Weed species such as mistweed (*Ageratina riparia*) and Mexican devilweed (*Ageratina adenophora*) are to be found in almost all forest and shrubland areas. All habitats are under threat from the spread of invasive weeds such as wild ginger (*Hedychium gardnerianum*), and coastal habitats are particularly susceptible to the spread of species such as moth plant (*Araujia sericifera*).

In the forest and shrubland areas, browsing animals such as stock, possums, goats, and pigs constitute the main immediate threat. However, uncontrolled dogs are posing a serious threat to ground-dwelling species, particularly kiwi (Pierce & Sporle 1997). Mustelids are also significant predators of ground-dwelling and bird species, particularly kiwi. (A list of introduced mammals is in Appendix 8.4.)

Uncontrolled dogs also pose a threat to shore birds such as the NZ dotterel, and little blue penguin, which nests along the coast in this district.

Over recent years the population of NZ pigeon in other parts of the Far North has been severely depleted, with heavy poaching pressure considered a significant factor, together with predation and/or competition from possums, rats, or stoats (Pierce et al. 1993).

Habitats on margins or in successional stages, some of which are kiwi habitat, are under threat from afforestation. Subdivision within kiwi habitats, particularly near Kerikeri, is intensifying the threats to this species.

This study confirmed that wetlands are now a very rare habitat type in the Kerikeri Ecological District. There are so few remaining that all are significant. Wetland species are particularly susceptible to changes in ground water levels and pH, and hence are easily affected by surrounding land uses. They are also threatened by invasion of exotic species, particularly species such as willow, honeysuckle, and blackberry. Many are accessible to stock, which exacerbate weediness, and so are severely degraded.

Coastal habitats in the Ecological District have been diminished by development for primary production and subdivision. There is so little original coastal vegetation remaining that all is significant, despite being fragmented and degraded by disturbance and weed invasion.

The main threats to the islands are from fire, weeds (particularly those with airborne seeds such as pampas (*Cortaderia selloana*) and mothplant), and invasion by mammalian predators. All of these threats are exacerbated by visitors from the mainland. However, being physically isolated from the mainland does reduce such threats, and the separation enables more effective predator control, and the maintenance of predator-free status where it exists. Sweet pea shrub (*Polygala myrtifolia)* is widespread on the islands, but most of the invasive weeds of Northland are absent, or present in small numbers.

Apart from eliminating or reducing human-related threats, natural areas need to be managed to control animal and plant pests to ensure long-term ecological viability of the natural habitats.

4. Schedule of sites

4.1 LEVEL 1 SITES

Site	Survey No.	Grid Ref.
Radar Hill North	P04/068	P04 865 875
Mahinepua Bay & Estuary	P04/069	P04 880 884
Mahinepua Peninsula & Environs	P04/070	P04 840-890, P04 880-890
Wainui South	P04/071	P04 885 850
Whakarara	P04/072	P04 915 842
Te Ngaire	P04/073	P04 904 864
Burrill	P04/074	P04 914 856
Matauri Bay Bush	P04/075	P04 940 840
Matauri, Waiaua Bays & Estuary	P04/076	P04 943 845, P04 955 820
Mahimahi	P04/078	P04 900-930, P04790-810
Popo Scenic Reserve	P04/079	P04 915 787
Hauriri Rd	P04/080	P04 903 783
Lonsdale Park	P04/081	P04 876 765
Omahanui	P04/082	P04 940 775
Takou Bay Estuary & Environs	P04/083	P04 954 777
Takou Stream Bush	P04/084	P04 910 760
Upper Tahoranui Valley	P04/086	P04 916 721
Otaha Rd	P04/088	P04 950 740
Waimanga Stream	P04/089	P04 962 757
Tahoranui River	P04/090	P04 982 745
Tapuaetahi	P04/091	P04 001 740
Te Tii Shrubland	P04/092	P04 025 730
Upper Te Puna Inlet	P04/093	P04 030 710
Opete Creek Estuary & Shrublands	P04/097	P04 070 715
Mataka Wetlands & Shrublands	P04/098	P04 080 730
Purerua Peninsula Shrublands	P04/Q04/100	P04/Q04 110 710
Pakaraka Bush/ Werowero Swamp	P05/051	P05 000 498
Hupara Road Bush Remnants	P05/052	P05 012 495
Turntable Hill Bush	P05/053	P05 000 445
Waiharakeke Stream Alluvial Forest	P05/054	P05 025 440
Whangae Bush Remnants	P05/055	P05 040 500
Taramawa Forest	P05/056	P05 060 480
Opua Forest	P05/058	P05 080 540
Blackridge Road Swamp	P05/059	P05 000 557
Puketona Pa Riparian Forest	P05/060	P05 000 561
Te Aute Road Bush	P05/061	P05 985 530
Porotu Road Swamp and Environs	P05/062	P05 992 524
Oromahoe Bush	P05/063	P05 975 525
Puketona Reserve	P05/077	P05 965 575
Pukewhau	P05/078	P05 995 590
Waitangi Wetlands and Environs	P05/079	P05 040 620
Day Point and Wharau Shrublands	P05/080	P05 060 645
Brampton Shoal Bush	P05/081	P05 085 613
Hutia Creek Coastal Shrublands	P05/082	P05 070 585
Te Taro Pond	P05/084	P05 055 635

Site	Survey No.	Grid Ref.
Waitangi River Alluvial Remnants	P05/085	P05 960 550
Kerikeri River Riparian Remnants	P05/086	P05 948 650
Rangitane Shrublands	P05/087	P05 030 680
Te Aiorua Creek Wetland Remnant	P05/088	P05 008 695
Stanners Road Remnant	P05/089	P05 933 693
Puketotara Road Alluvial Remnant	P05/090	P05 940 633
Kerikeri Stream Bush	P05/091	P05 890 650
Pungaere Road Bush	P05/092	P05 900 665
Pungaere Stream Bush	P05/093	P05 890 685
Upper Kerikeri Stream Bush	P05/094	P05 860 660
Puketotara River Bush	P05/095	P05 885 606
Lodore Wetland	P05/096	P05 867 593
Whaengaere Rd	P05/098	P05 075 680
Rangihoua	P05/099	P05 085 685
Onewhero Bay	P05/102	P05 072 630
Kerikeri Airport Gumland	P05/103	P05 935 595
Ngatahuna Stream Swamp	P05/104	P05 014 512
Kawakawa Flood Plain	P05/105	P05 065 460
Cabbage Tree Remnant	P05/107	P05 082 474
Upper Pungaere Shrubland	P05/114	P04/P05 840 700
Islands		
Cone Island	P04/113	P04 810 938
Stephenson Island	P04/101	P04 824 928
Oruatemanu Island	P04/112	P04 837 895
Karaka Island	P04/111	P04 856 896
Motueka (Flat) Island	P04/102	P04 898 910
Motuekaiti Island	P04/103	P04 897 901
Cavalli Islands - Motukawanui cluster	P04/104	P04 970 885
Cavalli Islands - Northern Group	P04/114	P04 980 910
Cavalli Islands - Eastern Group	P04/115	P04 990 885
Cavalli Islands - Southern Group	P04/116	P04 975 855
Motuiwi Island	P04/105	P04 966 825
Lion Rock	P04/106	P04 074 760
Snail Island	P04/108	P04 106 734
Kowhatuhuri Point Island	P04/107	P04 101 745
Cape Wiwiki Group	P04/109	P04 140 712
Te Pahi Island Group	P05/108	P05 095 680
Motupapa Island	P05/110	P05 898 910
Moturoa Island Group	P05/112	P05 100 650
Black & Battleship Rocks Groups	Q05/067	Q05 122 655
Motutui Island	Q05/056	Q05 130 692
Motuterakihi Island	Q05/057	Q05 105 678

RADAR HILL NORTH

Survey no.	P04/068
Survey date	3 April 1995
Grid reference	PO4 865 875
Area	133.8 ha
Altitude	20-160 m asl

Ecological unit

(a) Manuka shrubland on moderate hillslope

(b) Taraire-towai forest in gully

(c) Secondary kanuka forest on hillslope

FIGURE 3. RADAR HILL NORTH, P04/068
EACH GRID IS 1000 M × 1000 M AND EQUALS 100 HA.
s = SHRUBLAND; f = FOREST.

Landform/geology

Dissected hill country of Waipapa Group greywacke, with an overlying remnant of Kerikeri Volcanics basalt flows (Horeke Basalt) adjacent to Wainui Road.

Vegetation

A mosaic of manuka shrubland with areas of secondary forest in the gullies.

Type (a) is manuka shrubland between 1 and 4 m tall. Scattered within it are tanekaha, towai, rewarewa, mamaku, cabbage tree, mahoe, bracken, gorse, and pine.

Type (b), towai–taraire forest, is found in the gullies. Other species occurring are rimu, totara, kahikatea, rewarewa, puriri, karaka, kauri, tanekaha, northern rata, pukatea, hinau, kawaka, and matai.

Type (c), secondary kanuka forest, contains kauri, rimu, tanekaha, rewarewa and totara.

Fauna

NI brown kiwi (Category A threatened species) may be present.

Significance

Contiguous with Tauranga Valley (P04/067 Whangaroa Ecological District), Wainui South (P04/071), areas known to contain kiwi, and part of a much larger habitat, primarily in the Whangaroa Ecological District, which stretches west to Kaeo.

MAHINEPUA BAY AND ESTUARY

Survey no.	P04/069
Survey date	4 April 1995
Grid reference	P04 880 884
Area	8.6 ha
Altitude	sea level

Ecological unit

(a) Raupo wetland in valley bottom

(b) Shore ribbonwood shrubland in brackish zone

(c) *Juncus* rushland in brackish zone

(d) Mangrove forest on estuary

(e) Sandy beach

Landform/geology

Gravelly sandy beach and estuary

Vegetation

On the edge of the plantation is Type (a), a raupo wetland, which runs into a brackish area where Type (b), shore ribbonwood, is abundant. Sea rush is frequent and raupo and mangroves are scattered. Upstream of the bridge, sea

rush is abundant in Type (c). Mangroves and shore ribbonwood occur rarely as do flax and oioi.

Downstream of the bridge, mangroves are dominant in Type (d). Sea rush occurs frequently, and shore ribbonwood, oioi, and glasswort are also present.

Fauna

NZ dotterel (Category B threatened species), Caspian tern (Category O threatened species), variable oystercatcher (Category C threatened species), white-faced heron.

Significance

Remnant of a diminished habitat type and a representative site for shore ribbonwood and sea rush.

The habitat supports threatened shorebirds.

FIGURE 4. MAHINEPUA BAY AND ESTUARY, P04/069
EACH GRID IS 1000 M × 1000 M AND EQUALS 100 HA.
w = WETLAND; e = ESTUARY.

MAHINEPUA PENINSULA AND ENVIRONS

Survey no.	P04/070
Survey date	4 April 1995
Grid reference	P04 865 892
Area	47.3 ha
Altitude	0-20 m asl

Ecological unit

(a) Scattered pohutukawa on coastal cliffs

(b) Coastal manuka shrubland on coastal cliffs

(c) Pohutukawa-mamaku shrubland on coastal hillslope

(d) Mamangi shrubland on coastal hillslope

(e) Taraire forest on hillslope

Landform/geology

Coastal cliffs and hillslopes of Waipapa Group greywacke

Vegetation

Primarily coastal cliff vegetation but also including some broadleaf remnants.

Type (a) Scattered pohutukawa

From Orua Bay to Whangaihe Bay, the cliffs are mostly grass, with scattered pohutukawa, flax, manuka and gorse. Some of the pohutukawa are badly browsed. From East Bay to the eastern side of the Mahinepua Peninsula, pohutukawa, *Astelia banksii* and flax are scattered on the cliffs (10%).

Type (b) Coastal manuka shrubland

On the eastern side of the Mahinepua Peninsula, the vegetation is more continuous. Much of the cliff is covered in manuka 2-3 metres tall with frequent pohutukawa, *Astelia banksii* and ponga and occasional puriri and cabbage tree. Flax is locally frequent.

In exposed places the manuka shrubland is stunted to below 1 metre with frequent *Hebe,* locally abundant bracken and occasional ponga (50%).

Type (c) Pohutukawa-mamaku shrubland

There is one small area where pohutukawa and mamaku are common with occasional mamangi and karamu (<5%).

Nearby, Type (d), mamangi shrubland, contains frequent manuka and karamu, and five-finger, mamaku, and pohutukawa are occasional (<5%).

Type (e) Taraire forest

Behind Orua Bay, in the Kairawau Stream catchment, is a remnant of taraire with kanuka and scattered rimu, northern rata, rewarewa and puriri. There is also a taraire remnant at Whangaihe Bay, in which both tanekaha and manuka are frequent and puriri, rewarewa and karaka scattered (30%).

Significant flora

Korthalsella salicornioides (Insufficiently Known), *Fuchsia procumbens* (Local), *Tetragonia tetragonioides,* and *Thelymitra* "rough leaf" (uncommon). All occur on the Mahinepua Peninsula.

Fauna

NZ dotterel (Category B threatened species), variable oystercatcher (Category C threatened species).

Significance

Remnant of coastal vegetation types, of which very little remains from Whangaroa to the Bay of Islands. A representative site for pohutukawa, pohutukawa-mamaku, coastal manuka and mamangi shrubland (the only site in the Ecological District of pohutukawa-mamaku and mamangi).

Habitat for threatened flora and fauna species.

This site includes the 36.2 ha Mahinepua Peninsula Scenic Reserve administered by the Department of Conservation.

FIGURE 5. MAHINEPUA PENINSULA AND ENVIRONS, P04/070.
EACH GRID IS 1000 M × 1000 M AND EQUALS 100 HA.
s = SHRUBLAND; f = FOREST.

WAINUI SOUTH

Survey no.	P04/071
Survey date	3 April 1995
Grid reference	P04 885 850
Area	918.7 ha
Altitude	20-340 m asl

Ecological unit

(a) Manuka shrubland on moderate to steep hillslope

(b) Taraire-manuka/kanuka forest mosaic in gullies

(c) Towai-taraire forest on steep hillslope

(d) Secondary kauri forest on ridge

(e) Secondary kanuka forest on steep hillslopes

Landform/geology

Steep, dissected hill country of Waipapa Group greywacke with overlying Kerikeri Group andesitic breccia NNW of Teheoriri trig, and remnant Kerikeri Volcanics basalt flows (Horeke Volcanics) in the vicinity of Teheoriri trig and on a knoll east of Whitirau Stream (P04 888 837).

Vegetation

Type (a) Manuka shrubland

Occurs in an extensive area, a great deal of which is only 1-2 metres tall, close to Wainui Rd and behind the settled areas. Occurring occasionally within this are mahoe, hangehange, mamaku, pine, gorse, and tobacco weed. (The weeds are mainly confined to the northwest corner.) This grades into a mosaic of taller vegetation in which mamaku is frequent and totara, kahikatea, puriri and karaka also occur.

Type (b) Taraire-manuka/kanuka forest mosaic occurs in gullies between the Ngutuko and Whareato Streams. Puriri and karaka are frequent. Rimu, totara, kahikatea, nikau and rewarewa are also present.

Type (c) Towai-taraire forest occurs on the higher slopes north of Weta, with frequent kanuka. Kauri, northern rata, tanekaha, rimu, puriri and karaka all occur.

Type (d) Secondary kauri forest occurs further east, on the ridges south of Wainui Valley Rd.

Type (e) Secondary kanuka forest

Kauri and tanekaha are frequent. Rimu and totara also occur.

Fauna

NI brown kiwi (Category A threatened species), kauri snail (Category C threatened species).

Significance

A large, diverse area of forest contiguous with other large habitats (P04/072 Whakarara and P04/066 Teheoriri in Whangaroa Ecological District).

Habitat for two threatened species including kiwi.

Contains representative examples of kanuka, kauri forest, taraire-towai and taraire-manuka/kanuka forest (the only example in the Ecological District of the latter).

FIGURE 6. WAINUI SOUTH, P04/071.
EACH GRID IS 1000 M × 1000 M AND EQUALS 100 HA.
s = SHRUBLAND; f = FOREST.

WHAKARARA

Survey no.	P04/072
Survey date	4 April 1995
Grid reference	P04 915 842
Area	249.5 ha
Altitude	20-260 m asl

Ecological unit

(a) Manuka shrubland on moderate to steep hillslope

(b) Secondary manuka/kanuka forest on moderate to steep hillslope

(c) Towai-taraire forest in gully

(d) Taraire forest on steep hillslope

Landform/geology

Steeply dissected hill country of Waipapa Group greywacke and chert downslope from basalt plateau remnants (Kerikeri Volcanics Horeke Basalt).

Vegetation

Type (a) Manuka shrubland occurs on the lower slopes, mainly low in height with scattered puriri, mamaku, cabbage tree and tanekaha. On the eastern side of the valley, only remnant puriri stand above the manuka.

Type (b) Secondary manuka/kanuka forest with frequent rimu and towai and occasional kahikatea, tanekaha, rewarewa, and kauri, occurs further up the valley towards Whakarara.

Type (c) Towai-taraire with manuka and scattered rimu, rewarewa, puriri, tanekaha, totara, kauri, nikau and mamaku occurs in the gullies.

Type (d), taraire dominant with frequent tawa and tanekaha with occasional kauri, northern rata, puriri, rewarewa, titoki, pohutukawa and towai occurs in the valley below the airstrip. Shrubland on either side of this also contains frequent pohutukawa, as does a tiny broadleaf remnant nearby.

Fauna

NI brown kiwi. (Category A threatened species)

Significance

Part of the large contiguous area of indigenous vegetation from Matauri Bay to Kaeo.

Contains representative examples of coastal taraire forest (a nationally uncommon vegetation type) and manuka shrubland.

This site includes 231 ha of stewardship land administered by the Department of Conservation.

FIGURE 7. WHAKARARA, P04/072.
EACH GRID IS 1000 M × 1000 M AND EQUALS 100 HA.
s = SHRUBLAND; f = FOREST.

TE NGAIRE

Survey no.	P04/073
Survey date	4 April 1995
Grid reference	P04 904 864
Area	18.3 ha
Altitude	sea level to 40 m

Ecological unit

(a) Sandy beach

(b) Manuka shrubland on coastal cliffs

(c) *Coprosma*-manuka shrubland on low coastal cliffs

Landform/geology

Coastal cliffs and hillslopes of Waipapa Group greywacke and sandy beach end with estuary.

FIGURE 8. TE NGAIRE, P04/073
EACH GRID IS 1000 M × 1000 M AND EQUALS 100 HA.
s = SHRUBLAND.

Vegetation

On the cliffs between Mahinepua and Te Ngaire, type (b), manuka, is common with pohutukawa and sweet pea shrub frequent.

At the southern end of Te Ngaire beach, Type (c) occurs in which *Coprosma* are abundant and manuka common. Pohutukawa, Cape honey flower and mahoe also occur.

Fauna

NZ dotterel (Category B threatened species)

Significance

The only site in the Ecological District where a manuka-*Coprosma* association has been recorded.

The eastern end of Te Ngaire beach has supported NZ dotterel in the past but heavy recreational use including launching of vehicles is limiting breeding success.

BURRILL

Survey no.	P04/074
Survey date	4 April 1995
Grid reference	P04 914 856
Area	53.2 ha
Altitude	60-140 m asl

Ecological unit

(a) Secondary coastal manuka forest on steep coastal hillslope

(b) Manuka shrubland on steep coastal hillslope

Landform/geology

Steep hill country of Waipapa Group greywacke.

Vegetation

Mostly Type (a), secondary coastal hardwood forest with frequent pohutukawa and tanekaha. Rimu, kauri, karaka, towai and rewarewa also occur (80%).

Type (b) Manuka shrubland with open canopy and various exotic weed species as well as pohutukawa (20%).

Fauna

Not surveyed.

Significance

Contains the only example in the Ecological District of coastal manuka forest, a nationally rare vegetation type.

FIGURE 9. BURRILL, P04/074.
EACH GRID IS 1000 M × 1000 M AND EQUALS 100 HA.
s = SHRUBLAND; f = FOREST.

MATAURI BAY BUSH

Survey no.	P04/075
Survey date	4 April 1995
Grid reference	P04 940 840
Area	500.3 ha [approx. 100 ha cleared since survey]
Altitude	sea level to 200 m

Ecological unit

(a) Manuka shrubland on hillslope

(b) Taraire forest on moderate to steep hillslope

(c) Manuka-taraire forest on steep hillslope

(d) Puriri-taraire forest on steep hillslope

(e) Secondary manuka/kanuka shrubland on hillslope

(f) Manuka–gorse scrub on coastal hillslope

(g) Pohutukawa-puriri on coastal cliff

Landform/geology

Steep coastal hill country on Waipapa Group greywacke and chert, downslope from basalt plateau remnants (Kerikeri Volcanics Horeke Basalt).

Vegetation

Type (a) Manuka shrubland between 1 and 4 metres tall with occasional gorse and mamaku which occurs over the hill from Putataua Bay. [Cleared since survey].

This adjoins Type (b), taraire forest with puriri frequent. Other species occurring occasionally are pohutukawa, rewarewa, tawa and tanekaha.

Type (b) also occurs in the catchment of the Matauri Creek; taraire is abundant with a wide variety of other canopy species including puriri, rimu, totara, kauri, rewarewa, pohutukawa, tanekaha, karaka, kohekohe, white maire, nikau and mamaku.

Type (c) Manuka-taraire forest

Towai is frequent with pole rimu, kauri, puriri and kahikatea (Kingett-Mitchell).

Type (d) Puriri-taraire forest

With pole rimu and kauri, and frequent kahikatea (Kingett-Mitchell).

Type (e) Secondary manuka/kanuka forest

Tall vegetation occurring by the road with scattered rimu, puriri and tree fern.

Behind Orokaraka Bay Type (e), secondary manuka/kanuka with towai is predominant. Kauri occurs on the ridges. Puriri, rimu, kahikatea, tanekaha, kohekohe, taraire, nikau and pohutukawa all occur. Mapou, rangiora, lacebark, ponga, kiekie, turepo, kawakawa, and kanono occur in the understorey.

The area to the south is nearly all Type (f), manuka scrub with gorse, tree fern and tobacco weed [cleared], apart from a gully remnant of pohutukawa and puriri (Type (g)).

Fauna

NI brown kiwi (Category A threatened species).

Significance

A large, almost contiguous area supporting kiwi.

Contains representative examples of manuka-kanuka forest and pohutukawa-puriri forest (the only example in the Ecological District of the latter).

FIGURE 10. MATAURI BAY BUSH, P04/075.
EACH GRID IS 1000 M × 1000 M AND EQUALS 100 HA.
s = SHRUBLAND; f = FOREST.

MATAURI BAY AND WAIAUA BAY AND ESTUARY

Survey no.	P04/076
Survey date	1 June 1995
Grid reference	P04 943 845, P04 955 820
Area	12.3 ha
Altitude	sea level

Ecological unit

(a) Saltmeadow on sand flats

(b) *Juncus* rushland on sand banks

(c) Pohutukawa on coastal bank

(d) Mixed freshwater wetland on stream margin

(e) Raupo–kuta reedland on stream margin

Landform/geology

Sandy beaches and stream mouth estuaries behind Holocene foredunes.

Vegetation

The lower reaches of the Matauri Stream are partially inundated by seawater at high tide.

Type (a) Saltmeadow occurs behind the open foreshore where streamside sand-flats are covered with salt marsh vegetation.

Salt marsh on the sand flats comprises locally dense *Paspalum vaginatum* on the edges of the stream with clumps of knobby clubrush and glasswort towards higher ground. There are also occasional individual Kings Island Melilot *(Melilotus indicus).* Lower down near the mouth of the stream there are locally dense stands of oioi *(Leptocarpus similis).*

Type (b) *Juncus* rushland

Further up sea rush becomes dominant and forms dense swards on the stream banks with sea primrose and occasional slender plants of sea celery *(Apium prostratum)* underneath. Occasional seedling mangroves are present locally where sediment has been trapped. There are occasional shrubs of shore ribbonwood.

Towards the bridge, sea rush is the dominant stream-side plant with grasses on the banks.

A rocky knoll and banks at the stream mouth has Type (c), tall pohutukawa with an understorey comprising *Coprosma macrocarpa, Haloragis erecta, Muehlenbeckia australis* and native morning glory *(Ipomoea cairica).*

Away from the stream channel the banks are covered with grasses. The southern bank is weedy with locally dense Cape honey flower. Bracken is also locally dense.

Type (d) A small stream on the southern side contains freshwater wetland plants including willow weed, *Carex virgata* and arum lily.

Type (e) Raupo/kuta reedland

A small hollow with raupo and kuta occurs further upstream of (d).

Where the salt influence diminishes near the road bridge, kuta and raupo are locally dense.

Fauna

Historical records of NZ dotterel, (Category B threatened species), banded dotterel and variable oystercatcher (Category C threatened species) (1978 record).

Significance

Matauri Bay Estuary is a small but representative piece of indigenous estuarine salt marsh community, a representative site for all vegetation types present.

Waiaua Bay is more isolated, and small numbers of NZ dotterel are known to persist. These would be important bird feeding and resting areas for wading birds at high tide. (Reference: Lisa Forester 1992.)

FIGURE 11. MATAURI AND WAIAUA BAYS, P04/076.
EACH GRID IS 1000 M × 1000 M AND EQUALS 100 HA.
d = DUNELAND; e = ESTUARY.

MAHIMAHI

Survey no.	P04/078
Survey date	27 April 1995
Grid reference	P04 910 800
Area	643.3 ha
Altitude	80-210 m asl

Ecological unit

(a) Towai–taraire forest on hillslope and ridge

(b) Totara–towai forest on hillslope and ridge

(c) Towai–totara–taraire forest on hillslope and ridge

(d) Taraire forest on hillslope and ridge

(e) Secondary totara on gentle hillslope

(f) Totara–taraire forest on hillslope

(g) Manuka–gorse shrubland on plain and hillslope

(h) Manuka shrubland on undulating plain

(i) Towai shrubland on gentle hillslope

(j) Bracken fernland on hillslope

(k) Manuka–towai shrubland on undulating plain

(l) Bracken–gorse shrubland on plain

Landform/geology

This area includes several rock types. Waipapa Group greywacke underlies the northeastern corner adjacent to Matauri Bay Road and outcrops along Te Paparata Stream upstream of its junction with Kohangakawau Stream. Te Kuiti group glauconite sandstone outcrops in the northwestern part of the area, deeply weathered rhyolite is present centred on P04 922 810 and P04 906 813, and weathered Kerikeri Volcanics (Horeke Basalt) lava flows underlies much of the southern part of the area.

Vegetation

A mosaic of fern, regenerating shrubland and pockets of forest. The largest area of forest is in the Matauhi Stream catchment and contains Types (a) and (b).

Type (a) Towai-taraire forest with totara frequent, and scattered puriri, rimu, rewarewa, kauri, northern rata and karaka.

Type (b) Towai-totara forest with occasional rimu and rewarewa.

Moving east along Hikurua Rd are several remnants.

The first two are Type (c), towai-totara-taraire forest with rewarewa, northern rata, karaka, puriri, kahikatea and kohekohe also occurring.

The two blocks near the end of the road are Type (d), taraire dominant. Totara may be frequent, and puriri, rimu, kahikatea, karaka and rewarewa are also present. One of these blocks is very degraded from its 1978 condition, when the flora and fauna was reported to be dense and diverse.

In the lower Mahimahi stream catchment are several other small remnants. The largest is on the true left bank north of Hikurua Rd end and is also Type (d). Taraire is abundant and towai frequent. Kauri occurs rarely as well as the other species already mentioned. This area is being protected under a

FIGURE 12. MAHIMAHI, P04/078.
EACH GRID IS 1000 M × 1000 M AND EQUALS 100 HA.
s = SHRUBLAND; f = FOREST.

Queen Elizabeth II National Trust covenant. A short distance downstream is a similar area but smaller and less diverse. Adjoining it is an area of secondary totara (Type (e)), with frequent manuka and mamaku.

Next to the pine trees is a further taraire remnant (Type (d)), containing tawa as well as rimu, kahikatea and towai.

Type (f) Totara-taraire occurs in an outlying remnant, high on the hillside on the southern side of the Hikurua stream, with scattered puriri and rimu.

Type (g) Manuka and gorse with bracken is between 2 and 3 metres high along Hikurua Rd. Scattered through this are totara, towai, pigeonwood and mamaku.

Adjoining Matauri Bay Rd is an extensive area of shrubland around the clay pit developments. It is mostly Type (h), low manuka with scattered rewarewa, totara and mamaku. From time to time gorse also occurs, sometimes frequently.

There is a small pocket of Type (e), secondary totara with puriri and kahikatea and the occasional kauri.

Type (i) Towai dominant shrubland to 4 metres occurs near the head of the Waipapa Stream. Manuka is frequent and mamaku occurs occasionally.

Type (k) Manuka-towai shrubland and Type (l), bracken-gorse shrubland also occur near the Matauri Bay Rd.

Type (j) Bracken with frequent gorse covers an extensive area in the lower Mahimahi valley. Manuka, towai and mamaku are scattered throughout.

Fauna

Not surveyed but kiwi presence possible.

Significance

A very large area of contiguous vegetation providing catchment protection in the headwaters of the Takou River. Almost the entire sub-catchment has retained riparian vegetation.

The site contains a diversity of rock types and includes the only occurrence in Northland of very deeply weathered rhyolite. A detailed survey of the vegetation is required to establish the full values of the site.

A Queen Elizabeth II National Trust covenant protects 6 ha of this site.

POPO SCENIC RESERVE

Survey no.	P04/079
Survey date	27 April 1995
Grid reference	P04 915 787
Area	40.1 ha
Altitude	60–160 m asl

Ecological unit

(a) Towai–taraire forest on steep hillslope

(b) Secondary totara on steep hillslope

(c) Manuka shrubland on moderate to steep hillslope

(d) Totara–taraire forest on hillslope

Landform/geology

Valley in weathered Kerikeri Volcanics (Horeke Basalt) lava flows, with Waipapa Group greywacke outcropping locally in the stream bed.

FIGURE 13. POPO SCENIC RESERVE, P04/079.
EACH GRID IS 1000 M × 1000 M AND EQUALS 100 HA.
f = FOREST.

Vegetation

Type (a) Towai and taraire forest

Comprises the main bush area with frequent totara. Rimu, northern rata, rewarewa, puriri, karaka and nikau are also present.

Type (b) Secondary totara is abundant and tanekaha and kanuka frequent, on the opposite bank. Also present are towai, kahikatea, rimu, rewarewa, kauri, cabbage tree and mamaku.

On the margins is Type (c) manuka about 2–3 metres tall.

Downstream, the riparian vegetation is mostly Type (b), totara with occasional rimu, kahikatea, kauri, rewarewa and mamaku, linking to another area of bush Type (d) in which both totara and taraire are common.

Fauna

NZ pigeon. (Category B threatened species)

Kiwi record 1978. Up-to-date survey recommended.

Significance

High-quality riparian vegetation in the upper catchment of the Takou River.

The main bush area includes the 29 ha Popo Scenic Reserve administered by the Department of Conservation.

HAURIRI RD

Survey no.	P04/080
Survey date	3 November 1995
Grid reference	P04 903 783
Area	18.5 ha
Altitude	c. 160–200 m asl

Ecological unit

(a) Secondary totara forest on ridge and in gully

(b) Towai–taraire forest in gully

Landform/geology

Valleys cut in plateau of weathered Kerikeri Volcanics (Horeke Basalt) lava flows.

Vegetation

Bush remnants in two gullies.

Type (a) Secondary totara forest occurs in the main gully, southwest of the map point '232', where totara is abundant on the flat ridge top, with taraire, towai and kanuka. Rimu, kahikatea, puriri and rewarewa are also present.

In the other gully, Type (b) occurs, taraire-towai forest with totara occurring frequently. Large single specimens of puriri, kahikatea, pukatea and northern rata are a feature.

Although the area has been fenced for 15 years, the understorey is still fairly open. Kohekohe, nikau, ponga, pigeonwood, mahoe and rewarewa form the

subcanopy, with pigeonwood and nikau also common in the shrub layer. Hangehange and karaka seedlings are locally common.

There is a deep layer of leaf litter with rasp fern, thread fern and nikau seedlings being locally abundant. Taraire and karaka seedlings (some germinating) are abundant beneath pigeon roosts.

On the gully sides, the understorey is more dense with wheki being frequent within the gully and *Blechnum chambersii* common on the stream margins.

There is a small patch of bracken and blackberry on the bush edge with occasional manuka and gorse.

The invasive mistweed *Ageratina riparia* is abundant on the bush edge and scattered near the stream and along an old track. Elsewhere it occurs rarely. Possum browse has been limited by ongoing control and the foliage is generally healthy.

Fauna

NZ pigeon (Category B threatened species).

Significance

Riparian protection in the upper catchment of the Takou River.

Supports the threatened NZ pigeon.

FIGURE 14. HAURIRI ROAD, P04/080
EACH GRID IS 1000 M × 1000 M AND EQUALS 100 HA.
f = FOREST.

LONSDALE PARK AND ENVIRONS

Survey no.	P04/081
Survey date	12 April 1995
Grid reference	P04 876 765
Area	13.5 ha
Altitude	c 200 m asl

Ecological unit

(a) Totara–towai forest in gully

(b) Totara forest on gentle undulation

(c) Totara–taraire in gully

FIGURE 15. LONSDALE PARK AND ENVIRONS, P04/081. EACH GRID IS 1000 M × 1000 M AND EQUALS 100 HA. f = FOREST.

Landform/geology

Gullies in plateau of weathered Kerikeri Volcanics (Horeke Basalt) lava flows.

Vegetation

The main bush area is part of an outdoor education centre.

Totara is dominant with towai and rewarewa, puriri, taraire, kahikatea and rimu.

In gullies on either side, but not contiguous, are totara-towai and totara-taraire remnants. Kahikatea, kanuka, rimu, rewarewa, northern rata and pukatea also occur.

Fauna

Not surveyed.

Significance

Representative site for totara forest and totara-taraire forest.

Seasonal food source for NZ pigeon and also riparian protection from gully remnants.

OMAHANUI

(also known as Hikurua Stream Bush)

Survey no.	P04/082
Survey date	12 April 1995
Grid reference	P04 940 775
Area	62.9 ha
Altitude	< 20–100 m asl

Ecological unit

(a) Taraire forest on hillslope

(b) Manuka shrubland on river terrace and hillslope

Landform/geology

Valley cut into weathered Kerikeri Volcanics (Horeke Basalt) lava flows with underlying Waipapa Group greywacke outcropping locally in the bed of Hikurua River.

Vegetation

Type (a) Taraire forest comprises the main bush area, on the true left bank of the Hikurua Stream near its confluence with the Takou River. Kauri, rimu, kahikatea, totara, puriri, kohekohe, towai, tanekaha, kanuka and rewarewa also occur.

The subcanopy consists of frequent ponga, occasional pigeonwood, kohekohe, mingimingi, mamangi, miro and mamaku. The shrub layer is generally sparse from grazing. Occasional totara, *Coprosma rhamnoides*, nikau and locally abundant kiekie persist.

Recently fenced.

On the right bank is Type (b) manuka scrub with gorse, tobacco weed and totara. Elsewhere is a ribbon of manuka along the river and stream banks.

Fauna

NZ pigeon (Category B threatened species), NI brown kiwi (Category A threatened species), and the ornate skink *Cyclodina ornato* which is uncommon on the mainland. Brown teal (Category C threatened species), have been observed at the site from time to time.

Significance

Riparian protection in the lower catchment of the Takou River.

Supports several threatened and uncommon species, including kiwi.

The site includes 0.9 ha of stewardship land on the Hikurua River.

FIGURE 16. OMAHANUI, P04/082.
EACH GRID IS 1000 M × 1000 M AND EQUALS 100 HA.
s = SHRUBLAND; f = FOREST.

TAKOU BAY ESTUARY AND ENVIRONS

Survey no.	P04/083
Survey date	12 April 1995
Grid reference	P04 954 777
Area	161.8 ha
Altitude	sea level to 100 m

Ecological unit

(a) Totara–kanuka forest in gully and on hillslope

(b) Puriri–taraire forest in gully

(c) Manuka shrubland on hillslope

(d) Manuka–gorse scrub on hillslope

(e) Raupo wetland on estuarine sands

(f) *Juncus–Leptocarpus* saltmarsh

(g) Mangrove forest on estuary

(h) *Spinifex*–harestail association on dunes

Landform/geology

Sandy beach and river mouth estuary, backed by dissected hill country of Waipapa Group greywacke and overlying weathered Kerikeri Volcanics (Horeke Basalt) lava flows.

Vegetation

Type (a) Totara-kanuka forest occurs on the north bank of the Takou River, and in gullies inland from the coast north of the estuary with frequent taraire and kohekohe and occasional puriri, rewarewa and pohutukawa.

Type (b) Puriri and taraire forest occurs in the gullies along the river.

Type (c) Tall manuka shrubland occurs on the north bank of the Takou River with occasional rimu, totara, kahikatea, kauri, rewarewa and mamaku.

Type (d) Manuka and gorse occur on the higher slopes above Type (a) inland from the coast.

In the estuary, mangroves form a discontinuous waterside verge with occasionally large mangrove forest areas of up to 1 hectare (Type (g)), with *Leptocarpus, Juncus* and associated sedges occurring commonly on estuarine margins (Type (f)). Several small areas of raupo dominated rushlands with occasional *Eleocharis* (Type (e)), and scattered flax, manuka and pohutukawa join the estuary.

Duneland areas are dominated by Type (h), abundant S*pinifex*, frequent harestail and occasional pingao to seaward, and kikuyu and buffalo grass to landward, which grades into a verge of abundant gorse and frequent regenerating native seral species.

The endangered species *Atriplex billardiere* agg. was recorded from Takou Bay in 1889.

Fauna

Kauri snail (Category C threatened species); Australasian bittern (Category O threatened species), NI fernbird (regionally significant species), NZ dotterel (Category B threatened species), variable oystercatcher (Category C threatened species), and wide diversity of other birds.

Significance

The site contains a diversity of habitat types, including several much dimished from their former extent.

It is a representative site for raupo, *Juncus-Leptocarpus*, mangrove, and manuka shrubland in a small estuarine setting, and the best example of dune habitat in the Ecological District.

The wetland and estuary are important habitat and breeding areas for shorebirds and waders, some of which are threatened.

The shrubland and gully remnants may be important to kiwi, which are present close by (P04/082).

The presence of the pingao is notable, as it is uncommon in this Ecological District.

FIGURE 17. TAKOU BAY ESTUARY, P04/083.
EACH GRID IS 1000 M × 1000 M AND EQUALS 100 HA.
e = ESTUARY; s = SHRUBLAND; f = FOREST.

TAKOU STREAM BUSH

Survey no.	P04/084
Survey date	12 April 1995
Grid reference	P04 910 760
Area	308.3 ha
Altitude	30–220 m asl

Ecological unit

(a) Towai forest on steep hillslope

(b) Kauri on steep spur

(c) Towai shrubland on steep hillslope

(d) Towai-manuka shrubland on moderate to steep hillslope and gully

(e) Taraire forest on hillslope

(f) Tanekaha-towai forest on steep hillslope

(g) Tanekaha-kanuka forest on steep hillslope

(h) Gorse-manuka-*Ageratina* scrub on gentle to steep hillslope

(i) Taraire-totara forest on hillslope

Landform/geology

Valley cut through plateau of weathered Kerikeri Volcanics (Horeke Basalt) lava flows into underlying Waipapa Group greywacke, Te Kuiti Group glauconite sandstone, and Kerikeri Group andesitic flows.

Vegetation

More than half of the main stem of the river is vegetated on both sides.

Type (a) Towai dominant with kanuka and taraire occurs at the top of the catchment. A wide variety of other canopy species occur here including rimu, kahikatea, rewarewa, puriri, tanekaha, kauri, pukatea, totara, northern rata and karaka. The understorey is dominated by nikau, ponga and mahoe, with good rimu regeneration. There is a kauri dominant spur (Type (b)), with occasional tanekaha and northern rata. Most of this section (45 ha) is protected under QEII covenants.

There is a break in the vegetation, then in a side gully Type (c), towai shrubland occurs with scattered mamaku, cabbage tree and rewarewa. Towai abundance continues downstream, particularly on the north bank.

Type (d) Manuka-towai shrubland also occurs on the north bank. Rimu, kahikatea and rewarewa occur sparsely.

Type (e) Taraire forest becomes dominant half way down the river, still on the north bank, with frequent nikau. Rimu, kahikatea, totara, kauri, towai and puriri occur occasionally.

Downstream of here the vegetation is extensive and diverse. Taraire dominance continues, with frequent tanekaha and a diversity of other canopy species.

At the downstream end on the south bank there are pockets of taraire (Type (e)), with totara, kahikatea and puriri.

Types (f) and (g) tanekaha is common with either towai or kanuka. Kauri, rimu, northern rata and rewarewa occur occasionally.

The vegetation on the south bank is less extensive and more modified, mostly mixed scrub, Type (h), and shrubland of towai, manuka, Type (d). Tanekaha, totara, rewarewa and mamaku occur from time to time.

Type (i) Taraire-totara forest

A small remnant near Takou Bay Rd.

Fauna

NZ pigeon (Category B threatened species), NI brown kiwi (Category A threatened species).

Significance

An unusually high proportion of the catchment of the Takou River is vegetated.

A diversity of vegetation types are present including representative examples of taraire forest, towai forest, kauri forest, and secondary tanekaha forest with towai and kanuka, the only example in the Ecological District of the latter. It is also a representative site for towai and towai-manuka shrubland in the Ecological District.

The site also supports threatened species including kiwi .

The site includes 45 ha protected under Queen Elizabeth II National Trust covenants and 200 ha of stewardship land administered by the Department of Conservation.

FIGURE 18. TAKOU STREAM BUSH, P04/084

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

s = SHRUBLAND; f = FOREST.

UPPER TAHORANUI VALLEY

Survey no.	P04/086
Survey date	10 April 1995
Grid reference	P04 916 721
Area	13 ha
Altitude	140-180 m asl

Ecological unit

(a) Towai-taraire forest in gully

(b) Manuka shrubland on ridge and hillslope

Landform/geology

Gullies in Waipapa Group greywacke.

Vegetation

Two gullies of Type (a), towai and taraire linked by Type (b), manuka shrubland.

FIGURE 19. UPPER TAHORANUI VALLEY, P04/086.
EACH GRID IS 1000 M × 1000 M AND EQUALS 100 HA.
s = SHRUBLAND; f = FOREST.

In the first gully, towai is abundant, with frequent taraire. Other species present are puriri, rimu, pukatea and kohuhu as well as some pine and other exotics.

In the second gully both towai and taraire are common, and totara is frequent. In addition to the species mentioned above, kahikatea, nikau, northern rata, karaka and rewarewa also occur.

The shrubland contains some towai, gorse and mamaku.

Fauna

NZ pigeon (Category B threatened species), NI brown kiwi (Category A threatened species).

Significance

Habitat for two threatened species.

OTAHA RD

Survey no.	P04/088
Survey date	12 April 1995
Grid reference	P04 950 740
Area	132.7 ha [some cleared since survey]
Altitude	50–120 m asl

Ecological unit

(a) Gorse-manuka scrub on plain

(b) Taraire forest in gully

Landform/geology

Valleys cut in weathered Kerikeri Volcanics (Horeke Basalt) lava flows, with underlying Waipapa Group greywacke outcropping locally in Tahoranui River valley.

Vegetation

A large area of Type (a) scrub, predominantly gorse, with frequent tobacco weed and occasional mahoe and cabbage tree.

Some of the scrub has been cleared since the site was recorded.

In the gullies are Type (b) remnants of taraire with kahikatea.

Fauna

NI brown kiwi (Category A threatened species).

Significance

Kiwi habitat.

FIGURE 20. OTAHA ROAD, P04/088.
EACH GRID IS 1000 M × 1000 M AND EQUALS 100 HA.
s = SHRUBLAND.

WAIMANGA STREAM

Survey no.	P04/089
Survey date	12 April 1995
Grid reference	P04 962 757
Area	16.6 ha
Altitude	30–80 m asl

Ecological unit

(a) Totara–towai–taraire forest in gully

Landform/geology

Valley in weathered Kerikeri Volcanics (Horeke Basalt) lava flows.

Vegetation

In the gullies are remnants of forest in which taraire, totara and towai are common. Rimu, kahikatea, puriri, karaka, nikau and rewarewa are also present.

Fauna

NI brown kiwi (Category A threatened species)

Significance

Riparian protection and kiwi habitat.

FIGURE 21. WAIMANGA STREAM, P04/089.
EACH GRID IS 1000 M × 1000 M AND EQUALS 100 HA.
f = FOREST.

TAHORANUI RIVER

Survey no.	P04/090
Survey date	21 June 1995
Grid reference	P04 982 745
Area	142.6 ha
Altitude	sea level to 80 m asl

Ecological unit

(a) Mangrove forest on estuary

(b) *Juncus–Leptocarpus* saltmarsh

(c) Manuka shrubland on coastal banks

(d) Gorse–tobacco weed scrub on gentle to moderate hillslope

(e) Totara–taraire forest on hillslope

Landform/geology

Sandy beach and river mouth estuary bounded by hillslopes of weathered Kerikeri Volcanics (Horeke Basalt) lava flows.

Vegetation

A sequence from estuary to broadleaf–podocarp forest including an island of mangroves.

The estuarine vegetation is primarily Type (a), mangrove with Type (b), frequent sea rush and oioi. Shore ribbonwood occurs rarely.

Type (c) Manuka about 2-3 metres tall occurs in a ribbon along the river.

Type (d) Extensive scrub of gorse and tobacco weed with manuka occurs on the north bank.

Type (e) Totara-taraire with kanuka and occasional rimu occurs on higher ground near the head of the tidal influence.

Fauna

NI brown kiwi (Category A threatened species), NZ dotterel (Category B threatened species), variable oystercatcher (Category C threatened species), Caspian tern (Category O threatened species), banded rail (regionally significant species).

Significance

The site includes a sequence from estuary to forest, and is a representative site for *Juncus-Leptocarpus* and totara-taraire.

Although pine and scrub are present, the area is valuable habitat for threatened bird species, including kiwi. Further survey is recommended to establish the full values of the site.

FIGURE 22. TAHORANUI RIVER, P04/090.
EACH GRID IS 1000 M × 1000 M AND EQUALS 100 HA.
e = ESTUARY; s = SHRUBLAND; f = FOREST.

TAPUAETAHI

Survey no.	P04/091
Survey date	10 April 1995
Grid reference	P04 001 740
Area	131.8 ha
Altitude	sea level to 70 m

Ecological unit

(a) Manuka shrubland on hillslope

(b) Gorse–tobacco weed scrub on coastal hillslope

(c) Mangrove–*Leptocarpus* association in estuary

(d) Raupo wetland in stream gullies

Landform/geology

Sandy beach and river mouth estuary, coastal cliffs of Kerikeri Volcanics (Horeke Basalt) lava flows, and low coastal hills of Horeke Basalt and underlying Waipapa Group greywacke.

Vegetation

Type (a), a large area of manuka with occasional cabbage tree, mamaku, *Acacia* and taraire in the upper catchment, below Te Tii school. There are some pines on the edge, as well as some gorse and tobacco weed.

The riparian areas contain manuka about 3 metres tall with an open canopy. Cabbage tree, mamaku, gorse and tobacco weed are also present.

Along the estuary the manuka shrubland is about 6 metres tall. Puriri, pohutukawa, rewarewa, totara, kahikatea, taraire and cabbage tree all occur here. In the understorey, sweet pea shrub is common.

Around Taronui Bay, the vegetation is mostly Type (b), scrub of gorse and tobacco weed with occasional mamaku, mapou, mamangi and pohutukawa.

North of Taronui Rd, is Type (a), manuka shrubland with occasional mamaku and cabbage tree.

The estuary Type (c), contains a small amount of mangroves and oioi and Type (d), raupo, occurs in the upper gullies.

Fauna

NI brown kiwi (Category A threatened species), NZ dotterel (Category B threatened species), Caspian tern (Category O threatened species), banded rail and possibly spotless crake (both regionally significant species).

Significance

The site includes a variety of habitat types (shrubland, estuary, dune and rocky shore) supporting several threatened species, and is a representative site for mangrove–*Leptocarpus* association.

It includes the 24 ha of the Taronui Bay Recreation Reserve, administered by the Department of Conservation.

FIGURE 23. TAPUAETAHI, P04/091.
EACH GRID IS 1000 M × 1000 M AND EQUALS 100 HA.
e = ESTUARY; s = SHRUBLAND.

TE TII SHRUBLAND

Survey no.	P04/092
Survey date	10 April 1995
Grid reference	P04 025 720
Area	170.4 ha
Altitude	sea level to 80 m

Ecological unit

(a) Manuka shrubland on coastal hillslope

(b) Kanuka shrubland on coastal cliffs

Landform/geology

Low coastal cliffs and hills of Waipapa Group greywacke.

Vegetation

West of Te Tii, is Type (a), manuka shrubland to 6 metres with occasional pohutukawa, karaka, towai, taraire, rewarewa, mamaku, mahoe and tobacco weed.

On the eastern side there is also manuka in the gullies and along the coastal fringe, including pohutukawa, cabbage tree, kowhai, ponga, kumerahou and *Pittosporum.* The vegetation here is generally of a lower height and more modified - gorse, tobacco weed and pine occur.

South of Te Tii on the eastern side of the inlet, the cliffs have a dense cover of Type (b), kanuka shrubland. Pohutukawa, puriri, kohekohe and karaka all occur occasionally. A small area at 037 720 is protected by a QEII covenant.

The vegetation grades into raupo wetlands, saltmarsh and estuary (see P04/093).

Fauna

NI brown kiwi (Category A threatened species).

Significance

Representative example of coastal shrublands which form a sequence with fresh and saltwater wetlands.

Kiwi habitat.

The area includes 15 ha protected under Queen Elizabeth II National Trust covenant.

FIGURE 24. TE TII SHRUBLAND, P04/092.
EACH GRID IS 1000 M × 1000 M AND EQUALS 100 HA.
w = WETLAND; s = SHRUBLAND.

UPPER TE PUNA INLET

Survey no.	P04/093
Survey date	10 April 1995
Grid reference	P04 020 715
Area	554.2 ha
Altitude	sea level to 40 m

Ecological unit

(a) Raupo wetland in valley bottom

(b) *Leptocarpus* saltmarsh

(c) Mangrove forest in estuary

Landform/geology

Intertidal flats, mangrove forest, saltmarsh and freshwater wetlands, bounded by low coastal cliffs and hills of Waipapa Group greywacke.

Vegetation

At the head of the inlet on the western side Type (a), a raupo wetland grades into saltmarsh and mangroves of the Te Aiorua Estuary.

East and south of Te Tii, a sequence of tidal mudflats with Type (c), tall mangroves, Type (b), saltmarsh with sea rush and oioi, shore ribbonwood, manuka, *Baumea* species and raupo wetlands grades into shrubland.

Fauna

Spotless crake, NI fernbird, banded rail (regionally significant species) NZ dotterel (Category B threatened species), variable oystercatcher (Category C threatened species), white-fronted tern (Category C threatened species), Caspian tern (Category O threatened species), Australasian bittern (Category O threatened species), SI pied oystercatcher, godwit, Asiatic whimbrill (migratory species), and NI brown kiwi (Category A threatened species).

Significance

Excellent habitat for waders and other wetland species, several of which are threatened or of regional significance.

Representative site for raupo, *Leptocarpus* and mangrove.

FIGURE 25. UPPER TE PUNA INLET, P04/093.
EACH GRID IS 1000 M × 1000 M AND EQUALS 100 HA.
e = ESTUARY; w = WETLAND.

OPETE CREEK & ESTUARY AND SHRUBLANDS

Survey no.	P04/097
Survey date	10 April 1995
Grid reference	P04 070 715
Area	170.4 ha
Altitude	sea level to 20 m

Ecological unit

(a) Mangrove forest on estuary

(b) Oioi saltmarsh

(c) Raupo swamp at freshwater interface

(d) Kanuka shrubland on coastal cliffs

Landform/geology

Mangrove forest and saltmarsh bounding low hill country of Waipapa group greywacke and Kerikeri Volcanics (Horeke Basalt) lava flows at head of Poukoura Inlet.

Vegetation

A mangrove estuary and associated mudflats and saltmarsh. Part of the southern shores of the creek is lined with manuka. At the head of the estuary is a raupo wetland with some manuka on the margins.

A small island in the estuary is kanuka dominant with sweet pea shrub, gorse, *Coprosma rhamnoides* and bracken in the understorey. A few pohutukawa occur on the fringes. It is joined to the mainland by mudflats and a shell bank at low tide.

Fauna

Banded rail, spotless crake (regionally significant species); NI brown kiwi (Category A threatened species) are likely to utilise the shrublands - further survey needed.

Significance

A sequence from estuarine to freshwater habitat, and representative site for raupo and *Leptocarpus*.

FIGURE 26. OPETE CREEK & ESTUARY AND SHRUBLANDS, P04/097.
EACH GRID IS 1000 M × 1000 M AND EQUALS 100 HA.
e = ESTUARY; s = SHRUBLAND.

MATAKA WETLANDS AND SHRUBLANDS

Survey no.	P04/098
Survey date	10 April 1995
Grid reference	P04 080 730
Area	138.1 ha
Altitude	<20–100 m asl

Ecological unit

(a) Open water in constructed pond

(b) Raupo wetland on pond margin and in valley bottom

(c) Manuka shrubland on hillslope

Landform/geology

Gullies and freshwater wetlands in hill country of Waipapa Group greywacke.

Vegetation

A series of wetlands consisting of open water and raupo with scattered manuka on the margins and on stream banks and upland pockets of manuka shrubland about 2–3 metres tall.

Fauna

Spotless crake (regionally significant species), NI brown kiwi (Category A threatened species), *Galaxias* sp.

Significance

Purerua Peninsula has some of the highest number of kiwi calls per hour recorded in Northland, and the shrubland areas are important for kiwi. The wetland areas are potentially important for spotless crake, bittern and fernbird.

FIGURE 27. MATAKA WETLANDS AND SHRUBLANDS, P04/098.
EACH GRID IS 1000 M × 1000 M AND EQUALS 100 HA.
w = WETLAND; s = SHRUBLAND.

PURERUA PENINSULA SHRUBLANDS

Survey no.	P04/Q04/100
Survey date	26 May 1995
Grid reference	P04/Q04 110 710
Area	117.6 ha
Altitude	20–160 m asl

Ecological unit

(a) Open water in constructed pond

(b) Raupo wetland on pond margin

(c) Manuka/kanuka shrubland on hillslope

Landform/geology

Valleys and coastal hillslopes in hill country of Waipapa Group greywacke.

Vegetation

Extensive areas of manuka/kanuka shrubland with occasional puriri, cabbage tree and gorse. There are also 2 artificial ponds with a fringe of raupo.

Fauna

NI brown kiwi (Category A threatened species) in high numbers.

Significance

Purerua Peninsula has some of the highest number of kiwi calls per hour recorded in Northland. The shrubland areas are important for kiwi and the wetland areas potentially important for spotless crake, bittern and fernbird.

The ponds are also potentially valuable brown teal habitat.

FIGURE 28. PURERUA PENINSULA SHRUBLANDS, P04/Q04/100.
EACH GRID IS 1000 M × 1000 M AND EQUALS 100 HA.
w = WETLAND; s = SHRUBLAND.

PAKARAKA BUSH/WEROWERO SWAMP

Site no.	P05/051
Survey date	19 December 1994
Grid reference	P05 000 498
Area	87.2 ha
Altitude	80-140 m asl

Ecological unit

(a) Totara–puriri–kahikatea–taraire forest on hillslope
(b) Kahikatea forest on toeslope
(c) Kauri forest on hillslope
(d) Taraire–puriri forest on hillslope
(e) Totara–kahikatea–rimu forest on hillslope
(f) Bracken–mamaku tree fern shrubland on hillslope
(g) Raupo reedland in swamp
(h) Crack willow treeland in swamp
(i) Weeping willow treeland in swamp
(j) *Glyceria* grassland in swamp

Landform/geology

Hill country of Waipapa Group greywacke overlain by Te Kuiti Group glauconitic sandstone, and alluvial swamp deposits.

Vegetation

Six terrestrial types and four wetland types were identified:

Type (a) - Totara-puriri-kahikatea-taraire forest with rimu and rewarewa and occasional towai (c.10%).

Type (b) - Kahikatea forest (c.1%).

Type (c) - Kauri forest with manuka and occasional rimu (c.5%).

Type (d) - Taraire-puriri forest with occasional tawa, rewarewa, rimu, northern rata and pukatea (c.30%).

Type (e) - Totara-kahikatea-rimu forest with manuka and occasional kauri, matai, black maire and puriri (c.50%).

Type (f) - Bracken-mamaku tree fern shrubland with mahoe and totara and occasional pate, gorse and cabbage tree (<5%).

Wetland types were:

Type (g) - Raupo reedland with occasional cabbage tree, flax, kahikatea and totara (c.70%).

Type (h) - Crack willow treeland with occasional weeping willow (c.20%).

Type (i) - Weeping willow with frequent cabbage trees (<5%).

Type (j) - *Glyceria maxima* (<5%).

Fauna

The forest is known to support NI brown kiwi (Category A threatened species), kauri snail (Category C threatened species) and NZ pigeon (Category B threatened species), while the wetland contains Australasian bittern (Category O threatened species), NI fernbird and spotless crake (regionally significant species) as well as seven other water-related bird species.

FIGURE 29. PAKARAKA BUSH/WEROWERO SWAMP, P05/051.
EACH GRID IS 1000 M × 1000 M AND EQUALS 100 HA.
w = WETLAND; f = FOREST.

Significance

The site contains uncommon forest types (kauri and kahikatea), areas of excellent podocarp regeneration, and regionally uncommon species such as black maire. It is a representative site for all of the indigenous vegetation types present.

It includes the 2.3 hectare Pakaraka Kauri Scenic Reserve.

The adjoining forest and shrubland is important as habitat for threatened species.

The wetland is representative of a rare and diminishing ecosystem which contains threatened species and may perform a linking role between wetlands to the south (Pokapu-Motatau) and to the north (Waitangi).

HUPARA ROAD FOREST REMNANTS

Survey no.	P05/052
Survey date	19 December 1994
Grid reference	P05 012 495
Area	65.2 ha
Altitude	80–180 m asl

Ecological unit

(a) Taraire-puriri forest on hillslope

(b) Totara forest on hillslope

Landform/geology

Hill country of Waipapa Group greywacke.

Vegetation

Two forest types were identified:

Type (a) - Taraire-puriri forest with rewarewa and rimu and occasional kawaka, towai, pukatea, totara, kauri, kahikatea and tawa.

Type (b) - Totara forest.

Scattered towai, local taraire and puriri and a few pole rimu (Kingett-Mitchell). The understorey is generally sparse but part of this site is fenced from stock.

Fauna

NI brown kiwi (Category A threatened species) and NZ pigeon (Category B threatened species) are known to utilise this site.

Significance

A representative example of taraire-puriri forest type which has been shown in other parts of Northland to be important habitat for NZ pigeon (Pierce & Graham 1995).

The site also contributes to the maintenance of NI brown kiwi distribution and contains two regionally uncommon trees - kawaka and whau.

FIGURE 30. HUPARA ROAD FOREST REMNANTS, P05/052.
EACH GRID IS 1000 M × 1000 M AND EQUALS 100 HA.
f = FOREST.

TURNTABLE HILL BUSH

Survey no.	P05/053
Survey date	8 February 1995
Grid reference	P05 000 445
Area	193.5 ha
Altitude	40-180 m asl

Ecological unit

(a) Totara-kanuka forest on hillslope

(b) Puriri-taraire forest on hillslope

(c) Towai-tanekaha forest on hillslope

(d) *Hakea* scrub on hillslope

(e) Bracken-gorse scrub on hillslope

(f) Raupo reedland in swamp

Landform/geology

Hill country of Waipapa Group greywacke and overlying Mangakahia Complex mudstone, with a prominent fault scarp forming the northern side of Otiria Stream valley.

Vegetation

Three forest, one wetland and two shrubland types were identified:

Type (a) - Totara-manuka/kanuka forest with mamaku tree fern and tanekaha and occasional kahikatea and towai.

Type (b) - Puriri-taraire forest with totara and occasional rimu, rewarewa, kahikatea and kauri.

Type (c) - Towai-tanekaha forest with totara and occasional manuka.

Type (d) - *Hakea* spp. with occasional mamaku tree fern.

Type (e) - Bracken-gorse scrubland with mamaku tree fern and occasional mahoe and cabbage tree.

Type (f) - Raupo reedland with occasional cabbage tree, kahikatea and wheki.

Fauna

Kauri snail (Category C threatened species), green gecko (*Naultinus* sp. - reported) and NZ pigeon (Category B threatened species).

The small mineralised wetland contains spotless crake (regionally significant), banded kokopu (Category C threatened species) and the rare freshwater crab *Halicarcinus lacustris* known only from a few sites within Northland.

Significance

Representative site for totara-kanuka and towai-tanekaha forest.

It contains a rare and diminishing ecosystem type - mineralised wetland, and is habitat for significant fauna.

FIGURE 31. TURNTABLE HILL BUSH, P05/053.
EACH GRID IS 1000 M × 1000 M AND EQUALS 100 HA.
w = WETLAND; s = SHRUBLAND; f = FOREST.

WAIHARAKEKE STREAM ALLUVIAL FOREST

Survey no.	P05/054
Survey date	26 October 1994
Grid reference	P05 025 440
Area	61.7 ha
Altitude	30 m asl

Ecological unit

(a) Totara-kahikatea forest on alluvial flat

(b) Crack willow treeland on river margin

(c) Totara forest on alluvial flat

Landform/geology

Alluvial valley floor on Kerikeri volcanic basalt lava flow.

Vegetation

Three forest types were identified:

Type (a) - Totara-kahikatea forest (secondary) with kanuka and kowhai and occasional matai, lowland ribbonwood, *Eucalyptus* sp., macrocarpa and karaka.

Type (b) - Crack willow treeland.

Type (c) - Totara forest (secondary) with occasional kowhai and kanuka.

Fauna

Not surveyed.

Significance

Representative site for secondary riverine podocarp forest (totara forest and totara-kahikatea forest) - one of only two examples in the Ecological District of the latter - with some plant species which are only found in riparian situations, e.g. lowland ribbonwood (*Plagianthus regius*).

An uncommon and diminishing forest type which is likely to perform riparian functions such as riverbank stabilisation, lowering water temperature and providing habitat for other riparian species.

FIGURE 32. WAIHARAKEKE STREAM ALLUVIAL FOREST, P05/054.
EACH GRID IS 1000 M × 1000 M AND EQUALS 100 HA.
w = WETLAND; f = FOREST.

WHANGAE BUSH REMNANTS

Survey no.	P05/055
Survey date	20 December 1994
Grid reference	P05 040 500
Area	55.3 ha
Altitude	100–200 m asl

Ecological unit

(a) Taraire-puriri forest on hillslope

(b) Rimu-totara forest on hillslope

(c) Totara forest on hillslope

Landform/geology

Hill country of Waipapa Group greywacke.

Vegetation

There are three main vegetation types:

Type (a) - Taraire-puriri forest with emergent rimu and rewarewa and occasional totara, pukatea, kahikatea and kauri (c.70%).

Type (b) - Secondary rimu-totara forest with rewarewa (c.10%).

Type (c) - Secondary totara dominant forest with occasional towai (c.20%).

Fauna

Common forest birds are present as well as good numbers of NZ pigeon (Category B threatened species). This may be attributable to the dominance of taraire-puriri forest, a type which is capable of sustaining NZ pigeon year round.

Significance

Good examples of taraire-puriri and secondary podocarp forest with likely importance as a local food source for forest birds, especially the NZ pigeon. One of only four sites in the Ecological District of totara-rimu forest, an uncommon vegetation type in the Ecological Region.

The vegetation performs a catchment protection function.

FIGURE 33. WHANGAE BUSH REMNANTS, P05/055.
EACH GRID IS 1000 M × 1000 M AND EQUALS 100 HA.
f = FOREST.

TARAMAWA FOREST

Survey no.	P05/056
Survey date	22 December 1994
Grid reference	P05 060 480
Area	1088.8 ha
Altitude	20-230 m asl

Ecological unit

(a) Tanekaha forest on steep hillslope

(b) Towai-mamaku tree fern on steep hillslope

(c) Taraire forest on hillslope

(d) Manuka-kanuka-tanekaha forest on steep hillslope

(e) Gorse-bracken scrub on hillslope

(f) *Hakea* scrub on hillslope

Landform/geology

Hill country of Waipapa Group greywacke, overlying Te Kuiti Group glauconitic sandstone and Mangakahia Complex mudstone. A prominent fault scarp forms the northern side of the Otiria Stream-Kawakawa river valley.

Vegetation

Type (a) - Secondary tanekaha forest with totara, towai, manuka and occasional rewarewa (c.50%).

Type (b) - Secondary towai-mamaku tree fern forest with occasional totara, taraire, puriri and tanekaha (c. 10%).

Type (c) - Secondary taraire forest with tawa and puriri and occasional rimu, kauri and rewarewa (<10%).

Type (d) - Manuka-kanuka-tanekaha dominant with towai and mamaku tree fern and occasional pine (c. 20%).

Type (e) - Gorse-bracken scrub (<5%).

Type (f) - *Hakea* dominant scrub with occasional wattle.

Fauna

NI brown kiwi (Category A threatened species) and kauri snail (Category C threatened species) are present as are the common forest bird species. NZ shoveler and grey duck have been recorded on the small reservoir in the catchment of Kotukutuku Stream.

Significance

A large secondary forest/shrubland mosaic with numerous short streams feeding into the Otiria Stream and lower Kawakawa River, forming a catchment protection function.

It forms a critical linkage between the forest remnants of the Pokapu-Ngapipito-Ngawha area (Kaikohe Ecological District) and the Opua Forest, with which it is contiguous, and has significant fauna values.

It is a representative site for taraire forest, tanekaha forest, manuka/kanuka tanekaha forest and towai-mamaku shrubland.

The site includes 154 ha of stewardship land administered by the Department of Conservation.

FIGURE 34. TARAMAWA FOREST, P05/056.
EACH GRID IS 1000 M × 1000 M AND EQUALS 100 HA.
s = SHRUBLAND; f = FOREST.

OPUA FOREST

Survey no.	P05/058
Survey date	3 February 1995
Grid reference	P05 080 540
Area	4294.1 ha
Altitude	0–236 m asl

Ecological unit

(a) Towai-taraire forest on hillslope

(b) Towai-taraire-totara forest on hillslope

(c) Kauri forest on hillslope

(d) Manuka-kanuka-towai forest on hillslope

(e) Manuka-kanuka-tanekaha forest on hillslope

(f) Manuka-kanuka shrubland on hillslope

(g) Five finger-mamaku tree fern shrubland on hillslope

(h) Raupo reedland in swampy gullies

Landform/geology

Steeply dissected inland and coastal hill country of Waipapa Group greywacke and chert, adjoining estuarine areas of the Kaipatiki Creek, Haumai River and the Whangae River. Freshwater wetlands are present along tributaries of the Kaipatiki River.

Vegetation

Five forest and two shrubland types were identified:

Type (a) - Towai-taraire forest with emergent rimu and occasional emergent kauri and kahikatea.

Type (b) - Towai-taraire-totara forest with puriri and occasional emergent rimu, kauri and rewarewa.

Type (c) - Kauri forest with manuka and occasional towai and rimu.

Type (d) - Manuka-kanuka-towai forest with kohuhu, puriri and rewarewa, and occasional rimu and totara.

Type (e) - Manuka-kanuka-tanekaha forest.

Shrubland types were:

Type (f) - Manuka-kanuka with occasional kohuhu, tanekaha and towai.

Type (g) - Five finger-mamaku tree fern shrubland with pate, hangehange and *Gahnia* sp. and occasional towai and cabbage tree.

Extensive raupo dominant wetlands exist in some valleys, Type (h).

Fauna

Significant species included pied tit (regionally significant), NI brown kiwi (Category A threatened species), NZ pigeon (Category B threatened species), the endemic Northland green gecko (*Naultinus grayi*) and a small population of NI weka (Category B threatened species), introduced in 1959 which now number only a few individuals.

FIGURE 35. OPUA FOREST, P05/058.
EACH GRID IS 1000 M × 1000 M AND EQUALS 100 HA.
s = SHRUBLAND; f = FOREST; e = ESTUARY.

Significance

The significance of this forest lies in its large size, coastal influences and mosaic of vegetation types including freshwater and saltwater ecotones and sequential gradients from sealevel to over 230 m asl. It is a representative site for all vegetation types present.

It is the major national stronghold of the Rare *Pittosporum pimeleoides* subsp. *pimeleoides,* and the uncommon coastal tree, tawaroa (Wright 1984) occurs here in good numbers.

It also supports significant fauna species.

Approximately 45% of the site (1932 ha) is stewardship land administered by the Department of Conservation. It also includes the 29.5 ha Horotutu S.R. which is contiguous.

BLACKRIDGE ROAD SWAMP

Survey no.	P05/059
Survey date	8 February 1995
Grid reference	P05 000 557
Area	6.3 ha
Altitude	60 m asl

Ecological unit

(a) Raupo reedland in swamp

(b) *Baumea* sedgeland in swamp

(c) Totara forest on periphery

(d) Manuka-gorse scrub on periphery

Landform/geology

Freshwater wetland ponded on surface of Kerikeri volcanics lava flow.

Vegetation

Two wetland and two terrestrial vegetation types were identified:

Type (a) - Raupo reedland with some small areas of manuka (c.90%).

Type (b) - *Baumea articulata* sedgeland with occasional raupo.

Peripheral vegetation consists of:

Type (c) - secondary totara emergent from gorse.

Type (d) - Manuka-gorse scrub.

Fauna

Both NI fernbird and spotless crake (regionally significant species) were recorded here in 1978.

Significance

A small but relatively unmodified mineralised swamp with regenerating periphery, and representative example of raupo and *Baumea*.

It may perform a linking function between wetlands to the north (Waitangi Forest) and south.

FIGURE 36. BLACKRIDGE ROAD SWAMP, P05/059.
EACH GRID IS 1000 M × 1000 M AND EQUALS 100 HA.
w = WETLAND.

PUKETONA PA RIPARIAN FOREST

Survey no.	P05/060
Survey date	8 February 1995
Grid reference	P05 000 561
Area	15.7 ha
Altitude	40-60 m asl

Ecological

(a) Puriri-totara-taraire forest on hillslope

(b) Totara forest on hillslope

Landform/geology

Kerikeri volcanics lava flow in valley of Waipapa Group greywacke.

Vegetation

Two forest types were identified:

Type (a) - Puriri, totara and taraire are co-dominant, with frequent rewarewa and occasional karaka, kohekohe, titoki and matai (c.60%).

Type (b) - Secondary totara forest (c. 40%).

FIGURE 37. PUKETONA PA RIPARIAN FOREST, P05/060.
EACH GRID IS 1000 M × 1000 M AND EQUALS 100 HA.
f = FOREST.

Fauna

Not surveyed.

Significance

Riparian forest adjoining the lower Waitangi River. The considerable downstream obstacle of Haruru Falls has not stopped a range of native freshwater fish from gaining access to the upper river. They include both the long and short-finned eel, red-finned bully, common bully, Crans bully and the threatened (Category C) banded kokopu. Riparian forest is an important element of suitable native fish habitat.

Representative example of puriri-totara-taraire forest.

TE AUTE ROAD BUSH

Survey no.	P05/061
Survey date	3 February 1995
Grid reference	P05 985 530
Area	31.7 ha
Altitude	50-60 m asl

Ecological unit

(a) Kahikatea forest on alluvial flats/gentle hillslope

(b) Totara-rimu forest on alluvial flats/gentle hillslope

(c) Gorse scrub on alluvial flats/gentle hillslope

Landform/geology

Low hill country of Waipapa Group greywacke and adjoining Holocene alluvial flats along the Waiaruhe River valley.

Vegetation

Two forest and one scrub type were identified:

Type (a) - secondary kahikatea forest with occasional kohuhu, cabbage tree and totara.

Type (b) - secondary totara-rimu forest with kahikatea and occasional kohuhu.

Type (c) - The scrub is peripheral gorse with some manuka.

Fauna

Not surveyed.

Significance

Representative of a rare association—secondary podocarp forest on flats, some of which is of alluvial origin. It is one of only three sites of kahikatea forest and one of only four sites of totara-rimu forest in the Ecological District. The latter is an uncommon vegetation type in the Ecological Region.

FIGURE 38. TE AUTE ROAD BUSH, P05/061.
EACH GRID IS 1000 M × 1000 M AND EQUALS 100 HA.
s = SHRUBLAND; f = FOREST.

POROTU ROAD SWAMP AND ENVIRONS

Survey no.	P05/062
Survey date	20 February 1995
Grid reference	P05 992 524
Area	15.7 ha
Altitude	70–90 m asl

Ecological unit

(a) Kahikatea forest on gentle hillslope

(b) Totara forest on gentle hillslope

(c) Raupo-*Baumea* association in swamp

Landform/geology

Low hill country of Waipapa Group greywacke.

Vegetation

Two forest and one wetland vegetation type were identified:

Type (a) - Kahikatea forest with occasional totara and cabbage tree.

Type (b) - Totara forest with occasional kahikatea, matai and rimu.

Type (c) - Raupo-*Baumea articulata* with occasional *Carex* sp. in swamp (c. 15%).

Fauna

Common forest birds are known from the forest area but little information exists. Australasian bittern (Category O threatened species) have been recorded utilising the small wetland. Spotless crake (regionally significant) are present.

Significance

A diversity of habitat types including secondary podocarp forest grading through seral tones to open water and dense raupo swamp. A representative site for raupo-*Baumea*, totara forest, and one of only three examples in the Ecological District of kahikatea forest.

The site may perform a linking function between Opua Forest to the east and Puketi and its outliers to the west.

FIGURE 39. PORUTU ROAD SWAMP AND ENVIRONS, P05/062.
EACH GRID IS 1000 M × 1000 M AND EQUALS 100 HA.
w = WETLAND; f = FOREST.

OROMAHOE BUSH

Survey no.	P05/063
Survey date	3 February 1995
Grid reference	P05 975 525
Area	80 ha
Altitude	50–100 m asl

Ecological unit

(a) Totara forest on hillslope

(b) Rimu-totara forest on hillslope

(c) Puriri-taraire forest on hillslope

(d) Manuka-kanuka shrubland on hillslope

(e) Kohuhu-manuka-kanuka shrubland on hillslope

(f) Gorse scrub on hillslope

Landform/geology

Hill country of Waipapa Group greywacke and Te Kuiti Group glauconitic sandstone, with an area of Kerikeri volcanics lava flows in the south-east.

Vegetation

Three secondary forest and three shrubland vegetation types were identified:

Type (a) - Totara forest with puriri (c. 10%).

Type (b) - Rimu-totara forest with kanuka and occasional puriri and rewarewa (c. 15%).

Type (c) - Puriri-taraire forest with rewarewa and occasional tawa and totara (c. 10%).

Type (d) - Manuka-kanuka with mamaku tree fern and occasional kohuhu, gorse and bracken (c. 20%).

Type (e) - Kohuhu-manuka-kanuka with gorse, privet and occasional cabbage tree (c. 25%).

Type (f) - Gorse (c. 20%).

An unconfirmed record of the regionally significant shrub *Pseudopanax gilliesii* is reported from the site.

Fauna

NI brown kiwi (Category A threatened species), NZ pigeon (Category B threatened species) and kauri snail (Category C threatened species) have been recorded, as well as the common forest birds. The common copper skink *Cyclodina aenea* has also been found here.

Significance

A secondary forest/shrubland mosaic, some of which is riparian, which provides habitat for threatened fauna and may perform a linking role between the forests of Opua and eastern Omapere.

The only site in the Ecological District of kohuhu-manuka-kanuka shrubland and one of only four examples of rimu-totara forest, an uncommon vegetation type in the Ecological District.

FIGURE 40. OROMAHOE BUSH, P05/063.
EACH GRID IS 1000 M × 1000 M AND EQUALS 100 HA.
s = SHRUBLAND; f = FOREST.

PUKETONA RESERVE

Survey no.	P05/077
Survey date	18 February 1995
Grid reference	P05 965 575
Area	161.2 ha
Altitude	70–190 m asl

Ecological unit

(a) Towai-tanekaha-kanuka forest on hillslope

(b) Taraire-puriri forest on hillslope

(c) Towai-kauri-kanuka forest on hillslope

(d) Manuka-kanuka shrubland on hillslope

(e) Manuka-kanuka-tanekaha shrubland on hillslope

(f) Manuka-kanuka-towai shrubland on hillslope

(g) Mamaku tree fern shrubland on hillslope

Landform/geology

Hill country of Waipapa Group greywacke.

Vegetation

Three forest and four shrubland types were identified:

Type (a) - Secondary towai-tanekaha-kanuka forest with puriri and occasional rimu.

Type (b) - Taraire-puriri forest with occasional tawa, rimu and pukatea.

Type (c) - Towai-kauri-kanuka forest with tanekaha.

Shrubland types were:

Type (d) - Manuka-kanuka.

Type (e) - Manuka-kanuka-tanekaha.

Type (f) - Manuka-kanuka-towai with occasional totara.

Type (g) - Mamaku tree fern with towai.

Fauna

Common forest birds are present as well as NZ pigeon (Category B threatened species) and NI brown kiwi (Category A threatened species).

Significance

A moderately large regenerating forest/shrubland mosaic, which is closely linked to another large site to the east, effectively an outlier of Waitangi Forest.

The site is fenced with 127 ha administered by the Department of Conservation as scenic reserve.

The site is one of the best examples of tanekaha in the Ecological District, the only site of towai-kauri-kanuka forest, and a representative site for mamaku tree fern.

It also performs catchment and riparian protection functions.

FIGURE 41. PUKETONA RESERVE, P05/077.
EACH GRID IS 1000 M × 1000 M AND EQUALS 100 HA.
s = SHRUBLAND; f = FOREST.

PUKEWHAU

Survey no.	P05/078
Survey date	17 August 1994
Grid reference	P05 995 590
Area	232.6 ha
Altitude	80–232 m asl

Ecological unit

(a) Tanekaha-kanuka-towai forest on hillslope

(b) Taraire-tawa forest on hillslope

(c) Rimu-totara forest on hillslope

(d) Manuka-kanuka-towai shrubland on hillslope

Landform/geology

Hill country of Waipapa Group greywacke.

Vegetation

Three forest and one shrubland type were identified.

Type (a) - Tanekaha-kanuka-towai forest with tawaroa, totara, rimu, puriri and rewarewa, and occasional kauri, miro, taraire and tawa (c. 80%).

Type (b) - Taraire-tawa forest with kanuka, tanekaha, puriri, kohekohe, tawaroa, rewarewa and occasional emergent northern rata and rimu (c. 15%).

Type (c) - Rimu-totara forest with tanekaha and occasional miro, northern rata, Hall's totara and puriri (c. 2%).

(d) - Tall Manuka-kanuka-towai with totara, lancewood and *Hakea* sp. and occasional rewarewa, toru and tawheowheo (c. 3%).

Fauna

Common forest birds as well as pied tit (regionally significant species), NZ pigeon (Category B threatened species) and NI brown kiwi (Category A threatened species) have been recorded within these sites.

Significance

Two large forest/shrubland remnants adjoining a large plantation forest known to support high kiwi numbers. These sites are important as refuges when the plantation forest is logged.

The site contains the uncommon coastal tree tawaroa, and a good example of a tanekaha association which is an uncommon forest type in this Ecological District. It is also a representative site for manuka–kanuka-towai shrubland, the only site in the Ecological District of taraire-tawa forest (rare in the Ecological Region) and one of only four sites in the Ecological District of rimu-totara forest, also uncommon in the Ecological Region.

The Department of Conservation administers 33 ha of this site as an Ecological Area under the Conservation Act 1987.

FIGURE 42. PUKEWHAU, P05/078.
EACH GRID IS 1000 M × 1000 M AND EQUALS 100 HA.
s = SHRUBLAND; f = FOREST.

WAITANGI WETLANDS AND ENVIRONS

Survey no.	P05/079
Survey date	6 March 1995
Grid reference	P05 040 620
Area	Wetland 193 ha; shrubland 79.4 ha
Altitude	5-60 m asl

Ecological unit

(a) Taraire-puriri forest on hillslope

(b) Manuka-kanuka-totara forest on volcanic flats

(c) Manuka shrubland on volcanic flats

(d) Manuka-wattle shrubland on volcanic flats

(e) Wattle treeland on volcanic flats

(f) Gorse scrub on volcanic flats

(g) *Baumea-Isolepis-Juncus* association in swamp

(h) Sedge-rush-manuka swamp shrubland

(i) *Baumea* sedgeland in swamp

(j) *Eleocharis* sedgeland in swamp

(k) Raupo reedland in swamp

(l) Raupo-swamp maire swamp forest in swamp

(m) *Epilobium-Eleocharis* herbfield in swamp

(n) Open water in pond

Landform/geology

Fluvial wetlands ponded by Kerikeri volcanics basalt lava flows.

Vegetation

This site is a mosaic of wetland and shrubland vegetation types. Many of the shrubland areas are islands within the wetland. Forest remnants are very few and very small - less than 2% of the total area. They include:

Type (a) - Taraire-puriri forest with towai and kahikatea and occasional pukatea and totara.

Type (b) - Secondary manuka-kanuka-totara forest with wattle and occasional rimu.

Shrublands were defined as:

Type (c) - Manuka with the threatened *Korthalsella salicornioides* and occasional cabbage tree.

Type (d) - Manuka-wattle. Type (e) - Wattle with manuka and gorse (mainly exotic). Type (f) - Gorse. Largely exotic shrubland types, are included due to their linking and buffering roles making them integral components of predominantly native ecosystems.

Shrubland understorey species include *Coprosma spathulata*, karamu, hangehange, mahoe, hopeless menace, *Lepidosperma laterale*, waterfern and *Pteris tremula*.

Wetland types were:

Type (g) - *Baumea-Isolepis-Juncus* occuring in dense beds.

FIGURE 43. WAITANGI WETLANDS AND ENVIRONS, P05/079.
EACH GRID IS 1000 M × 1000 M AND EQUALS 100 HA.
s = SHRUBLAND; w = WETLAND.

Type (h) - *Baumea-Isolepis-Juncus*-manuka-*Coprosma tenuicaulis* with flax and occasional *Korthalsella*, swamp maire, cabbage tree, swamp kiokio, umbrella fern and *Hebe* sp.

Type (i) - *Baumea articulata*, Type (j) - *Eleocharis sphacelata*, and Type (k) - Raupo are characterised by monospecific dominance.

Type (l) - Raupo-swamp maire with flax and manuka and occasional cabbage tree.

Type (m) - *Epilobium-Eleocharis acuta* herbfield.

Type (n) - Open water.

Significant flora

Sparganium subglobosum, an aquatic herb uncommon in Northland.

The threatened ferns *Cyclosorus interruptus* and *Thelypteris confluens,* both Rare*,* have been recorded here and a small population of *Todea barbara* (Vulnerable) exists in the pines in a gazetted Ecological Area.

Korthalsella salicornioides (Insufficently Known).

Fauna

Water-related native bird species include Australasian bittern (Category O threatened species), NI fernbird, banded rail, spotless crake (regionally significant species), NZ shoveler, grey teal, little black shag, grey and mallard duck, paradise duck, black swan, white-faced heron, Australasian harrier, NZ kingfisher, black-backed gull and pukeko.

Native fish include at least one species of galaxid (whitebait) which is interesting in that this wetland complex has no permanent surface outlet.

NI brown kiwi (Category A threatened species) also utilise the wetland margins.

Significance

The fauna of this wetland system remains rich and varied, despite a highly modified catchment, mainly due to the range of site fertility resulting from the geomorphologic origin (greywacke or basalt) and the availability of open water.

This wetland complex is unusual in that it is close to the coast, is underlain in parts by basaltic lava flows and is the most northern non-aeolian (sand dune) wetland complex of any great size remaining in Northland. It is also the largest within this Ecological District and includes some large areas of native shrubland on volcanic flats. It is a representative site for open water habitat, raupo, raupo-swamp maire, *Baumea, Baumea-Isolepis-Juncus, Eleocharis, Eleocharis-Epilobium* and swamp sedge-shrubland.

The threatened parasitic plant *Korthalsella salicornioides* has one of its strongholds within the manuka shrublands of the Waitangi system and two rare ferns are known from some semi-mineralised sites within the wetlands.

Approximately 50 ha of the wetlands within land managed by private forestry interests are protected by covenant under the Reserves Act 1977. A further 76.3 ha of the lower wetland system is held in stewardship by the Department of Conservation and is managed by the Northland Fish and Game Council.

DAY POINT AND WHARAU SHRUBLANDS

Survey no.	P05/080
Survey date	22 February 1995
Grid reference	P05 060 645
Area	125.9 ha
Altitude	0-87 m asl

Ecological unit

(a) Manuka-kanuka shrubland on coastal hillslope

(b) Bracken-*Gleichenia* shrubland on coastal hillslope

(c) Pohutukawa forest on coastal hillslope

FIGURE 44.
DAY POINT AND WHARAU SHRUBLANDS, P05/080.

EACH GRID IS 1000 M × 1000 M AND EQUALS 100 HA. s = SHRUBLAND.

Landform/geology

Coastal hill country of Waipapa Group greywacke.

Vegetation

Two shrubland and one forest type were identified:

Type (a) - Manuka-kanuka with occasional puriri, kohekohe and pine (c. 80%).

Type (b) - Bracken-*Gleichenia* with mamaku tree fern and hangehange (c. 5%).

Type (c) - Pohutukawa forest (riparian 15%).

Fauna

Common forest birds plus NI brown kiwi (Category A threatened species).

Significance

A representative example of coastal pohutukawa forest and the only example of manuka-*Gleichenia* association recorded in the Ecological District.

It is also habitat for NI brown kiwi.

Other features include their riparian nature and linking role for coastal species within the Bay of Islands.

BRAMPTON SHOAL BUSH

Survey no.	P05/081
Survey date	8 February 1995
Grid reference	P05 085 613
Area	19.1 ha
Altitude	0-70 m asl

Ecological unit

(a) Manuka-kanuka shrubland on volcanic flats

(b) Kanuka shrubland on volcanic flats

Landform/geology

Coastal margin of Kerikeri volcanic basalt lava flow and adjoining coastal hills of Waipapa Group greywacke.

Vegetation

Only two vegetation types were identified:

Type (a) - Manuka-kanuka shrubland on a steep coastal face.

Type (b) - Tall old growth kanuka on flat volcanic coastal margin.

Fauna

Not surveyed.

Significance

The old growth coastal kanuka on a flat volcanic geomorphic base is very unusual - possibly unique within this Ecological Region. It is also a representative site of manuka-kanuka shrubland on volcanic flats.

The site is deteriorating as the senescent kanuka collapses and is not being replaced by broadleaf species due to stock suppressing regeneration.

FIGURE 45. BRAMPTON SHOAL BUSH, P05/081.
EACH GRID IS 1000 M × 1000 M AND EQUALS 100 HA.
s = SHRUBLAND.

HUTIA CREEK COASTAL SHRUBLANDS

Survey no.	P05/082
Survey date	8 February 1995
Grid reference	P05 070 585
Area	137.5 ha
Altitude	0-131 m asl

Ecological unit

(a) Kanuka shrubland on coastal hillslope

(b) Broadleaf forest in gully

(c) Mangrove forest on estuary

(d) *Leptocarpus* on estuary

(e) Strand-shrubland association on foreshore

(f) Salt meadow on estuary

(g) Swamp shrubland

(h) Raupo reedland in swamp

Landform/geology

Coastal hills of Waipapa Group greywacke and Kerikeri volcanic basalt lava flows, adjoining the Waitangi River-Waitangi Creek estuary.

Vegetation

Type (a) consists of tall kanuka shrubland with frequent towai, totara and occasional rimu and cabbage tree with a well established sub-canopy of broadleaved species.

Type (b) - Some gullies retain original tall broadleaf forest of towai, totara, puriri, karaka, mamaku, taraire and occasional kohekohe, pohutukawa and nikau. In places, areas of taller forest fringe the estuary and foreshore including kowhai, puriri, pohutukawa and karaka.

Tidal flats are covered with dense mangrove (Type (c)), which grades into Type (d), dense saltmarsh in which jointed rush is common with frequent knobby clubrush and locally abundant sea rush and *Baumea juncea*.

On the foreshore, strand vegetation (Type (e)) comprises some of the saltmarsh plants with shore ribbonwood, mangrove, flax, manuka and *Coprosma macrocarpa*.

Type (f) Salt meadow with herbs include shore primrose, glasswort, shore bindweed, *Paspalum vaginatum* and other shore grasses.

Freshwater wetlands include Type (g), cabbage tree, *Coprosma propinqua*, wheki, manuka and flax emergent over a dense sward of *Isachne globosa* and bindweed (*Calystegia sepium*), with locally dense *Baumea articulata, Eleocharis, Carex and Isolepis* sedges, and occasional dense stands of raupo (Type (h)).

Significant flora

Korthalsella salicornioides (Insufficiently Known) has been recorded on manuka fringing the raupo.

FIGURE 46. HUTIA CREEK COASTAL SHRUBLANDS, P05/082.
EACH GRID IS 1000 M × 1000 M AND EQUALS 100 HA.
s = SHRUBLAND; f = FOREST; w = WETLAND.

Fauna

Common forest and estuarine birds, plus the less common NZ pigeon (Category B threatened species), NZ dotterel (Category B threatened species), variable oystercatcher (Category C threatened species), Caspian tern, Australasian bittern (both Category O threatened species), NI fernbird, spotless crake, and banded rail (all regionally significant species).

NI brown kiwi (Category A threatened species), Northland green gecko (Northland endemic) and copper skink are known from the shrublands.

Significance

A good example of estuarine ecological gradients from freshwater wetland through brackish marsh, saltmarsh, *Selliera*/glasswort saltmeadow into mangrove forest edged by coastal riparian shrubland, and is a representative site for all vegetation types. The coastal forest is the only example of its type in the Ecological District.

Two plant species uncommon in Northland are present, *Myrsine divaricata* and *Hebe diosmifolia*, and several threatened or regionally significant fauna species.

TE TARO POND

Survey no.	P05/084
Survey date	6 March 1995
Grid reference	P05 055 635
Area	96.6 ha
Altitude	10–60 m asl

Ecological unit

(a) Manuka-kanuka shrubland on hillslope

(b) *Polygonum-Epilobium-Isolepis* herbfield in ephemeral swamp

(c) *Baumea* sedgeland in swamp

(d) Raupo reedland in swamp gullies

Landform/geology

Freshwater ephemeral wetland ponded by Kerikeri volcanic basalt lava flow within valley of Waipapa Group greywacke hill country.

Vegetation

Ephemeral wetland and herbfield with shrubland periphery and catchments.

Type (a)(i) - Manuka-kanuka shrubland with occasional totara (c.20%).

Type (a)(ii) - Manuka periphery with occasional cabbage tree (c.30%).

Type (b) - *Polygonum-Epilobilum-Isolepis* herbfield with pasture species when dry in mid summer (c.30%).

Type (c) - *Baumea articulata* sedgeland with occasional flax.

Type (d) - Raupo reedland in gullies.

Fauna

Waterfowl usage varies greatly depending upon the amount and depth of open water, known to support paradise shelduck, grey duck, black shag, pukeko, welcome swallow, Australasian harrier, spur-winged plover, kingfisher, white-faced heron, spotless crake (regionally significant species), black swan and mallard duck.

Significance

An unusual combination of geomorphic, biological and physical aspects (ephemeral wetland on volcanic base with minimal catchment area and diverse vegetation). It is a representative site for both *Baumea* and the *Polygonum-Epilobium-Isolepis* herbfield.

It forms part of the Waitangi wetland complex but occurs within a separate catchment and with different physical attributes.

FIGURE 47. TE TARO POND, P05/084.
EACH GRID IS 1000 M × 1000 M AND EQUALS 100 HA.
s = SHRUBLAND; w = WETLAND.

WAITANGI RIVER ALLUVIAL REMNANTS

Survey no.	P05/085
Survey date	4 April 1995
Grid reference	P05 960 550
Area	46 ha
Altitude	50–140 m asl

Ecological unit

(a) Kanuka shrubland on hillslope and alluvial flats

(b) Taraire-puriri-towai forest on hillslope

(c) Secondary totara forest on hillslope

Landform/geology

Valley in Waipapa Group greywacke hill country with Holocene alluvial flats along the valley floor.

Vegetation

Two young secondary forest and one older secondary or cutover forest types were recognised.

Type (a)

(i) - Tall kanuka shrubland with towai and tanekaha and occasional totara on hillslopes.

(ii) - Tall kanuka shrubland with tanekaha and occasional kowhai, cabbage tree, mahoe, totara, lowland ribbonwood, titoki, kohuhu and *Muehlenbeckia australis* on alluvial river flats.

Type (b) - Taraire-puriri-towai forest with occasional rimu, rewarewa, kahikatea, tawa, miro and pukatea. Totara is locally common (Kingett-Mitchell).

Type (c) Secondary totara forest

Mamaku and puriri are occasional (Kingett-Mitchell).

Fauna

NI brown kiwi (Category A threatened species) (Kingett-Mitchell)

Significance

Old growth kanuka forest on alluvium is uncommon in the Ecological District and Region. The site is the only example of taraire-puriri-towai forest recorded in the Ecological District.

It provides riparian protection and is probably habitat for native fish including the banded kokopu - found within this catchment and known to utilise native forest riparian cover as its preferred habitat (Collier 1995).

FIGURE 48. WAITANGI RIVER ALLUVIAL REMNANTS, P05/085.
EACH GRID IS 1000 M × 1000 M AND EQUALS 100 HA.
s = SHRUBLAND; f = FOREST.

KERIKERI RIVER RIPARIAN REMNANTS

Survey no.	P05/086
Survey date	4 April 1995
Grid reference	P05 945 650
Area	102 ha
Altitude	10–160 m asl

Ecological unit

(a) Totara forest on riparian margin

(b) Totara-kahikatea forest on alluvial flats

(c) Totara-kanuka forest on alluvial flats

(d) Manuka shrubland on hillslope

(e) *Eucalyptus* treeland on alluvial flats

(f) *Hakea* scrub on hillslope

Landform/geology

Kerikeri volcanic basalt lava flows form riparian margins in the vicinity of Rainbow Falls, whereas the sites upstream of State Highway 1 are on Holocene alluvial flats and rhyolitic hill country.

Vegetation

Three secondary forest and one shrubland type were identified. Two additional exotic vegetation types were included due to their integral association with the native riparian function.

Type (a) - secondary totara forest with kauri and rewarewa and occasional puriri and kohuhu.

Type (b) - secondary totara-kahikatea forest with puriri and occasional rewarewa, karaka, cabbage tree, taraire, matai and rimu.

Type (c) - secondary totara-kanuka forest with taraire and occasional tawa, rewarewa, kahikatea, puriri, towai and kowhai with mahoe in the understorey. Brush wattle is local.

Type (d) - Manuka with *Gleichenia*.

Type (e) - *Eucalyptus* sp.

Type (f) - *Hakea* sp.

Significant flora

Hebe acutiflora (see 3.3.4)

Fauna

Apart from the common forest birds this site is known to support NI brown kiwi (Category A threatened species), NZ pigeon (Category B threatened species), the Northland green gecko (Northland endemic), grey duck and brown teal (Category C threatened species - one resident bird).

Significance

Good examples of an uncommon forest type/situation. It is a representative site for manuka shrubland, totara forest, totara-kanuka forest, and one of only two sites of totara-kahikatea forest in the Ecological District.

The riparian zones are important areas of biodiversity supporting species which use both aquatic and terrestrial environments and reflecting the steep

environmental gradients, high levels of change and physical diversity that occur in these zones. At least 144 species New Zealand wide are dependent to some degree upon riparian zones, and some native fish such as banded kokopu and red-finned bully which are known to occur in the Kerikeri River have been shown to prefer native forest riparian cover to all others (Collier 1995).

Approximately 32 ha of this site is Scenic Reserve administered by the Department of Conservation.

FIGURE 49. KERIKERI RIVER RIPARIAN REMNANTS, P05/086.
EACH GRID IS 1000 M × 1000 M AND EQUALS 100 HA.
s = SHRUBLAND; f = FOREST.

RANGITANE SHRUBLANDS

Survey no.	P05/087
Survey date	11 April 1995
Grid reference	P05 030 680
Area	330 ha
Altitude	0–60 m asl

Ecological unit

(a) Kanuka shrubland/forest on coastal hillslope

(b) *Acacia* treeland on coastal hillslope

(c) Mamaku tree fernland on coastal hillslope

(d) *Hakea* scrub on coastal hillslope

(e) Pohutukawa-kanuka forest on coastal hillslope

(f) Towai-mamaku forest on coastal hillslope

(g) Manuka shrubland on hillslope

Landform/geology

Coastal hills of Waipapa Group greywacke and Kerikeri volcanic basalt lava flows along the margins of the Rangitane River and the Kerikeri Inlet.

Vegetation

Advanced shrubland, some dominated by exotics, and young secondary forest typify this coastal riparian site. Throughout the site, puriri, kohekohe and ponga occur in gullies (Kingett-Mitchell).

Type (a) - Kanuka with occasional *Hakea* sp., mamaku tree fern and pine (c. 60%).

Type (b) - *Acacia* sp. with kanuka and occasional tobacco weed and gorse (c. 20%).

Type (c) - Mamaku tree fern (c. 1%).

Type (d) - *Hakea* sp. (c. 5%).

Type (e) - Pohutukawa-kanuka forest with kohekohe and occasional houpara, *Pittosporum umbellatum*, mapou and mahoe (c. 10%).

Type (f) - Towai-mamaku tree fern with manuka and mapou and occasional houpara and mahoe (c. 5%).

Type (g) Manuka shrubland with towai. Mingimingi occurs in the understorey and ponga is common in the gullies.

Significant flora

Of note is the presence of the uncommon native buttercup *Ranunculus urvilleanus* known from only five sites between Te Paki and Russell.

Korthalsella salicornioides (Insufficiently known) was recorded by Cooper in 1966 at Appletree Bay and more recently by Maureen Young (L. Forester pers. comm. 1997). *Pittosporum pimeleoides* subsp. *pimeleoides* (Rare) was recorded from Rangitane and Opito Bay.

Fauna

This site is known to support NI brown kiwi (Category A threatened species), reef heron (Category O threatened species) and Northland green gecko (Northland endemic). Little blue penguin have been located and probably breed here.

Significance

One of the largest coastal shrubland/forest remnants remaining in the northern Bay of Islands and the only site in the Ecological District where pohutukawa-

kanuka and towai-mamaku have been recorded. It is riparian in nature with sequential gradients from estuarine mangroves through to coastal hill forest.

Habitat for threatened flora and fauna.

The site includes the 19 ha Rangitane Scenic Reserve, 5.5 ha of stewardship land at Blacksmith's Bay and the 15.5 ha Akeake Historic Reserve, all administered by the Department of Conservation.

FIGURE 38. RANGITANE SHRUBLANDS, P05/087.

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

s = SHRUBLAND; f = FOREST; w = WETLAND.

TE AIORUA CREEK WETLAND REMNANT

Survey no.	P05/088
Survey date	11 April 1995
Grid reference	P05 008 695
Area	3.4 ha
Altitude	5 m asl

Ecological unit

(a) Raupo reedland in swamp

Landform/geology

Freshwater wetland near mouth of a valley in hill country of Waipapa Group greywacke.

Vegetation

Small raupo dominant wetland near the upper edge of a drained alluvial flat which probably once graded into saltmarsh and the still present estuarine mangrove forest. The water table of this site may be altered by the drainage of the adjacent flats.

Fauna

Not surveyed.

Significance

Representative of freshwater wetland in a location which is largely devoid of extant wetlands of this type.

FIGURE 51. TE AIORUA CREEK WETLAND REMNANT, P05/088.
EACH GRID IS 1000 M × 1000 M AND EQUALS 100 HA. w = WETLAND.

STANNERS ROAD REMNANT

Survey no.	P05/089
Survey date	11 April 1995
Grid reference	P05 933 693
Area	18.3 ha ha
Altitude	90–130 m asl

Ecological unit

(a) Taraire-puriri forest on hillslope

(b) *Eucalyptus*-totara forest on hillslope

(c) Gorse scrub on hillslope

Landform/geology

Valley in Kerikeri volcanic basalt lava flows.

FIGURE 52. STANNERS ROAD REMNANT, P05/089.
EACH GRID IS 1000 M × 1000 M AND EQUALS 100 HA.
s = SHRUBLAND; f = FOREST.

Vegetation

Two exotic dominant (or shared dominant) vegetation types are included as they may be important to the viability of the remnant NI brown kiwi population.

Type (a) - Taraire-puriri forest with totara and occasional kahikatea, rimu, rewarewa and towai.

Type (b) - *Eucalyptus* sp.-totara treeland with *Acacia* sp.

Type (c) - Gorse scrub with mamaku tree fern and occasional tobacco weed and pine.

Fauna

NI brown kiwi (Category A threatened species) are known to be present as are many of the more common forest birds.

Significance

Representative of volcanic broadleaf dominant forest in a location which is largely devoid of natural areas.

This forest type is of particular importance as a food source for NZ pigeon, as well as being kiwi habitat.

PUKETOTARA ROAD ALLUVIAL REMNANT

Survey no.	P05/090
Survey date	10 April 1995
Grid reference	P05 940 633
Area	3.1 ha
Altitude	70 m asl

Ecological unit

(a) Kahikatea-puriri forest on alluvial flats

Landform/geology

Pleistocene and Holocene alluvial flats ponded by Kerikeri volcanic lava flows.

Vegetation

Type (a) - secondary kahikatea-puriri forest with occasional totara and rimu.

Fauna

Not surveyed.

Significance

The only site in the Ecological District of this uncommon forest type on an unusual geomorphic basic (raised alluvial flats) in a location depauperate in natural areas of this type.

FIGURE 53. PUKETOTARA ROAD ALLUVIAL REMNANT, P05/090.
EACH GRID IS 1000 M × 1000 M AND EQUALS 100 HA. f = FOREST.

KERIKERI STREAM BUSH

Survey no.	P05/091
Survey date	5 April 1995
Grid reference	P05 890 650
Area	493.4 ha
Altitude	90–260 m asl

Ecological unit

(a) Taraire-puriri forest on hillslope
(b) Kauri-tanekaha forest on ridges
(c) Totara forest on hillslope
(d) Gorse scrub on hillslope

Landform/geology

Steep hillslopes on flanks of Mangaparerua rhyolite dome, with Horeke basalt lava flows and Holocene alluvium along the floor of the Kerikeri River valley.

Vegetation

Three forest and one exotic scrub type were identified:

Type (a) - Cutover taraire-puriri forest with rewarewa and towai and occasional northern rata, pukatea, kohekohe, totara, emergent kahikatea and rimu (c.75%).

Type (b) - Secondary kauri-tanekaha ridge forest with occasional towai (<5%).

Type (c) - Secondary totara forest (c.2%).

Type (d) - Gorse scrub (c.20%).

Significant flora

The regionally significant mistletoe *Ileostylus micranthus* (classified by Cameron et al. as Local) is known from the riparian forest of Type (c).

Fauna

Known to support NI brown kiwi (Category A threatened species) and NZ pigeon (Category B threatened species) in high numbers, the gecko *Hoplodactylus pacificus* and more common forest birds.

Significance

Represents the only rhyolite dome in the Kerikeri Ecological District.

A large and relatively compact area, providing good quality habitat for several threatened species and riparian protection in the Upper Kerikeri River catchment. It is one of the few habitats where feral pigs are absent.

A representative site and one of the largest areas of puriri-taraire forest in the Ecological District, and the only site in the Ecological District where kauri-tanekaha forest has been recorded.

FIGURE 54. KERIKERI STREAM BUSH, P05/091.

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

s = SHRUBLAND; f = FOREST.

PUNGAERE ROAD BUSH

Survey no.	P05/092
Survey date	4 April 1995
Grid reference	P05 900 665
Area	26.4 ha
Altitude	110–190 m asl

Ecological unit

(a) Totara-puriri forest on hillslope

Landform/geology

Valley cut through plateau of Kerikeri volcanic lava flows.

Vegetation

Secondary totara-puriri forest with kahikatea and occasional taraire, towai, rewarewa and rimu.

Fauna

Common forest birds are present.

Significance

The only site in the Ecological District where totara-puriri forest has been recorded.

Close association with large forest remnants containing threatened species. Further survey work is required before its full significance can be assessed.

FIGURE 55. PUNGAERE ROAD BUSH, P05/092.
EACH GRID IS 1000 M × 1000 M AND EQUALS 100 HA. f = FOREST.

PUNGAERE STREAM BUSH

Survey no.	P05/093
Survey date	7 April 1995
Grid reference	P05 890 685
Area	50.7 ha
Altitude	130–200 m asl

Ecological unit

(a) Taraire-puriri forest on hillslope

(b) Towai-totara forest on hillslope

(c) Mamaku tree fernland on hillslope

Landform/geology

Valleys cut through plateau of Kerikeri volcanic basalt lava flows with spectacular bluffs and chasms, and areas of talus at the edge of the plateau. Small areas of Waipapa group sandstone in valley.

Vegetation

The site comprises three main vegetation types:

Type (a) - Cutover taraire-puriri forest with towai and rewarewa and occasional pukatea, totara and kahikatea.

Type (b) - Secondary towai-totara forest with kanuka and rewarewa and occasional taraire, puriri and tanekaha.

FIGURE 56. PUNGAERE STREAM BUSH, P05/093.
EACH GRID IS 1000 M × 1000 M AND EQUALS 100 HA. f = FOREST.

Type (c) - Mamaku tree fernland with totara.

Fauna

Common forest birds and the NZ pigeon (Category B threatened species) are known to be present. No survey work has been done for NI brown kiwi.

Significance

Contains a cutover volcanic broadleaf element which is an important food source for NZ pigeon.

It is one of the last older growth remnants within the mid section of the Kerikeri Ecological District, and is a representative site for towai-totara forest.

The Department of Conservation administers 6.3 ha of this site.

UPPER KERIKERI STREAM BUSH

Survey no.	P05/094
Survey date	5 April 1995
Grid reference	P05 860 660
Area	353.6 ha
Altitude	200–340 m asl

Ecological unit

(a) Towai forest on hillslope

(b) Puriri-taraire forest on hillslope

(c) Totara forest on hillslope

(d) Kanuka forest on hillslope

(e) Manuka shrubland on gentle hillslope

(f) Gorse scrub on rolling hillslope

Landform/geology

Valleys cut through plateau of Kerikeri volcanic basalt lava flows.

Vegetation

Cutover and secondary forest mosaic with large shrublands to the south. Vegetation types include:

Type (a) - Secondary towai forest with rimu, kauri and *Acacia* sp. and occasional pine, kanuka, rewarewa, taraire and totara (c. 30%).

Type (b) - Puriri-taraire forest with towai and rewarewa and occasional kahikatea and rimu (c. 10%).

Type (c) - Secondary totara forest with tanekaha and occasional towai (c. 10%).

Type (d) - Kanuka with totara and occasional rimu and kahikatea (c. 10%).

Type (e) - Manuka shrubland with occasional *Hakea* sp. (c. 30%).

Type (f) - Gorse scrub with *Hakea* sp. and occasional bracken (c. 10%).

Fauna

NI brown kiwi (Category A threatened species) and NZ pigeon (Category B threatened species).

Significance

A large forest/shrubland outlier to Puketi Forest and providing upper catchment protection to the Kerikeri River ecosystem and linkage to the adjoining forests to the east as well as being habitat for threatened bird species.

A representative site for totara forest and the only site recorded in the District of secondary towai forest.

FIGURE 57. UPPER KERIKERI STREAM BUSH, P05/094.
EACH GRID IS 1000 M × 1000 M AND EQUALS 100 HA.
s = SHRUBLAND; f = FOREST.

PUKETOTARA RIVER BUSH

Survey no.	P05/095
Survey date	10 April 1995
Grid reference	P05 885 606
Area	250.6 ha
Altitude	130–280 m asl

Ecological unit

(a) Towai-totara-*Hakea* forest on hillslope

(b) Taraire-puriri forest on hillslope

(c) Towai-totara forest on hillslope

(d) Kauri forest on hillslope

(e) Kahikatea-cabbage tree-flax swamp forest on alluvial flats

(f) *Hakea* scrub on hillslope

Landform/geology

Valley cut through a plateau of Kerikeri volcanic basalt lava flows.

Vegetation

Five forest and one shrubland type were identified within this site:

Type (a) - Secondary towai-totara-*Hakea* sp. forest with kohuhu and manuka and occasional rewarewa and tanekaha (c. 40%).

Type (b) - Taraire-puriri forest with rewarewa and towai and occasional northern rata, pukatea, kohekohe, totara, kahikatea, matai and rimu (c. 20%).

Type (c) - Towai-totara forest with taraire and occasional kanuka and mamaku tree fern (c. 10%).

Type (d) - Secondary kauri forest with kanuka and occasional towai and tanekaha (c. 2%).

Type (e) - Kahikatea-cabbage tree-flax swamp forest with *Carex* sp., *Coprosma tenuifolia* and occasional kohuhu, manuka and *Baumea* sp. (<1%).

Type (f) - *Hakea* sp.-gorse scrub with towai and occasional mamaku tree fern and totara emergent.

Fauna

NI brown kiwi (Category A threatened species), NZ pigeon (Category B threatened species).

Significance

A large riparian forest remnant within the mid catchment of the Puketotara Stream, a large tributary of the lower Kerikeri River, and which supports threatened bird species.

It contains a good diversity of vegetation types including an area of uncommon swamp forest which is the only example of its type recorded in the Ecological District. It is also a representative site for taraire-puriri forest and kauri forest.

FIGURE 58. PUKETOTARA RIVER BUSH, P05/095.
EACH GRID IS 1000 M × 1000 M AND EQUALS 100 HA.
s = SHRUBLAND; f = FOREST; w = WETLAND.

LODORE WETLAND

Survey no.	P05/096
Survey date	10 April 1995
Grid reference	P05 867 593
Area	5 ha
Altitude	290 m asl

Ecological unit

(a) Manuka-flax association in swamp

(b) *Baumea* sedgeland in swamp

(c) Manuka shrubland on volcanic flats

Landform/geology

Freshwater wetland in valley and in Kerikeri volcanic basalt lava flows.

Vegetation

A semi-drained wetland with three vegetation types identified:

Type (a) - Manuka-flax association (c. 75%).

Type (b) - *Baumea articulata* sedgeland (c. 5%).

Type (c) - Manuka shrubland (c. 20%).

FIGURE 59. LODORE WETLAND, P05/096.
EACH GRID IS 1000 M × 1000 M AND EQUALS 100 HA. w = WETLAND.

Fauna

Not surveyed.

Significance

The only natural semi-mineralised freshwater wetland remnant within the western portion of this Ecological District. The next closest wetlands of this type are within the Waitangi Forest - 15 km to the east. It is the only site in the District where a manuka-flax association has been recorded.

Partial draining has promoted the dominance of manuka. Further survey work is required before the full significance of this site can be assessed.

WHAENGAERE RD

Survey no.	P05/098
Survey date	27 April 1995
Grid reference	P05 076 680
Area	95.5 ha
Altitude	sea level to 60 m

Ecological unit

(a) Manuka-gorse association on coastal cliffs and hillslopes

(b) Manuka shrubland on cliff coastal and hillslope

(c) Coastal forest association on coastal cliffs

Landform/geology

Coastal hills of Waipapa Group greywacke and Kerikeri Volcanics (Horeke Basalt) lava flows.

Vegetation

Type (a) is a large area of manuka and gorse scrub at the end of Whaengaere Rd with frequent sweet pea shrub and scattered tobacco weed and lantana, some of which has been regularly burnt.

Type (b) occurs at Kaihiki Bay. On the cliff there is some kowhai. Along the cliffs and in gullies of the south western corner of the Purerua Peninsula is scrub and shrubland used by kiwi, as well as remnants of coastal vegetation.

At Poraenui Point, the scrub consists mainly of gorse and sweet pea shrub with occasional flax and karaka. The Local *Fuchsia procumbens* is found at Poraenui Point.

The inland valley contains manuka shrubland about 2-3 metres tall.

There is also manuka shrubland to 4 metres with scattered pohutukawa and karaka.

Type (c) is a small remnant of coastal forest on a cliff—pohutukawa, kohekohe, karaka and *Astelia*, with occasional puriri and kawakawa.

Fauna

NI brown kiwi (Category A threatened species)

Significance

The site includes a remnant of coastal forest, rarely seen on the mainland, which is the only example of its type in the Ecological District.

Kiwi habitat.

FIGURE 60. WHANGAERE ROAD, P05/098.
EACH GRID IS 1000 M × 1000 M AND EQUALS 100 HA. s = SHRUBLAND.

RANGIHOUA

Survey no.	P05/099
Survey date	10 April, 25 May 1995
Grid reference	P05 090 690
Area	73.2 ha
Altitude	sea level to 100 m asl

Ecological unit

(a) Manuka-gorse scrub on coastal cliffs

(b) Manuka shrubland on hillslope

(c) Raupo wetland on alluvium

(d) Open water

(e) Saltmarsh on sand flats

(f) Sandy beach

Landform/geology

Coastal hills and cliffs of Waipapa Group greywacke, and gravel beaches with back-beach fluvial wetlands

Vegetation

In Wairoa Bay, the scrub consists of gorse, manuka, sweet pea shrub and mamaku with tobacco weed and occasional pohutukawa, mahoe, hangehange and kawakawa.

The beaches are sandy with manuka shrubland or a pasture platform behind them.

Behind the beaches are raupo wetlands and manuka shrubland.

At Marsden Cross, the manuka shrubland is a little taller and more extensive, containing mahoe, mamaku and puriri.

A small area of saltmarsh links a small pond surrounded by raupo to the beach.

Fauna

NI brown kiwi (Category A threatened species), NZ dotterel (Category B threatened species), Caspian tern (Category O threatened species), spotless crake (regionally significant species).

Significance

An important site for kiwi, being one of the highest kiwi call areas in Northland (around 30 calls per hour).

The area also supports several threatened and regionally significant species of shore and wetland birds, and is a representative site for manuka shrubland.

The site includes 13 ha of the Marsden Cross Historic Reserve, administered by the Department of Conservation.

FIGURE 61. RANGIHOUA, P05/099.
EACH GRID IS 1000 M × 1000 M AND EQUALS 100 HA.
s = SHRUBLAND; w = WETLAND.

ONEWHERO BAY

Survey no.	P05/102
Survey date	2 May 1995
Grid reference	P05 072 630
Area	9.6 ha
Altitude	0.3 m asl

Ecological unit

(a) Sand on beach

Landform/geology

Sandy beach pocket.

Vegetation

Scattered pohutukawa over exotic pasture on the hind dunes. Sandy beach.

Fauna

Breeding NZ dotterel (Category B threatened species) and little blue penguin.

Significance

This relatively undisturbed private beach may be an important breeding site for NZ dotterel which are particularly susceptible to nest disturbance and chick mortality from dogs.

Sandy beaches are relatively uncommon in the inner Bay of Islands, and this is one of the best examples.

FIGURE 62. ONEWHERO BAY, P05/102.
EACH GRID IS 1000 M × 1000 M AND EQUALS 100 HA. d = DUNELAND.

KERIKERI AIRPORT GUMLAND

Survey no.	P05/103
Survey date	3 May 1995
Grid reference	P05 935 595
Area	67.6 ha
Altitude	150 m asl

Ecological unit

(a) *Baumea*-manuka-*Gleichenia* association in bog

(b) *Tetraria-Baumea* sedgeland in bog

(c) Manuka shrubland on impoverished flats and gentle slopes

(d) Mixed scrub on volcanic flats

Landform/geology

Deeply leached and weathered shallow basin on shallow Kerikeri volcanic basalt lava flows overlying impoverished sedimentary Otaha clays.

Vegetation

Bog and shrubland associations including:

Type (a) - *Baumea*-manuka-*Gleichenia* bog, is seasonally waterlogged and occurs in the lower part of the basin.

Baumea teretifolia is dominant or co-dominant with *Gleichenia dicarpa* in a dense stand. Spindly manuka and *Dracophyllum* are scattered throughout. Prickly hakea and willow-leaved hakea are also sparsely present. On slightly raised mounds, *Schoenus brevifolius* is co-dominant with *Baumea*.

Dianella is scattered and the clubmoss, *Lycopodium laterale* is locally common. The tall sedge, *Baumea* grows locally around flooded pits and on drain edges.

In Type (b) - *Tetraria* is locally dominant with Baumea on flats near some channels.

Type (c) Manuka shrubland, occurs on slightly elevated sites on impoverished ironstone soils. Spindly manuka is dominant or co-dominant with prickly hakea and/or gorse, with scattered mingimingi and kumerahou. The understorey is sparse with scattered *Lycopodium laterale, Pomaderris phylicifolia, Lepidosperma laterale, Dianella, Gonocarpus montanus* and occasional ground orchids and sedges. *Schoenus brevifolius* and *Lindsea linearis* are locally common.

On some poorly drained and gentle slopes, manuka is up to 4.5 m with an even canopy. Hangehange is common in the understorey, with kumerahou, and scattered willow-leafed hakea, bracken and gorse.

Type (d) - On more fertile ground on the margins of the site, exotic species such as willow-leafed hakea, black wattle, *Acacia,* tobacco weed and gorse form a dense scrub with manuka and occasional totara, mahoe and mamaku.

Fauna

NI brown kiwi (Category A threatened species), Australasian bittern (Category O threatened species), NI fernbird (regionally significant species); mudfish species (Category A threatened species - see 3.4.4).

Significance

The site exhibits several unique or very rare attributes which cumulatively make it of very high conservation value. Gumlands on a volcanic geomorphic base are extremely rare now. It is a representative site for all the indigenous vegetation types and the only site in the Ecological District of *Baumea-Tetraria* and *Baumea*-manuka-*Gleichenia* types.

The Kerikeri Airport gumland also contains an oxidised ironstone soil (Otaha clay) of high scientific interest which may be unique in temperate latitudes and is probably the only natural area remaining on this soil type (Clunie 1987). Its bog and communities support at least four threatened species, including a mudfish species known from only two sites.

FIGURE 63. KERIKERI AIRPORT GUMLAND, P05/103.
EACH GRID IS 1000 M × 1000 M AND EQUALS 100 HA.
s = SHRUBLAND.

NGATAHUNA STREAM SWAMP

Survey no.	P05/104
Survey date	29 August 1995
Grid reference	P05 014 512
Area	10 ha
Altitude	70 m asl

Ecological unit

(a) Raupo swamp on alluvium

(b) Crack willow on stream flats

(c) Open water

landform/geology

Freshwater wetland near mouth of a valley in Waipapa Group greywacke.

Vegetation

The Ngatahuna Stream runs along the western side of a raupo dominant wetland which is about 500 m long and 100–300 m wide. Crack willow is common along the stream edge, and less common in the body of the swamp, where there are 3-4 clumps. Weeping willows are scattered near the western edge, especially at the upstream (southern) end. Cabbage tree occurs occasionally,

FIGURE 64. NGATAHUNA STREAM SWAMP, P05/104.
EACH GRID IS 1000 M × 1000 M AND EQUALS 100 HA. w = WETLAND.

and flax is locally common. *Calystegia sepium* is present and locally abundant at the northern end.

Other species present are *Eleocharis sphacelata, Schoenoplectus tabernaemontani, Blechnum* sp., and patches of *Tradescantia. Potomogeton sub-oblongus* occurs in some open areas of water along the stream.

Upstream of the wetland the stream is slow moving with abundant willow weed (*Polygonum* sp.), thin strips of raupo on the margins, *Eleocharis, Carex solandri* and *C. virgata*, soft rush (*Juncus effusus*), pennyroyal and *Calystegia*. Flax, cabbage tree, manuka, crack and weeping willow all occur.

There is an area of open water here approximately 5 m wide and 100 m long, used by mallard ducks.

Grazed farmland occurs on the western side of the stream, with a narrow buffer mainly of gorse, blackberry, bracken, *Pteris tremula, Hypolepis, Histopteris*, honeysuckle, African club moss, and scattered totara.

On the eastern margin there is a strip of manuka shrubland of varying width which adjoins a gorse-covered hillside. Totara, *Pittosporum tenuifolium*, cabbage tree, and gorse are apparent in the canopy. Near the northern end of the wetland a small secondary broadleaf-podocarp remnant adjoins the strip of manuka shrubland.

Fauna

NI fernbird (regionally significant) and common bird species.

Significance

In association with the other mineralised freshwater wetlands of the immediate area, including the Werowero Swamp, this site provides additional habitat for species which have large habitat requirements such as Australasian bittern. It contains some good stands of flax, now uncommon in the Ecological District. A threatened and diminishing habitat type.

KAWAKAWA FLOOD PLAIN

Survey no.	P05/105
Survey date	2 October 1995
Grid reference	P05 065 460
Area	75 ha
Altitude	2–10 m asl

Ecological unit

(a) *Polygonum*-alligator weed herbfield in swamp

(b) Alligator weed herbfield in swamp

(c) *Carex s*edgeland in swamp

(d) Crack willow treeland in swamp

(e) Flax-cabbage tree association in swamp

(f) Open water in swamp

(g) Manuka-Chinese privet-totara forest on swampy flat

Landform/geology

Holocene swamp and alluvial deposits.

Vegetation

Ephemeral flood-plain vegetation, largely dominated by exotic species. Associated plants include:

Type (a) *Polygonum*-alligator weed herbfield

Myriophyllum propinquum, Galium palustrine, Ranunculus repens are local. *Carex virgata, Baumea articulata, Juncus gregifolius* and flax are locally emergent. There are also local areas of rank grass (Kingett-Mitchell). Water plantain (*Alisma plantago aquatica*) is occasional.

Type (b) Alligator weed herbfield

Scattered willow and occasional cabbage trees and *Carex* sp.

Type (d) Crack willow treeland

Occasional cabbage tree and flax are emergent over willow weed and alligator weed.

Type (e) Flax-cabbage tree association

Raupo, *Coprosma propinqua* with occasional rush-like sedge.

Type (f) Open water - *Azolla rubra* is frequent.

Type (g) Manuka-Chinese privet-totara forest

Eucalyptus sp. is emergent.

Fauna

Water-related fauna include NZ shoveler, grey teal, black swan, grey duck, pukeko, welcome swallow, Australasian harrier, paradise duck, kingfisher, black shag, pied stilt, white-faced heron and mallard duck. Some common forest birds are present. No information is available on native fish, but usage is likely to be considerable.

Significance

Although comprising predominantly exotic vegetation, the high water table, low lying aspect and association with other large fertile wetlands within the

same catchment makes this fertile ephemeral (seasonal) wetland of considerable significance - especially to breeding waterfowl.

It is a representative site for open water habitat, *Carex* sedgeland, and the only site recorded in the Ecological District of flax-cabbage tree association, a rare vegetation type in the Ecological Region.

FIGURE 65. KAWAKAWA FLOOD PLAIN, P05/105.
EACH GRID IS 1000 M × 1000 M AND EQUALS 100 HA.
w = WETLAND.

CABBAGE TREE REMNANT

Survey no.	P05/107
Survey date	12 December 1996
Grid reference	P05 082 474
Area	3 ha
Altitude	15m asl

Ecologial unit

(a) Cabbage tree forest on floodplain

Landform/geology

Holocene alluvium in river valley.

Vegetation

A remnant of cabbage tree forest with an understorey solely of pasture grasses, due to grazing.

Fauna

Not surveyed.

Significance

Cabbage tree forest is a particularly uncommon habitat type nationally, and this is the only such site recorded in the Ecological District. The landowner intends fencing the area which will contribute to enhancing its values.

FIGURE 66. CABBAGE TREE REMNANT, P05/107.
EACH GRID IS 1000 M × 1000 M AND EQUALS 100 HA. f = FOREST.

UPPER PUNGAERE SHRUBLAND

Survey no.	P05/114
Survey date	13 February 1995
Grid reference	P04/P05 870 690
Area	287.5 ha
Altitude	200–320 m asl

Ecological unit

(a) Manuka shrubland in gullies and hillslopes

Landform/geology

Gullies and hillslopes on deeply weathered Kerikeri volcanics, rhyolite and basalt flows, with small areas of underlying glauconitic sandstone and siliceous mudstone in the west.

Vegetation

The south-eastern portion of the Te Mata uplands, near Pungaere Rd, consists of low manuka shrubland on infertile podzol soils. Tangle fern is common. Sedges and orchids are scattered throughout and some gorse is present.

FIGURE 67. UPPER PUNGAERE SHRUBLAND, P05/114.
EACH GRID IS 1000 M × 1000 M AND EQUALS 100 HA. s = SHRUBLAND.

Fauna

NI fernbird. (Regionally significant species)

Significance

An uncommon rock and vegetation type (gumland) and forms part of a vegetated linkage into the Puketi Ecological District. A representative site of manuka shrubland.

Further surveying is recommended during the orchid flowering season to fully assess the botanical values.

CONE ISLAND

Survey no.	P04/113
Survey date	16 April 1998
Grid reference	P04 810 938
Area	5.8 ha
Altitude	sea level to 82 m asl

Ecological unit

(a) Flax coastal association on steep hillslope

(b) Karaka-coastal mahoe forest on steep hillslope

Landform/geology

Torlesse Terrane greywacke and argillite.

Vegetation

Type (a) Flax dominates the northern end of the island with grass species frequently occurring. Cutty grass, toetoe, taupata, pohutukawa, coastal tussock and hangehange are occasional.

Type (b) A small patch of coastal forest at the southern end of the island is dominated by karaka. Coastal mahoe is common with ngaio and flax frequently occurring. Hangehange, bracken and wharangi are occasional.

FIGURE 68. CONE ISLAND, P04/113.
EACH GRID IS 1000 M × 1000 M AND EQUALS 100 HA.

Fauna

Fluttering shearwater, little shearwater, common diving petrel, grey-faced petrel, reef heron (Category O threatened species), blue penguin, Australasian harrier, NZ kingfisher, and silvereye.

Duvaucel's gecko, shore skink.

Significance

Compared with neighbouring Stephenson Island, Cone Island is relatively unspoilt with high fauna values.

It is habitat for a threatened bird species and a breeding site for five species of seabirds.

Cone Island is also habitat for the Duvaucel's gecko which is extinct on the mainland.

The karaka-coastal mahoe forest is a nationally uncommon vegetation type, and the only example recorded in the Ecological District.

STEPHENSON ISLAND

Survey no.	P04/101
Survey date	16 April 1998
Grid reference	P04 824 928
Area	112.5 ha
Altitude	sea level to 132 m

Ecological unit

(a) Kikuyu grassland on hillslope

(b) Pohuehue vineland on hillslope

(c) Bracken fernland on hillslope

Landform/geology

Torlesse Terrane greywacke and argillite.

Vegetation

Most of the island is kikuyu, with scattered pohutukawa around the coast. Bracken and pohuehue are spreading into the kikuyu, with patches of flax.

Tawapou, flax, bracken and the large-leaved milk tree (Local) occur on an adjoining stack located at PO4 818 920.

Fauna

Pycrofts petrel (endemic species of regional significance), fluttering shearwater, little shearwater (regionally significant), grey-faced petrel, common diving petrel, fairy prion, blue penguin, black shag, pied shag, little shag, reef heron (Category O threatened species), NZ dotterel (Category B threatened species), white-fronted tern (Category C threatened species), NZ kingfisher, welcome swallow, NZ pipit, grey warbler, silvereye.

Duvaucel's gecko, common gecko, copper skink, moko skink, shore skink.

Significance

Stephenson Island has been severely modified by agricultural practices and is mainly in pasture, however this island is an important habitat for threatened species (NZ dotterel and reef heron) as well as several species found only on offshore islands including little shearwater, Pycroft's petrel, Duvaucel's gecko and moko skink.

The re-establishing pohuehue vineland represents the largest area of this vegetation type in the Ecological District.

FIGURE 69. STEPHENSON ISLAND, P04/101.
EACH GRID IS 1000 M × 1000 M AND EQUALS 100 HA.

ORUATEMANU ISLAND

Survey no.	P04/112
Survey date	16 April 1998
Grid reference	P04 837 895
Area	1.05 ha
Altitude	sea level to 44 m

Ecological unit

(a) Pohutukawa coastal forest on steep hillslope

Landform/geology

Torlesse Terrane greywacke and argillite.

Vegetation

The eastern end of the island is dominated by pohutukawa forest with frequent houpara. Karo, kawakawa, taupata, *Coprosma* sp, rengarenga lily, coastal astelia, tawapou, and the adventives lantana and gorse are occasional.

Fauna

Common diving petrel, fluttering shearwater, blue penguin, pied shag, welcome swallow, grey warbler, silvereye.

Moko skink, shore skink.

FIGURE 70. ORUATEMANU ISLAND, P04/112.
EACH GRID IS 1000 M × 1000 M AND EQUALS 100 HA.

Significance

Oruatemanu Island is rat and possum free and as a consequence supports good populations of lizards, notably the moko skink. The fluttering shearwater has been reported as breeding on the island.

An intact canopy with a representative assemblage of coastal species.

The island is a Scenic Reserve administered by the Department of Conservation.

KARAKA ISLAND

Survey no.	P04/111
Survey date	16 April 1998
Grid reference	P04 856 896
Area	1.35 ha
Altitude	sea level to 20 m

Ecological unit

(a) Coastal tussock-flax-grass coastal association on hillslope

(b) Flax-rengarenga lily coastal association on cliffs

Landform/geology

Torlesse Terrane greywacke and argillite.

Vegetation

Type (a) The common species on the island are coastal tussock, flax and grass species. Species that are occasional include cabbage tree, cutty grass, rengarenga lily, coastal astelia, toetoe, and mingimingi.

Type (b) The cliffs on the western side of the island are dominated by flax and rengarenga lily. Coastal astelia is frequent. Several species are present on this cliff face in low amounts - coastal tussock, native iceplant, NZ spinach, oioi, and mingimingi.

Significant flora

Asplenium obtusatum subsp. *northlandicum* occurs in 2 patches.

Hebe 'Whangarei', a Northland endemic of restricted distribution that is found only between Whangaroa and Whangarei.

Fauna

Black-backed gull, red-billed gull.

Shore skink.

Significance

The island is habitat for two plant species of restricted distribution, and is the only site in the Ecological District where the flax-rengarenga lily association has been recorded.

The island is a Scenic Reserve administered by the Department of Conservation.

FIGURE 71. KARAKA ISLAND, P04/11.
EACH GRID IS 1000 M × 1000 M AND EQUALS 100 HA.

MOTUEKA ISLAND (FLAT ISLAND)

Survey no.	P04/102
Survey date	16 April 1998
Grid reference	P04 898 910
Area	3.5 ha
Altitude	sea level to 30 m

Ecological unit

(a) Flax-grass species coastal association on hillslope

(b) Flax-oioi-pohutukawa coastal association on raised flat

Landform/geology

Eroded remnants of Kerikeri volcanics basaltic lava flows.

Vegetation

Type (a) Flax dominates the southern end of the island with grass spp commonly occuring. Pohuehue, taupata and Norfolk pine are of occasional occurrence.

Type (b) A small area on the northern edge of the island has flax, oioi and pohutukawa commonly occurring. Hangehange, toetoe and taupata are occasional.

Fauna

Reef heron (Category O threatened species), pied shag, Australasian harrier, blue penguin, red-billed gull, NZ kingfisher, grey warbler, silvereye.

Shore skink.

Significance

A large area of this island is dominated by pasture and pines. However, the quality of the vegetation that is to be found on the fringes of the island is significant and is possibly a breeding habitat for the threatened reef heron.

The site is the only one in the Ecological District where the flax-oioi-pohutukawa association has been recorded.

FIGURE 72. MOTUEKA ISLAND, P04/102.
EACH GRID IS 1000 M × 1000 M AND EQUALS 100 HA.
s = SHRUBLAND.

MOTUEKAITI ISLAND

Survey no.	P04/103
Survey date	16 April 1998
Grid reference	P04 897 901
Area	3.3 ha
Altitude	< 20 m

Ecological unit

(a) Flax coastal association on hillslope

Landform/geology

Eroded remnants of Kerikeri volcanics basaltic lava flows.

Vegetation

The south eastern side of the island is dominated by flax. Whau, taupata, pohutukawa, wheki, houpara, mapou, and mingimingi are occasional along with several exotic species.

Fauna

Blue penguin, red-billed gull, Caspian tern (Category O threatened species), welcome swallow.

Shore skink.

Significance

Although the island has been considerably modified, the margins of the island constitute habitat for threatened species and is a breeding site for blue penguin.

Close to Mahinepua Scenic Reserve and a linkage to Motueka Island, it is a good example of its vegetation type.

FIGURE 73. MOTUEKAITI ISLAND, P04/103.
EACH GRID IS 1000 M × 1000 M AND EQUALS 100 HA. s = SHRUBLAND.

CAVALLI ISLANDS - MOTUKAWANUI CLUSTER

Survey no.	P04/104
Survey date	14 April 1998
Grid reference	P04 967 884 - Motukawanui
	P04 975 881 - Moturahurahu
	P04 975 865 - Motumuka
	P04 976 865 - Motukeokeo
Area	384.95 ha
Altitude	sea level to 172 m

Ecological unit

(a) Kanuka coastal forest on hillslope

(b) Pohutukawa coastal forest in gully and on hillslope

(c) Flax-bracken coastal association on hillslope

(d) Raupo coastal wetland association on flat

(e) Cabbage tree-*Coprosma* coastal shrubland on hillslope

(f) Coastal astelia-flax-pohutukawa coastal association on steep hillslope

(g) Houpara-kanuka coastal forest on steep hillslope

(h) Flax-pohutukawa coastal forest on steep hillslope

Landform/geology

Torlesse Terrane metasedimentary rocks including greywacke, argillite and minor chert and basaltic pillow lava. The lava outcrop on Motukawanui is listed as a site of geological significance.

Vegetation

Type (a) Kanuka forest

Kanuka forest is abundant on the north eastern side of Motukawanui. Pohutukawa, which is mainly found on the margins, mamaku, hangehange, cabbage tree, manuka, houpara, flax, *Cyperus* and pampas are all occasional.

Type (b) Pohutukawa forest

An area of pohutukawa forest can be seen on the western side of the Motukawanui just south of Motumahanga Island.

It also occurs along the east coast of Motukawanui. Puriri is occasional within this area.

Pohutukawa forest is also abundant in a small gully on the western side of the Motukawanui that can be seen south of Motumahanga Island. Akeake and kanuka are frequent and flax is occasional in this gully.

Type (c) Flax-bracken

Moving from this gully towards Waiiti Bay, flax is dominant in an area with bracken commonly occuring. Kanuka is frequent and coastal astelia, hangehange, and cabbage tree are occasional. The invasive sweet pea shrub is also present.

This type also occurs on Motumahanga Island to the west of Motukawanui. Large pohutukawa are scattered.

FIGURE 74. CAVALLI ISLANDS - MOTUKAWANUI CLUSTER, P04/104.
EACH GRID IS 1000 M × 1000 M AND EQUALS 100 HA.

Type (d) Raupo wetlands occur at two sites within Waiiti Bay.

Cabbage tree is frequent and flax is occasional.

Type (e) Cabbage tree-*Coprosma*

At the northern end of Papatara Bay, cabbage tree dominates with *Coprosma* sp commonly dispersed. Flax, mahoe, bracken are frequent while pohutukawa, mamaku, coastal astelia, and rengarenga lily are occasional.

Type (f) Coastal astelia-flax-pohutukawa

On Moturahurahu Island (eastern side of Motukawanui), coastal astelia, flax and pohutukawa are common. Cutty grass and hangehange are frequent and mingimingi and bracken are occasional.

Type (g) Houpara-kanuka

Houpara and kanuka are common species on Motumuka Island situated just off the southern end of Motukawanui. Pohutukawa, karaka, *Coprosma* sp and flax are frequent. Cabbage tree, mamaku and mahoe are occasional.

Type (h) Flax-pohutukawa

Occurs on Motukeokeo just to the east of Motumuka. Houpara, coastal astelia and cutty grass occur frequently and hangehange and coastal mahoe are occasional.

Significant flora

Mistletoe (*Korthalsella salicornioides*) (Insufficiently Known), *Colensoa physaloides* (Local).

Coastal species parapara and tawapou (uncommon).

Fauna

NI brown kiwi (Category A threatened species), pukeko, morepork, NZ kingfisher, welcome swallow, NZ pipit, grey warbler, fantail, silvereye, tui, little shag, white-faced heron, reef heron (Category O threatened species), Australasian harrier, variable oystercatcher (Category C threatened species), NZ dotterel (Category B threatened species), black-backed gull, red-billed gull, Caspian tern (Category O threatened species), white-fronted tern (Category C threatened species), grey-faced petrel, blue penguin, fluttering shearwater, common diving petrel, little shearwater (regionally significant), Australasian gannet.

Duvaucel's gecko, Pacific gecko, common gecko, shore skink, moko skink, copper skink.

Significance

Motukawanui is a large rolling island (380 ha) that was previously farmed but now provides habitat for many notable flora and fauna species. The other islands of this cluster provide significant complementing habitat for Motukawanui Island.

Motukawanui Island supports a large number of bird species including the threatened NI brown kiwi which was introduced on to Motukawanui in 1995. Several threatened wader species are breeding on Motukawanui - notably the NZ dotterel, variable oystercatcher and Caspian tern. It is likely that other seabirds are also breeding on the island.

Motukawanui contains Duvacel's gecko and the moko skink; Suter's skink and moko skink are found on Motumuka Island.

It is a representative site for coastal kanuka forest and pohutukawa forest, one of only two sites in the Ecological District of houpara-kanuka and pohutukawa-flax, and the only site in the Ecological District where the cabbage tree-*Coprosma*, bracken-flax and flax-*Astelia*-pohutukawa associations have been recorded.

Motukawanui is a Scenic Reserve administered by the Department of Conservation. The other islands in this group are Maori Reserve.

CAVALLI ISLANDS - NORTHERN GROUP

Survey no.	P04/114
Survey date	14 April 1998
Grid reference	P04 962 917 - Horonui Island
	P04 968 917 - Motutapere Island
	P04 973 912 - Hamaruru Island
	P04 980 912 - Panaki Island
	P04 988 912 - Tuturuowae Island
	P04 990 910 - Nukutaunga Island
	P04 982 905 - Haraweka Island
Area	53.3 ha
Altitude	sea level to 108 m

Ecological unit

(a) Coastal tussock-flax coastal association on hillslope

(b) Flax-grass coastal association on steep hillslope

(c) Pohutukawa coastal forest on steep hillslope, gully and headlands

(d) Flax-grass pohutukawa coastal association on hillslope

(e) Kanuka coastal forest on hillslope

(f) Flax-hangehange-pohutukawa coastal association on hillslope

(g) Flax reedland on hillslope

(h) Flax-cabbage tree coastal association on hillslope

(i) Flax-pohutukawa-taupata coastal association on steep hillslope

(j) Cabbage tree-pohutukawa coastal forest on steep hillslope

(k) Pohuehue herbfield on steep hillslope

(l) Houpara-kanuka coastal forest on steep hillslope

(m) Taupata coastal shrubland on steep hillslope

Landform/geology

Torlesse Terrane greywacke and argillite.

Vegetation

Type (a) Coastal tussock-flax

The common species on Horonui Island are coastal tussock, flax and grass species. Species occasionally occuring are cabbage tree, cutty grass, rengarenga lily, coastal astelia, toetoe, and mingimingi.

Type (b) Flax-grass

Flax and grass species are the common vegetation types on Motutapere Island and Nukutaunga Island.

Other species on Motutapere Island are hangehange, coastal astelia, rengarenga lily, cutty grass, bracken, native iceplant, taupata, pohuehue, pohutukawa and pampas.

Frequent species on Nukutaunga Island are pohutukawa, coastal tussock and rengarenga lily. Coastal astelia is occasional.

FIGURE 75. CAVALLI ISLANDS - NORTHERN GROUP, P04/114.
EACH GRID IS 1000 M × 1000 M AND EQUALS 100 HA.

At two sites on Hamaruru Island (one in the north west and one in the southwest), grass species dominate with flax commonly occuring. Coastal tussock is frequent and hangehange, pohutukawa and sweet pea shrub are occasional.

Type (c) Pohutukawa

Pohutukawa up to four metres is abundant in an area on Motutapere Island. Kanuka, coastal tussock and cutty grass are frequent. Hangehange, karo, native broom, flax, rengarenga lily and coastal astelia are occasional. Pampas is also present in this area.

In a gully in the south east and in an area in the south of Hamaruru Island, pohutukawa forest is also abundant.

Pohutukawa forest is dominant on the headlands of Panaki Island.

Type (d) Flax-grass-pohutukawa

In the north eastern area of Hamaruru Island, the plant associations of flax, grass species and pohutukawa are common. Cutty grass and coastal tussock are frequent. Coastal astelia, hangehange and cabbage trees are occasional and sweet pea shrub is also present.

Type (e) Kanuka forest

In the south east side of Hamaruru Island, kanuka forest is common. Flax, cutty grass, coastal tussock, pohutukawa and sweet pea shrub are frequent. Coastal astelia, rengarenga lily, houpara, cabbage trees, native broom and karaka are occasional.

Type (f) Flax-hangehange-pohutukawa

This association is common around the southern end of Hamaruru Island. Karo, houpara, coastal tussock, cutty grass, coastal astelia are frequent. Sweet pea shrub is also present here. Karaka, *Hebe* sp., rengarenga lily and native broom are occasional.

Type (g) Flax

Flax dominates the northern and south eastern parts of Panaki Island. In the northern part of the island, toetoe, coastal tussock and grass species are frequent. Knobby clubrush, pohuehue, hangehange, taupata and pohutukawa are occasional.

In the south eastern area of the island, cabbage trees, bracken, kanuka, cutty grass, and coastal tussock are frequent.

Coastal astelia, rengarenga lily, houpara, taupata and pohutukawa and pampas are present.

Most of Haraweka Island, especially around the southern end, is dominated by flax. Pohutukawa and grass species are uncommon. Coastal astelia, rengarenga lily, tutu, bracken, coastal tussock, and mingimingi are occasional. Sweet pea shrub is also present.

Type (h) Flax-cabbage tree

In the southern area of Panaki Island, flax is abundant and cabbage tree is common. Cutty grass is frequent and coastal astelia, coastal tussock, tutu, rengarenga lily, hangehange, native broom, wharangi and pohutukawa are occasional.

Type (i) Flax-pohutukawa-taupata

The association of flax, pohutukawa and taupata is common over Tuturuowae Island. Coastal tussock is frequent and native iceplant, rengarenga lily and sweet pea shrub are occasional.

Type (j) Cabbage tree and pohutukawa

Cabbage tree and pohutukawa are common at the southern end of Nukutaunga Island. Ngaio, wharangi, houpara, hangehange, bracken and grass species are frequent and rush species, rengarenga lily, and flax are occasional.

Type (k) Pohuehue

A small area on the south eastern side of Nukutaunga Island is dominated by pohuehue. Pohutukawa, houpara and grass species are frequent and rengarenga lily, native iceplant, and sweet pea shrub are occasional.

Type (l) Houpara-kanuka

A small area on the western side of Haraweka Island is dominated by houpara and kanuka. Pohutukawa is frequent within this area along with sweet pea shrub. Coastal astelia, flax, *Hebe* sp., cabbage tree, karaka, and pampas are occasional.

Type (m) Taupata

Motutakupu Island is dominated by taupata. Flax, houpara and karaka are frequent while native iceplant, rengarenga lily, coastal tussock, pohutukawa, and sweet pea shrub are occasional.

Significant flora

Hibiscus trionum (Taxonomically Indeterminate/Vulnerable) (Motutapere Island 1969, Nukutaunga, Haraweka Island)

Tawapou (Motutapere Island, Nukutaunga)

Large-leaved milk tree (Local) (Nukutaunga, Haraweka)

Cook's scurvy grass (Endangered)

Fauna

Reef heron (Category O threatened species), Australasian gannet, blue penguin, white-faced storm petrel, red-billed gull, black-backed gull, fluttering shearwater, white-fronted tern (Category C threatened species), grey-faced petrel, common diving petrel, pied shag, little shag, NZ pipit, NZ kingfisher, Australasian harrier, silvereye, welcome swallow, grey warbler.

Shore skink, moko skink, pacific gecko,common gecko, copper skink, Suter's skink.

Placostylus ambagiosus pandora (Category A threatened species).

Significance

Horonui, Hamaruru, Panaki, Tuturuawae, and Motutakupu Islands are free of mammalian pests. Suter's skink and moko skink are both present on Horonui and Panaki Islands. Suter's skink has also been recorded on Nukutaunga Island.

Horonui Island is an important breeding site for many seabird species, especially the threatened white-fronted tern.

Fauna of significance on Haraweka Island includes the threatened reef heron.

The flax snail, *Placostylus ambagiosus pandora*, was introduced to Motutakupu Island and Cook's scurvy grass has been found growing on the island.

Flax is represented on all seven islands in this Cavalli Island group. It is a representative site for coastal kanuka forest and flax, one of only three sites in the Ecological District where taupata is dominant, one of only two sites with houpara-kanuka and pohuehue, and the only site in the Ecological District with pohutukawa-cabbage tree, pohutukawa-flax-hangehange, flax-cabbage tree and unmodified flax-*Chionochloa* associations.

All the islands referred to in this group are Maori Reserve.

CAVALLI ISLANDS - EASTERN GROUP

Survey no.	P04/115
Survey date	14 April 1998
Grid reference	P04 987 885 - Te Anaputa Island
	P04 993 884 - Motuharakeke Is
Area	6.5 ha
Altitude	sea level to 59 m

Ecological unit

(a) Taupata-pohutukawa coastal forest on steep hillslope

(b) Taupata coastal forest on steep hillslope

Landform/geology

Torlesse Terrane greywacke and argillite.

Vegetation

Type (a) Taupata is abundant over Te Anaputa Island and pohutukawa is common throughout.

Coastal mahoe, karaka, rengarenga lily and coastal tussock are occasional.

Type (b) The northern and southern areas of Motuharakeke Island are both dominated by taupata.

In the north, pohuehue is frequent with native iceplant, coastal tussock, pohutukawa and cape gooseberry occasional.

In the south, karaka, houpara and coastal mahoe are frequent. Native iceplant, inkweed and pohutukawa are occasional.

FIGURE 76. CAVALLI ISLANDS - EASTERN GROUP, P04/115.
EACH GRID IS 1000 M × 1000 M AND EQUALS 100 HA.

Significant flora

Large-leaved milk tree (Local) (Te Anaputa Island).

Fauna

Common diving petrel, fluttering shearwater, black-billed gull, grey-faced petrel, blue penguin, welcome swallow, grey warbler, NZ pipit, silvereye, Australasian harrier.

McGregors skink (Category B threatened species), Duvaucel's gecko, Suter's skink, moko skink, Pacific gecko, shore skink, common gecko.

Significance

Te Anaputa Island is rat free and largely unmodified and is an important breeding site for seabirds.

The habitat on Motuharakeke Island is outstanding providing an excellent environment for many species of lizards including the threatened McGregor's skink, a vulnerable species located on only three other islands. The Suter's skink, moko skink and the Duvaucel's gecko are also found on the island, and a diving petrel colony is located there.

It is one of only three sites in the Ecological District where taupata is dominant and the only site where the pohutukawa-taupata association is recorded.

All the islands in this group are Maori Reserve.

CAVALLI ISLANDS - SOUTHERN GROUP

Survey no.	P04/116
Survey date	14 April 1998
Grid reference	P04 961 852 - Piraunui Island
	P04 970 850 - Kahango Island
	P04 984 848 - Motukawaiti Island
Area	55.3 ha
Altitude	sea level to 115 m

Ecological unit

(a) Pohutukawa coastal forest on hillslope and headland

(b) Grass-flax coastal association on hillslope

(c) Kanuka coastal forest on hillslope

Landform/geology

Torlesse Terrane greywacke and argillite.

Vegetation

Type (a) Pohutukawa coastal forest dominates Piraunui Island with flax frequent. Coastal astelia, coastal tussock, rengarenga lily, pohuehue, hangehange, taupata, cabbage trees, houpara and gorse are occasional.

Pohutukawa forest also appears in small patches on the headlands and margins of Motukawaiti Island. Cabbage tree, mamaku and flax are occasional.

Type (b) Kahangaro Island is dominated by grass sp with flax frequent.

Pohutukawa is frequent and coastal tussock, taupata and gorse are present.

Type (c) Kanuka coastal forest is dominant along the southern edge of Motukawaiti Island with cabbage tree scattered.

Significant flora

Tawapou (Motukawaiti Island).

Fauna

NZ dotterel (Category B threatened species), variable oystercatcher (Category C threatened species), pied shag, little shag, reef heron (Category O threatened species), Caspian tern (Category O threatened species), black-backed gull, grey-faced petrel, red-billed gull, blue penguin, shining cuckoo, NZ kingfisher, welcome swallow, silvereye, Australasian harrier.

Shore skink.

Significance

Habitat for threatened species (NZ dotterel - Kahangaro and Motukawaiti), reef heron, variable oystercatcher and Caspian tern (Motukawaiti Island).

All three islands referred to in this group have flax present.

The islands referred to in this group are Maori Reserve.

FIGURE 77. CAVALLI ISLANDS - SOUTHERN GROUP, P04/116.
EACH GRID IS 1000 M × 1000 M AND EQUALS 100 HA.

MOTUIWI ISLAND

Survey no.	P04/105
Survey date	16 April 1998
Grid reference	P04 966 825
Area	1.5 ha
Altitude	< 20 m

Ecological unit

(a) Flax reedland on hillslope

Landform/geology

Torlesse Terrane greywacke and argillite.

Vegetation

The vegetation on this island is sparse.

Flax is the most abundant species with kanuka and gorse appearing frequently. Cabbage tree, mingimingi, coastal tussock, rush species, pohutukawa and one pine tree were recorded. Some of the pohutukawa are dead.

Significant flora

Hebe "Whangarei" (Northland endemic species of limited distribution).

FIGURE 78. MOTUIWI ISLAND, P04/105.
EACH GRID IS 1000 M × 1000 M AND EQUALS 100 HA.

Fauna

Black-backed gull, welcome swallow, grey warbler.

Significance

Presence of *Hebe* "Whangarei".

The island is Maori Reserve.

LION ROCK

Survey no.	P04/106
Survey date	16 April 1998
Grid reference	P04 074 760
Area	1.95 ha
Altitude	sea level to 40 m

Ecologicla unit

(a) Pohutukawa coastal forest on steep hillslope

(b) Flax-taupata coastal association on hillslope

Landform/geology

Torlesse Terrane greywacke and argillite.

FIGURE 79. LION ROCK, P04/106.
EACH GRID IS 1000 M × 1000 M AND EQUALS 100 HA.

Vegetation

Type (a) Approximately 30% of the island is pohutukawa forest. Houpara is frequent and cabbage tree is occasional.

Type (b) The rest of the vegetated areas of the island are abundant in flax with taupata commonly occuring.

Pohuehue, native iceplant, toetoe, and houpara are frequent. Coastal astelia, bracken, rengarenga lily and *Coprosma* sp. are occasional along with the weed species gorse and inkweed.

Fauna

Grey-faced petrel, common diving petrel, red-billed gull, Australasian harrier, NZ kingfisher, silvereye.

On an associated stack, P04 074 758, shore skinks and the common gecko have been recorded.

Significance

The island is free of mammalian pests and this is reflected in the quality of the unbrowsed pohutukawa. It is the only site in the Ecological District representing the flax-taupata association.

KOWHATUHURI POINT ISLAND

Survey no.	P04/107
Survey date	16 April 1998
Grid reference	P04 101 745
Area	2.8 ha
Altitude	sea level to 47 m

Ecological unit

(a) Flax-pohutukawa coastal association on steep hillslope

Landform/geology

Torlesse Terrane greywacke and argillite.

Vegetation

Flax and pohutukawa are commonly dispersed over the island. Kanuka, hangehange, houpara, bracken, cutty grass, and coastal astelia are frequent. Cabbage tree, kawakawa, karaka, coastal tussock, rengarenga lily, toetoe, rush sp and gorse are occasional.

Significant flora

Hebe "Whangarei" (a plant of limited distribution that is endemic to Northland).

Large-leaved milk tree. (Local)

Fauna

Grey-faced petrel, silvereye.

Shore skink.

Significance

Flora species of restricted distribution, and one of only two examples of its type in the Ecological District.

FIGURE 80. KOWHATUHURI POINT ISLAND, P04/107.
EACH GRID IS 1000 M × 1000 M AND EQUALS 100 HA.

SNAIL ISLAND

Survey no.	P04/108
Survey date	16 April 1998
Grid reference	P04 106 734
Area	1.5 ha
Altitude	sea level to 47 m

Ecological unit

(a) Flax reedland on steep hillslope

Landform/geology

Torlesse Terrane greywacke and argillite.

Vegetation

Flax is the common vegetation cover on Snail Island.

Other species occuring frequently are pohutukawa, tawapou, mahoe, houpara, *Coprosma* sp., and coastal astelia. Species that are occasional are hangehange, mingimingi, mapou, cabbage tree, coastal mahoe, taupata (which is mainly evident on the margins), coastal tussock and bracken.

Significant flora

Tawapou

FIGURE 81. SNAIL ISLAND, P04/108.
EACH GRID IS 1000 M × 1000 M AND EQUALS 100 HA.

Fauna

Blue penguin, grey warbler, grey-faced petrel.

Flax snail *Placostylus hongii* (Category C threatened species), shore skink, common gecko, moko skink.

Significance

An important fauna habitat for many lizards including the moko skink and the threatened flax snail, *Placostylus hongii,* and a representative site for flax.

CAPE WIWIKI GROUP

Survey no.	P04/109
Survey date	06 April 1998
Grid reference	P04 135 711
	P04 137 711
	P04 141 711
	P04 152 713
Area	15.15 ha
Altitude	sea level to 90 m

Ecological unit

(a) Pohutukawa-houpara coastal forest on steep hillslope

(b) Flax reedland on steep hillslope

(c) Houpara coastal association on steep hillslope

(d) Taupata coastal shrubland on steep hillslope

Landform/geology

Torlesse Terrane greywacke and argillite.

Vegetation

Type (a) The small island by the mainland that is east of Harakeke Island is dominated by pohutukawa. Houpara is common. Flax and coastal tussock are frequent and kowhai, cabbage tree and gorse are occasional.

Large pohutukawa are dispersed amongst houpara on the south western slopes of Harakeke Island. These species are common over the island with flax appearing frequently. Kowhai, taupata (margins), coastal tussock, rengarenga lily, coastal astelia and sweet pea shrub are occasional.

Type (b) Flax is the dominant cover on the small island closest to the eastern end of Harakeke Island. Houpara is frequent and toetoe, coastal tussock, and pohuehue are occasional. Pohutukawa is present on the margins.

Type (c) On the north eastern slopes of Harakeke Island, houpara is the common canopy cover. Stunted pohutukawa, (up to 4 metres), and flax are frequent in the area.

Other species present are hangehange, coastal tussock, coastal astelia, and rengarenga lily.

Type (d) Low growing taupata is abundant over the whole of Tikitiki Island with pohuehue occasionally occuring.

Significant flora

Colensoa physaloides (Local)

Tawapou, coastal maire, and large-leaved milk tree (Local).

Fauna

Variable oystercatcher (Category C threatened species), white-fronted tern (Category C threatened species), grey-faced petrel, blue penguin, red-billed gull, black-billed gull, welcome swallow, Australasian harrier, NZ pipit, grey warbler, fantail, silvereye, tui, NZ pigeon (Category B threatened species).

Shore skink, common gecko.

Significance

A representative site for flax, one of only three examples in the Ecological District of taupata dominance, and the only site representing houpara dominance and pohutukawa-houpara association. The island closest to the mainland displays a diverse forest including coastal maire, a relatively uncommon species, and prostrate kowhai. Tikitiki Island is an unmodified mainly bare island.

Habitat for several threatened bird species.

FIGURE 82. CAPE WIWIKI GROUP, P04/109.
EACH GRID IS 1000 M × 1000 M AND EQUALS 100 HA.

TE PAHI ISLAND GROUP

Survey no.	P05/108
Survey date	06 April 1998
Grid reference	P05 095 675
	P05 097 679
	P05 095 683
Area	6.35 ha
Altitude	sea level to 20 m

Ecological unit

(a) Kanuka/manuka coastal forest on hillslope

(b) Pohutukawa coastal forest on hillslope

Landform/geology

Torlesse Terrane greywacke and argillite.

Vegetation

Type (a) Kanuka/manuka is the dominant vegetation cover on the eastern and southern islands of the group. Kohekohe and houpara are frequent on the southern island and pohutukawa, kowhai and coastal astelia are occasional. Gorse and the sweet pea shrub are also present.

Pohutukawa is frequent on the eastern island with sweet pea shrub also present in this grouping. Mamaku, *Coprosma* sp. and gorse are occasional on the island.

FIGURE 83. TE PAHI ISLAND GROUP, P04/108.
EACH GRID IS 1000 M × 1000 M AND EQUALS 100 HA.

Type (b) Pohutukawa is the main cover over the northern island. Kanuka/manuka and puriri are common. Puka (probably planted), cabbage tree, whau, karaka, kawakawa, *Coprosma* sp., flax, and pohuehue are occasional. The adventives *Agapanthus* and sweet pea shrub are also occasional.

Fauna

Little black shag, variable oystercatcher (Category C threatened species - northern island), NZ dotterel (Category B threatened species - eastern island, northern island), reef heron (Category O threatened species - northern and southern island), blue penguin, black shag, white-faced heron, paradise shelduck, pied shag, black-backed gull, red-billed gull, Caspian tern (Category O threatened species), Australasian harrier, NZ pipit, silvereye, morepork, grey warbler, fantail, tui.

Shore skink.

Significance

This group of islands have been severely modified in the past, however regeneration will greatly enhance these island habitats. All three islands have records of threatened species.

The northern island - P05 095 683 is Protected Private Land - Scenic Reserve (1.6 ha). The other islands are Maori Reserve.

MOTUPAPA ISLAND

Survey no.	P05/110
Survey date	06 April 1998
Grid reference	P05 063 662
Area	3.2 ha
Altitude	sea level to 6 m

Ecological unit

(a) Knobby clubrush sedgeland on gentle slope

Landform/geology

Eroded remnants of Kerikeri volcanics basaltic lava flows.

Vegetation

Knobby clubrush is locally common with occasional bracken. Flax and taupata (planted) are scattered on the perimeter.

Pohutukawa, *Coprosma* sp., cabbage tree, five-finger, karo, ngaio, *Hebe*, akepiro,wharangi, tawapou, karaka and other species have been planted at

frequent intervals over most of the island. A few mature karaka trees are present on the southern margin, and a clump of ngaio occurs at the eastern end. The exotic grass, *Imperata* sp., is locally abundant.

Fauna

Pied shag, reef heron (Category O threatened species), variable oystercatcher (Category C threatened species), black-billed gull, red-billed gull, Caspian tern (Category O threatened species), NZ pipit.

Significance

The island has been severely modified in the past, but a major revegetation project by the Royal Forest and Bird Protection Society has been undertaken.

It is the only site in the Ecological District where *Isolepis* sedgeland has been recorded as a dominant type.

Several threatened species have been recorded and NZ dotterel (Category B threatened species) is present, breeding on an adjoining island P05 061 660.

The island is Scenic Reserve administered by the Department of Conservation.

FIGURE 84. MOTUPAPA ISLAND, P05/110.
EACH GRID IS 1000 M × 1000 M AND EQUALS 100 HA.

MOTUROA ISLAND GROUP

Survey no.	P05/112
Survey date	06 April 1998
Grid reference	P05 092 658
	P05 096 656
	P05 105 650 - Moturoa Island
	Q05 112 657
Area	166 ha
Altitude	sea level to 82 m

Ecological unit

(a) Kanuka coastal forest on moderate and steep hillslope

(b) Flax-grass species coastal association on hillslope

(c) Kanuka/manuka-sweet pea shrubland on steep hillslope

Landform/geology

Moturoa Island and P05/096656 and Q05/108657 and Q05/113657 are formed of Torlesse Terrane, greywacke and argillite; P05/091659 and P05/092659 are eroded remnants of a Kerikeri Volcanics basaltic lava flow.

Vegetation

Type (a) Kanuka forest is the common canopy cover of the two small atolls off the north western end of Moturoa Island. Pohutukawa, karaka, coastal tussock, coastal astelia, and flax are also present.

Kanuka forest is dominant on the northern side of Moturoa Island. Gorse and tobacco weed are frequent. Pohutukawa, houpara, mamaku, *Pseudopanax* sp., puriri, and towai are occasional. *Pinus* sp. and the sweet pea shrub are also present.

Type (a) also occurs along the southern side of Moturoa island. Other species of scattered occurrence include pohutukawa, houpara, *Pittosporum umbellatum*, hangehange, kohekohe, puriri, kowhai, mamaku, cabbage tree, rengarenga lily, and flax.

The north eastern outlying cluster of islands (Q05 109 657 & 113 657) are also dominated by kanuka. Hangehange, *Coprosma* sp., houpara, and sweet pea shrub are sited infrequently on the stacks and pohutukawa is occasional.

Type (b) The island to the east of the two atolls is sparsely vegetated. Flax and grass species are the most common species. Pohutukawa is frequent and pine occasional.

Type (c) Kanuka/manuka-sweet pea shrub

This association is the common canopy cover on the northern side of the eastern end of Moturoa Island. Bracken, wattle and tobacco weed are frequent in this area. Pohutukawa, flax, and houpara are occasional.

Significant flora

Calystegia marginata (Vulnerable), *Pittosporum pimeleoides* subsp. *pimeleoides* (Rare).

Tawapou, coastal maire, *Psilotum nudum,* (uncommon); *Cassytha paniculata* (possibly southern limit of natural occurrence - see Cameron 1995).

FIGURE 85. MOTUROA ISLAND GROUP, P05/112.
EACH GRID IS 1000 M × 1000 M AND EQUALS 100 HA.
s = SHRUBLAND; f = FOREST.

Fauna

Reef heron (Category O threatened species), black-backed gull, blue penguin, variable oystercatcher (Category C threatened species), NZ dotterel (Category B threatened species), brown teal (Category C threatened species), white-fronted tern (Category C threatened species), Caspian tern (Category O threatened species), grey-faced petrel, pied shag, little shag, NI brown kiwi (Category A threatened species), morepork, fantail, tui, NZ kingfisher, welcome swallow, grey warbler, silvereye, NI saddleback (Category C threatened species), paradise shelduck, banded rail (regionally significant species), Australasian harrier.

Banded kokopu (Category C threatened species), red-finned bully, long-finned eel

Several native land snail species, mainly *Rhytida* sp.

Significance

A representative site for coastal manuka/kanuka and kanuka forest.

The two atolls located at the north western end of Moturoa Island are breeding sites for the threatened reef heron. The western island of the two has records of the white-fronted tern.

The island to the east of the two small atolls is attached to Moturoa Island at low tide and although this island has been severely modified its value would develop with active restoration.

Moturoa Island is an island of outstanding habitat for many threatened fauna and flora species, notably the NI brown kiwi whose populations have been reduced severely over the years and whose conservation is of the highest priority. The threatened NI saddleback was released on to Moturoa Island in 1997. Banded rail are also present on the island. Northland is a stronghold for the banded rail but nationally this bird species does have a limited distribution.

The threatened NZ dotterel, reef heron and Caspian tern have been recorded on the northeastern clusters off the island.

The northeast and northwest clusters are Scenic Reserve administered by the Department of Conservation (9 ha).

Moturoa Island is a Wildlife Refuge - Private Land (157 ha).

BLACK & BATTLESHIP ROCKS GROUPS

Survey no.	Q05/067
Survey date	6 April 1998
Grid reference	Q05 120 657 - Black Rocks
	Q05 123 651 - Battleship Rock
Area	3.8 ha
Altitude	sea level to 20 m

Ecological unit

(a) Pohutukawa coastal forest on hillslope

FIGURE 86. BLACK AND BATTLESHIP ROCKS GROUPS, Q05/067.

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

f = FOREST.

Landform/geology

Eroded remnants of Kerikeri volcanics basaltic lava flows.

Vegetation

Most of Black Rocks consists of bare rock. Pohutukawa forest is the dominant type in the vegetated areas of islands. Houpara, flax and coastal astelia are frequent. Taupata, coastal tussock, knobby clubrush, oioi and rengarenga lily are occasional.

Significant flora

Coastal maire and large-leaved milk tree (Local) (Q05 121 649 and stack Q05 123 651).

Fauna

Caspian tern (Category O threatened species), white-fronted tern (Category C threatened species - recorded breeding on the rock stack Q05 120 655), variable oystercatcher (Category C threatened species), reef heron (Category O threatened species), black-backed gull, red-billed gull, grey duck, grey warbler, welcome swallow, grey-faced petrel, silvereye, NZ kingfisher.

Significance

The small islands that make up the Black Rock group provide significant habitat for several species of seabird, including five which are threatened.

The site is representative for pohutukawa forest.

The entire group is Scenic Reserve.

MOTUTUI ISLAND

Survey no.	Q05/056
Survey date	06 April 1998
Grid reference	Q05 130 692
Area	1.9 ha
Altitude	sea level to 63 m

Ecological unit

(a) Pohutukawa coastal forest on steep hillslope

Landform/geology

Torlesse Terrane greywacke and argillite.

Vegetation

Pohutukawa coastal forest is abundant over this island Kanuka/manuka, pururi, houpara and flax are frequent species on this island and kowhai and coastal astelia and coastal tussock are occasional.

Significant flora

Hebe "Whangarei", an endemic species to Northland of limited distribution

Colensoa physaloides (Local).

Tawapou, coastal maire.

Fauna

Grey-faced petrel, welcome swallow, silvereye

Significance

The vegetation of Motutui Island includes several species which are threatened, uncommon or of restricted distribution, and is a representative site of coastal pohutukawa forest.

FIGURE 87. MOTUTUI ISLAND, Q05/056.
EACH GRID IS 1000 M × 1000 M AND EQUALS 100 HA.

MOTUTERAKIHI ISLAND

Survey no.	Q05/057
Survey date	6 April 1998
Grid reference	Q05 105 678
Area	0.45 ha
Altitude	sea level to 12 m

Ecological unit

(a) Bracken-grass species fernland on gentle hillslope

(b) Pohutukawa coastal forest on gentle hillslope

Landform/geology

Torlesse Terrane greywacke and argillite.

Vegetation

Type (a) Approximately 50% of the island includes this vegetation type, which also contains scattered shrubs.

FIGURE 88. MOTUTERAKIHI ISLAND, Q05/057.
EACH GRID IS 1000 M × 1000 M AND EQUALS 100 HA.
s = SHRUBLAND.

Type (b) Pohutukawa forest with houpara, coastal astelia and bracken make up approximately 15% of the island.

30% of the island is bare rock.

Fauna

Reef heron (Category O threatened species), pied shag, grey-faced petrel, welcome swallow.

Significance

This small island is home to the threatened reef heron which has been recorded breeding on the island.

The island is Maori Reserve.

Site	Survey No.	Grid Ref.
Marawhiti Point Lake	P04/074A	P04 926 868
Myers	P04/074B	P04 923 853
Tepene Bush	P04/077	P04 942 814
Lake Manuwai	P04/087	P04 900 707, P05 893 700
Purerua Dams	P04/094	P04 045 728
McKenzie Rd Wetland	P04/095	P04 052 708
McKenzie Rd	P04/096	P04 051 706, P05 053 700
Oneroa/Tangitu	P04/099	P04 065 705
Kerikeri Inlet Road Pond	P05/083	P05 013 647
Patunui Bay	P05/097	P05 070 695
Motutapu Island	P05/109	P05 035 670

MARAWHITI POINT LAKE

Survey no. P04/074A

Survey date 9 June 1995

Grid reference P04 926 868

Area 7.5 ha

Altitude <20 m asl

Ecological unit

(a) Constructed pond on alluvium

(b) Raupo reedland on pond margin

(c) Manuka shrubland on gentle hillslope

(d) *Juncus*-kikuyu rushland in swamp

Landform/geology

Freshwater wetland including constructed pond on alluvium behind Holocene foredunes between Marawhiti and Opounui Points.

Vegetation

An artificially created freshwater pond, most of which is open water (c. 80%).

There is a 2-3 metre wide band of raupo around much of the pond, with frequent *Eleocharis sphacelata*. Flax, cabbage tree, mamaku, pohutukawa and *Juncus* also occur (c. 5%).

Type (d) also occurs on the margins.

On one side is an area of adjoining manuka shrubland which contains pohutukawa, totara, puriri, karo, *Cryptomeria* and silver dollar. Many of these have been planted. The area is fully fenced (c. 15%).

Fauna

Paradise shelduck, mallard, pukeko, kingfisher. Australasian bittern (Category O threatened species) (G. Dumbell 1995).

Significance

Waterfowl habitat and potential for brown teal.

FIGURE 89. MARAWHITI POINT LAKE, P04/074A.
EACH GRID IS 1000 M × 1000 M AND EQUALS 100 HA.
s = SHRUBLAND; w = WETLAND.

MYERS

Survey no.	P04/074B
Survey date	4 April /9 June 1995
Grid reference	P04 923 853
Area	14.9 ha
Altitude	40-160 m asl

Ecological unit

(a) Taraire forest on steep hillslope and gully (70%)

(b) Manuka shrubland in gully (10%)

(c) Manuka shrubland on coastal cliffs (20%)

Landform/geology

Coastal cliffs of Waipapa Group greywacke at Opounui Point and steep dissected hill country on Waipapa Group greywacke.

Vegetation

A number of remnants of forest in proximity to the coast.

Type (a) The largest remnant is taraire dominant with frequent kanuka. Rimu, puriri, totara, kohekohe and towai also occur. This area is fenced.

Across the gully a second taraire dominant remnant occurs with frequent tanekaha and scattered towai, rewarewa, pohutukawa, lemonwood, puriri, karaka, totara and manuka.

Type (b) The remnant nearest the road is mostly manuka with frequent tree fern and occasional pohutukawa, rewarewa and tanekaha.

Type (c) On Opounui Point and at Parua Bay, is an area of coastal shrubland, manuka with scattered pohutukawa. This is also fenced.

Fauna

Not surveyed.

Significance

Coastal shrubland and forest remnants.

FIGURE 90. MYERS, P04/074B.
EACH GRID IS 1000 M × 1000 M AND EQUALS 100 HA.
s = SHRUBLAND; f = FOREST.

TEPENE BUSH

Survey no.	P04/077
Survey date	27 April 1995
Grid reference	P04 942 814
Area	16.8 ha
Altitude	60-100 m asl

Ecological unit

(a) Towai-taraire forest in gully

Landform/geology

Gully in plateau of Kerikeri Volcanics (Horeke Basalt) lava flows.

Vegetation

Towai and taraire are common and totara occurs frequently in this block. Puriri, rimu, kahikatea and kauri also occur in the canopy, and white maire and wharangi are present. Some trees are large but there is little understorey.

Fauna

Kiwi reported.

Significance

Contains a good range of canopy species and a seasonal food source for NZ pigeon. Kiwi may be present.

Approximately 12 ha is being covenanted by the QE II National Trust.

FIGURE 91. TEPENE BUSH, P04/077.
EACH GRID IS 1000 M × 1000 M AND EQUALS 100 HA. f = FOREST.

LAKE MANUWAI

Survey no.	P04/087
Survey date	14 March 1995
Grid reference	P04 900 707, P05 893 700
Area	13.9 ha
Altitude	c. 150 m asl

Ecological unit

(a) Lake in owned stream valleys

(b) Grass-rush association on lake margins

(c) Manuka shrubland on low terrace

(d) Gorse-rush association on lake margins

Landform/geology

Weathered Kerikeri Volcanics (Horeke Basalt) lava flows around margins of constructed Lake Manuwai.

Vegetation

An irrigation lake.

On the eastern side is a small island of manuka with frequent cabbage tree and karamu and occasional five-finger (possibly planted).

FIGURE 92. LAKE MANUWAI, P04/087.
EACH GRID IS 1000 M × 1000 M AND EQUALS 100 HA. s = SHRUBLAND.

On the western side of the lake is a fringe of vegetation which is mostly gorse with occasional towai and mamaku.

At the southern end of this is an area of grass and rushes with scattered flax, cabbage tree and totara.

Fauna

Australasian bittern (Category O threatened species) reported.

Significance

Habitat for waterfowl.

PURERUA DAMS

Survey no.	P04/094
Survey date	10 April 1995
Grid reference	P04 045 728
Area	11.7 ha
Altitude	< 20 m

Ecological unit

(a) Open water in constructed pond

(b) Raupo wetland in gully

Landform/geology

Freshwater wetland in valley cut in Waipapa Group greywacke.

Vegetation

Artificial ponds with raupo between them and at the head of a mangrove and saltmarsh estuary. Unfenced and surrounded by pasture.

Fauna

Spotless crake (regionally significant) reported 1987.

Significance

Potential wildlife habitat.

FIGURE 93. PURERUA DAMS, P04/094.
EACH GRID IS 1000 M × 1000 M AND EQUALS 100 HA. w = WETLAND.

McKENZIE RD WETLAND

Survey no.	P04/095
Survey date	27 April 1995
Grid reference	P04 052 708
Area	1.1 ha
Altitude	c. 20 m asl

Ecological unit

(a) Open water in constructed pond

(b) Raupo wetland on pond margin

Landform/geology

Freshwater pond in hill country of Waipapa Group greywacke.

Vegetation

An apparently artificially made pond with a fringe of raupo.

Fauna

Not surveyed.

Significance

Potential wildlife habitat.

FIGURE 93. McKENZIE ROAD WETLAND, P04/095.
EACH GRID IS 1000 M × 1000 M AND EQUALS 100 HA. w = WETLAND.

McKENZIE RD

Survey no.	P04/096
Survey date	27 April 1995
Grid reference	P04 051 706, P05 053 700
Area	46.3 ha
Altitude	sea level to 60 m

Ecological unit

(a) Manuka shrubland on coastal hillslope and cliffs

Landform/geology

Low coastal hills and cliffs of Waipapa Group greywacke and overlying Kerikeri Volcanics (Horeke Basalt) lava flows, on peninsula in Te Puna Inlet.

FIGURE 95. McKENZIE ROAD, P04/096.
EACH GRID IS 1000 M × 1000 M AND EQUALS 100 HA.
s = SHRUBLAND.

Vegetation

On the eastern side of McKenzie Rd is manuka scrub between 1 and 4 metres tall. It contains mamaku, wattle, hakea, mamaku, gorse, pampas and tobacco weed.

Nearer the end of the road the vegetation is 3-4 metres tall and contains pohutukawa, mamaku, gorse, wattle and pine.

Fauna

Not surveyed, but habitat suitable for kiwi which are known to be in the general area.

Significance

Coastal riparian vegetation and possibly kiwi habitat.

ONEROA/TANGITU

Survey no.	P04/099
Survey date	10 April 1995
Grid reference	P04 065 705
Area	7.2 ha
Altitude	sea level to 40 m

Ecological unit

(a) Manuka shrubland on coastal cliffs

Landform/geology

Coastal hills and cliffs of Waipapa group greywacke fronting Poukoura Inlet.

Vegetation

A coastal fringe between Oneroa and Tangitu Bays consists of manuka about 2-3 metres tall with frequent wattle and occasional pohutukawa. (Pines and eucalypts are growing behind the coastal fringe).

At Oneroa Bay there is some manuka on the slopes behind the beach.

Tangitu Bay is lined with pines and macrocarpa with manuka shrubland behind them.

Fauna

Not surveyed.

Significance

Coastal riparian vegetation.

FIGURE 96. ONEROA/TANGITU, P04/099.
EACH GRID IS 1000 M × 1000 M AND EQUALS 100 HA.
s = SHRUBLAND.

KERIKERI INLET ROAD POND

Survey no.	P05/083
Survey date	6 March 1995
Grid reference	P05 013 647
Area	4 ha
Altitude	10 m asl

Ecological unit

(a) Raupo-*Isachne* association in swamp

(b) *Eleocharis* sedgeland in swamp

(c) Open water

Landform/geology

Constructed freshwater wetland on Kerikeri volcanic basalt lava flows.

Vegetation

The majority (c.90%) of this site is open water with a margin of:

Type (a) - Raupo-*Isachne* association with *Carex* sp.

Type (b) - *Eleocharis* sedgeland.

Fauna

Water-related native bird species include Australasian bittern (Category O threatened species), spotless crake (regionally significant species), white-faced heron, pukeko, black shag, pied shag, little black shag, mallard and grey duck, paradise duck, pied stilt, black swan and the threatened brown teal up to 1981. Teal may still use the site periodically.

Significance

A generally improving artificial pond which unfortunately lacks riparian cover. Despite this it is of obvious habitat value to waterfowl, and represents wetland vegetation types of limited abundance in the Ecological District.

FIGURE 97. KERIKERI INLET ROAD POND, P05/083.
EACH GRID IS 1000 M × 1000 M AND EQUALS 100 HA.
w = WETLAND.

PATUNUI BAY

Survey no.	P05/097
Survey date	27 April 1995
Grid reference	P05 070 695
Area	22.9 ha
Altitude	sea level to 60 m

Ecological unit

(a) Manuka shrubland on coastal cliffs and hillslope

(b) Bracken–tobacco weed association on coastal cliffs

FIGURE 98. PATUNUI BAY, P05/097.
EACH GRID IS 1000 M × 1000 M AND EQUALS 100 HA.
s = SHRUBLAND.

Landform/geology
Coastal hills and cliffs of Waipapa Group greywacke and Kerikeri Volcanics (Horeke Basalt) lava flows.

Vegetation
On the northern side of the bay is coastal shrubland of manuka to 3-4 metres with frequent pohutukawa and occasional puriri and mamaku.

On the corner of Whangaere Rd and behind Patunui Bay the manuka is about a metre lower, and may contain occasional pine, tobacco weed and mamaku.

On the southern side of the bay is scrub of bracken and tobacco weed with frequent lantana and occasional pohutukawa.

Fauna
Not surveyed, but kiwi possibly present as known from nearby area.

Significance
Coastal vegetation.

MOTUTAPU ISLAND

Survey no.	P05/109
Survey date	06 April 1998
Grid reference	P05 035 670
Area	0.42 ha
Altitude	sea level to 42 m

Ecological unit
(a) Kanuka coastal forest on gentle hillslope

Landform/geology
Eroded remnants of Kerikeri volcanics basaltic lava flows.

Vegetation

Kanuka is the most common species to be found on the island. Bracken and kowhai are frequent. Karaka, kohekohe, houpara, flax, and mangrove are occasional.

A range of very invasive weed species are evident on this significantly modified island - mothplant, elaeagnus, tobacco weed, banana passionfruit, and gorse. Fruit trees are also present.

Fauna

Pied shag, black-backed gull, red-billed gull, grey warbler, fantail, silvereye.

Significance

The island is Scenic Reserve administered by the Department of Conservation.

FIGURE 99. MOTUTAPU ISLAND, P05/109.
EACH GRID IS 1000 M × 1000 M AND EQUALS 100 HA.

5. Summary and conclusions

The Protected Natural Areas network in the Kerikeri Ecological District is summarised in Table 1. One quarter of the natural areas in the Kerikeri Ecological District have some form of formal protection. This is equivalent to 5% of the land area of the Ecological District.

A list of ecological units recorded in the Kerikeri Ecological District and their current protection status is set out in Table 2 (page 208) and a summary of the site evaluations is given in Table 3 (page 220).

TABLE 1. PROTECTED NATURAL AREAS NETWORK IN THE KERIKERI ECOLOGICAL DISTRICT (area given in ha).

	SITE NO.	STATUS					TOTAL
		CC	QEII	SL	SR	OTHER	
Mahinepua Pen.	P04/070				36.2		36.2
Whakarara	P04/071			231			231
Mahimahi	P04/078		6				6
Popo SR	P04/079				29		29
Omahanui	P04/082			0.9			0.9
Takou St Bush	P04/084		45	178	13.4		236.4
Tapuaetahi	P04/091					24 RR	24
Te Tii Shrubland	P04/092		15				15
Rangihoua	P05/099					13 HR	13
Pakaraka Bush	P05/051				2.3		2.3
Taramawa	P05/056			154			154
Opua Forest	P05/058			1932	29.5		1961.5
Puketona SR	P05/077				127		127
Pukewhau	P05/078					33 EA	33
Waitangi Wetlands	P05/079	50		76.3		4 CL*	130.3
Hutia Creek	P05/082					3 CL*	3

	SITE NO.	STATUS					TOTAL
		CC	QEII	SL	SR	OTHER	
Kerikeri River	P05/086				32		32
Rangitane Shrub	P05/087			5.5	19	15.5 HR	15.5
Pungaere Stream	P05/093			6.3			6.3
Kerikeri Airport	P05/103			35			35
Karaka Is	P04/111				1.35		1.35
Oruatemanu Is	P04/112				1.05		1.05
Motukawanui	P04/114				354.5	31 MR	354.5
Cavallis -Nth						52.5 MR	52.5
Cavallis -East	P04/115					6.5 MR	6.5
Cavallis - Sth	P04/116					55.3 MR	55.3
Motuiwi	P05/105					1.5 MR	1.5
Cape Wiwiki	P04/109					15.15 MR	15.15
Te Pahi Is Gp	P05/109					4.75 MR 1.6 PPL	6.35
Motupapa Is	P05/110				3.2		3.2
Moturoa Is Grp	P05/112				9	157 #	166
Black/Battleship Rocks	Q05/067				3.8		3.8
Motuterakihi Is	Q05/057					0.45 MR	0.45
Motutapu Is	P05/109				0.42		0.42
TOTAL		50	78	2619	661.72	261.2	**3604.57**

Key: CC = Conservation Covenant; CL = Crown Land (* Waitangi National Trust Endowment); HR = Historic Reserve; QEII = Queen Elizabeth II National Trust covenant; RR = Recreation Reserve; SL = Stewardship Land; SR = Scenic Reserve; EA = Ecological Area; MR = Maori Reserve; PPL = Protected Private Land (# Private Wildlife Refuge).

5.1 PRIORITY NATURAL AREAS FOR PROTECTION IN THIS ECOLOGICAL DISTRICT

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

   (a) Freshwater wetlands

   - The highest priority wetland areas include Waitangi Wetlands, Kawakawa Flood Plain, Werowero Swamp, Blackridge Rd Swamp, Ngatahuna Stream Swamp and Lodore Wetland.
   - Rare remnant areas of swamp forest and cabbage tree (Puketotara River and Cabbage Tree Remnant).

   (b)Islands

   Protection of the indigenous coastal vegetation on the islands is essential for the continued survival of the diverse species utilising these habitats. The islands are a direct link to the past, supporting a broader diversity of species than the neighbouring semi-barren coastal zone, and constitute a dwindling seed bank for a very distinctive coastal flora.

   The most outstanding islands include Cone Island, Lion Rock, Snail Island, the Cape Wiwiki Group (especially Harakeke Island), and the Cavalli Islands, (especially Motukawanui and the adjacent islands to the north and east). The Northern Group contain very good examples of coatal vegetation types, and Motuharakeke is important for lizards and breeding seabirds. Several of these islands are important shorebird breeding sites, especially for the NZ dottterel, with mainland habitats under a great deal of pressure.

   However, Stephenson, Oruatemanu, Karaka, Kowhatuhuri Point, Moturoa Group, and Black Rocks also have extremely high values.

   (c) Mainland coastal habitats

   Coastal sites in this district are all degraded and warrant enhancement as well as protection. These areas include Mahinepua, Day Point, Brampton Shoal, Onewhero Bay, and coastal forest remnants at Matauri Bay Bush, Whaengaere, and Waitangi.

   The priority coastal wetlands are Matauri Bay, Takou Bay, Taupuaetahi, Upper Te Puna Inlet, and Hutia Creek.

   (d)Gumland

   Represented by Kerikeri Airport and Upper Pungaere Shrubland.

   (e) Podocarp forests

   Podocarp forest types excluding totara remaining in this ecological district are limited in number and extent. All sites are important (see Table 2) but ones which stand out include Takou Stream Bush, Taramawa, Pakaraka Bush, Whangae Bush Remnants, Puketona, and Pukewhau.

   (f) Kauri forests

   Unprotected kauri occurs at Wainui South and Kerikeri Stream Bush.

   (g) Riparian forest and shrubland

   Takou Stream, Kerikeri River Riparian Remnants, Kerikeri Stream Bush, Upper Kerikeri Stream Bush, Puketotara River Bush, Waitangi River Alluvial Remnants, and Puketona Pa Riparian Forest.

2. Habitats which are under-represented within protected areas in the Ecological District.

Very little shrubland habitat is contained within the existing protected areas despite such areas being ecologically important to provide for successional processes, as well as for any flora or faunal values these areas may hold. Many of the shrubland areas in this Ecological District are habitat for the threatened NI brown kiwi.

The most important shrubland sites in this Ecological District are Whakarara, Matauri Bay and Takou Stream. Others are significant because of their kiwi populations, e.g.Te Tii, Omahanui, Tapuaetahi, and all sites on the Purerua Peninsula.

Shrubland sites important for representative values include Mahinepua Bay and Peninsula, Puketona, and Oromahoe.

3. Habitats on substrates uncommon in the Ecological District:
   - alluvium - Waiharakeke Stream, Kerikeri Stream Bush, Kerikeri River, Waitangi River Alluvial Remnants, Te Aute Rd Bush,
   - rhyolite - Mahimahi, Kerikeri Stream Bush.
4. Retention of the contiguity of large habitats, for species dispersal and particularly to retain habitat for, and maintain the range of kiwi. Such areas include Wainui South, Whakarara, Takou Stream, Rangitane Shrublands, Kerikeri Stream Bush, Puketotara Stream Bush, Turntable Bush/Taramawa/ Opua Forest.
5. Distinctive plant species associations or uncommon ecological units which occur at Pukewhau (taraire–tawa) and Puketotara Rd Alluvial (kahikatea–puriri).

TABLE 2 ECOLOGICAL UNITS RECORDED IN THE KERIKERI ECOLOGICAL DISTRICT AND PROTECTED NATURAL AREA STATUS

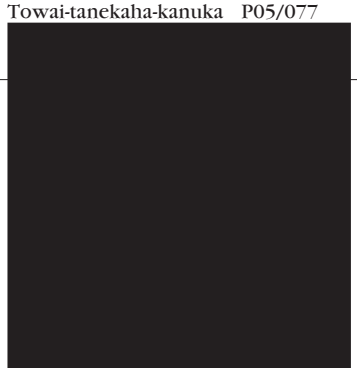
Key: CC = Conservation Covenant; CL = Crown Land; HR = Historic Reserve; MR = Maori Reserve; QEII = Queen Elizabeth II National Trust covenant; RR = Recreation Reserve; SL = Stewardship Land; SR = Scenic Reserve; EA = Ecological Area; PPL = Protected Private Land; UP = Unprotected

VEGETATION TYPE	SITE NO.	NAME	STATUS	GEOLOGY	REP. SITE
FOREST - BROADLEAF					
Taraire	P04/070	Mahinpua Pen.	UP	Waipapa greywacke	
	P04/072	Whakarara	UP	Waipapa greywacke & chert/ Horeke basalt plateau remnts	Yes
	P04/075	Matauri Bay Bush	UP	Waipapa greywacke & chert/ Horeke basalt plateau remnts	
	P04/078	Mahimahi	UP	Waipapa greywacke; Te Kuiti glau.sand rhyolite domes/Horeke basalt lava flows	
	P04/082	Omahanui	Pt SL most UP	Horeke basalt lava flows/ underlying greywacke	
	P04/084	Takou Stream	UP	Horeke basalt lava flows/greywacke/ Te Kuiti glau. sand/ KK andesitic flows	Yes
	P04/088	Otaha Rd	UP	Horeke basalt lava flow/greywacke	
	P05/056	Taramawa Forest	Pt SL	Waipapa greywacke/Te Kuiti glau. sand/Mang. mud	Yes
	P04/074B-2	Myers	UP	Waipapa greywacke	
Taraire-tawa	P05/078	Pukewhau	Pt EA	Waipapa greywacke	Yes
Puriri-taraire	P04/075	Matauri Bay Bush	UP	Waipapa greywacke & chert/ Horeke basalt plateau remnts	
	P04/083	Takou Bay Estuary	UP	greywacke over Horeke basalt lava flow	
	P05/051	Pakaraka Bush/ Werowero Swp	UP	Waipapa greywacke Te Kuiti glau. sand	Yes
	P05/052	Hupara Rd	UP	Waipapa greywacke	Yes
	P05/053	Turntable Hill Bush	UP	Waipapa greywacke/overlying Mang. mud	
	P05/055	Whangae Bush	UP	Waipapa greywacke	
	P05/063	Oromahoe Bush	UP	Waipapa greywacke/Te Kuiti glau. sand KK vol lava flows	
	P05/077	Puketona Reserve	Pt SR	Waipapa greywacke	
	P05/079	Waitangi Wetlands		KK vol basalt lava flow	
	P05/089	Stanners Rd Remnant	UP	KK vol basalt lava flow	
	P05/091	Kerikeri Stream Bush	UP	rhyolite dome, Horeke basalt lava flow; alluvium	Yes
	P05/093	Pungaere Stream Bush	UP	KK vol basalt lava flows; talus Waipapa sandstone	
	P05/094	Upper Kerikeri Stream Bush	UP	KK vol basalt lava flow	
	P05/095	Puketotara River	UP	KK vol basalt lava flow	Yes
Taraire-puriri-towai	P05/085	Waitangi River Alluvial Rmnts	UP	Waipapa greywacke; alluvium	Yes
Taraire-towai	P04/068	Radar Hill Nth	UP	Waipapa greywacke; Horeke Basalt	

VEGETATION TYPE	SITE NO.	NAME	STATUS	GEOLOGY	REP. SITE
	P04/071	Wainui Sth	UP	Waipapa greywacke; KK andesitic breccia Horeke basalt flows	Yes
	P04/072	Whakarara	Pt SL	Waipapa greywacke & chert	
	P04/078	Mahimahi	UP	Te Kuiti glau.sand/Horeke basalt lava flows	
	P04/079	Popo SR	Pt SR	Horeke basalt lava flows	
	P04/080	Hauriri Rd	UP	Horeke basalt lava flow	
	P04/086	U. Tahoranui Valley	UP	Waipapa greywacke	
	P05/058	Opua Forest	Pt SL, SR	Waipapa greywacke & chert	Yes
	P04/077	Tepene Bush	QEII	Horeke basalt lava flow	
	P04/081-2	Lonsdale Park		Horeke basalt lava flow	
Towai	P04/084	Takou Stream	UP	Horeke basalt lava flows/greywacke/ Te Kuiti glau.sand/KK andesitic flows	Yes
Towai - secondary	P05/094	Upper Kerikeri Stream Bush	UP	KK vol basalt lava flow	Yes
Towai-mamaku	P05/087	Rangitane Shrublands	UP	Waipapa greywacke/KK basalt lava flow	Yes
Taraire-manuka/kanuka	P04/071	Wainui Sth	UP	Waipapa greywacke	Yes
	P04/075	Matauri Bay Bush	UP	Waipapa greywacke & chert/ Horeke basalt plateau remnts	
Towai-manuka/kanuka	P05/058	Opua Forest	Pt SL, SR	Waipapa greywacke & chert	Yes
Manuka	P04/074	Burrill	UP	Waipapa greywacke	Yes
Manuka/kanuka	P04/072	Whakarara	Pt SL	Waipapa greywacke & chert/ Horeke basalt plateau remnts	
	P04/075	Matauri Bay Bush	UP	Waipapa greywacke & chert/ Horeke basalt plateau remnts	Yes
	P05/108	Te Pahi Is	MR	Torlesse Terrane greywacke & argillite	
Kanuka/*Polygala*	P05/112	Moturoa	PPL	Torlesse Terrane greywacke & argillite	
Kanuka	P04/068	Radar Hill Nth	UP	Waipapa greywacke Horeke Basalt	
	P04/071	Wainui Sth	UP	Waipapa greywacke	Yes
	P04/104	Motukawanui	SR	Torlesse Terrane greywacke & argillite	Yes
	P04/114	Cavallis - North	MR	Torlesse Terrane greywacke & argillite	Yes
	P04/116	Cavallis - South	MR	Torlesse Terrane greywacke & argillite	
	P05/109	Motutapu Is	SR	Eroded KK vol basaltic lava flows	
	P05/112	Moturoa	SR	Torlesse Terrane greywacke & argillite	Yes
	P05/081	Brampton Shoal Bush	UP	KK vol basalt lava flow/greywacke	Yes
	P05/085	Waitangi River Alluvial Remnts	UP	Waipapa greywacke alluvium	Yes
	P05/087	Rangitane Shrublands	Pt SR	Waipapa greywacke/KK basalt lava flow	
	P05/094	Upper Kerikeri Stream Bush	UP	KK vol basalt lava flow	
Houpara-kanuka	P04/104	Motukawanui	SR	Torlesse Terrane greywacke & argillite	Yes
	P04/114	Cavallis - North	MR	Torlesse Terrane greywacke & argillite	Yes

VEGETATION TYPE	SITE NO.	NAME	STATUS	GEOLOGY	REP. SITE
Pohutukawa-kanuka	P05/087	Rangitane Shrublands	Pt SR	Waipapa greywacke/KK basalt lava flow	Yes
Pohutukawa-puriri	P04/075	Matauri Bay Bush	UP	Waipapa greywacke & chert/ Horeke basalt plateau remnts	Yes
Pohutukawa (treeland)	P04/070	Mahinpua Pen.	Pt SR	Waipapa greywacke	Yes
	P04/076	Matauri Bay	UP	foredune	Yes
	P05/080	Day Point	UP	Waipapa greywacke	Yes
	P04/112	Oruatemanu Is	SR	Torlesse Terrane greywacke & argillite	Yes
	P04/104	Motukawanui	SR	Torlesse Terrane greywacke & argillite	Yes
	P04/114	Cavallis - North	MR	Torlesse Terrane greywacke & argillite	
	P04/116	Cavallis - South	MR	Torlesse Terrane greywacke & argillite	
	P04/106	Lion Rock	UP	Torlesse Terrane greywacke & argillite	
	P04/108	Te Pahi Is	MR	Torlesse Terrane greywacke & argillite	
	Q05/067	Black Rocks	SR	Eroded KK vol basaltic lava flows	Yes
	Q05/056	Motutui Is	UP	Torlesse Terrane greywacke & argillite	Yes
	Q05/057	Motuterakihi Is	MR	Torlesse Terrane greywacke & argillite	
Pohutukawa-cabbage tree	P04/114	Cavallis - North	MR	Torlesse Terrane greywacke & argillite	Yes
Pohutukawa-flax	P04/104	Motukawanui	SR	Torlesse Terrane greywacke & argillite	Yes
	P04/107	Kowhatuhuri Pt	UP	Torlesse Terrane greywacke & argillite	Yes
Pohutukawa-flax-hangehange	P04/114	Cavallis - North	UP	Torlesse Terrane greywacke & argillite	Yes
Pohutukawa-flax-taupata	P04/114	Cavallis - North	MR	Torlesse Terrane greywacke & argillite	Yes
Pohutukawa-taupata	P04/115	Cavallis - East	MR	Torlesse Terrane greywacke & argillite	Yes
Pohutukawa-houpara	P04/109	Cape Wiwiki	MR	Torlesse Terrane greywacke & argillite	Yes
Coastal forest	P05/098	Whaengaere	UP	Waipapa greywacke/ Hoereke basalt lava flows	Yes
	P05/082	Waitangi Estate	CL	KK basalt lava flow/greywacke	Yes
Karaka-coastal mahoe	P04/113	Cone Island	UP	Torlesse Terrane greywacke & argillite	Yes
Eucalyptus treeland	P05/086	Kerikeri River Riparian Remnants	UP	KK vol lava flow alluvium; rhyolite	

VEGETATION TYPE	SITE NO.	NAME	STATUS	GEOLOGY	REP. SITE
BROADLEAF-PODOCARP FOREST					
Eucalyptus-totara	P05/089	Stanners Rd Rmnt	UP	KK vol basalt lava flow	
Towai-totara-taraire	P04/078	Mahimahi	UP	Te Kuiti glau.sand Horeke basalt lava flows	
	P04/089	Waimanga Stream	UP	Horeke basalt lava flows	
	P05/058	Opua Forest	Pt SL, SR	Waipapa greywacke & chert	Yes
Towai-totara	P04/078	Mahimahi	UP	Waipapa greywacke/ Te Kuiti glau.sand Horeke basalt lava flows	
	P04/081	Lonsdale Park		Horeke basalt lava flow	
	P05/093	Pungaere Stream Bush	UP	KK vol basalt lava flows; talus/Waipapa sandstone	Yes
	P05/095	Puketotara River	UP	KK vol basalt lava flow	
Towai-totara-*Hakea*	P05/095	Puketotara River	UP	KK vol basalt lava flow	
Totara-taraire	P04/078	Mahimahi	UP	Waipapa greywacke Horeke basalt lava flows	
	P04/079	Popo SR	Pt SR	Horeke basalt lava flows/Waip. greywacke	
	P04/081	Lonsdale Park	UP	Horeke basalt lava flow	Yes
	P04/084	Takou Stream	UP	Horeke basalt lava flows/greywacke/ Te Kuiti glau. sand/ KK andesitic flows	
	P04/090	Tahoranui River	UP	Horeke basalt	Yes
Totara-puriri	P05/092	Pungaere Rd Bush	UP	KK vol lava flow	Yes
Totara-puriri-taraire	P05/060	Puketona Pa Riparian Forest	UP	KK vol lava flow Waipapa greywacke	Yes
Totara-puriri-kahikatea-taraire	P05/051	Pakaraka Bush/ Werowero Swamp	UP	Waipapa greywacke/Te Kuiti glau. sand	Yes
Kahikatea-puriri	P05/090	Puketotara Rd Alluvial	UP	alluvium ponded by KK vol lava flows	Yes
Totara-kanuka	P04/083	Takou Bay Estuary	UP	greywacke over Horeke basalt lava flow	
	P05/053	Turntable Hill Bush	UP	Waipapa greywacke/overlying Mang. mud	Yes
	P05/086	Kerikeri River Riparian Remnants	UP	KK vol lava flow/alluvium; rhyolite	Yes
Manuka/kanuka-totara	P05/079	Waitangi Wetlands	CC	KK vol basalt lava flow	
Tanekaha-towai	P04/084	Takou Stream	UP	Horeke basalt lava flows/greywacke/ Te Kuiti glau. sand/KK andesitic flows	Yes
	P05/053	Turntable Hill Bush	UP	Waipapa greywacke/overlying Mang. mud	Yes
Towai-tanekaha-kanuka	P05/077	Puketona Reserve	Pt SR	Waipapa greywacke	Yes
		Pukewhau	Pt EA	Waipapa greywacke	Yes



VEGETATION TYPE	SITE NO.	NAME	STATUS	GEOLOGY	REP. SITE
Tanekaha-kanuka	P04/084	Takou Stream	UP	Horeke basalt lava flows/greywacke/ Te Kuiti glau. sand/ KK andesitic flows	Yes
Tanekaha-manuka-kanuka	P05/056	Taramawa Forest	Pt SL	Waipapa greywacke/Te Kuiti glau. sand Mang. mud	Yes
	P05/058	Opua Forest	Pt SL, SR	Waipapa greywacke & chert	Yes
Towai-kauri-kanuka	P05/077	Puketona Reserve	Pt SR	Waipapa greywacke	Yes
Kahikatea-cabbage tree-flax	P05/095	Puketotara River	UP	KK vol basalt lava flow	Yes
PODOCARP FOREST					
Tanekaha	P05/056	Taramawa Forest	Pt SL	Waipapa greywacke/ Te Kuiti glau. sand Mang. mud	Yes
Totara	P04/081	Lonsdale Park		Horeke basalt lava flow	Yes
	P05/052	Hupara Rd	UP	Waipapa greywacke	
	P05/062	Porotu Rd Swamp	UP	Waipapa greywacke	Yes
	P05/063	Oromahoe Bush	UP	Waipapa greywacke/Te Kuiti glau. sand KK vol lava flows	
Totara 2°	P04/078	Mahimahi	UP	Waipapa greywacke/Te Kuiti glau.sand rhyolite domes/ Horeke basalt lava flows	
	P04/079	Popo SR	Pt SR	Horeke basalt lava flows/Waip. greywacke	
	P04/080	Hauriri Rd	UP	Horeke basalt lava flow	
	P05/054	Waiharakeke Stream Alluvial	UP	alluvium on KK basalt lava flow	Yes
	P05/055	Whangae Bush Rmnts	UP	Waipapa greywacke	
	P05/059	Blackridge Rd Swp	UP	KK vol lava flow	
	P05/060	Puketona Pa Riparian Forest	UP	KK vol lava flow/Waipapa greywacke	
	P05/085	Waitangi River	UP	Waipapa greywacke	
	P05/086	Kerikeri River Riparian Remnants	Pt SR	KK vol lava flow; alluvium; rhyolite	Yes
	P05/091	Kerikeri Stream Bush	UP	rhyolite dome, Horeke basalt lava flow; alluvium	
	P05/094	Upper Kerikeri Stream Bush	UP	KK vol basalt lava flow	Yes
Totara-kahikatea	P05/054	Waiharakeke Stream Alluvial	UP	alluvium on KK basalt lava flow	Yes
	P05/086	Kerikeri River Riparian Remnants	UP	KK vol lava flow; alluvium; rhyolite	Yes
Totara-kahikatea-rimu	P05/051	Pakaraka Bush/ Werowero Swamp	UP	Waipapa greywacke/Te Kuiti glau. sand	Yes
Rimu-totara	P05/055	Whangae Bush Rmnts	UP	Waipapa greywacke	Yes
	P05/061	Te Aute Rd Bush	UP	Waipapa greywacke; alluvium	Yes
	P05/063	Oromahoe Bush	UP	Waipapa greywacke/Te Kuiti glau. sand KK vol lava flows	Yes

VEGETATION TYPE	SITE NO.	NAME	STATUS	GEOLOGY	REP. SITE
	P05/078	Pukewhau	Pt EA	Waipapa greywacke	Yes
Kahikatea	P05/051	Pakaraka Bush/ Werowero Swamp	UP	Waipapa greywacke/Te Kuiti glau. sand	Yes
	P05/061	Te Aute Rd Bush	UP	Waipapa greywacke; alluvium	Yes
	P05/062	Porotu Rd Swamp	UP	Waipapa greywacke	Yes
Kauri	P04/071	Wainui Sth	UP	Waipapa greywacke/KK andesitic breccia Horeke basalt flows	Yes
	P04/084	Takou Stream	QEII	Horeke basalt lava flows/greywacke/ Te Kuiti glau. sand/KK andesitic flows	Yes
	P05/051	Pakaraka Bush/ Werowero Swamp	UP	Waipapa greywacke/Te Kuiti glau. sand	Yes
	P05/058	Opua Forest	Pt SL, SR	Waipapa greywacke & chert	Yes
Kauri-tanekaha	P05/091	Kerikeri Stream Bush	UP	rhyolite dome, Horeke basalt lava flow; alluvium	Yes
SHRUBLAND					
Houpara	P04/109	Cape Wiwiki	MR	Torlesse Terrane greywacke & argillite	Yes
Taupata	P04/114	Cavallis - North	MR	Torlesse Terrane greywacke & argillite	Yes
	P04/115	Cavallis - East	MR	Torlesse Terrane greywacke & argillite	Yes
	P04/109	Cape Wiwiki	MR	Torlesse Terrane greywacke & argillite	Yes
Cabbage tree-*Coprosma*	P04/114	Motukawanui	SR	Torlesse Terrane greywacke & argillite	Yes
Manuka(coastal)	P04/070	Mahinpua Pen.	Pt S.R.	Waipapa greywacke	Yes
	P04/073	Te Ngaire	UP	Waipapa greywacke	Yes
	P04/074	Burrill	UP	Waipapa greywacke	
	P04/074B-2	Myers	UP	Waipapa greywacke	
	P04/099-2	Oneroa/Tangitu	UP	Waipapa greywacke	
	P05/097-2	Patunui Bay	UP	Waipapa greywacke/Horeke basalt lava flow	
Manuka	P04/068	Radar Hill Nth	UP	Waipapa greywacke/Horeke basalt	
	P04/071	Wainui Sth	UP	Waipapa greywacke/KK andesitic breccia Horeke basalt flows	
	P04/072	Whakarara	UP	Waipapa greywacke & chert/ Horeke basalt plateau remnts	Yes
	P04/075	Matauri Bay Bush	UP	Waipapa greywacke & chert/ Horeke basalt plateau remnts	
	P04/078	Mahimahi	UP	Waipapa greywacke/Te Kuiti glau. sand rhyolite domes/ Horeke basalt lava flows	
	P04/079	Popo SR	Pt SR	Horeke basalt lava flows/Waip. greywacke	
	P04/082	Omahanui	Pt SL most UP	Horeke basalt lava flows/ underlying greywacke	
	P04/083	Takou Bay Estuary	UP	greywacke over Horeke basalt lava flow	Yes
	P04/086	U. Tahoranui Valley	UP	Waipapa greywacke	
	P04/090	Tahoranui River	UP	Horeke basalt	
	P04/091	Tapuaetahi	Pt RR	Horeke basalt lava flow/underlying greywacke	
	P04/097	Opete Creek	UP	Waipapa greywacke/Horeke basalt lava flows	

VEGETATION TYPE	SITE NO.	NAME	STATUS	GEOLOGY	REP. SITE
	P04/098	Mataka Wetlands/Shrub	UP	Waipapa greywacke	
	P05/087	Rangitane Shrublands	Pt SR	Waipapa greywacke/KK basalt lava flows	
	P05/098	Whaengaere	UP	Waipapa greywacke/ Horeke basalt lava flows	
	P05/099	Rangihoua	Pt HR	Waipapa greywacke	Yes
	P04/100	Purerua Peninsula Shrub	UP	Waipapa greywacke	
	P05/079	Waitangi Wetlands	SL	KK vol basalt lava flow	
	P05/086	Kerikeri River Riparian Remnants	UP	KK vol lava flow; alluvium; rhyolite	Yes
	P05/094	Upper Kerikeri Stream Bush	UP	KK vol basalt lava flow	
	P05/096	Lodore Wetland	UP	KK vol basalt lava flow	Yes
	P05/103	Kerikeri Airport Gumland	Pt SL	KK vol basalt lava flow overlying Otaha	Yes
	P05/114	Upper Pungaere Shrubland	UP	KK vol, rhyolite & basalt flows; underlying glau sand & silic mud	Yes
	P04/074A-2	Marawhiti Point Lake	UP	alluvium	
	P04/087-2	Lake Monowai	UP	Horeke basalt lava flow	
	P04/096-2	McKenzie Rd	UP	Waipapa greywacke/Horeke basalt lava flow	
Manuka-*Coprosma*	P04/073	Te Ngaire	UP	Waipapa greywacke	Yes
Manuka-flax	P05/096	Lodore Wetland	UP	KK vol basalt lava flow	Yes
Manuka-kanuka	P05/058	Opua Forest	Pt SL, SR	Waipapa greywacke & chert	Yes
	P05/063	Oromahoe Bush	UP	Waipapa greywacke/Te Kuiti glau. sand KK vol lava flows	
	P05/077	Puketona Reserve	Pt SR	Waipapa greywacke	
	P05/080	Day Point	UP	Waipapa greywacke	
	P05/081	Brampton Shoal Bush	UP	KK vol basalt lava flow /greywacke	Yes
	P05/084	Te Taro Pond	UP	KK vol basalt lava flow/greywacke	
Kanuka	P04/092	Te Tii Shrubland	Pt QEII	Waipapa greywacke	Yes
	P05/082	Hutia Creek	CL	KK vol basalt lava flow/greywacke	Yes
	P04/097	Opete Creek	UP	Waipapa greywacke/Horeke basalt lava flows	
Kohuhu-manuka/ kanuka	P05/063	Oromahoe Bush	UP	Waipapa greywacke/Te Kuiti glau. sand KK vol lava flows	Yes
Manuka/kanuka-tanekaha	P05/077	Puketona Reserve	Pt SR	Waipapa greywacke	Yes
Manuka-towai	P04/078	Mahimahi	UP	Waipapa greywacke/Te Kuiti glau. sand rhyolite domes/Horeke basalt lava flows	
	P04/084	Takou Stream	UP	Horeke basalt lava flows/greywacke/ Te Kuiti glau. sand/ KK andesitic flows	Yes
Manuka/kanuka-towai	P05/077	Puketona Reserve	Pt SR	Waipapa greywacke	
	P05/078	Pukewhau	Pt EA	Waipapa greywacke	Yes

VEGETATION TYPE	SITE NO.	NAME	STATUS	GEOLOGY	REP. SITE
Towai	P04/078	Mahimahi	UP	Waipapa greywacke/Te Kuiti glau. sand rhyolite domes/ Horeke basalt lava flows	
	P04/084	Takou Stream	Pt QEII	Horeke basalt lava flows/greywacke/ Te Kuiti glau. sand/ KK andesitic flows	Yes
Mamangi	P04/070	Mahinepua Pen.	S.R.	Waipapa greywacke	Yes
Shore ribbonwood	P04/069	Mahinepua Bay	UP	gravelly/sand beach; estuary	Yes
Manuka/gorse	P04/075	Matauri Bay Bush	UP	Waipapa greywacke & chert/ Horeke basalt plateau remnts	
	P04/078	Mahimahi	UP	Waipapa greywacke/Te Kuiti glau. sand rhyolite domes/ Horeke basalt lava flows	
	P04/083	Takou Bay Estuary	UP	beach/estuary; greywacke over Horeke basalt lava flow	
	P04/088	Otaha Rd	UP	Horeke basalt lava flow/greywacke	
	P05/098	Whaengaere	UP	Waipapa greywacke/Horeke basalt lava flows	
	P05/099	Rangihoua	Pt HR	Waipapa greywacke	
	P05/059	Blackridge Rd Swp	UP	KK vol lava flow	
Manuka/gorse/ *Ageratina*	P04/084	Takou Stream	UP	Horeke basalt lava flows/greywacke/ Te Kuiti glau. sand/ KK andesitic flows	
Manuka-wattle	P05/079	Waitangi Wetlands	SL	KK vol basalt lava flow	
Gorse-tobacco weed	P04/090	Tahoranui River	UP	estuary/Horeke basalt	
	P04/091	Tapuaetahi	Pt RR	Horeke basalt lava flow/underlying greywacke	
Gorse	P05/061	Te Aute Rd Bush	UP	Waipapa greywacke; alluvium	
	P05/063	Oromahoe Bush	UP	Waipapa greywacke/Te Kuiti glau. sand KK vol lava flows	
	P05/079	Waitangi Wetlands	UP	KK vol basalt lava flow	
	P05/089	Stanners Rd Remnant	UP	KK vol basalt lava flow	
	P05/091	Kerikeri Stream Bush	UP	rhyolite dome, Horeke basalt lava flow; alluvium	
	P05/094	Upper Kerikeri Stm	UP	KK vol basalt lava flow	
Hakea	P05/053	Turntable Hill Bush	UP	Waipapa greywacke/overlying Mang. mud	
	P05/056	Taramawa Forest	Pt SL	Waipapa greywacke/Te Kuiti glau. sand Mang. mud	
	P05/086	Kerikeri River Riparian Remnants	UP	KK vol lava flow; alluvium; rhyolite	
	P05/087	Rangitane Shrublands	UP	Waipapa greywacke/KK basalt lava flow	
	P05/095	Puketotara River	UP	KK vol basalt lava flow	
Acacia	P05/079	Waitangi Wetlands	UP	KK vol basalt lava flow	
	P05/087	Rangitane Shrublands	UP	Waipapa greywacke/KK basalt lava flow	
Mixed scrub	P05/103	Kerikeri Airport Gumlands	SL	KK vol basalt lava flow overlying Otaha	
Kikuyu grassland	P04/101	Stephenson Is	UP		

VEGETATION TYPE	SITE NO.	NAME	STATUS	GEOLOGY	REP. SITE
FERNLAND					
Mamaku-pohutukawa	P04/070	Mahinepua Pen.	SR	Waipapa greywacke	Yes
Five-finger-mamaku	P05/058	Opua Forest	Pt SL, SR	Waipapa greywacke & chert	Yes
Towai-mamaku	P05/056	Taramawa Forest	Pt SL	Waipapa greywacke/Te Kuiti glau. sand Mang. mud	Yes
Mamaku	P05/077	Puketona Reserve	Pt SR	Waipapa greywacke	Yes
	P05/087	Rangitane Shrublands	UP	Waipapa greywacke/KK basalt lava flow	
	P05/093	Pungaere Stream Bush	UP	KK vol basalt lava flows; talus/ Waipapa sandstone	
Bracken-mamaku	P05/051	Pakaraka Bush/ Werowero Swamp	UP	alluvium over greywacke	Yes
Bracken	P04/078	Mahimahi	UP	Waipapa greywacke/Te Kuiti glau. sand rhyolite domes/ Horeke basalt lava flows	
	P04/101	Stephenson I.	UP		
Bracken-flax	P04/114	Motukawanui	SR		Yes
Bracken-*Gleichinia*	P05/080	Day Point	UP	Waipapa greywacke	Yes
Bracken-grass	Q05/057	Motuterakihi	MR		
Bracken-gorse	P04/078	Mahimahi	UP	Waipapa greywacke/Te Kuiti glau. sand rhyolite domes/ Horeke basalt lava flows	
	P05/053	Turntable Hill Bush	UP	Waipapa greywacke/ overlying Mang. mud	
	P05/056	Taramawa Forest	Pt SL	Waipapa greywacke/Te Kuiti glau. sand Mang. mud	
Bracken-tobacco weed	P05/097-2	Patunui Bay	UP	Waipapa greywacke/Horeke basalt lava flow	
REEDLAND and MONOCOTYLEDONOUS ASSOCIATIONS					
Flax (coastal)	P04/113	Cone Island	UP		
	P04/103	Motuekaiti I.	UP		Yes
	P04/114	Cavallis - North	MR		Yes
	P04/105	Motuiwi I.	MR		
	P04/108	Snail I.	UP		Yes
	P04/109	Cape Wiwiki	MR		Yes
Flax-*Chionchloa*-grass	P04/111	Karaka I.	SR		
Flax-*Chionochloa*	P04/114	Cavallis - North	MR		Yes
	P04/102	Motueka I.	UP		
	P04/114	Cavallis - North	MR		
	P04/116	Cavallis - South	MR		
	P05/112	Moturoa	SR		

VEGETATION TYPE	SITE NO.	NAME	STATUS	GEOLOGY	REP. SITE
Flax-grass-pohutukawa	P04/114	Cavallis - North	MR		
Flax-renga lily	P04/111	Karaka I.	SR		Yes
Flax-oioi-pohutukawa	P04/102	Motueka I.	UP		Yes
Flax-*Astelia*-pohutukawa	P04/114	Motukawanui	SR		Yes
Flax-cabbage tree	P04/114	Cavallis - North	MR		Yes
Flax-taupata	P04/106	Lion Rock	UP		Yes
Isolepis	P05/110	Motupapa	SR		Yes
VINELAND					
Pohuehue vineland	P04/101	Stephenson I.	UP		Yes
	P04/114	Cavallis - North	MR		Yes
WETLAND					
Open water	P04/098	Mataka Wetlands/ Shrubland	UP	Waipapa greywacke	
	P04/100	Purerua Peninsula Shrubland	UP	Waipapa greywacke	
	P05/079	Waitangi Wetlands	SL	KK vol basalt lava flow	Yes
	P05/104	Ngatahuna Stream Swamp	UP	Waipapa greywacke	
	P05/105	Kawakawa Flood Plain	UP	alluvium	Yes
	P04/074A-2	Marawhiti Point Lake	UP	alluvium	
	P04/087-2	Lake Monowai	UP	Horeke basalt lava flow	
	P04/094-2	Purerua Dams	UP	Waipapa greywacke	
	P04/095-2	McKenzie Rd Wetland	UP	Waipapa greywacke	
	P05/083-2	Kerikeri Inlet Rd Pond	UP	KK vol basalt lava flow	
Raupo	P04/069	Mahinepua Bay	UP	gravelly/sand beach; estuary	
	P04/083	Takou Bay Estuary	UP	beach/estuary; greywacke over	Yes
	P04/091	Tapuaetahi	UP	estuary	
	P04/093	Upper Te Puna Inlet	UP		Yes
	P04/097	Opete Creek	UP		Yes
	P04/098	Mataka Wetlands/ Shrubland	UP	Waipapa greywacke	
	P05/099	Rangihoua	Pt HR	Waipapa greywacke	
	P04/100	Purerua Peninsula Shrubland	UP	Waipapa greywacke	
	P04/114	Motukawanui	SR		
	P05/051	Pakaraka Bush/ Werowero Swamp	UP	alluvium over greywacke	Yes
	P05/053	Turntable Hill Bush	UP	Waipapa greywacke/overlying Mang. mud	
	P05/058	Opua Forest	Pt SL, SR	Waipapa greywacke & chert	Yes
	P05/059	Blackridge Rd Swp	UP	KK vol lava flow	Yes
	P05/079	Waitangi Wetlands	SL	KK vol basalt lava flow	Yes
	P05/084	Te Taro Pond	UP	KK vol basalt lava flow/greywacke	

VEGETATION TYPE	SITE NO.	NAME	STATUS	GEOLOGY	REP. SITE
	P05/088	Te Aiorua Creek	UP	Waipapa greywacke	
	P05/104	Ngatahuna Stream Swamp	UP	Waipapa greywacke	
	P04/047A-2	Marawhiti Point Lake	UP	alluvium	
	P04/094-2	Purerua Dams	UP	Waipapa greywacke	
	P04/095-2	McKenzie Rd Wetland	UP	Waipapa greywacke	
Raupo-swamp maire	P05/079	Waitangi Wetlands	UP	KK vol basalt lava flow	Yes
Raupo-*Isachne*	P05/083-2	Kerikeri Inlet Rd Pond	UP	KK vol basalt lava flow	
Raupo-kuta	P04/076	Matauri Bay	UP	stream estuary	Yes
Raupo-*Baumea*	P05/062	Porotu Rd Swamp	UP		Yes
Baumea	P05/059	Blackridge Rd Swp	UP	KK vol lava flow	Yes
	P05/079	Waitangi Wetlands	SL	KK vol basalt lava flow	Yes
	P05/084	Te Taro Pond	UP	KK vol basalt lava flow/greywacke	Yes
	P05/096	Lodore Wetland	UP	KK vol basalt lava flow	Yes
Baumea-Isolepis-Juncus	P05/079	Waitangi Wetlands	CC	KK vol basalt lava flow	Yes
Eleocharis	P05/079	Waitangi Wetlands	SL	KK vol basalt lava flow	Yes
	P05/083-2	Kerikeri Inlet Rd Pond	UP	KK vol basalt lava flow	
Epilobium-Eleocharis	P05/079	Waitangi Wetlands	SL	KK vol basalt lava flow	Yes
Polygonum-Epilobium-Isolepis	P05/084	Te Taro Pond	UP	KK vol basalt lava flow/greywacke	Yes
Polygonun-alligator weed	P05/105	Kawakawa Flood Plain	UP	alluvium	
Alligator weed	P05/105	Kawakawa Flood Plain	UP	alluvium	
Carex	P05/105	Kawakawa Flood Plain	UP	alluvium	Yes
Baumea-Tetraria	P05/103	Kerikeri Airport Gumland	Pt SL	KK vol basalt lava flow overlying Otaha	Yes
Baumea-manuka-*Gleichenia*	P05/103	Kerikeri Airport *Gumland*	Pt SL	KK vol basalt lava flow overlying Otaha	Yes
grass-rush	P04/087-2	Lake Monowai	UP	Horeke basalt lava flow	
gorse-rush	P04/087-2	Lake Monowai	UP	Horeke basalt lava flow	
Juncus-kikuyu	P04/047A-2	Marawhiti Point Lake	UP	alluvium	
sedge-rush-manuka swamp shrubland	P05/079	Waitangi Wetlands	SL,CC	KK vol basalt lava flow	Yes
	P05/082	Hutia Creek	CL	KK vol basalt lava flow /greywacke	Yes

VEGETATION TYPE	SITE NO.	NAME	STATUS	GEOLOGY	REP. SITE
Strand shrubland	P05/082	Hutia Creek	CL	KK vol basalt lava flow /greywacke	Yes
Mixed assoc	P04/076	Matauri Bay	UP	stream estuary	Yes
Flax-cabbage tree	P05/105	Kawakawa Flood Plain	UP	alluvium	Yes
Cabbage tree	P05/107	Cabbage Tree Rmnt	UP	alluvium	
Juncus	P04/069	Mahinepua Bay	UP	gravelly/sand beach; estuary	Yes
	P04/076	Matauri Bay	UP	sandy beach; stream estuaries; foredune	Yes
Juncus-Leptocarpus	P04/083	Takou Bay Estuary	UP	beach/estuary; greywacke over Horeke basalt lava flow	Yes
	P04/090	Tahoranui River	UP	estuary/Horeke basalt	Yes
Leptocarpus	P04/093	Upper Te Puna Inlet	UP		Yes
	P04/097	Opete Creek	UP		Yes
	P05/082	Hutia Creek		KK vol basalt lava flow /greywacke	Yes
Mangrove-*Leptocarpus*	P04/091	Tapuaetahi		estuary	Yes
Mangrove	P04/069	Mahinepua Bay	UP	gravelly/sand beach; estuary	
	P04/083	Takou Bay Estuary	UP	beach/estuary	Yes
	P04/090	Tahoranui River	UP	estuary/Horeke basalt	
	P04/093	Upr Te Puna Inlet	UP		Yes
	P04/097	Opete Creek	UP		
	P05/082	Hutia Creek		KK vol basalt lava flow /greywacke	Yes
Salt meadow	P04/076	Matauri Bay	UP	stream estuary	Yes
	P05/082	Hutia Creek		KK vol basalt lava flow /greywacke	Yes
Crack willow	P05/051	Pakaraka Bush/ Werowero Swamp	UP	alluvium over greywacke	
	P05/054	Waiharakeke Stream Alluvial	UP	alluvium on KK basalt lava flow	
	P05/104	Ngatahuna Stream Swamp	UP	Waipapa greywacke	
	P05/105	Kawakawa Flood Plain	UP	alluvium	
Weeping willow	P05/051	Pakaraka Bush/ Werowero Swamp	UP	alluvium over greywacke	
Glyceria	P05/051	Pakaraka Bush/ Werowero Swamp	UP	alluvium over greywacke	
Spinifex-harestail	P04/083	Takou Bay Estuary	UP	beach	Yes
Sandy beach	P04/069	Mahinepua Bay	UP	gravelly/sand beach; estuary	
	P04/073	Te Ngaire	UP		
	P05/099	Rangihoua	Pt HR	Waipapa greywacke	Yes
	P05/102	Onewhero Bay	UP		Yes

TABLE 3. SUMMARY OF SITE EVALUATIONS (e.u. = ecological unit)

SITE	REPRESENTATIVENESS	RARITY/SPECIAL FEATURES	
LEVEL ONE SITES Radar Hill Nth		Possibly kiwi	
Mahinepua Bay	Rep site 2 e.u.s	Estuarine habitat. Fauna: 3 threatened	
Mahinepua Peninsula	Rep site 4 e.u.s	Coastal. Flora:1 threatened, 3 uncommon	
Wainui Sth	Rep site 4 e.u.s	Fauna: 2 threatened	
Te Ngaire	Rep site for 1 e.u.	Fauna:1 threatened	
Whakarara	Rep site 2 e.u.s	Coastal forest	
Burrill	Rep site 1 e.u.	Coastal forest	
Matauri Bay Bush	Rep site for 2 e.u.s	Kiwi	
Matauri/Waiaua Bays	Rep site for 5 e.u.s	Dune/estuarine habitats	
Mahimahi		Only Northland occurrence of deeply weathered rhyolite	
Popo SR		NZ pigeon, kiwi?	
Hauriri Rd		NZ pigeon	
Omahanui		NZ pigeon, kiwi; 1 uncommon	
Takou Bay	Rep site for 5 e.u.s; best dunes in ED	Coastal/estuarine; Fauna: 5 threatened, 1 reg. significant	
Takou Stream	Rep site for 6 e.u.s	Fauna: 2 threatened	
Upper Tahoranui Valley		Fauna: 2 threatened	
Otaha Rd		Kiwi	
Waimanga Stream		Kiwi	
Tahoranui R.	Rep site for 2 e.u.s	Fauna: 4 threatened, 1 reg. significant estuarine habitat	
Tapuaetahi	Rep site for 1 e.u.	Fauna: 3 threatened, 1 reg. significant estuarine habitat	

	DIVERSITY & PATTERN	NATURALNESS	BUFFER/LINKAGE/CORRIDOR	SIZE & SHAPE
	3 e.u.s	Mosaic of shrubland; forest in gullies	Contiguous with P04/067; close to P04/071	> 130 ha
	dune/salt/freshwater	Margins modified	Adjoins P04/070	> 8 ha
	5 e.u.s	Fragmented, regenerating	Adjoins P04/069	47 ha
	5 e.u.s	Advanced regeneration	Adjoins P04/072	> 900 ha
	estuary/cliff	Exotics present; high public usage		> 18 ha
	5 e.u.s	Advanced regeneration	Adjoins P04/071	c. 250 ha
	2 e.u.s	Regenerating; exotics present		> 50 ha
	7 e.u.s	Varies - some regeneration and fragmentation by forestry, roads		c. 400 ha
	5 e.u.s	Modified; exotics present		c. 12 ha
	12 e.u.s; diversity of rock types	Heavily grazed; weedy	Upper catchment of Takou River	> 600 ha
	4 e.u.s	fragmented	Riparian	40 ha
	2 e.u.s	Mostly fenced	Riparian	18 ha
	2 e.u.s	Part recently fenced; part weedy	Riparian	c. 60 ha
	8 e.u.s; salt/fresh/land	Some exotics and fragmentation	Riparian	> 150 ha
	9 e.u.s; diversity of rock types	Part intact, part weedy	Riparian	> 300 ha
	2 e.u.s	Grazed		13 ha
	2 e.u.s	Weedy, modified	Upper catchment of Tahoranui R.	c. 100 ha
	1 e.u.		Riparian	c. 16 ha
	5 e.u.s; estuary/shrub/forest	Varies - high at river mouth; exotics in part of catchment	Riparian	c. 140 ha
	4 e.u.s salt/fresh/land	Estuary high; shrubland weedy	Riparian	c. 130 ha

SITE	REPRESENTATIVENESS	RARITY/SPECIAL FEATURES	
Te Tii Shrubland	Rep site for 2 e.u.s	Kiwi; coastal	
Upper Te Puna Inlet	Rep site for 3 e.u.s	Fauna: 4 threatened, 5 uncommon	
Opete Creek	Rep site for 2 e.u.s	Estuarine. Fauna: 2 uncommon	
Mataka/Pederson		Kiwi, 1 reg. significant	
Purerua Peninsula		Kiwi wetlands	
Pakaraka Bush/Werowero	Rep site for 7 e.u.s	Large wetland; Fauna: 4 threatened, 2 reg. significant. Flora: 1 uncommon	
Hupara Rd	Rep site for 1 e.u.	Fauna: 2 threatened 2 uncommon plants	
Turntable Hill	Rep site for 2 e.u.s	Fauna: 3 threatened 1 endemic, 1 uncommon	
Waiharakeke	Rep site for 2 e.u.s	Alluvial forest	
Whangae Bush	Rep site for 1 e.u.	NZ pigeon	
Taramawa Forest	Rep site for 4 e.u.s	Fauna:2 threatened	
Opua Forest	Rep site for 8 e.u.s	Fauna: 1 threatened, 1 endemic, 1 reg. significant Flora: 1 threatened, 1 uncommon	
Blackridge Rd Swamp	Rep site for 2 e.u.s	Wetland; 2 reg. significant	
Puketona Pa Riparian Forest	Rep site for 1 e.u.		
Te Aute Rd Bush	Rep site for 2 e.u.s	Podocarp forest on alluvium uncommon in ED	
Porotu Rd	Rep site for 3 e.u.s	Fauna: 1 threatened, 1 reg. significant	
Oromahoe Bush	Rep site for 2 e.u.s	Fauna: 3 threatened	
Puketona Reserve	Rep site for 4 e.u.s	Fauna: 2 threatened	
Pukewhau	Rep site for 4 e.u.s	Fauna: 2 threatened	
Waitangi Wetlands	Rep site for 8 e.u.s; large wetland	Fauna: 2 threatened, 3 reg. significant. Flora: 4 threatened	
Day Point	Rep site for 2 e.u.s	Kiwi; coastal	
Brampton Shoal	Rep site for 2 e.u.s	Old growth coastal manuka on volcanics	

	DIVERSITY & PATTERN	NATURALNESS	BUFFER/LINKAGE/CORRIDOR	SIZE & SHAPE
	2 e.u.s	Regenerating; exotics present	Riparian; adjoins P04/093	170 ha
	3 e.u.s salt/freshwater	Oyster farm	Adjoins P04/092	> 500 ha
	4 e.u.s salt/freshwater	Oyster farm		170 ha
	3 e.u.s wetland/shrub	Fragmented		> 130 ha
	3 e.u.s	Fragmented; regenerating		> 100 ha
	wetland/ forest bird diversity	Exotics in wetland		> 80 ha
	2 e.u.s	Fragmented		> 65 ha
	6 e.u.s	Some exotics		> 190 ha
	3 e.u.s	Some exotics		> 60 ha
	3 e.u.s		Upper catchment	> 55 ha
	6 e.u.s	Some exotics	Upper catchment linkage to Opua forest	> 1000 ha
	8 e.u.s gradients from sea level to > 230 m; salt/fresh/land	Mostly high		> 4000 ha
	4 e.u.s	Some exotics on margins		> 6 ha
	2 e.u.s	High	Riparian	>15 ha
	3 e.u.s	Gorse on margins		> 30 ha
	open water/swamp/ seral/ forest			> 15 ha
	5 e.u.s	Regenerating mosaic; gorse		80 ha
	7 e.u.s	Fenced; some regenerating	Upper catchment	> 160 ha
	4 e.u.s	Remnants adjoining exotics	Linkage via exotics to Waitangi	> 230 ha
	14 e.u.s	Raised water level; some exotics on margins		> 270 ha
	3 e.u.s	Some pine	Riparian; coastal linkage	>125 ha
	2 e.u.s	Heavily grazed	Coastal riparian	19 ha

SITE	REPRESENTATIVENESS	RARITY/SPECIAL FEATURES	
Waitangi Estate/Hutia Creek	Rep site for 6 e.u.s	Fauna: 7 threatened, 1 endemic, 3 reg. significant. Flora: 1 threatened, 2 uncommon	
Te Taro Pond	Rep site for 2 e.u.s	Fauna: 1 reg. significant. Ephemeral wetland	
Waitangi River Alluvial	Rep site for 2 e.u.s	Old-growth kanuka on alluvium	
Kerikeri River	Rep site for 4 e.u.s	Fauna: 2 threatened, 1 endemic. Flora: 1 endemic	
Rangitane Shrublands	Rep site for 2 e.u.s	Fauna: 2 threatened, 1 endemic. Flora: 2 threatened, 1 uncommon	
Te Aiorua Creek Wetland		Wetland	
Stanners Rd		Kiwi	
Puketotara Rd	Only site of e.u.	Alluvium	
Kerikeri Stream Bush	Rep site for 2 e.u.s	Fauna: 2 threatened. Rhyolite dome	
Pungaere Rd Bush	Only site in ED of 1 e.u.		
Pungaere Stm	Rep site for 1 e.u.	NZ pigeon	
Upper Kerikeri Stream	Rep site for 2 e.u.s	Fauna: 2 threatened	
Puketotara River	Rep site for 2 e.u.s; only swamp forest	Fauna: 2 threatened	
Lodore Wetland	Rep site for 3 e.u.s	Semi-mineralised wetland	
Whaengaere Rd		Kiwi; 1 uncommon plant; coastal	
Rangihoua	Rep site for 1 e.u.	Kiwi; coastal	
Kerikeri Airport	Rep site for 3 e.u.s	Rare soil type and gumland vegetation; new mudfish sp + 2 threatened, 1 reg. significant bird sp.	
Onewhero Bay	Beach habitat	NZ dotterel	
Ngatahuna Stm Swamp		Wetland; 1 reg. significant bird	
Kawakawa Flood Plain	Rep site for 3 e.u.s	Large wetland	
Cabbage Tree Remnant	Only site in ED	Uncommon habitat type	
Upper Pungaere Shrubland	Rep site for 1 e.u.	Uncommon rock & vegetation type; 1 reg. significant bird	

	DIVERSITY & PATTERN	NATURALNESS	BUFFER/LINKAGE/CORRIDOR	SIZE & SHAPE
	Sequence from mangrove to forest	Medium-high	Coastal riparian	> 130 ha
	12 sp waterfowl 4 e.u.s wetland/shrub		Part of Waitangi wetland complex	96 ha
	2 e.u.s	Remnants	Riparian	46 ha
	Site physically diverse	Exotics present	Riparian	> 100 ha
		Residential development; exotics present	Riparian	330 ha
	1 e.u.	Remnant isolated from estuary		> 3 ha
		Exotics present		> 18 ha
	1 e.u.			> 3 ha
	3 e.u.s	Exotics on margins	Riparian; Linkage from Puketi to BoI	> 490 ha
			close to kiwi habitats	> 25 ha
	3 e.u.s	High	some Riparian; close to Lake Manuwai	> 50 ha
	5 e.u.s	Some exotics present	Upper catchment; Linkage from Puketi to BoI	> 350 ha
	5 e.u.s	Some exotics present	Riparian	> 250 ha
	3 e.u.s			5 ha
	3 e.u.s	Weedy regenerating		c. 90 ha
	4 e.u.s; wetland/beach	Fragmented; some exotics		> 70 ha
		Exotics on margins and dry ground		> 60 ha
				> 9 ha
	3 e.u.s	Willows	Waitangi River catchment	10 ha
	13 bird sp.	Exotics common		75 ha
		Remnant; grazed	Near Kawakawa River	3 ha
			Linked to habitats in Puketi ED	> 200 ha

SITE	REPRESENTATIVENESS	RARITY/SPECIAL FEATURES	
ISLANDS Cone Island	Only site in ED for 1 e.u.	Duvaucel's gecko	
Stephenson Island		Fauna: 3 threatened, 4 restricted distribution	
Oruatemanu Island	Rep site for 1 e.u.	Moko skink	
Karaka Island	Only site for 1 e.u.	Flora: 2 sp restricted distribution	
Motueka Is	Only site for 1 e.u	1 threatened bird sp	
Motuekaiti Is	Rep site for 1 e.u.	Fauna: 1 threatened; Blue penguin breeding site	
Cavallis - Motukawanui cluster	Rep site for 7 e.u.s & only site of 3	Fauna: 6 threatened bird sp, 1 reg. significant; 2 uncommon lizard sp; Flora: 2 threatened, 2 uncommon sp.	
Cavallis - Northern	Rep site for 8 e.u.s & only site of 4	Fauna: 2 threatened bird sp, 1 endangered & 2 uncommon lizards Flora: 3 uncommon sp	
Cavallis - Eastern	Rep site for 2 e.u.s	Fauna: 1 threatened lizard sp & 3 restricted distribution. Flora: 1 uncommon sp	
Cavallis - Southern		Fauna: 4 threatened bird sp Flora: 1 uncommon sp	
Motuiwi Is		Flora: 1 N'land endemic sp	
Lion Rock	Only site for 1 e.u.		
Snail Island	Rep site for 1 e.u.	Lizards: 1 threatened sp & 1 restricted distribution sp. Flora: 1 uncommon sp	
Kowhatuhuri Island	Rep site for 1 e.u.	Flora: 1 N'land endemic sp, 1 uncommon sp	
Cape Wiwiki	Rep site for 4 e.u.s	Fauna: 3 threatened bird sp. Flora: 4 uncommon sp	
Te Pahi Is		Fauna: 4 threatened bird sp	
Motupapa	Rep site for 1 e.u.	Fauna: 3 threatened bird sp	
Moturoa Gp	Rep site for 2 e.u.s	Fauna: 9 threatened bird sp & 1 reg significant. Flora: 2 threatened & 2 uncommon sp	
Black Rocks & Battleship	Rep site for 1 e.u.	Fauna: 4 threatened bird sp Flora: 2 uncommon sp	
Motutui Is	Rep site for 1 e.u.	Flora 1 threatened & 4 uncommon sp	
Motuterakihi		Reef heron breeding	

	DIVERSITY & PATTERN	NATURALNESS	BUFFER/LINKAGE/CORRIDOR	SIZE & SHAPE
	Breeding site for 5 seabird sp.	High–medium	Adjacent to Stephenson I.	> 5 ha
	13 seabird sp, 5 lizard sp	Highly modified	Adjacent to Cone Rock	> 100 ha
	5 sea bird sp, 2 lizards	High - rat- and possum-free		c. 1 ha
		High	Close to mainland	> 1 ha
		Modified except for fringes	Close to Motuekaiti Is	3.5 ha
		Modified except for fringes	Close to Motueka Is & Mahinepua Peninsula	> 3 ha
	26 bird sp; 6 lizard sp; 8 e.u.s	Medium to high; vigorous regeneration	Large island & small islets; adjacent to many other small islands	> 380 ha
	18 bird sp; 6 lizard sp; 13 e.u.s	High	several small islands near to Motukawanui	> 50 ha
	7 lizard sp	High	Near Motukawanui	6.5 ha
		Modified	Near Motukawanui	55 ha
		Modified	Close to mainland	1.5 ha
		High - free of mammalian pests	Close to mainland	c. 2 ha
		High	Close to mainland	1.5 ha
		Medium	Close to mainland	2.8 ha
		High	Close to mainland	15 ha
		Modified	Close to mainland	> 6 ha
		Highly modified; some restoration	Close to mainland & Akeake Point SR	> 3 ha
	23 bird sp, 3 freshwater fish sp	Modified; active restoration	Close to mainland & Black Rocks	166 ha
		High	Close to Moturoa	> 3 ha
		Moderate		
		Modified		< 0.5 ha

SITE	REPRESENTATIVENESS	RARITY/SPECIAL FEATURES	
LEVEL TWO SITES Marawhiti Point Lake		Fauna: 1 threatened	
Myers		Coastal	
Tepene Bush		Kiwi reported coastal species	
Lonsdale Park	Rep site for 2 e.u.s		
Lake Manuwai		Bittern reported	
Purerua Dams		Spotless crake 1987	
McKenzie Rd Wetland			
McKenzie Rd		Possibly kiwi	
Oneroa/ Tangitu			
Kerikeri Inlet Rd Pond		Fauna: 1 threatened, 1 reg. significant	
Patunui Bay		Possibly kiwi	
Motutapu Is			

	DIVERSITY & PATTERN	NATURALNESS	BUFFER/LINKAGE/CORRIDOR	SIZE & SHAPE
		Constructed	Close to ocean	7.5 ha
		Remnants	Some coastal Riparian	c. 15 ha
		Remnant		16 ha
		Part fenced	Some Riparian	> 13 ha
	large lake	Constructed		> 13 ha
		Constructed	Near estuary	> 11 ha
		Constructed		> 1 ha
		Weedy	Some coastal Riparian	> 46 ha
		Some exotics	Coastal Riparian	> 7 ha
	12 species waterfowl	Constructed; sparse margins	Part of Waitangi wetland complex	4 ha
		Part weedy	Coastal Riparian	> 20 ha
		Weedy		< 0.5 ha

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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 and 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 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 birds recorded in the Kerikeri Ecological District

NI brown kiwi	*Apteryx australis mantelli*	
Blue penguin	*Eudyptula minor*	
Giant petrel	*Macronectes giganteus*	Offshore
Antarctic fulmar	*Fulmarus glacialoides*	Offshore
Grey-faced petrel	*Pterodroma macroptera*	Cavalli Is, Stephenson I. (B)
Pycroft's petrel	*Pterodroma pycrofti*	Stephenson I.
Fairy prion	*Pachyyptila turtur*	Stephenson I.
Sooty shearwater	*P. griseus*	Offshore
Fluttering shearwater	*P. gavia*	Cavalli Is (B)
Little shearwater	*P. assimilis*	Cavalli Is (B)
Diving petrel	*Pelecanoides urinatrix*	Cavalli Is (B)
Australasian gannet	*Morus serrator*	
Black shag	*Phalacrocorax carbo*	
Pied shag	*Phalacrocorax varius varius*	
Little black shag	*P. sulcirostris*	
Little shag	*P. melanoleucos brevirostris*	
White faced heron	*Ardea novaehollandiae novaehollandiae*	
Reef heron	*Egretta sacra sacra*	
Australasian bittern	*Botaurus poiciloptilus*	
Black swan	*Cygnus atratus*	
Paradise shelduck	*Tadorna variegata*	
*Mallard	*Anas platyrhynchos platyrhynchos*	
Grey duck	*Anas superciliosa superciliosa*	
Grey teal	*Anas gibberifrons*	
Brown teal	*Anas aucklandica chlorotis*	
NZ shoveler	*Anas rhynchotis variegata*	
Australasian harrier	*Circus approximans*	
*Californian quail	*Callipela californica brunnescens*	
*Brown quail	*Synoicus ypsilophorus*	
*Ring-necked pheasant	*Phasianus colchicus*	
NI weka	*Gallirallus australis greyi*	
Banded rail	*Rallus philippensis assimilis*	
Spotless crake	*Porzana tabuensis plumbea*	
Pukeko	*Porphyrio porphyrio melanotus*	
Variable oystercatcher	*Haemotopus unicolor*	
Pied stilt	*Himantopus himantopus leucocephalus*	
NZ dotterel	*Charaius obscurus aquilonius*	
Banded dotterel	*Charaius bicinctus bicinctus*	
Wrybill	*Anarhynchus frontalis*	
Asiatic whimbrel	*Numenius phaeopus variegatus*	
Turnstone	*Arenaria interpres*	
Spur-winged plover	*Vanellus miles novaehollandiae*	
Eastern bar-tailed godwit	*Limosa lapponica baueri*	
Arctic skua	*Stercorarius parasiticus*	Offshore - Cavallis
Southern black-backed gull	*Larus dominicanus dominicanus*	
Red-billed gull	*Larus novaehollandiae scopulinus*	
Caspian tern	*Sterna caspia*	
White-fronted tern	*Sterna striata*	
NZ pigeon	*Hemiphaega novaeseelandiae novaeseelandiae*	
*Eastern rosella	*Platycerus eximius*	
Shining cuckoo	*Chalcites lucidus lucidus*	
Morepork	*Ninox novaeseelandiae novaeseelandiae*	
Kingfisher	*Halcyon sancta vagans*	
*Skylark	*Alauda arvensis arvensis*	
Welcome swallow	*Hirundo tahitica neoxena*	
NZ pipit	*Anthus novaeseelandiae*	
*Blackbird	*Turdus merula merula*	

*Song thrush	*Turdus philomelos clarkei*	
*Hedge sparrow	*Prunella modularis*	
NI fernbird	*Bowdleria punctata vealeae*	
NI fantail	*Rhipidura fuliginosa placabilis*	
Pied tit	*Petroica macroceohala toitoi*	
Grey warbler	*Gerygone igata*	
Silvereye	*Zosterops lateralis lateralis*	
Tui	*Prosthemadera novaeseelandiae*	
*Yellow hammer	*Emberiza cintrinella caliginosa*	
*Chaffinch	*Fringilla coelebs gengleri*	
*Greenfinch	*Carduelis chloris*	
*Goldfinch	*Carduelis carduelis britannica*	
*Redpoll	*Carduelis flammea*	
*House sparrow	*Passer domesticus domesticus*	
*Starling	*Sturnus vulgaris vulgaris*	
*Myna	*Acridotheres tristis*	
NI saddleback	*Philesturnus carunculatus*	Moturoa Is
*White-backed magpie	*Gymnorhina tibicen hypoleuca*	

* = Introduced

B = Breeding (for offshore seabirds only)

B. Other fauna present in the Kerikeri Ecological District

Lizards/Geckos		
Northland green gecko	*Naultinus grayi*	Northland endemic
Forest gecko	*Hoplodactylus granulatus*	widespread
Pacific gecko	*H. pacificus*	Waitangi
Common gecko	*H. maculatus*	Islands
Duvaucel's gecko	*H. duvaucelii*	Islands
Common copper skink	*Cyclodina aenea*	
McGregor's skink	*C. macgregori*	Motukarakeke I.
Ornate skink	*Cyclodina ornata*	uncommon on the mainland, has been recorded from Omahanui.
Shore skink	*Oligosoma smithi*	Waitangi and islands
Suter's skink	*O. suteri*	Cavallis
moko skink	*O. moco*	Offshore Islands
Freshwater invertebrates		
Freshwater crayfish	*Parenephrops planifrons*	
Freshwater crab	*Halicarcinus lacustris*	
Native fish		
Shortfinned eel	*Anguilla australis*	
Longfinned eel	*Anguilla dieffenbachii*	
Lamprey	*Geotria australis*	(Waiharakeke Stream 1996)
Black mudfish	*Neochanna diversus*	
Banded kokopu	*G. fasciatus*	
Inanga	*G. maculatus*	
Common smelt	*Retropinna retropinna*	
Red-finned bully	*Gobiomorphus huttoni*	
Cran's bully	*G. basalis*	(Waitangi, Manaia Stream)
Common bully	*G. cotidianus*	
Blue-gilled bully	*G. hubbsi*	(recorded in the Kerikeri River in 1965)
Giant bully	*G. gobioides*	(Kerikeri River)
Grey mullet	*Mugil cephalus*	
Cockabully	*Tripterygion nigripenne*	
Introduced fish		
Mosquito fish	*Gambusia affinis*	
Tench	*Tinca tinca*	(Waitangi 1982)
Catfish	*Ictalurus nebulosus*	(Kawakawa River)
Rainbow trout	*Oncorhynchus mykiss*	(Kerikeri River)
Introduced mammals		
Mouse	*Mus musculus*	
Ship rat	*Rattus rattus rattus*	
Norway rat	*Rattus norvegicus*	
Weasel	*Mustela nivalis*	
Stoat	*Mustela erminea*	
Ferret	*Mustela furro*	
Feral cat	*Felis catus*	
Feral dog	*Canis familaris*	
Cattle	*Bos taurus*	
Goat	*Capra hircus*	
Possum	*Trichosurus vulpecula*	
Pig	*Sus scrofa*	
Hedgehog	*Erinaceus europeus occidentalis*	

8.5A LIST OF COMMON 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

akepiro	*Olearia furfuracea*
black maire	*Nestegis cunninghamii*
bracken	*Pteridium esculentum*
cabbage tree	*Cordyline australis*
coastal astelia	*Astelia banksii*
coastal mahoe	*Melicytus novae-zelandiae*
coastal maire	*Nestegis apetala*
coastal tussock	*Chionochloa bromoides*
Cook's scurvy grass	*Lepidium oleraceum*
cutty grass	*Gahnia lacera*
fivefinger	*Pseudopanax arboreus*
flax	*Phormium tenax*
glasswort	*Sarcocornia quinqueflora*
hangehange	*Geniostoma rupestre* var. *ligustrifolium*
hinau	*Elaeocarpus dentatus*
houpara	*Pseudopanax lessonii*
kanono	*Coprosma grandifolia*
kahikatea	*Dacrycarpus dacrydioides*
kanuka	*Kunzea ericoides s.l.*
karaka	*Corynocarpus laevigatus*
karamu	*Coprosma robusta*
karo	*Pittosporum crassifolius*
kauri	*Agathis australis*
kawaka	*Libocedrus plumosa*
kawakawa	*Macropiper excelsum*
kiekie	*Freycinettia banksii*
King's Island melilot	*Melilotus indicus*
knobby clubrush	*Isolepis nodosa*
kohekohe	*Dysoxylum spectabile*
kohuhu	*Pittosporum tenuifolium* var. *tenuifolium*
kowhai	*Sophora microphylla*
kumerahou	*Pomaderris kumeraho*
kuta	*Schoenoplectus tabernaemontani*
lacebark	*Hoheria populnea*
lancewood	*Pseudopanax crassifolius*
large-leaved milktree	*Streblus banksii*
lemonwood	*Pittosporum eugenoides*
lowland ribbonwood	*Plagianthus regius*
mahoe	*Melicytus ramiflorus*
mamaku	*Cyathea medullaris*
mamangi	*Coprosma arborea*
manuka	*Leptospermum scoparium*
mangrove	*Avicennia marina* var. *resinifera*
mapou	*Myrsine australis*
matai	*Prumnopitys taxifolia*
mingimingi	*Leucopogon fasciculatus*
miro	*Prumnopitys ferruginea*
native broom	*Carmichaelia arborea*
native iceplant	*Disphyma australe*
ngaio	*Myoporum laetum*
nikau	*Rhopalostylis sapida*
northern rata	*Metrosideros robusta*
NZ spinach	*Tetragonia* sp.
oioi	*Leptocarpus similis*
parapara	*Pisonia brunoniana*
pate	*Schefflera digitata*
pigeonwood	*Hedycarya arborea*
pingao	*Desmoschoenus spiralis*
pohuehue	*Muehlenbeckia complexa*
pohutukawa	*Metrosideros excelsa*
ponga	*Cyathea dealbata*
puka	*Meryta sinclairii*
pukatea	*Laurelia novae-zelandiae*
puriri	*Vitex lucens*
rangiora	*Brachyglottis repanda*
rasp fern	*Doodia media*
raupo	*Typha orientalis*
rengarenga lily	*Arthropodium cirratum*
rewarewa	*Knightia excelsa*
rimu	*Dacrydium cupressinum*
shore bindweed	*Calystegia soldanella*
sea primrose	*Samolus repens*
sea rush	*Juncus maritimus* var. *australiensis*
shore ribbonwood	*Plagianthus divaricatus*
swamp kiokio	*Blechnum novae-zelandiae*
swamp maire	*Syzygium maire*
swamp millet	*Isachne globosa*
tanekaha	*Phyllocladus trichomanoides*
tangle fern	*Gleichenia* sp.
taraire	*Beilschmiedia tarairi*
taupata	*Coprosma repens*
tawa	*Beilschmiedia tawa*
tawapou	*Planchonella costata*
tawaroa	*Beilschmiedia tawaroa*
tawheowheo	*Quintinia serrata*
thread fern	*Blechnum filiforme*
titoki	*Alectryon excelsus*
toetoe	*Cortaderia splendens*
toru	*Toronia toru*
totara	*Podocarpus totara*
towai	*Weinmannia silvicola*
turepo	*Rhabdothamnus solandri*
tutu	*Coriaria arborea*

whau	*Entelea arborescens*
wharangi	*Melicope ternata*
wheki	*Dicksonia squarrosa*
white maire	*Nestegis lanceolata*

Adventives

alligator weed	*Alternanthera philoxeroides*
African clubmoss	*Selaginella kraussiana*
Arum lily	*Zantedeschia aethiopica*
banana passionfruit	*Passiflora mixta*
blackberry	*Rubus fruticosus*
brush wattle	*Paraserienthes lophantha*
buffalo grass	*Stenotaphrum secondatum*
cape gooseberry	*Physalis peruviana*
Cape honey flower	*Melianthus major*
Chinese privet	*Ligustrum sinense*
Elaeagnus	*Elaeagnus* x *reflexa*
ginger	*Hedychium gardnerianum*
gorse	*Ulex europaeus*
hakea	*Hakea sericea* or *H. salicifolia*
harestail	*Lagarus ovatus*
honeysuckle	*Lonicera japonica*
inkweed	*Phytolacca octandra*
kikuyu	*Pennisetum clandestinum*
lantana	*Lantana camara* var. *aculeata*
macrocarpa	*Cupressus macrocarpa*
marram grass	*Ammophila arenaria*
Mexican devilweed	*Ageratina adenophora*
mistweed	*Ageratina riparia*
mothplant	*Araujia sericifera*
Norfolk pine	*Araucaria heterophylla*
pampas	*Cortaderia sellonoa*
pine	*Pinus radiata*
privet	*Ligustrum* sp.
reed sweet grass	*Glyceria maxima*
silver dollar	*Eucalyptus cinerea*
sweet pea shrub	*Polygala myrtifolia*
tobacco weed	*Solanum mauritianum*
wattle	*Racosperma mearnsii*
willow weed	*Polygonum* sp.
willow (crack)	*Salix fragilis*
willow (weeping)	*Salix babylonica*

8.5B KERIKERI ECOLOGICAL DISTRICT TYPE LOCALITIES (CUNNINGHAM 1838)

**AC = Alan Cunningham RC = Richard Cunningham

SPECIES			DATE	COMMENTS
Alseuosmia banksii		RC	1834	"skirts of woods on the shores of the BoI"
A. quercifolia		AC	1826	"Dry woods on the shores of the BoI"
Beilschmiedia tarairi	taraire	AC	1826	"banks of rivers"
B. tawa	tawa	AC	1826	"shaded moist forests at BoI"
Coprosma rhamnoides		RC	1834	"Banks of the KeriKeri River"
Corokio buddleoides		AC	1826	"margins of woods on the shores of the BoI, Wangaroa etc"
Elatostema rugosum	parataniwha	AC	1826	flooded banks at Kawakawa River
Epilobium cinereum		#	1827	Type specimen D'Urville but collected by RC 1834 margins of woods, near the Waitangi Falls
E. nerterioides		AC	1826	"bogs near the Kana-Kana River, BoI"
E. nummularifolium		RC	1834	"shores of the KeriKeri River, and in dry as well as boggy grounds"
Fuchsia procumbens		RC		"Around the village of Matauri…inhabiting the sands immediately above the range of the tide, where it was found in flower in March"
Gnaphalium keriense		RC	1834	near Kerikeri Falls
Hebe ligustrifolia		RC	1833	"in shady woods on the hills above the Kawakawa River"
Hoheria populnea	lacebark	RC	1833	"banks of rivers and skirts of forests on the shores of the BoI"
Korthalsella salicornioides (*Viscum salicornioides*)		RC	1834	on manuka, Kerikeri River
Lagenophora lanata		RC	1834	"among fern, between the Waitangi and Keri-Keri Rivers"
Laurelia novae-zelandiae	pukatea	AC	1826	"margins of streams flowing into the Kerikeri River"
Linum mongynum		AC	1826	"on bare rocks on the islets of the BoI"
Litsea calicaris	mangeo	RC	1834	"riversides at BoI"
Lophomyrtus bullata	ramarama	RC	1834	"shady woods, BoI"
Mida salicifolia var. *myrtifolia*		AC	1826	"woods in the neighbourhood of the BoI"
Myriophyllum propinquum		RC	1834	"Bogs at the Mission Station on the Kerikeri River, as also on the Hokianga River"
Nertera dichondraefolia		RC	1834	"Dry woods on the shores of the BoI"
Pittosporum cornifolium		AC	1826	"in humid woods on the banks o the Kana-Kana, and other rivers, BoI"
P. crassifolium	karo	RC	1833	Flat Island and Matauri
P. eugenoides	lemonwood	RC	1833	shores of Onawero Bay Wangaroa
P. pimeleoides		AC	1826	"Dry woods on the shores of the BoI, Wangaroa etc"
Olearia rani	heketara	RC		"Banks of rivers, BoI"
Plagianthus regius (*P. betulinus*)	ribbonwood	RC	1833	"on the banks of the Kana-Kana River, near its head"
Pomaderris kumerahou	kumerahou	RC	1834	"Banks of the Kerikeri River"
Quintinia serrata		AC	1826	"forests at the source of the KanaKana [Kawakawa] River and elsewhere, on the shores of the BoI"
Rhabdothamnus solandri	turepo	AC	1826	"Dry woods in the vicinity of the BoI"
Syzygium maire	swamp maire	RC	1834	"alluvial banks of rivers, BoI"
Vitex lucens	puriri	AC	1826	"rocky shores of the BoI"

Kerikeri ED - Other Cunningham collections

Aristotelia serrata	wineberry	AC	1826	BoI and elsewhere on the east coast
Cardamine debilis		AC	1826	banks of the Kawakawa river amongst ferns
Clematis paniculata	clematis	AC	1826	margins of woods and shores BoI and on Hokianga River
Coriaria sarmentosa		AC	1826	"abundant on the hills around the B0I"
Corynocarpus laevigatus	karaka	AC	1826	"in moist and shady woods on the shores of the BoI"
Dodonaea viscosa	akeake	AC	1826	Dry woods, BoI
Dysoxylum spectabile	kohekohe	AC	1826	damp forests on the banks of rivers BoI
Entelea arboresens	whau	AC	1826	
Epilobium rotundifolium		AC	1826	"alluvial shores of the Kana-Kana River"
E. glabellum		RC	1834	Between Waitangi and Kerikeri Rivers
Hypericum pusillum		AC	1826	Hills among fern, Kerikeri River
Lepidium olearaceum	Cook's scurvy grass	AC	1826	on the shores of the BoI
Melicope ternata	wharangi	AC	1826	hills around BoI
Melicytus ramiflorus	mahoe	RC	1833	"on the skirts of forests and banks of rivulets, BoI"
Pittosporum tenuifolium	kohuhu	AC	1826	"margins of forests on the immediate shores of the BoI"
P. umbellatum	haekaro	AC	1826	shores of Onawero Bay Wangaroa
Pomaderris phylicifolia var. *ericifolia*		RC	1834	on hills among fern in the BoI
Passiflora tetrandra		RC	1833	near Waimate and on forest margins at the head of the Kawakawa River [Tangihua ED?]
Pseudowintera axillaris	horopito	AC	1826	damp shady forests on the Kana-Kana and Hokianga Rivers:
Ranunculus rivularis		AC	1826	banks of Kawakawa & Hokianga Rivers
Sophora microphylla	kowhai	AC	1826	
Tupeia antarctica (*Viscum pubigerum*)		AC		from trees on riverbanks in the BoI

8.6 GLOSSARY OF TERMS

Alluvial flats
Valley floor flat lands underlain by alluvial deposits.

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 the natural area. 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.

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.

Exotic
Introduced from outside New Zealand.

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

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.

Gumland
Land in northern New Zealand with infertile podzol soils originally formed under former kauri forests as indicated by the presence of kauri gum and roots, characterised by low shrub and sedgeland vegetation induced by repeated burning.

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

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.

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 what natural values are retained despite these factors, i.e. to what extent native species are functioning according to natural processes.

Podzol

A soil often formed in a wet temperate climate under forest. Characterised by very strong leaching, the development of a whitish-grey E horizon, usually underlain by B horizons enriched in iron, aluminum and organic matter.

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, *Eleocharis,* flax.

Refuge

Native bush enclaves in production pine forest become a refuge for some native species during the logging phase. For example, they allow 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, which is important in

Northland, with many streams having small catchments, the water temperature can rise depleting the available oxygen and leading to the death of aquatic life. Litter debris enters into the nutrient cycle with invertebrates like mayfly, caddisfly and stonefly feeding on it. Riparian vegetation 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*), cabbage tree 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, or rush-like sedges e.g. *Baumea, Juncus* (rush), *Carex*, *Schoenus, Isolepis, Bolboschoenus*.

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 plant communities in the process of succession.

Shrubland

Vegetation in which the canopy is dominated by indigenous woody plants less than 10cm 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.

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.

Some small habitats occurring in close geographical proximity, with similar characteristics and functions, have been grouped and adessed as one site e.g small broadleaf remnants.

Some large contiguous habitats have been subdivided into separate sites on the basis of catchment or vegetation type, for convenience of administration.

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. The colonisation of bare rock, or soil by algae and lichens ending with a stable climax community in equilibrium with the environment is primary successsion. 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 longterm 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 comprising trees which tolerate some degree of waterlogging, such as kahikatea, swamp maire, ribbonwood, cabbage tree 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-cabbage tree with putaputaweta, *Coprosma tenuicaulis*, and other divaricating shrubs.

Toeslope
The area at the base of a slope where debris and topsoil has accumulated and 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 longterm 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.

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